

**INDIGENOUS POST-HARVEST PRACTICES AND THEIR IMPLICATIONS ON
FOOD SECURITY IN ALEBTONG DISTRICT 1980-2022; A HISTORICAL
PERSPECTIVE**

BY

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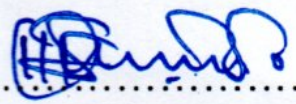
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**A RESEARCH DISSERTATION SUBMITTED TO THE DIRECTORATE OF
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DECLARATION

I, Ojok Sam Omara, affirm that the data confined in this research dissertation is my original work, to the best of my knowledge, and hence no part of this proposal has ever been submitted to any academic institution for the award of any degree.

Signature... 

Date... 

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APPROVAL

This is to certify that this research proposal titled “Indigenous Post-harvest Practices and their Implications on Food Security in Alebtong District 1980-2022; a Historical Perspective” has been under our close supervision and therefore, is ready for submission with our approval.

1. Dr. Agatha Alidri

Signature..  ..

Date..... 

2. Dr. Nuwategeka Expedito

Signature..  ..

Date..... 

DEDICATION

I dedicate this work to my late father John Ogwal my mother Eromalina Ogwal who gave life to me and opportunities to study, my wife Beatrice Ojok, children; Mercy, Ezra, Jonathan and Ezekiel for their unending support through the entire time of my studies and the course of this research. I also dedicate this work to all my friends who gave me the moral support.

ACKNOWLEDGEMENT

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TABLE OF CONTENTS

DECLARATION.....	i
APPROVAL	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
LIST OF ABBREVIATIONS	vi
LIST OF FIGURES	vii
GLOSSARY OF TERMS.....	viii
ABSTRACT.....	ix
CHAPTER ONE	1
INTRODUCTION AND BACKGROUND TO THE STUDY.....	1
1.0 Introduction.....	1
1.1 Background to the study	1
1.1.1 Historical background.....	1
1.1.2 Conceptual Background.....	7
1.1.3 Theoretical Background.....	10
1.1.4 Contextual Perspective.....	11
1.2 Problem Statement.....	12
1.3 Purpose of the Study	13
1.4 Objectives of the study.....	13
1.5 Research Questions.....	14
1.6 Scope of the study	14

1.6.1 Geographical Scope	14
1.6.2 Time scope	14
1.6.3 Content scope.....	15
1.7 Significance of the study.....	15
1.8 Justification of the study	16
1.9 Theoretical Framework.....	16
1.10 Conceptual framework.....	17
CHAPTER TWO	19
LITERATURE REVIEW	19
2.0 Introduction.....	19
2.1 The existing post-harvest food management practices related to the indigenous technologies	19
2.2 The historical trend of food security	21
2.3 The relationship between indigenous post-harvest food management practices and food security	22
2.4 Gaps in the literature	26
CHAPTER THREE.....	27
RESEARCH METHODOLOGY	27
3.0 Introduction.....	27
3.1 Research Approach	27
3.2 Research Design.....	27
3.3 Study Area	27

3.4 Study Population.....	28
3.5 Sample Size.....	28
3.6 Data Collection Methods	30
3.6.1 One-on-one Interviews.....	31
3.6.2 Key Informant Interviews	31
3.6.3 Focused Group Discussion	31
3.6.4 Ethnographic Observation	32
3.7 Data Analysis	32
3.8 Data collection Procedure	33
3.9 Limitations and Delimitations to the study	33
3.10 Ethical Considerations	34
CHAPTER FOUR.....	35
EXISTING POST-HARVEST FOOD MANAGEMENT PRACTICES RELATED TO THE INDIGENOUS TECHNOLOGIES OF THE LANGO IN ALEBTONG DISTRICT	35
4.0 Introduction.....	35
4.1 Lango Perception of indigenous knowledge in post-harvest food management	35
4.2 The existing post-harvest food management practices related to the indigenous technologies of the Lango in Alebtong District	39
4.3 Conclusion	43
CHAPTER FIVE	44
THE HISTORICAL TREND OF FOOD SECURITY IN ALEBTONG DISTRICT BETWEEN 1980 AND 2022.....	44

5.0 Introduction.....	44
5.1 Lango indigenous Perception of food security	44
5.2 The historical trend of food security in Alebtong District between 1980 and 2022.....	45
5.3 Conclusion	50
CHAPTER SIX	51
THE RELATIONSHIP BETWEEN THE OBSERVED INDIGENOUS POST- HARVEST MANAGEMENT PRACTICES AND FOOD SECURITY IN ALEBTONG DISTRICT	51
6.0 Introduction.....	51
6.1 The relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District.....	51
CHAPTER SEVEN.....	54
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	54
7.0 Introduction.....	54
7.1 Summary	54
7.1.1 Objective 1	54
7.1.2 Objective 2	54
7.1.3 Objective 3	55
7.2 Conclusions.....	55
7.3 Recommendations.....	56
7.4 Areas of further study	58
REFERENCES.....	59
APPENDICES	65

Appendix 1: Research work plan.....	65
Appendix 2: Research budget	66
Appendix 3. Letter of Introduction	68
Appendix 4: Oral interview guide.....	69
Appendix 5: Ethnographic observation guide.....	70
Appendix 6: Focus Group Discussion guide	71
Appendix 7: Informed consent form.....	72
Appendix 8. Statement of consent for photographs and video recordings	75
Appendix 9: List of figures	76

LIST OF ABBREVIATIONS

FAO – Food and Agricultural Organisation

FGD – Focus Group Discussion

GDP – Gross Domestic Product

IDP – Internally Displaced Persons

IFAD – International Fund for Agricultural Development

IK – Indigenous Knowledge

IPC – Integrated food security Phase Classification

LRA – Lord’s Resistance Army

NAADS – National Agriculture Advisory Services

PEAP – Poverty Eradication Action Plan

PMA – Plan for Modernisation of Agriculture

SDG – Strategic Development Goal

SSA – Sub-Saharan Africa

UBOS – Uganda Bureau of Statistics

UN – United Nations

WFP – World Food Program

WHO – World Health Organisation

LIST OF FIGURES

Figure 1: The Researcher involved in drying of freshly harvested maize	76
Figure 2: Freshly harvested simsim packed for drying.....	77
Figure 3: The Researcher smoking meat, a commonly used indigenous practice of preserving it among the Lango	78
Figure 4: Winnowing of rice as an indigenous practice of cleaning it just like other cereals and legumes	79
Figure 5 a: Granary (at the center), an indigenous method of storing food.....	80
Figure 6: An indigenous practice of hanging of maize inside and near cooking places for drying	82
Figure 7: The Researcher interviewing an elder on the concept of indigenous knowledge and food security among the Lango in Ajuri County, Alebtong District	83
Figure 8: The Researcher interviewing an elder on the relationship between the observed indigenous post-harvest food management practices and food security in Moroto County, Alebtong District.....	84
Figure 9: Traditional method of storing food in the pot eg; smoked meat, millet, sorghum, cassava and maize floor among the Lango in Alebtong District	85
Figure 10: Modern method of storing food in the sacks eg; rice, millet, sorghum, cassava and maize floor among the Lango in Alebtong District	86

GLOSSARY OF TERMS

Okwang mak wek anwong – (Catch until I get) A period when people are approaching real famine normally in month of May that whatever is planted cannot yield anything fruitful.

Odunge – a period of no food in most homes especially in the month of June.

Omaru – the harvesting month (July) for millet, beans and sweet potatoes planted in the month of April.

Otikok – The month of August when the disastrous famine is done.

Kidi-rego – Well-shaped stones used for threshing crops like millet and sorghum into flour.

Dero – Granary used for storing crops.

Tua – Silos placed in the house for storing seeds of the harvested crops especially legumes.

Kwon – Bread made from millet or sorghum.

Awak-Communal labour system

Ngec me Tekwaro – Indigenous knowledge.

ABSTRACT

This study explored the role of indigenous post-harvest practices on food security in Alebtong District from 1980 to 2022. It aimed to: (1) examine existing indigenous post-harvest food management practices among the Lango; (2) investigate the historical trend of food security in Alebtong District between 1980 and 2022; and (3) examine the relationship between these practices and food security. Using a qualitative historical research approach, participatory observations, semi-structured oral interviews (including 7 key informant interviews), and 4 focus group discussions (20 participants) were conducted with 77 participants (43 women, 34 men) aged 40-92 years. The findings reveal that traditional practices like threshing, winnowing, sun-drying, smoking, fermentation, and granary storage remain crucial for preserving food among the Lango. However, challenges such as pest infestation, climate change, and labor intensity limit their sustainability. The historical analysis reveals five distinct phases: conflict-induced food crisis (1980-1989); continued insecurity and humanitarian dependence (1990-1999); post-conflict recovery (2000-2009); modern agricultural transition (2010-2019); and climate-economic challenges (2020-2022). The 1980s “Kalodo” drought represents a pivotal famine event that fundamentally altered local food management strategies. The study concludes that indigenous practices demonstrate significant resilience value, and recommends integrating indigenous knowledge with modern technologies, implementing climate-smart agricultural training that builds on local knowledge, improving market access for preserved traditional foods, and developing district-level policies that recognize indigenous knowledge systems as outlined in NDPIII (2020/21-2024/2025) and SDG 4.7 on education for sustainable development.

Key words: Indigenous post-harvest practices, Food security, Alebtong District, Lango, Traditional food management

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.0 Introduction

These historical aspects of indigenous post-harvest practices and their implications on food security among the Lango people. The purpose was to explore the indigenous knowledge practices used in enhancing food security in Alebtong District, Lango sub-region. Despite the modern post-harvest interventions to improve food security among the Lango people, food crisis continues to persist. Chapter one provides an overview of the study, including the historical, conceptual, theoretical, and contextual background, the problem statement, the study's purpose, and its specific objectives. It also outlines the research questions, hypothesis, conceptual framework, significance, and justification of the study, as well as the scope and operational definitions of key concepts.

1.1 Background to the study

1.1.1 Historical background

1.1.1 a) Location of Alebtong

Alebtong District, located in the Lango Sub-region of Northern Uganda, is one of the youngest districts in the country, carved out of Lira District in 2010 as part of a decentralization effort to improve governance and service delivery. According to the Alebtong District Local Government Report (2020), the district geographically lies approximately 45 kilometers East of Lira City, bordered by Amuria District to the East, Otuke District to the North, Dokolo District to the South, and Kaberamaido District to the South-East. Alebtong covers a total area of about 1,728 square kilometers, comprising a mix of savanna grasslands and wetlands, which support agriculture and livestock rearing the main economic activities of its predominantly rural population. The district is home to the Lango ethnic group, whose rich cultural heritage is deeply tied to traditional farming practices and communal living (Uganda Bureau of

Statistics, 2021). Historically, Alebtong was affected by the Lord's Resistance Army (LRA) insurgency, which disrupted livelihoods and displaced communities, but the region has since made significant strides toward recovery and development (Oketch, 2021). The district's strategic location near Lira, a regional economic hub, positions it as an important area for trade and agriculture in Northern Uganda (Uganda Bureau of Statistics, 2021).

1.1.1 b) Climate, soil and vegetation

Alebtong District, located in the Lango Sub-region of Northern Uganda, has a tropical climate with clearly defined wet and dry seasons. According to NEMA (2021), the wet season generally lasts from March to November, with the heaviest rainfall occurring between April and October, while the dry season prevails from December to February. The district receives an average annual rainfall of 1,000 mm to 1,200 mm, making agriculture the key foundation of its residents' livelihood.

The soils in Alebtong are predominantly ferruginous loams, rich in iron and moderately fertile, making them suitable for cultivating staples like millet, sorghum, cassava, and groundnuts. However, pockets of sandy and less fertile soils exist, requiring sustainable farming practices to maintain productivity.

Vegetation in the district is predominantly savanna, interspersed with scattered woodlands and shrubs. This ecosystem supports both crop farming and livestock grazing, while wetland areas, which cover parts of the district, provide water sources and seasonal pastures. Historically, the vegetation has been under pressure from human activities like deforestation and charcoal burning, emphasizing the need for conservation efforts to sustain agricultural and ecological balance (Uganda Bureau of Statistics, 2021).

1.1.1 c) Origin, Migration and Settlement of the Lango People

According to Ogot (1999) the Lango people, an ethnic group in Northern Uganda, trace their origins to the Abyssinian Highlands (present-day Ethiopia), from where they are believed to have migrated centuries ago. Oral traditions and historical accounts suggest that their migration began around the 16th century and was driven by the search for fertile lands, security, and better living conditions. The Lango were part of a larger Nilotic migration, moving southward through the Nile Valley and believed to have initially settled in present-day Karamoja before moving further south and west due to pressure from the Karamojong and other Nilotic groups. They eventually settled in their present location in the Lango Sub-region. Along the way, they interacted with various ethnic groups, assimilating cultural practices while maintaining their unique identity (Atkinson, 2015).

By the 16th and 17th centuries, they had established settlements in the plains between Lake Kyoga and the Nile River. The fertile soils and savanna vegetation of this area were ideal for their agrarian lifestyle, which revolved around millet cultivation, livestock keeping, and fishing. Traditional governance structures, centered on clan systems and elders, facilitated social cohesion and resource management. Similarly, the Lango maintained strong cultural traditions, including the use of *wang oo* (evening fire discussions) to pass down knowledge, which remains a cornerstone of their identity. The migration and settlement of the Lango were not only a response to environmental and economic needs but also shaped by conflicts and alliances with neighboring groups, such as the Acholi and Iteso, influencing their eventual cultural and territorial consolidation (Ogot, 1999).

1.1.1 d) The organization of the Lango People in Alebtong

i) Political organization

The Lango people of Northern Uganda historically had a decentralized political organization characterized by clan-based governance. According to Ogot (1999), each clan (commonly known as *ot* or *kac*) operated autonomously under the leadership of a *won ot* (clan leader), whose authority stemmed from seniority and respect rather than formal coercive power. The clan leader, together with a council of elders (*won nyaci*), mediated disputes, maintained order, and presided over rituals. Decision-making was highly consultative, emphasizing consensus to maintain harmony within the community (Allen, 2019). This system was flexible, allowing for adaptation to external influences such as colonial rule and modernization, which introduced formal administrative structures while undermining traditional roles. Today, remnants of this organization persist in cultural practices and dispute resolution mechanisms, reflecting the resilience of indigenous governance amidst evolving socio-political contexts.

ii) Economic organization and indigenous economy

Economically, Allen (2019) and Atkinson (1994) observed that the organization of the Lango in Northern Uganda has traditionally been agrarian, with subsistence farming and livestock rearing forming the backbone of their livelihoods. Millet, sorghum, and cassava are staple crops, while cattle are not only a critical source of wealth but also central to social and cultural practices, such as marriage dowries (*ayit*). Land ownership is communal, managed by clans, and access is often determined by kinship ties. Division of labor is gendered, with men responsible for herding and clearing fields, while women handle planting, weeding, and food processing. Trade has historically been conducted through barter, although the colonial introduction of cash crops like cotton and the establishment of marketplaces integrated the Lango into regional and national economies. Over time, economic activities diversified,

incorporating wage labor and small-scale businesses, influenced by modernization, urbanization, and shifts in land tenure systems (Owiny, 2021).

iii) Social organization

The social organization of the Lango in Northern Uganda revolves around the clan (*ot*), which serves as the primary social unit and is integral to identity, inheritance, and social obligations (Allen, 2019). Membership in a clan is patrilineal, and individuals are expected to uphold the values and norms of their clan, fostering a sense of collective responsibility. Marriage alliances are exogamous, meaning members must marry outside their own clan, strengthening inter-clan relations and cohesion. Atkinson (1994) observed that gender roles are well-defined, with men traditionally responsible for herding cattle and providing security, while women manage household chores and agricultural activities. Age groups and kinship networks also play a significant role in defining social hierarchies and responsibilities, with elders (*Odonge*) being highly respected for their wisdom and guidance in communal matters. These traditional structures have persisted despite external influences, such as colonialism and modernization, which introduced changes like formal education and urbanization, subtly re-shaping Lango social dynamics (Owiny, 2021).

Historical evidence from various parts of the world highlights the significant role of indigenous knowledge in understanding disaster risks, preparing for disasters, mitigating their impacts, and implementing disaster-related plans (Hiwasaki et al., 2014; Nakashima, 2010). In some cases, indigenous knowledge has proven to be more effective than modern science and technology (Zhang et al., 2010; Basak et al., 2015; Dewan, 2015). Hence from the above observation, indigenous knowledge generally applies to all societal phenomena ranging from biological, physical, social, cultural, and spiritual systems.

In the African context, indigenous knowledge practices represent the most cherished heritage and values of any community, richly embedded in the African culture (Tirivangasi & Tayengwa, 2017). Indigenous knowledge is often viewed as inferior to modern science and technology due to its mechanisms being insufficiently explained or scientifically validated. Globally, this knowledge faces threats and is often seen as a temporary or alternative solution for developing poor areas where modern science and technology are unaffordable (Sillitoe, 1998). However, since indigenous knowledge embodies time-tested wisdom derived from nature, it offers the potential for more environmentally friendly solutions compared to modern approaches. Therefore, as Masekoameng and Molotja (2019) emphasize, it is crucial to uncover the rationales and processes underpinning indigenous knowledge, explore its implications, strengths, and limitations, and integrate it with contemporary science and technology.

Indigenous knowledge exists in both structural and non-structural forms. Structural knowledge refers to tangible, physically observable technical knowledge that represents the practical aspects of local expertise. In contrast, non-structural knowledge encompasses less visible elements, such as environmental, agricultural, socio-cultural, and historical insights (Dekens, 2007). Akullo et al. (2007) highlighted that the development of Indigenous Knowledge Systems, particularly in managing the natural environment, has been crucial for the survival of the communities that created them. These systems are built over time, reflecting generations of experience, keen observations, and trial-and-error experimentation. This is evident in many African communities, where Indigenous Knowledge Systems have been passed down from one generation to the next.

Among the many applications of indigenous knowledge is oral narratives, cosmological observations and modes of reckoning time, planting and harvesting techniques, communication modes and symbols, food security, hunting and food gathering skills, manufacture of specialized tools and technologies like pottery, and so on (Bruchac, 2014; p.3). Specifically

among the Lango in Northern Uganda, existing studies for example, Odora-Hoppers (2002) indicate that indigenous knowledge (IK) among the Lango community is generated through various dynamic processes rooted in their cultural and social systems. These include oral transmission, observation, practice, and interaction with the environment and spiritual realms. Precisely, oral traditions form a significant avenue for generating and transmitting knowledge among the Lango. Elders and knowledgeable members of the community use stories, proverbs, and songs to educate the younger generations about agricultural practices, weather patterns, and social norms. These oral narratives often encode practical wisdom and ethical guidance relevant to survival and communal harmony. In this context, the research focused on food security, particularly through the application of post-harvest management practices such as cleaning, packaging, and storage.

1.1.2 Conceptual Background

1.1.2 a) Conceptualizing Indigenous Knowledge

Indigenous knowledge and cultural practices are culture specific. It is important to historicize and contextualize contemporary cultural and indigenous knowledge and practices to appreciate their role and significance to people. Across the globe, peoples from different cultures and traditional settings have demonstrated diverse understanding of phenomena around them, based on their experiences, which have over time guided relations among humans, non-humans as well as other human beings in given ecosystems (Bruchac, 2014; pp.2-3). It is upon such understanding and relations that indigenous knowledge is built.

Indigenous Knowledge has no single agreed definition and meaning. There have been rejections and acceptance of the meaning of the term indigenous knowledge (Alidri, 2016). Warren (1991) defines it as the knowledge used by people to earn a living in a specific environment. Also, it means a body of knowledge built up by a group of people through generations of living in close contact with nature (Johnson, 1992 pp. 319 –331). Hiwasaki et al. (2014) in the same thinking define indigenous knowledge as understandings, skills, and

philosophies developed by local communities with long histories and experiences of interaction with their natural surroundings. Alidri (2016) asserts that indigenous knowledge is the recognized traditional customs, beliefs, opinions, and practices of a people passed down through generations (Alidri 2016; p.1). In this context therefore, it can generally mean traditional knowledge that embeds traditional opinions, oral and written knowledge, inventions, beliefs and practices that enhance sustainability and the responsible stewardship of cultural and natural resources through relationships between humans and their landscape.

According to UNSECO (2017), indigenous knowledge encompasses the insights, skills, and philosophies cultivated by communities with deep-rooted connections to their natural environment. For rural and indigenous populations, this local knowledge guides decisions on essential aspects of daily life. Equally, Warren (1991) defined indigenous knowledge as the local knowledge that is unique to a culture or society. It is the basis for agriculture, healthcare, food preparation, education, and a myriad of other activities. The systems of indigenous knowledge are adaptive, dynamic, and capable of developing new information from outside sources.

The above observation is similar to the observation by Dei (2000), who contends that indigenous knowledge is the epistemologies that arise from the lived experiences and histories of indigenous people. It is a way of understanding that reflects the social, cultural, and ecological contexts of a people and serves to guide the way they live and interact with their environment. From the above definitions of indigenous knowledge, this study contends that indigenous knowledge is the exclusive, ordinary knowledge and practices developed by indigenous communities over generations through their interaction with the natural environment. It encompasses skills, technologies, beliefs, and cultural practices that are specific to a particular group of people and their local environment. Indigenous knowledge is often transmitted orally and through daily practices, and it plays a crucial role in sustainable

resource management, agriculture, health practices, and the preservation of biodiversity. This knowledge system is adaptive, dynamic, and constantly evolving, shaped by the community's experience, innovations, and interactions with their surroundings.

1.1.2 b) **Conceptualizing Food Security**

It is important to unpack the term 'Food security' which is understood in diverse ways by different scholars and communities. The Food and Agriculture Organization (FAO) (2008) and Dilley & Boudreau (2001) define 'food security' as a condition where all individuals, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life. In a similar vein, FAO (2009) outlines food security through four key dimensions: availability, access, utilization, and stability. A community is considered food-secure when all these dimensions are fulfilled, in line with Sustainable Development Goal 2 (SDG 2), which aims to eradicate hunger and malnutrition globally by 2030. This study adopts FAO's framework for defining food security.

In Uganda, despite the growing threat to food production due to climate change and its extreme impacts, such as floods and severe droughts, a report by UBOS (2019) indicated that food access and availability, especially in Northern Uganda, had improved and is expected to stay stable in the coming years. This improvement is partly attributed to favorable climatic conditions, as households have returned to their original homes and are actively involved in agricultural production. Therefore, as a way of promoting sustainable food security, people in their local communities have over time valued their indigenous knowledge practices related to food security (Warren & Rajasekaran, 1993; Maila, 2007; A-Magid, 2011), and mostly on local post-harvest food management practices like pre-cooling after harvest, cleaning, sorting and proper packaging for final storage (Kolawole, 2005). This has been the similar case with Alebtong District upon which this study is focused.

1.1.3 Theoretical Background

Alidri (2016) argues that both environmentalists and scholars have raised concerns about the relevance of traditional practices in modern society (Alidri, 2016; p.1). While these practices are often viewed as detrimental to post-harvest food management, research has shown that traditional methods of managing food resources remain valuable for ensuring food security. In response to the ongoing discussions, this study examines traditional post-harvest food management practices and their implications for food security.

Mwaniki (2006) identifies Africa's underdeveloped agricultural sector as the primary challenge to food security. This sector is marked by excessive dependence on primary agriculture, low soil fertility, limited use of external farm inputs, environmental degradation, substantial food crop losses both before and after harvest, minimal value addition and product differentiation, and inadequate food storage and preservation, all of which contribute to significant price fluctuations in commodities (Mwaniki, 2006, p.3). However, contemporary scholars do not examine how precolonial indigenous societies managed to ensure food security without the use of modern agricultural practices.

Sasson (2012) emphasizes that food insecurity remains a significant global issue, with 1 billion people suffering from starvation, under-nutrition, and malnutrition. In sub-Saharan Africa, approximately 239 million people are affected by hunger, and this number is expected to rise in the near future. This challenge has sparked global initiatives, as reflected in SDG 2, which seeks to eliminate hunger, ensure food security, enhance nutrition, and promote sustainable agriculture by 2030. Sub-Saharan Africa faces numerous examples of food insecurity, some reaching disastrous levels, particularly in regions like the Horn of Africa and Southern Madagascar.

Food insecurity is not just about insufficient food production, availability, or consumption; it also involves the poor quality or nutritional content of the food (Sasson, 2012, p.1). Okoye et al. (2017) noted that despite Africa's vast arable land, which has the potential to feed its growing population and beyond, it remains the most food-insecure continent. A significant factor contributing to food and nutrition insecurity in West African developing countries is the high level of post-harvest food losses, primarily due to inadequate preservation methods. These losses, combined with seasonal food shortages and malnutrition-related diseases, continue to pose major challenges (Okoye et al., 2017, p.1).

1.1.4 Contextual Perspective

Indigenous Knowledge (IK), traditionally known as “Ngec me tekwaro” among the Lango, has for long been an integral part for maintaining and strengthening sustainable livelihood opportunities in Lango sub-region, Alebtong District. Indigenous Knowledge is socio-economically affordable, sustainable, involves minimum risk to rural farmers and producers, and it is better for conserving natural resources. Indigenous Knowledge in rural communities of Alebtong has supported agricultural practices be productive and environmentally sustainable even under extremely challenging conditions. Despite interferences from the colonial and post-colonial practices and systems, it remains highly practiced in rural communities.

Food security in Lango sub-region since colonial time has been well managed; the region has fertile soil that allow goods crop yields. The insufficient rainfall in May leads to moisture shortages for crops, often causing delayed and below-average harvests, particularly in Northern Uganda (Uganda Food Security Outlook, 2021).

In 1980, when the sub-region experienced the longest ever dry spell, there was changing trend in food production and storage. This dry spell was called “Kalodo” which literally meant the remnants of sorghum in the garden, which the farmers harvested by sweeping from the ground after the drought had destroyed all the meaningful harvest. Owing to consistently inadequate

rainfall from March to May, the first season harvests in much of Greater Northern Uganda have been delayed and below average. Farmers have begun shifting from food crops to cash crops, leading to low incomes for many poor rural households from crop sales and other sources (Uganda Food Security Outlook, 2021).

From 1990, a decade after the drought, the community began to adopt modern ways of food storage like parking in sacks, pots, stores and others (Muriisa, 2019). These methods of food storage proved ineffective for longer storage. Currently, communities are shifting from food production to cash crops, therefore producing more high value and yielding crops like soya beans, cotton, sunflowers, and sim-sim among others (Mpiima et al., 2019). There is rampant stealing of food crops right from the garden before even harvest time. People are depending on market which is contrary to what used to be in the past where market dealers would move to buy from the communities of Alebtong.

It is still evident that food insecurity still manifests in Lango Sub-region, despite government effort to improve on food security through government programs at the sub-counties level (Uganda Food Security Outlook, 2021). It is noted that there is a shift from indigenous knowledge system in food security to scientific and modern ways of ensuring food security yet still the sub-region suffers high levels of household food insecurity. Local knowledge on the types of food to be produced, the time of production, consumption and preservation modalities were very effective in ensuring food security in the region over the years (Mpiima et al., 2019). Therefore, the study intended to explore the subject in order to appreciate indigenous practices and how they relate to food security in terms of physical accessibility and storage.

1.2 Problem Statement

Globally, food security remains a critical determinant of societal well-being. Examining the historical trajectory of African societies, indigenous knowledge is reflected in effective food security strategies, including practices like crop rotation, integrated pest management, safe

food storage, and a strong focus on cultivating food crops (Gravani, 2009). Modernization of agriculture and post-harvest handling is expected to improve food security. However, despite modernization and gradual transitions from traditional to modern ways of life, rural areas that historically served as food baskets have now become dependent upon urban food supplies.

The central paradox this study addresses is that the modernization of agriculture for sustainable food security has not achieved its intended purpose in the Lango sub-region. Indigenous post-harvest practices and knowledge are progressively weakening, yet food security has not correspondingly improved; more families cannot afford the traditional three meals in a day (Mpiima et al., 2019). This suggests that the wholesale displacement of indigenous practices without effective replacement may be partly responsible for persistent food insecurity. What remains under-researched is a systematic historical analysis of how indigenous post-harvest practices actually functioned to ensure food security in the Lango context before widespread modernization, and what specific lessons contemporary policy might draw from this historical record. This study therefore investigates the Lango traditional post-harvest food management practices and strategies that were based on indigenous knowledge to ensure food security in Alebtong District, with explicit attention to temporal changes between 1980 and 2022.

1.3 Purpose of the Study

To explore the indigenous knowledge practices used in post-harvest handling to enhance food security in Alebtong District, Lango sub-region.

1.4 Objectives of the study

To explore the existing indigenous technologies in post-harvest food management practices among the Lango in Alebtong District.

To investigate the historical trend of food security in Alebtong District between 1980 and 2022.

To examine the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District.

1.5 Research Questions

- i. What are the existing indigenous technologies in post-harvest food management practices among the Lango in Alebtong District?
- ii. What is the historical trend of food security in Alebtong District between 1980 and 2022?
- iii. What is the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District?

1.6 Scope of the study

1.6.1 Geographical Scope

The research was carried out in Alebtong District, located in the Lango sub-region of Northern Uganda. The district includes Moroto County, which has four sub-counties and one Town Council, as well as Ajuri County, which consists of six sub-counties, covering a total area of approximately 1,528 km². The district's name comes from the Lango word "tong," meaning spear. The primary economic activities in the district are trade, crop farming, and livestock rearing. Consequently, this study was conducted in the two counties of Moroto and Ajuri to examine the phenomenon under investigation.

1.6.2 Time scope

The study covered the period from 1980 to 2022. This timing was purposively made, so as to historicize the existing post-harvest indigenous technologies and practices, statuses and implications of the observed indigenous practices on food security in Lango, following the independence period of the country, war and post war periods in Lango Sub- region and Alebtong District in particular.

1.6.3 Content scope

This was a historical study which was limited to exploring indigenous knowledge practices and their contributions to food security among the Lango people in Alebtong District from 1980 to 2022. The study explored the contemporary practices and how they have affected indigenous knowledge practices and food security in the Lango sub-region as well.

1.7 Significance of the study

This study is important because it provides valuable knowledge and insights that the Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF) can use to promote effective food security practices and prioritize funding for agricultural methods that are easily manageable for the country's farming population. Specifically, the study aligns with Sustainable Development Goal 4.7, which emphasizes education for sustainable development and the appreciation of cultural diversity and indigenous knowledge systems. By documenting and validating indigenous post-harvest practices, this research contributes to the mandate of SDG 4.7 to promote knowledge and skills that support sustainable lifestyles, human rights, gender equality, and cultural diversity.

Furthermore, this research directly supports Uganda's National Development Plan III (NDPIII 2020/21-2024/2025), which identifies agro-industrialization as a key strategic priority and explicitly recognizes the need to integrate indigenous knowledge systems into agricultural extension services. The NDPIII framework emphasizes "commercial agriculture with industrial value addition" while acknowledging that "indigenous knowledge practices remain relevant for household food security." This study provides evidence-based recommendations for operationalizing this dual approach.

Additionally, the knowledge generated will act as a guiding tool for the Ministry of Education and Sports (MoES) on curriculum changes that value and promote indigenous knowledge in

agriculture and food security. It will help the Local Government of Alebtong District find lasting solutions to alarming household food insecurity, increase stakeholder involvement in community preparedness, and serve as a reference for future researchers.

1.8 Justification of the study

This study was justifiable because it arranged for research-based evidence towards enhancing:

Cultural Preservation: Alebtong District, like many other regions in Uganda, has a rich cultural heritage, including traditional post-harvest practices passed down through generations. Investigating these indigenous practices not only helps preserve cultural traditions but also sheds light on the historical context of food security in the region.

Food Security Concerns: Food security remains a critical issue in many parts of Uganda, including Alebtong District. Understanding how indigenous post-harvest practices have contributed to or hindered food security over time can provide valuable insights for policymakers and local communities striving to address food insecurity.

Sustainability: Indigenous post-harvest practices are often rooted in sustainable agricultural methods that utilize local resources and minimize waste. Analyzing these practices from a historical perspective enables us to evaluate their sustainability and resilience in response to shifting environmental and socio-economic conditions.

Community Empowerment: By documenting and analyzing indigenous post-harvest practices, this research can empower local communities to reclaim and revitalize traditional knowledge and techniques. This can contribute to community resilience and self-reliance in food production and storage.

1.9 Theoretical Framework

This study adopted the historical Reconstructionism theory which discovers the unique past as it actually was as advanced by Booth, D. (2004, pp.54-58). According to Booth,

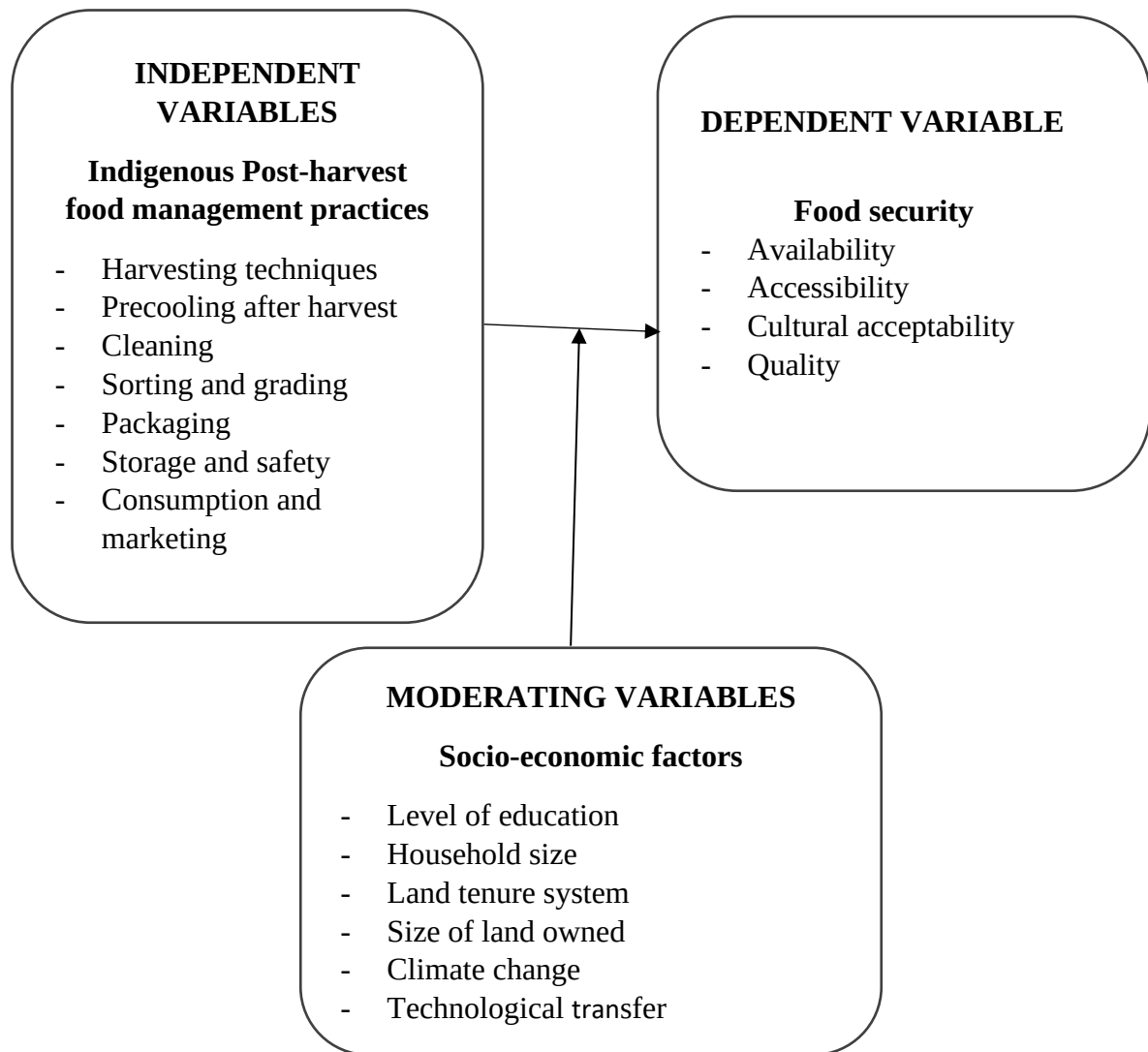
Reconstructionism accepts historical evidence as proof that the past can be recovered, views the past as fixed, and sees the past as yielding knowledge about the development of the present. Therefore, regarded the present as an unproblematic platform from which to look back into the past. It further assumed that traditional forms of representation are transparent and preserve the objectivity of observation (Booth, D. 2004, p. 52).

This theory, therefore, emphasizes the importance of reconstructing historical narratives from multiple perspectives, including those of indigenous communities, to gain a more comprehensive understanding of past events and their present-day implications. By centering on indigenous perspectives, revisiting historical narratives, understanding continuities and changes, contextualizing food security challenges, and empowering indigenous communities, this research will be able to gain a more nuanced understanding of the historical roots of food security in the region and develop more operational approaches for promoting supportable food systems.

1.10 Conceptual framework

The conceptual framework below illustrates the diagrammatic relationship between the independent variable (post-harvest food management practices) and the dependent variable (food security). On the other hand, the vertical arrow originating from the moderating variable shows those factors such as level of education, household size, land tenure system, size of land owned, and climate change also influences the relationship. The central idea of concern is that indigenous knowledge on post-harvest food management practices has a great influence on changing trend in food security as shown in Figure1.

Fig. 1. Conceptual framework



Source: Own conceptualization

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presented a review of relevant research studies and documents related to the topic under investigation. It is structured thematically, aligning with the study's objectives, and covers discussions on the following areas: current post-harvest food management practices linked to indigenous technologies of the Lango in Alebtong District; the historical trends of food security in Alebtong District from 1980 to 2022; and the connection between indigenous post-harvest food management practices and food security in the district. The chapter also identifies key knowledge issues, debates in the literature, research gaps, and the methodological, theoretical, and content strengths and gaps addressed by the study.

2.1 The existing post-harvest food management practices related to the indigenous technologies

Existing studies on indigenous technologies demonstrate that indigenous people possess cumulative knowledge that has evolved through inter-generational transmission. Barasa (2007, p. 45) defines indigenous technologies as “holistic, scientific knowledge of a people, land, natural resources, and environmental development over time resulting from the inter-relationship of the people and their natural environment.” This definition emphasizes that each community’s unique indigenous technology emerges from specific cultural and environmental contexts, thereby shaping decision-making processes to address common problems.

In the context of agriculture and post-harvest food management, these indigenous technologies operate within highly context-dependent agricultural systems, where practices rely on natural occurrences some of which communities regard as difficult to predict (Jha, 2008). Thus, land use practices depend on generational experiences, familiar experiments, and understanding of

the biophysical and socio-cultural environment. According to FAO (2010), post-harvest in agriculture encompasses activities executed after removing crops from the field. FAO (2009) and Bourne (1977) add that these activities include both technical operations (drying, threshing, cleaning, storage, processing) and economic ones (transportation, marketing, quality control, administration, management). These studies indicate that indigenous post-harvest management practices can be environmentally friendly and healthy when properly maintained.

Recent scholarship has strengthened the evidence base for indigenous food preservation. Abass et al. (2014), in a multi-country study across sub-Saharan Africa, found that traditional storage methods reduced post-harvest losses by 15-25% compared to no storage interventions. Similarly, Ng'ang'a et al. (2021) documented that indigenous storage structures using local materials proved as effective as modern methods in semi-arid environments of East Africa, with the added benefit of being economically accessible to smallholder farmers.

Globally, post-harvest food management practices can be traditional or modern and are commonly implemented to ensure food security, depending on community needs. Although global food production has increased to feed approximately 7 billion people, about 800 million remain affected by poverty and hunger, with one-third of all food meant for human consumption lost or wasted. This food insecurity can be attributed partly to post-harvest food loss at the household level (UN-FAO, 2011). The same study reports that 40% of food harvest in many developing countries is lost within the first three months after harvest, primarily to pests, insects, moisture, and mould, causing approximately 20 million metric tons of annual loss, especially in Sub-Saharan Africa.

Costa (2014) adds that insufficient drying, poor processing, and inadequate storage greatly impact the nutrition, health, and finances of both consumers and farmers, particularly women who are most involved in post-harvest activities. However, Costa (2014) and Gitonga et al. (2012) argue that these losses arise from poor maintenance of indigenous practices, suggesting

that improved food management practices can reduce post-harvest losses and food contamination while improving family nutrition, farmer productivity, and household incomes. This perspective requires critical examination, as it assumes indigenous practices are inherently deficient rather than recognizing their rational adaptation to local conditions, a limitation this historical study addresses.

2.2 The historical trend of food security

Food security means that all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food meeting their dietary needs and food preferences for an active and healthy life (Nakai, 2018). Ensuring food security has been a global challenge for centuries, and several strategies have been proposed to address it. Sustainable Development Goal 2.1 aims to end hunger by 2030 and calls for joint global action (Ogwal et al., 2020).

Historical perspective on food security in Africa: In pre-colonial Africa, food security was largely driven by indigenous agricultural practices and knowledge systems adapted to local ecological conditions. However, during the colonial period, food security became destabilized due to the introduction of cash crops like coffee and cotton, which displaced traditional food crops and contributed to periods of famine. Colonial policies that prioritized exports over local food production undermined traditional systems of food security and created lasting challenges (Mandala, 2005). This historical pattern is relevant to understanding the Lango experience, where similar dynamics of agricultural transformation have occurred.

In Sub-Saharan Africa (SSA), food insecurity has been escalating. The Food and Agriculture Organization (FAO, 2003) estimated that malnourished individuals in SSA grew from 165.5 million in 1990-92 to 198.4 million in 1999-2001. Recent studies examining food insecurity in South Africa and Senegal (Drysedale & Bob, 2020; Akpaki et al., 2020) align with this trend.

In East Africa, particularly Uganda, despite efforts to enhance food security, challenges such as low agricultural productivity persist (Mayanja et al., 2020).

In Uganda, nearly 80% of households engage in agriculture (Uganda Bureau of Statistics, 2016). The agricultural sector contributes over 70% of export earnings (World Bank, 2016) and accounts for 26% of GDP in the 2013/2014 fiscal year (MAAIF, 2015c). However, the sector is dominated by smallholder farmers (85% of the agricultural population) who produce the bulk of the country's crops and livestock (Balya, 2010). Challenges to food security, including high costs and limited access to improved inputs and production technologies, hinder agricultural productivity (Masaba, 2014).

2.3 The relationship between indigenous post-harvest food management practices and food security

In many parts of Sub-Saharan Africa, food contamination is a significant issue, presenting a major threat to food security in the region. Therefore, efforts to enhance post-harvest management skills among low-income farmers can not only improve crop preservation and increase food availability for consumption and trade but also have a direct positive impact on the health and well-being of people in the region. One of the most common food-related health risks is food poisoning caused by toxic aflatoxin contamination. Aflatoxins are highly carcinogenic toxins produced by the fungus *Aspergillus flavus* (Lawley, 2013).

Aflatoxins are naturally occurring toxic substances, especially prevalent in maize, and become a significant concern when crops come into contact with soil during harvesting, threshing, and drying. Contamination can also occur after grain is stored, due to pest infestations and poor storage conditions that promote the rapid growth of *Aspergillus* fungi. Aflatoxins are invisible, odorless, tasteless, and can only be detected through laboratory testing (IFPRI, 2010). Numerous studies have highlighted the harmful effects of this fungus on maize crops. For instance, the World Health Organization links aflatoxins to liver cancer, weakened immune

systems, stunted growth in children, and considers them the third leading cause of cancer-related deaths globally (WHO, 2008). This issue has become widespread across Africa, particularly in East Africa, with poisoning reaching epidemic levels. The traditional practice of storing dried crops on the floor, in baskets, or in polypropylene sacks within homes, driven by concerns like theft, increases the risk of food losses.

Interestingly, Uganda at national level is considered food secure. The disposal of food at this level, however, does not necessarily replicate the food security situation at the local level. In addition, sufficient food production in a given region does not automatically mean that all who need food can acquire food. This is clearly reflected in regions for example, Northern Uganda over the years, where households are confronted with temporal or permanent food insecurity (Bahiigwa, 1999). This explains why in attempts to improve people's livelihoods, the Ugandan government put in place the Plan for the Modernisation of Agriculture (PMA), a strategic framework well thought for eradicating rural poverty through transforming subsistence farming into a self-motivated and profitable commercial agricultural sector.

The PMA was put in place with mainly four goals: (a) to increase household incomes and improve the quality of life of farmers through increased agricultural productivity, (b) to improve household food security through markets rather than food self-sufficiency, (c) to provide off-farm and non-agricultural employment through processing and value adding, and (d) to promote the sustainable use of natural resources through the promotion of environmentally friendly technologies. The PMA was part of Uganda's Poverty Eradication Action Plan (PEAP) that aimed at reducing the share of people living in absolute poverty to less than 10 percent by the year 2017 (MFPED, 2000). This however seemed not to yield its total intended results, as reflected in the year 2002/2003, where approximately 42 percent of the rural population still continued to live in absolute poverty (UBOS, 2003).

Given that most Ugandan farmers are involved in small-scale production at the household level, they are typically low-income and have limited resources to manage storage losses caused by pests. Insects, rodents, and birds are the leading natural causes of crop losses in Uganda, and without timely interventions, this will likely continue to result in further losses for farming households. Poor handling practices also play a significant role in these losses. For example, in 2011, the World Bank, in collaboration with FAO and NRI, published a crucial industry study that described the value chain of agricultural production, which includes activities such as harvesting, assembling, drying, threshing, storage, transportation, and marketing. Inefficient post-harvest handling and management practices throughout this value chain expose crops to contamination by microorganisms, chemicals, excessive moisture, temperature fluctuations, and mechanical damage, all of which significantly contribute to food losses (Zorya et al., 2011).

Crop damage and spillage, particularly of legumes, during the initial transportation process is a common issue across Uganda. Additional damage often occurs during the threshing process, where the beating of the grain can crack or break the protective outer shell, providing an entry point for insects and mold during storage. Another significant problem is insufficient drying of crops before storage. Retaining high moisture content leads to temperature buildup due to respiration, which in turn promotes increased insect and fungal activity. This heating results in moisture condensation within the stored grain, creating a conducive environment for further fungal growth and insect infestation if the crops are poorly stored (Imura & Sinha, 1989).

Lastly, at what is arguably the most critical stage of the post-harvest value chain household storage deterioration of grain quality is unavoidable. Traditional storage methods such as granaries, cribs, and open-air holding units may offer some natural ventilation for additional drying of crops, but they provide minimal protection against insects, rodents, and birds. Additionally, repeatedly using the same wooden storage structures each year, where insects can hibernate and continue feeding on the wood, leads to an ongoing cycle of infestation. These

are common practices in Ugandan communities for example in the Eastern and Northern regions in particular, explaining one of the probable reasons why they continuously lack consistent food security in the country (Ogwal et al., 2020). Therefore, if attempts are directed towards ensuring sensitive indigenous knowledge post-harvest food management practices, alongside the modern practices, food security in Uganda and Northern Ugandan households in particular, cases of food insecurity arising from related poor handling practices would be reduced.

Regarding the contribution of indigenous knowledge post-harvest technologies and practices, existing literature indicates that such practices have significantly contributed to food security in various communities across the globe, particularly in regions that rely on traditional agricultural systems. Specifically, they reduce post-harvest losses, as methods for storing crops, such as using granaries, underground pits, and natural preservatives like ash and leaves, have been instrumental in minimizing post-harvest losses. These techniques have helped smallholder farmers store grains, cereals, and legumes for longer periods, reducing the risks of food shortages, especially during lean seasons (Abass et al., 2014). Equally, indigenous food processing methods such as fermentation, drying, and smoking help in preserving the nutritional content of foods like fish, fruits, and grains. These techniques extend shelf life while maintaining essential nutrients, contributing to household nutrition security (Lykke et al., 2019). Further studies indicate that indigenous post-harvest practices are typically low-cost, environmentally sustainable, and culturally accepted. They promote resilience by allowing communities to adapt to local environmental and climatic conditions. For instance, in parts of East Africa, the use of local materials for constructing food storage structures has proven to be effective and sustainable over time (Ng'ang'a et al., 2021).

2.4 Gaps in the literature

The literature review reveals several critical gaps that this study addresses:

Content gaps: Most studies on post-harvest storage in Uganda have focused on encouraging farmers to adopt modern agricultural inputs and techniques, with less attention to documenting and understanding indigenous food management practices at household level. Specifically, no systematic historical study has examined how Lango indigenous post-harvest practices functioned during the period 1980-2022, including during the LRA conflict and post-conflict recovery periods.

Temporal gaps: Existing research lacks longitudinal analysis of how indigenous practices have changed over time in response to conflict, climate variability, and modernization. Most studies provide cross-sectional data without historical depth.

Methodological gaps: Previous research has predominantly used quantitative surveys rather than qualitative historical methods that capture lived experiences and inter-generational knowledge transfer. The perspectives of elderly knowledge holders, the primary repositories of indigenous knowledge, have been underrepresented.

Theoretical gaps: Scholarship has not adequately theorized the relationship between indigenous knowledge systems and food security within contexts of violent conflict. This study addresses this through the historical reconstructionism framework.

This study, therefore, contributes original knowledge by documenting indigenous post-harvest practices among the Lango, analyzing their historical trajectory from 1980 to 2022, and examining their relationship to food security using qualitative historical methods that privilege local voices and lived experiences.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents an overview of the materials, methods, and approaches employed in the study. It details the research design, study area, target population, sample size, data collection methods and procedures, instruments used for data collection, and the data analysis process. Furthermore, it highlights the study's limitations and delimitations and addresses the ethical considerations undertaken during the research.

3.1 Research Approach

This study adopted the qualitative research approach to explore the participants' experiences, opinions, practices, feelings, beliefs, and values. Based on the Reconstructionism theory, the qualitative approach was suited to using participants' past experiences to reconstruct indigenous knowledge on post-harvest management and its implications on food security.

3.2 Research Design

The study adopted a historical and ethnographic design, deemed the most suitable method for exploring and addressing the research questions through a qualitative approach grounded in historical paradigms. According to Malunda and Atwebembeire (2021), this approach is rooted in constructivist paradigms, which emphasize the socially constructed nature of realities and their attributes, highlighting the importance of understanding people's opinions, attitudes, and beliefs.

3.3 Study Area

This study was carried out in Alebtong District, located in the Lango Sub-region of Northern Uganda. This district is made up of 2 counties, 10 sub-counties, 3 town councils, 35 parishes and 577 villages. The study covered the two Counties in the district, to generate data on the phenomenon under study. This area was purposively chosen because it is inhabited by

indigenous Langi people, with a history of indigenous knowledge in post-harvest handling, and people still largely practice agriculture.

Figure 3.1. The map below shows the study area:



3.4 Study Population

The study relied on a population comprising residents of Alebtong District, both male and female farmers, household heads, cultural leaders, as well as some political leaders as key informants of the study.

3.5 Sample Size

The study utilized a non-statistical approach to determine the sample size. The final sample size was guided by the saturation point, which occurs when no additional information or new data is obtained from participants (Guest et al., 2006; Saunders et al., 2018). Households included in the study were purposefully selected during the field scouting phase conducted before the main fieldwork.

Sample size: The study engaged 77 participants in total. This number was determined by the point at which responses no longer yielded new insights (saturation). Following the guidance of Guest et al. (2006), who found that saturation in homogeneous populations often occurs within 12 interviews, and Saunders et al. (2018), who emphasize that saturation should guide sample size determination in qualitative research, this study continued data collection until: (a) no new indigenous practices were identified, (b) participant accounts of historical trends became repetitive, and (c) the research team confirmed that additional interviews were not generating novel information. This was achieved at 77 participants across all data collection methods.

Generally, while the sample size (n=77) represents the number of participants, the sampling techniques employed were: (1) purposive sampling for key informants and household heads with specific knowledge criteria; (2) snowball sampling, where initial participants referred other knowledgeable community members; and (3) maximum variation sampling to ensure representation across age, gender, and geographic location within the two counties. These techniques are distinct from the sample size determination, which was guided by saturation. The composition of participants is detailed in Table 1 below:

Table 1: Participant Composition

Participant Category	Number	Gender Distribution	Age Range	Selection Criteria
Oral interview participants (household heads)	50	28 women, 22 men	40-92 years	Knowledge of indigenous practices; residency in study area for >30 years
Key informant interviews	17	8 women, 9 men	45-85 years	Specific expertise (cultural leaders,

				political leaders, extension officers)
- Cultural leaders	5	2 women, 3 men	55-85 years	Recognized clan authority; knowledge of traditional food systems
- Political leaders	5	2 women, 3 men	45-70 years	District or sub-county position; agricultural portfolio
- Agricultural extension officers	7	4 women, 3 men	40-60 years	Working in study area for >5 years
Focus Group Discussion participants	20	10 women, 10 men	40-80 years	Organized into 4 groups of 5 (2 women's groups, 2 men's groups)
TOTAL	77	43 women (56%), 34 men (44%)	40-92 years	

3.6 Data Collection Methods

This research, grounded in a historical-ethnographic framework, combined methods and approaches from anthropology and history. This methodology was particularly well-suited for exploring people's attitudes, behaviors, beliefs, opinions, experiences, and priorities, as highlighted by Merriam and Tisdell (2016). The primary tools for data collection included participatory observations, semi-structured oral interviews (including key informant interviews), and focus group discussions. Additionally, the study made extensive use of secondary literature, focusing on indigenous post-harvest food management practices,

particularly in Sub-Saharan Africa, Northern Uganda, and the Lango Sub-region, as well as literature on food security, its definition, processes, and associated benefits.

3.6.1 One-on-one Interviews

In-depth one-on-one oral interviews were also used, involving 50 participants. Individual interviews with the study participants required informed consent (as did the focus group discussions) and were conducted in the language of the participant's choice, with a translator if necessary. The interviews, which lasted up to 60 minutes, followed a semi-structured format, giving respondents the freedom to express themselves openly while ensuring the researcher covered specific pre-prepared questions for consistent data collection. With the respondents' consent, the interviews were audio-recorded; otherwise, the researcher relied on note-taking and promptly wrote a memory log after the session. All interviews were transcribed for data analysis, which was conducted using appropriate qualitative analysis tools, including Excel and Word.

3.6.2 Key Informant Interviews

In-depth oral key informant interviews were also used, involving 7 Agricultural extension officers who work within the area of study. These were purposively chosen due to their experience of agriculture and food security situations in the region.

3.6.3 Focused Group Discussion

Focus group discussions (FGD) involving 20 participants was conducted. The FGDs involved groups of only men and only women above 40 years. The consideration of separate FGDs for men and women was purposely done to ensure that they respectively talk freely about their households' indigenous knowledge practices and food security situations. Equally, the consideration of men and women above 40 years was to enrich the study with deeper understanding of the phenomenon under study from their lived experiences. Specifically, 2 FGDs were conducted in each County, totaling to 4 FGDs for the whole study. Each FGD

involved 5 participants, totaling to 20 participants for the whole study. This approach aimed to minimize potential challenges in the study, recognizing that men and women might feel more at ease and open to sharing their thoughts when the opposite gender is not present. The focus group discussions (FGDs) provided valuable insights into local perspectives on food security, specific indigenous knowledge practices, historical and cultural understanding, and the gender roles and labor division associated with indigenous knowledge.

3.6.4 Ethnographic Observation

Data collection was conducted through participant ethnographic observation, which implies long-term immersive fieldwork. This helped the researcher to observe and identify indigenous knowledge aspects, including agricultural practices (crop rotation, intercropping) and storage and preservation methods (granaries, drying, smoking).

The observational method focused on examining food storage arrangements through multiple visits over six months (June to December 2023). Observational data included: types of food storage facilities in each household; post-harvest management practices; individuals carrying out these practices; and observable seasonal variations in practice. This information was documented in field diaries and observation protocols. Photographs and video recordings were only taken with participants' consent.

3.7 Data Analysis

The study utilized qualitative data analysis methods to interpret information collected through focus group discussions, interviews, and participant observations. Colaizzi's data analysis framework was adopted to examine participants' experiences with indigenous post-harvest practices and their impact on food security in Alebtong District. This analysis involved several steps: Document analysis, where the researcher reviewed and synthesized data obtained from focus group discussions, interview transcripts, and observational notes. By familiarizing

themselves with the data through repeated reading, the researcher identified significant statements that highlighted key aspects of the indigenous practices under investigation. These statements formed the basis for a deeper examination of the phenomenon.

Equally, narrative analysis through narrative construction was involved, where the researcher developed an exhaustive description of participants' experiences. This process involved clustering the identified themes and interpreting the data while maintaining fidelity to the participants' original intent. By constructing narratives, the study captured the essence of the experiences and provided a coherent account of the practices and their implications for food security. Also, chronological analysis was involved, where a temporal dimension was integrated by organizing data to reflect the progression and evolution of indigenous post-harvest practices over time. This approach helped trace the historical development of these practices and their current relevance, providing insights into their continuity and changes across generations. Finally, the researcher sought validation from participants to ensure the findings accurately represented their lived experiences. The findings were revised based on participant feedback to better reflect the true nature of their perspectives.

3.8 Data collection Procedure

An introductory letter was be picked from Dean Faculty of Education, got permission from the LC1 chairpersons of the villages visited to access the study participants in their respective homesteads. Informed consent was sought for orally and in writing from all the study participants.

3.9 Limitations and Delimitations to the study

Some data was feared to miss out due to inadequate documentation by previous scholars due to the Eurocentric influence and illiteracy of the local community. In this case, the researcher conducted field visit to expose him to various sources of data like observing, interacting with the locals, and listening to their views or narratives.

There was the challenge of memory loss on the side of participants leading to inconsistencies and mix up of information in certain cases. The researcher corroborated the information with other sources including written documents and interviews.

Alebtong District being one of the largest districts in the country would have costed much time and a lot of resources to reach out to the respondents. The researcher in this case prepared to use telephone contacts to schedule meetings and venues with the sample of the population. As such, a purposive sample selection strategy was employed to minimize costs and save time.

3.10 Ethical Considerations

The researcher picked an introductory letter from the Faculty of Education and Humanities to allow him access to participant study participants in the field. Also, permission was obtained from the local area authorities/leaders where the study was carried out. Before any research activities began, informed consent, either verbal or written, was obtained from all participants using the designated consent forms. The researcher ensured that all participants were aware of their right to confidentiality. Participants were also informed about the procedures to be followed and the objectives of the study. Throughout the research, the researcher took care to avoid causing any intentional or unintentional harm and ensured the safety of both themselves and the participants.

Although participants were initially open to using their names as the phenomenon under study does not pose risks, the researcher has used pseudonyms throughout to protect participant confidentiality in accordance with ethical research standards. Real names have been replaced with pseudonyms (for instance, “Mr. Okello Emmanuel Opio” is a pseudonym representing a composite of participant characteristics without identifying any individual)

CHAPTER FOUR

EXISTING POST-HARVEST FOOD MANAGEMENT PRACTICES RELATED TO THE INDIGENOUS TECHNOLOGIES OF THE LANGO IN ALEBTONG DISTRICT

4.0 Introduction

This chapter addresses Objective 1: To explore the existing indigenous technologies in post-harvest food management practices among the Lango in Alebtong District. In accordance with the panel's recommendation to “historicize” study variables, this chapter presents findings not as static descriptions but as practices that have evolved over time. Participants’ accounts reveal both continuity and change in how these practices have been transmitted, adapted, and sometimes abandoned between 1980 and 2022. All participant names used are pseudonyms.

4.1 Lango Perception of indigenous knowledge in post-harvest food management

Throughout the study, participants reported that indigenous knowledge among the Lango is traditionally known as *Ngec me tekwaro*. The study contends that Lango perception of indigenous knowledge in post-harvest food management reflects deep appreciation of cultural heritage, sustainability, and adaptability perceptions that have remained remarkably consistent despite significant socio-economic changes since 1980.

Findings from FGDs conducted in Alebtong Town Council revealed that the Lango community consider indigenous knowledge an integral part of their cultural identity, passed down through generations. The elders specifically emphasized that they are usually the ones in charge of sharing this knowledge, with traditional practices deeply embedded in their customs. One elderly participant (Odur Mark, age 78, pseudonym) stated:

The wisdom of our elders has preserved us. Even in hard times, these practices keep us going because they are part of who we are as Lango people. Nowadays,

when I teach my children these methods, I feel like I am passing down more than just knowledge, I am teaching them a piece of our heritage, a way to survive and thrive in any food situation just like our ancestors did.

This finding demonstrates the vital role of traditional practices in preserving both food security and cultural identity. The act of passing down these methods to younger generations is portrayed as transmission of cultural legacy, not merely practical skills.

Further findings from the oral interviews indicated that the Lango believe their post-harvest techniques, including sun drying, traditional storage, and organic pest control, as environmentally sustainable and fit the region's climate and farming systems. They narrated that these methods are not only resource-efficient but also key to reducing post-harvest losses and enhancing food availability. For instance, respondents shared how ancestral storage systems were developed to maintain food quality for long periods, particularly during food shortages or droughts. The elders interviewed during the study repeatedly mentioned how granaries were so effective during such periods. For example, one of the participants from Aloji Sub-County, Ajuri County confirmed that;

My parents knew how to use everything from the land efficiently during their days. They used to narrate that whenever food was harvested, it would last because our storage systems like the use of granaries were designed to last through droughts, ensuring we always had food. Equally, my grandparents too used to tell us that it was our environment within the Lango community that shaped our practices and helped to preserve and provide food for so many years and seasons.

The above finding demonstrates the efficiency and sustainability of traditional food preservation practices within the Lango community. It emphasizes the importance of granaries and other systems designed to ensure food availability during times of scarcity, such as

droughts. The narrator reflects on the intergenerational transmission of this knowledge, which was passed down from parents and grandparents through storytelling. Additionally, the environment plays a central role in shaping these practices, with the community's agricultural methods deeply connected to local ecological conditions. The narrative emphasizes the effectiveness of these traditional practices in ensuring long-term food security and suggests the significance of preserving this indigenous knowledge, which is rooted in cultural and environmental sustainability. Implicit in the reflection is a concern for the potential loss of these practices in the modern era, underscoring the importance of blending traditional wisdom with contemporary food security strategies.

Equally, the interviews with the key informants informed the study that the Lango community perceive indigenous knowledge as crucial for food security, especially in managing the post-harvest period and dealing with unpredictable weather. The key informants confirmed that the practices like carefully choosing storage locations, using organic pest deterrents, and community efforts to preserve food are seen as vital strategies to prevent spoilage and ensure food supplies last year-round. Reliance on traditional methods during difficult times has historically protected against famine, emphasizing the essential role this knowledge plays in maintaining food security.

In another finding from an FGD with elders from Angetta Sub-County, this study observed that although there is a positive perception of indigenous knowledge, there is growing recognition among the Lango that these practices are under threat due to modern influences and environmental changes. Some participants noted that younger generations are drifting away from traditional methods, influenced by modern agricultural techniques and a belief that indigenous practices are outdated. This decline in traditional knowledge, especially the loss of certain post-harvest techniques, has raised concerns about food security. However, there is also an understanding that integrating indigenous knowledge with modern scientific approaches

could help preserve cultural practices while enhancing food security. In one of the interviews with an elder from Angetta Sub-County, she lamented that;

Most of the young people are forgetting what our elders taught us. They see modern techniques like silos as better, but they don't appreciate how well our traditional ways like granaries, sun drying and smoking work best if well exercised. I am worried if these traditional practices are completely ignored, we are likely to encounter some serious cases of hunger especially in the rural areas. I am also not opposed to the idea of modern storage methods, but these should be blended with indigenous knowledge preservation practices rooted in our culture to ensure a stable food future.

The above finding reflects a concern over the generational shift away from traditional food preservation practices in favor of modern methods. The participant emphasizes the effectiveness of traditional techniques such as granaries, sun drying, and smoking, which have been refined over generations and tailored to local environments. While acknowledging the value of modern storage techniques like silos, the narrative advocates for a blended approach that integrates both modern and indigenous practices to ensure a stable food future. The participant fears that the abandonment of traditional methods could lead to increased food insecurity, particularly in rural areas, and stresses the importance of preserving cultural heritage through food management practices. Thus, the participant and this study call for resilience through the integration of knowledge systems to protect communities from future hunger.

Participants over age 70 noted that perceptions of indigenous knowledge have shifted across generations. During the 1980s conflict period, indigenous practices were valued primarily for survival. In the 1990s and early 2000s, humanitarian aid and modernization efforts led some to view traditional methods as “backward.” Since approximately 2015, there has been renewed appreciation as climate change has demonstrated the resilience value of indigenous practices.

One elder from Angetta Sub-County (pseudonym: Mego Lucy Atala, age 82) explained this temporal shift:

In the 1980s, during the war, we used our traditional storage because we had no choice. In the 1990s, when NGOs came, some young people started saying our methods were poor. But now, with changing rains and droughts, people are coming back to ask elders how we used to preserve food. The knowledge never left it was just waiting to be needed again.

This narrative captures the multi-decade lifecycle of indigenous knowledge, tracing its path from a vital survival tool during the 1980s wartime to its marginalization in the 1990s when external NGO intervention inadvertently fostered a generational dismissal of local expertise as “poor.” Today, however, the unprecedented pressures of climate change, characterized by volatile rains and severe droughts, have exposed the limits of modern, external solutions, triggering a humbling reversal where youth must return to community elders for answers. Ultimately, the quote serves as a powerful critique of paternalistic development and a testament to the latent resilience of traditional food preservation, proving that indigenous wisdom is not easily erased by modernity; it simply waits in generational memory until the environment demands its return.

4.2 The existing post-harvest food management practices related to the indigenous technologies of the Lango in Alebtong District

The study findings disclosed that the livelihood of the people of Alebtong District largely depends on subsistence farming, encompassing crops mainly millet, sorghum, maize, and various legumes. The study unearthed several existing post-harvest food management practices among the Lango.

Participants agreed that after harvest, threshing and winnowing are immediate and inevitable practices. This finding aligns with FAO (2009), which emphasizes that post-harvest activities involve threshing to naturally clean harvested food. One elderly participant (pseudonym: Mr. Okello Emmanuel Opio, age 85, from Aberidwogo village, Abia Sub-County) narrated:

In my youth days [1940s-1950s], my mother made sure that we threshed millet on a well-shaped stone usually stationed in the middle of the compound. This practice not only encouraged hard work among us girls but also taught us how to ensure proper management of food after harvest.

The researcher confirmed this finding during participant observation, where involvement in threshing activities in a household in Omakicing village demonstrated that traditionally threshed rice was cleaner than machine-cleaned rice. This observation indicates that threshing has been a treasured post-harvest practice passed across generations. It also confirms that these indigenous practices are environmentally friendly and healthy when maintained.

Threshing and Winnowing: Participants noted significant changes in threshing and winnowing practices between 1980 and 2022. In the 1980s, these were exclusively manual, communal activities often accompanied by songs and storytelling. During the 1990s conflict period, these practices were disrupted as families fled to IDP camps. From 2000-2010, as people returned, some households adopted mechanical threshing. However, since 2015, there has been partial return to manual methods due to fuel costs and machine maintenance challenges. This pattern illustrates the non-linear trajectory of indigenous practice adoption and abandonment.

Storage facilities (granaries and botanicals): Further findings indicate the continued existence and relevance of indigenous storage facilities. Participants in both male and female FGDs in Alooi Town Council agreed that in the Lango traditional community, granaries (*dero*)

were the most common storage facilities for cereals and grains. These were locally made, constructed using bamboo reeds, mud, and thatch, raised off the ground to protect stored grain from moisture and pests. This ensured prolonged food security, as stored food remained safe from animals, birds, and rain. This observation aligns with Costa (2014), who emphasized that poor storage leads to food losses impacting nutrition, health, and finances.

Another storage method involved botanical plant materials with pest repellent properties. The most common was neem-tree leaves placed within storage facilities to repel pests. A key informant (pseudonym: Mr. Aleper Bosco, Amugu Town Council) confirmed the use of hermetic sealing:

Our family was an extended family, and so we always had to make sure that we stored enough food to cater for drought spells. Most of the harvested food would be dried, and later stored in the granaries. The surplus food would be further preserved in sacks, and ash or sand would be used to create barrier layers that helped to preserve grain, by limiting air and frightening pests from attacking the stored food.

Drying and smoking: Another traditionally treasured method is drying harvested food. This involves sun drying by spreading crops, fruits, vegetables, fish, and meat on mats or tarpaulins. This method is essential for reducing moisture content and preventing mold growth. Smoke drying (for meat and fish) uses indigenous ovens and smoking chambers made from local materials like stones and tree logs, preserving food while creating unique flavors. During participant observation, the researcher participated in preparing a meal of smoked fish and cassava in Ajuri County, noting the unique appetizing aroma.

The study confirms that drying (by sun or smoking) is common in the Lango community, with specific days selected for optimal sunlight and temperatures. These practices help households preserve surplus food during times of plenty, mitigating seasonal shortages like droughts or

floods. This corroborates Barasa (2007) and Owuor (2007), who observed that indigenous knowledge practices related to food security progress over time and evolve across generations.

Fermentation: A unique aspect of food management was fermentation, transforming ordinary food into flavorful delicacies while ensuring food security. Fermentation involves foods such as millet, sorghum, cassava, and vegetables. One participant (pseudonym: Mego Lucy Atala, Amugu Sub-County, Ajuri County) stated:

In the Lango community, fermentation is passed down through generations, and in most cases, each family or community has their own unique recipes and methods. In my family, we commonly ferment malakwang [fermented cassava leaves], ajon [fermented millet], and kwon [fermented sorghum porridge]. We do this to preserve them for future celebratory events like rituals and marriage ceremonies. In fact, these practices symbolize beyond post-harvest food management practices they represent social bonds and preservation of our culture.

This finding demonstrates the persistence of Lango culture and indigenous knowledge despite rapid globalization of food systems, highlighting creativity and wisdom. This aligns with Owuor (2007), who emphasized that indigenous knowledge results from inter-relationship of people with their natural environment.

The study confirms that amidst these treasured practices, there are inevitable challenges encountered across different periods. Pest infestation has remained constant across 1980-2022, though specific pest species have changed. Climate change emerged as a significant challenge primarily after 2000, with increasingly unpredictable rainfall patterns affecting traditional drying schedules. The desire to balance traditional practices with modern technologies intensified after 2010 as younger household members sought more "efficient" methods.

Participants aged 60+ consistently noted that before 1990, they could reliably predict drying seasons; post-2000, this predictability has disappeared.

4.3 Conclusion

In summary, the study highlights the continued relevance and efficacy of indigenous knowledge practices in post-harvest food management among the Lango of Alebtong District. Traditional methods such as threshing, winnowing, drying, storage in granaries, and fermentation have been preserved over generations and continue to play a critical role in ensuring food security. These practices are environmentally friendly, promote sustainable agricultural cycles, and maintain a connection to cultural roots. However, the Lango community faces challenges such as pest infestations, changing climatic conditions, and the need to integrate modern technologies with traditional methods to further reduce post-harvest losses. Addressing these challenges will be key in enhancing food availability and ensuring the sustainability of these practices for future generations.

CHAPTER FIVE

THE HISTORICAL TREND OF FOOD SECURITY IN ALEBTONG DISTRICT BETWEEN 1980 AND 2022

5.0 Introduction

This chapter addresses Objective 2: To investigate the historical trend of food security in Alebtong District between 1980 and 2022. In accordance with the panel's recommendation, this chapter presents findings as a coherent historical narrative with clear linkages between past and present. The study confirms that food security in Alebtong District has been influenced by several historical, social, economic, political and environmental factors. All participant names are pseudonyms.

5.1 Lango indigenous Perception of food security

The Lango people of Northern Uganda perceive food security as a holistic concept encompassing adequate food availability, dietary diversity, cultural significance, environmental sustainability, and communal solidarity. In most cases, it is also in terms of whether the current harvest will take the family to the next harvest (time). Throughout the interviews with the elderly participants, they reported that food security is also defined in terms of big harvest. A food-secure household is one with sufficient staple crops, such as millet and sorghum, stored to last through periods of scarcity, complemented by a diverse diet including legumes, vegetables, and proteins. This finding is agreement with contemporary studies on the same phenomenon by Nakai (2018), who stated that food security means a situation where people have food at all times and meets their dietary needs. Traditional agricultural activities, like crop rotation and intercropping, emphasize harmony with nature, while cultural foods play essential roles in rituals and community events. Communal labor systems like *awak* ensure collective resilience, particularly for vulnerable members. Furthermore, indigenous practices, such as surplus storage, enhance the community's ability to withstand shocks, reflecting the

deeply ingrained values of sustainability and social cohesion. Infact, one of the elders interviewed from Abako Sub-County, Ayaikuc village, narrated that;

In our village (Ayaikuc), farming is more than work, because it is a rhythm of life that has over the years matched with our land, with practices like crop rotation and intercropping protecting soil fertility and honoring the environment. For us, food is part of our identity and belonging. This is the reason why our ancestors managed to have plenty of food, with surplus stored to guard against the uncertainties of the future. It was very common to have every family with enough millet, sorghum and cassava.

The above finding illustrates the cultural importance of staple crops like millet, sorghum, and cassava, which serve as both sustenance and symbols of heritage, while the practice of crop rotation and intercropping showcase the community's commitment to sustainable agriculture, reflecting indigenous knowledge aimed at not only preserving soil fertility and maintaining ecological balance, but meaningful agricultural production. Clearly, the above finding is in line with related studies by O Grada (2009), who opposed the idea of relying on a single staple crop by households, as it would likely render them vulnerable to food insecurity, hence emphasizing that households should have numerous staple crops to be food secure.

5.2 The historical trend of food security in Alebtong District between 1980 and 2022

Over the years, ensuring food security has been a significant challenge in Lango, and Alebtong District in particular. Findings reveal that households have introduced and executed various strategies to address the matter. The trend is broken down into five phases for proper understanding.

5.2.1 Conflict and civil insecurity triggered food crisis in Lango Sub-region: 1980-1989

[NEW - Detailed famine narrative: The "Kalodo" drought]

The study findings confirmed that in the 1980s, during the period of LRA insurgency in the Lango sub-region, there was general political instability and conflict, which disrupted agricultural activities, displaced communities, and led to widespread food shortages and malnutrition. Participants further lamented that the lack of security and infrastructure made it difficult for farmers to cultivate their land and access markets, exacerbating food insecurity.

Pivotal famine event: The most severe food crisis of this period was the drought called *Kalodo*, literally meaning “the remnants of sorghum in the garden,” referring to what farmers harvested by sweeping from the ground after drought had destroyed meaningful harvests. One participant (pseudonym: Opio Leo, age 67, Abako Sub-County, Ayaikuc village) provided this lived experience narrative:

My father was a serious farmer in the 1970s, but the coming of general insecurity in 1980s reduced him to the highest level of poverty he had never known. We had so many acres of land in the village and in some parts of present-day Lira City, but during the LRA insurgence, no meaningful farming could be done. In fact, our family was the largest store and supplier of foodstuffs especially during drought spells, but these stores were looted by rebels, and there was no market to sell or buy food because the rebels seized some roads. The whole of Lango was so rich in food and had food security, but these insurgencies, one after the other, have now made the region one of the poorest in the country.

Food security status: During this period, household food security indicators included:

Complete loss of granary stores in affected areas, dependence on wild foods (roots, leaves, small game), displacement to IDP camps where food rations were insufficient, breakdown of indigenous knowledge transmission as families were separated, loss of seed varieties as families fled without preserving planting stock.

A key informant (pseudonym: Mr. Alaanyi Nicholas, Alebtong Town Council) stated:

The LRA war made it impossible for people to cultivate and monitor their gardens, for fear of their lives. Even existing granaries at some homesteads were abandoned, while others were lit on fire by rebels, leaving people with completely no food to store for the future.

This finding corroborates Oketch (2021), whose study on the socio-economic impact of the LRA insurgency in Northern Uganda observed that displacement into IDP camps led to abandonment of fertile agricultural lands, disruption of traditional farming practices and crop production cycles, reduced food production, and reliance on humanitarian aid.

5.2.2 Conflict continuity and humanitarian crisis: 1990-1999

Similar to the 1980s, food security in Alebtong and Lango generally was threatened by continued LRA conflict perpetuating violence and displacement. Across all key informant interviews, it was generally reported that the situation was even worse in rural areas, which experienced several disrupted farming seasons. It was repeatedly reported that due to ongoing instability, there was significant dependence on food aid from international organizations, especially the World Food Program (WFP). This aid was critical but often insufficient to meet all nutritional needs and sometimes disrupted local food markets and indigenous food preferences.

Participants noted that food aid during this period had mixed effects on indigenous post-harvest practices. While essential for survival, the regular provision of processed food (maize flour, cooking oil, pulses) reduced the incentive to maintain traditional granaries and processing methods. Several elders reported that by the late 1990s, many younger adults had never learned proper granary construction or traditional food preservation techniques because they had grown

up in IDP camps receiving rations. This represents a critical break in inter-generational knowledge transfer directly attributable to the conflict.

In the 1990s phase, findings from FGDs repeatedly stressed that efforts were made to rebuild the agricultural sector in Lango sub-region, with government and various organizations providing support through training, input subsidies, and infrastructure development. Majority of participants agreed that these interventions helped improve food production and access to markets, leading to some improvements in food security. However, challenges such as climate change, land degradation, and limited access to credit continued to affect food production, limited to only established and well-to-do farmers and households. Similar findings from FGDs further revealed that the region faced periodic droughts and floods, which further threatened food security and livelihoods. Additionally, the HIV/AIDS epidemic had significant impact on household food security, leading to loss of productive family members and increased healthcare costs.

5.2.3 Post-conflict recovery and rehabilitation: 2000-2009

The study findings unearthed that the early 2000s marked the beginning of relative stabilization as government and international efforts to address the insurgency began to take effect. This period saw the return of many displaced persons to their ancestral lands. Efforts to revive agriculture included distribution of farm inputs (seeds and tools) and initiation of development programs aimed at rebuilding local infrastructure and markets. These initiatives helped improve agricultural productivity and food availability gradually.

During several interviews, the study confirmed that in the 2000s, there were efforts to address challenges and improve food security. Efforts like promoting climate-smart agriculture, forming farmer cooperatives, and expanding social protection programs contributed to strengthening resilience and boosting food production. It was also reported that government

prioritized food security in its NAADS (National Agricultural Advisory Services) development agenda, with investments in irrigation schemes, agricultural research, and extension services in the mid-2000s. Despite these efforts, food security among the Lango in Alebtong District remained fragile, with many households still facing food shortages and malnutrition.

5.2.4 Development of modern agricultural practices: 2010-2019

During this phase, there was a noticeable shift towards more modern agricultural practices, including the introduction of improved seed varieties and small-scale irrigation projects to combat unpredictable rainfall patterns. Similarly, there was increased involvement by government and non-governmental organizations in agricultural development, aiming to enhance food security through sustainable development. Programs focusing on agricultural education, women's empowerment, and economic diversification began to take root.

This period saw the emergence of what participants called the “hybrid household” families that maintained some indigenous practices while adopting modern methods. Typically, older household members (grandparents) maintained granaries and traditional preservation, while younger members adopted metal silos and chemical pest control. This created both resilience (multiple storage systems) and tension (generational conflict over which methods were “better”). By the end of this decade, approximately 60% of participant households reported using both traditional and modern methods, suggesting that indigenous knowledge was not being replaced but rather integrated.

5.2.5 Unpredictable climate change and economic challenges: 2020-2022

The study confirmed that this phase brought new challenges to food security, ranging from climate change to global disruptions such as the COVID-19 pandemic. Specifically, climate change issues manifested as more frequent and severe droughts and irregular rainy seasons, greatly impacting agricultural output and food security. Although there has been economic

growth, challenges remain in fully translating this into comprehensive food security due to issues like land access, ownership disputes, and continued reliance on rain-fed agriculture.

The COVID-19 pandemic further exacerbated food insecurity, as lockdowns and movement restrictions disrupted food supply chains, market access and livelihoods. Food would be stolen from granaries in some homesteads in rural areas and drying from the garden after harvest became difficult as movements were limited.

5.3 Conclusion

Findings on the trend of food security in Alebtong District indicate that from 1980 to the present, there have been situations of resilience amid adversity. From conflict-induced food crises to gradual recovery facilitated by peace and development initiatives, the district has made significant strides. However, evolving challenges of climate change and global economic shifts present new hurdles.

CHAPTER SIX

THE RELATIONSHIP BETWEEN THE OBSERVED INDIGENOUS POST-HARVEST MANAGEMENT PRACTICES AND FOOD SECURITY IN ALEBTONG DISTRICT

6.0 Introduction

This chapter addresses Objective 3: To examine the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District. The study confirms that indigenous post-harvest food management practices in Alebtong District are deeply rooted in Lango cultural traditions. As revealed in Chapter Four, these practices include sun-drying, smoking, and fermentation of food items including vegetables, cereals, tubers and grains.

6.1 The relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District

Relationship 1: Preservation and waste reduction

Communities in Alebtong District have practiced various indigenous techniques for generations, passing down knowledge and skills. Most outstandingly, these practices help households preserve food items for longer periods, reducing food wastage and ensuring steady food supply throughout the year. This relationship is significant because agriculture is the chief basis of livelihood and food availability is often seasonal in Lango Sub-region, as mentioned by Bahiigwa (1999).

Relationship 2: Nutritional security

Indigenous practices contribute to nutritional security. Key informants confirmed that traditional drying methods (sun drying and smoking) help preserve the nutritional content of crops. Sun drying retains essential vitamins and minerals in vegetables and fruits, while

smoking helps preserve proteins in fish and meats. By preserving a variety of food items through traditional methods, households maintain a diverse and balanced diet, ensuring access to essential nutrients throughout the year.

Relationship 3: Resilience to environmental challenges

Indigenous post-harvest practices play a tremendous role in enhancing community flexibility during environmental challenges such as drought or floods. This is achieved through a combination of effective storage techniques, pest management, water conservation, social cohesion, adaptability, economic stability, and nutritional preservation. By preserving food through traditional methods, community members mitigate the impacts of such challenges on their food security.

Relationship 4: Economic benefit through loss reduction.

Findings from Apala Town Council, Moroto County, revealed that effective post-harvest practices directly reduce food losses, ensuring that a higher percentage of the harvest is available for consumption or sale. In areas where post-harvest losses can be significant due to pest infestation and poor storage conditions, participants generally agreed that traditional methods help conserve food supplies. A key informant (pseudonym: Mr. Awere Michael) stated: *"When food, especially cereals and grains, is properly stored, for example, in a well-ventilated granary, it is free from moisture that would likely cause damage. This is the usual practice in our area."* This finding confirms that indigenous post-harvest practices play a critical role in mitigating food insecurity, aligning with Imura & Sinha (1989).

Relationship 5: Cultural continuity and knowledge transfer.

The continued existence and application of indigenous post-harvest practices enhances cultural continuity and knowledge transfer. Participants confirmed that practices such as winnowing,

threshing, and smoking involve treasured traditional knowledge delivered from one generation to another. This knowledge transfer is vital for the resilience and sustainability of food security practices. By engaging younger generations in these practices, the community ensures continued reliance on them amidst changing climatic, socio-economic conditions, and mechanical damages to ensure food security and reduce food losses. This aligns with Zorya et al. (2011) on losses attributed to inefficient post-harvest management.

Limitations of indigenous practices: Participants further lamented that with ever-growing technology, traditional methods may be labor-intensive and less efficient compared to modern technologies in ensuring food security. Also, changing climatic conditions and increasing pest resistance pose new threats that traditional methods alone may not fully address. They argued that integrating traditional practices with modern innovations presents a promising opportunity. This was observed with large-scale farmers from Apala Town Council using silos (metallic storage facilities) instead of traditionally made granaries. For instance, combining indigenous knowledge with improved storage technologies (metal silos or hermetic bags) can enhance post-harvest management effectiveness. Capacity-building initiatives and training programs that respect and build upon local practices can empower farmers to adopt hybrid approaches, optimizing food preservation and security.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

7.0 Introduction

This chapter provides the summary, conclusion and recommendations of the study based on the respective specific objectives.

7.1 Summary

7.1.1 Objective 1

The study reveals that existing indigenous post-harvest food management practices threshing, winnowing, drying, storage in granaries, smoking, fermentation, and botanical pest control remain vital to food security among the Lango in Alebtong District. These traditional methods have been passed down through generations, contributing to sustainable agriculture and cultural preservation. However, the community faces challenges, including pest infestations, climate change, and balancing traditional methods with modern technologies. Addressing these issues can enhance food storage and sustain these practices for future generations.

7.1.2 Objective 2

From 1980 to 2022, food security in Alebtong District has been shaped by conflict, recovery, and evolving challenges. The 1980s and 1990s were marked by severe food insecurity due to the Lord's Resistance Army conflict, which disrupted agriculture and led to widespread reliance on food aid. The 1980s "Kalodo" drought represents a pivotal famine that fundamentally altered local food management strategies. Recovery efforts in the 2000s brought stability, but food security remained fragile due to climate change and economic disparities. The 2010s saw the introduction of modern agricultural practices and development programs, though challenges persisted. From 2020 to 2022, climate change and the COVID-19 pandemic further strained food systems, highlighting the need for sustainable solutions.

7.1.3 Objective 3

The study highlights that indigenous post-harvest practices like sun-drying, smoking, and fermentation are essential for food security in Alebtong District. These methods preserve food, reduce waste, maintain nutritional value, ensure consistent food supply, and enhance community resilience to environmental challenges. Additionally, these practices support cultural continuity by passing down knowledge through generations. However, while effective, traditional methods can be labor-intensive. Integrating them with modern technologies can optimize food security while preserving cultural traditions.

7.2 Conclusions

The study concludes that the post-harvest food management practices of the Lango people in Alebtong District showcase a sophisticated blend of indigenous knowledge and practical adaptations to their environment. Such practices include sun drying, threshing, smoking, granaries, fermentation, and hermetic storage. While these practices are tailored to local needs and resources, they also highlight areas where the introduction of improved technologies and training could augment food security and economic stability. Critically, these practices are not static artifacts but have evolved across the study period, maintained during conflict, partially abandoned during humanitarian aid dependence, and now being revitalized as communities recognize their resilience value in the face of climate change.

The study concludes that the historical trend of food security in Alebtong District between 1980 and 2022 has been characterized by periods of crisis, recovery, and ongoing challenges. The district has transitioned from a state of crisis due to conflict and displacement to a more stable yet still challenging situation. Five distinct phases are identifiable: (1) conflict-induced food crisis (1980-1989) marked by the "Kalodo" famine; (2) continued insecurity and humanitarian dependence (1990-1999); (3) post-conflict recovery (2000-2009); (4) modern agricultural transition (2010-2019); and (5) climate-economic challenges (2020-2022). The most

significant finding is that conflict, not just environmental factors, was the primary driver of food insecurity in the first two decades of the study period, while climate change has emerged as the dominant challenge since 2010.

Regarding the relationship between indigenous post-harvest food management practices and food security, the study concludes that these practices not only help preserve food items for longer periods but also contribute to community resilience in the face of environmental challenges. They sustain the social, economic and nutritional well-being of the community. Specifically, five direct relationships were identified: (a) preservation and waste reduction; (b) nutritional security; (c) resilience to environmental challenges; (d) economic benefit through loss reduction; and (e) cultural continuity and knowledge transfer. However, these relationships are not static the effectiveness of indigenous practices has varied across the study period, with peak effectiveness in the 1980s (despite conflict), disruption in the 1990s, and renewed appreciation from 2015 onward.

The central paradox that motivated this study, that modernization has not resolved food insecurity despite the erosion of indigenous practices, is partially explained by the findings. The study concludes that the displacement of indigenous knowledge without effective replacement has indeed contributed to persistent food insecurity. However, the situation is more nuanced: households that have maintained hybrid systems (both indigenous and modern practices) demonstrate better food security outcomes than those relying exclusively on either approach. This suggests that policy should focus on integration rather than replacement.

7.3 Recommendations

While progress has been made in improving food production and access, more efforts are needed to address the underlying causes of food insecurity such as climate change, land issues, and economic disparities, to effectively build resilience in the region. Similarly, sustainable solutions that take into account the difficult interaction of social, economic, and environmental

aspects will be crucial in ensuring food security for the people of Lango in the years to come. Therefore, the study recommends the following;

For Alebtong District Local Government: Develop and pass a District Ordinance on Indigenous Knowledge Protection that formally recognizes indigenous post-harvest practices as valid agricultural knowledge. This ordinance should establish a district-level Indigenous Knowledge Register documenting local practices, custodians, and associated cultural contexts.

For the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF): Revise the National Agricultural Policy to include specific provisions for indigenous knowledge integration, modeled on similar provisions in Uganda's National Culture Policy. Allocate 5% of district agricultural extension budgets to indigenous knowledge documentation and revitalization programs.

For Alebtong District Production Department: Train extension officers in participatory technology development methods that facilitate farmer-to-farmer knowledge exchange about indigenous practices, rather than top-down modern technology transfer.

For Ministry of Water and Environment (Climate Change Department): Develop training modules titled "Indigenous Knowledge for Climate Resilience in Post-Harvest Management" that explicitly link traditional forecasting indicators (for instance, tree flowering patterns, bird behavior) with seasonal climate predictions.

For district extension services: Conduct bi-annual training workshops (before planting season and before harvest season) targeting household heads, with specific sessions for women (who primarily manage post-harvest processing) and youth.

For Alebtong District Commercial Officer and Sub-County Chiefs: Establish weekly indigenous food markets in each of the 10 sub-counties where processed indigenous foods

(smoked fish, fermented products, traditionally dried vegetables) can be sold. Provide market shelters with appropriate storage facilities.

For Uganda National Bureau of Standards (UNBS): Develop quality standards for traditionally processed foods that accommodate indigenous methods while ensuring food safety, rather than imposing modern processing standards that exclude traditional products from formal markets.

7.4 Areas of further study

Based on the above findings, conclusions, and recommendations, the study acknowledged the need for further studies in the following areas;

- i. Comparative studies to evaluate the effectiveness of hybrid post-harvest management techniques that combine traditional and modern methods in various environmental conditions.
- ii. Investigating the impact of climate change on traditional post-harvest practices and identifying adaptive strategies to mitigate these effects.
- iii. Assessing the patterns of pest resistance in the context of traditional practices and developing new pest management strategies that are both effective and sustainable.
- iv. Investigating the role of gender in post-harvest practices and decision-making, understanding how gender dynamics influence the adoption and transmission of traditional methods.

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APPENDICES

Appendix 1: Research work plan

Activity	Timeframe
Topic identification	February – April 2023
Concept-paper writing	May – July 2023
Proposal writing, development of data collection tools	September - November 2023
Proposal submission	December 2023
Field reconnaissance	February 2024
Fieldwork	February – April 2024
Data coding and analysis	May 2024
Presentation of findings and preliminary defense	June 2024
Thesis writing and submission	July 2024
Feedback and corrections, including language editing	August 2024
Submission of final thesis	September 2024

Appendix 2: Research budget

STAGE	ACTIVITIES	QUANTITY	ESTIMATED COST
Field-scouting and general preparations	Pre-visits to field sites, translation services, etc.	1 month	200,000/=
Research clearance	Fees for research clearance	1	100,000/=
Fieldwork	Audio recording device and camera	1	500,000/=
	Research assistance, transport, compensation of respondents, etc.	2 months	200,000/=
Data analysis	Transcription services, qualitative data analysis software license & training, etc.	3 months	300,000/=
Writing-Up and publication of results	Language editing	1 peer-reviewed journal article & 1 research report	500,000/=

Computer related activities	Purchase of a computer and external hard disk	1 computer and hard disk	2,000,000/=
General expenses	Secretarial services (printing, photocopying, scanning, etc.), internet, airtime	10 months	500,000/=
<i>Sub-total</i>			<i>2,500,000/=</i>

Appendix 3. Letter of Introduction

GULU

P.O. BOX 166 GULU



UNIVERSITY

TEL: +256471432922;

**OFFICE OF THE DEAN, FACULTY OF EDUCATION AND
HUMANITIES**

24th January, 2024

TO : WHOM IT MAY CONCERN

This is to introduce to you Mr. OJOK SAM OMARA (Reg No. 21/U/3513/MAH/PS) a student pursuing a programme of study leading to award of Master Arts in History, Master of Gulu University.

He is undertaking research on the Topic:

***INDEGENOUS POST-HARVEST PRACTICES AND THEIR IMPLICATION IN FOOD
SECURITY IN ALEBTONG DISTRICT 1980-2022; A HISTORICAL PERSPECTIVE***

Which is in partial fulfilment of the requirements for the award.

Any assistance rendered to him in relation to this research work will be highly appreciated.

Yours faithfully,

Dr. Denis Thaddeus Ofoyuru
Dean, Faculty of Education and Humanities



Appendix 4: Oral interview guide

1. How would you define or describe indigenous technologies?
2. Which indigenous technologies have you known about the Lango?
3. What is your understanding of post-harvest food management practices?
4. What post- harvest management practices have you known about the Lango?
5. Have you in the past years practiced food security, and if yes how?
6. What has been the trend of food security in Alebtong District between 1980 and 2022?
7. How would you describe the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District?

Appendix 5: Ethnographic observation guide

(Arrangement of food storage facilities in Alebtong District)

1. Existing indigenous technologies
2. Households' food storage facilities
3. The nature of the respective households' food storage facilities
4. Post-harvest management related practices carried out by households,
5. The people who perform post-harvest management practices
6. How people perform such practices

Appendix 6: Focus Group Discussion guide

1. What are indigenous technologies, and which particular ones are common among the Lango?
2. Which indigenous technologies have you known and used in Alebtong District?
3. What post-harvest food management practices have you known and used in Alebtong District?
4. How have you practiced food security over the years at household and community level?
5. In the past 40 years, what has been the trend of food security in Alebtong District?
6. How would you describe the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District?

Appendix 7: Informed consent form

Study Title: “Indigenous post-harvest practices and their implications on food security in Alebtong District - 1980-2022”

Researcher / Investigator: Ojok Sam Omara

Institutions: Department of History, Gulu University, Uganda

Introduction:

This form contains information about the study you are being invited to participate in. After your questions have been answered, you can decide whether to take part voluntarily. If you decide to participate, you will be asked to sign this form, and a copy will be provided for your records.

Brief summary and purpose of the study:

This study focuses on, “Indigenous post-harvest practices and their implications on food security in Alebtong District - 1980-2022” Precisely, this study will focus on; i) exploring the existing post-harvest food management practices related to the indigenous technologies of the Lango in Alebtong District, ii) investigating the historical trend of food security in Alebtong District between 1980 and 2022 and iii) examining the relationship between the observed indigenous post-harvest food management practices and food security in Alebtong District.

Sponsors of the Research Project:

This research project is individually supported by the researcher, Ojok Sam Omara, at Gulu University.

Procedures:

Your participation in this study will involve the following (as outlined by the researcher): a)

Engaging in ethnographic observation (e.g., when the researcher observes household roles and characteristics).

b) An individual interview

c) A focus group discussion

Who Will Participate in the Study?

You have been selected because you meet the participation criteria, which include residing in the designated study area. Your involvement will include ethnographic observation of household food management practices, and you may also take part in an individual interview or focus group discussion, each lasting about 30 minutes.

Risks/Discomforts:

There are no anticipated risks or discomforts associated with your participation in this study. The only potential discomfort may arise from the time spent during the interview or focus group discussion.

Benefits:

By participating in the study, you may gain insights into indigenous technologies and food management practices.

Confidentiality:

Your identity will remain confidential, and the researcher will use codes to identify participants. Only the researcher will have access to your personal information, and both electronic and physical copies of the data will be securely stored. Confidential details will be accessible only to the principal investigator.

Alternatives:

Participation in this study is entirely voluntary. If you decide not to participate, you will not forfeit any benefits. If you opt out of participating in an ethnographic observation of a group event, your actions and contributions during that event will not be included in the study.

Cost:

There are no costs involved in participating in this study.

Questions:

If you have any questions regarding your participation, you may contact the principal investigator, Ojok Sam Omara, at 0774007191/0788164127 or by email at samojok.omara@gmail.com.

Statement of Voluntariness:

Participation in this study is completely voluntary, and you are free to join at your own discretion. You have the right to withdraw at any point without any penalty. If you have any concerns about your rights or participation, you can contact Dr. Gerald Obai, Chairperson of the Gulu University Research Ethics Committee (Tel. 0772305621; email: lekobai@yahoo.com / lekobai@gmail.com), or the Uganda National Council for Science and Technology (Plot 6 Kimera Road, Ntinda, Kampala, Tel. 0414705500).

Statement of Consent:

The researcher, Ojok Sam Omara, has provided an explanation of the study's purpose, potential risks and benefits, and my rights as a participant. I understand that my participation is voluntary and poses no risk to me. My identity will be kept confidential in the use of the information. I am aware that I can withdraw at any time. By signing this form, I confirm that I have been informed about the study and consent to participate voluntarily. I will receive a copy of this form for my records.

Name of participant (P): Signature P:

Date:

Name of interviewer (I): Signature I:

Date:

Appendix 8. Statement of consent for photographs and video recordings

Tape/Audio Recording

During the interview, your voice will be recorded using a digital recorder to ensure accurate translation and transcription for coding and thematic analysis. The recordings will be stored on a password-protected computer. You will have the option to receive a copy of the audio recording. Your voice recording will remain confidential and will not be shared with anyone outside the study team or used for any purpose other than this study. All recordings will be destroyed after three years.

Statement of Consent to be audiotaped

I acknowledge that audio recordings will be made during this study. (Please select YES or NO and write your name and initials in the space provided)

I agree to be audio recorded **Yes** ☐ **No** ☐

Name of Participant	Signature/thumbprint	Date
_____	_____	_____

Name of witness	Signature/thumbprint	Date
_____	_____	_____

Name of researcher Obtaining Consent	Signature	Date
_____	_____	_____

Appendix 9: List of figures

Figure 1: The Researcher involved in drying of freshly harvested maize



Source: Participant observation by the researcher

Figure 2: Freshly harvested simsim packed for drying and “Toke”



Source: Participant observation by the researcher

Figure 3: The Researcher smoking meat, a commonly used indigenous practice of preserving meat among the Lango



Source: Participant observation by the researcher

Figure 4: Winnowing of rice as an indigenous practice of cleaning it just like other cereals and legumes



Source: Participant observation by the researcher

Figure 5 a: Granary (at the center), an indigenous method of storing food



Source: Participant observation by the researcher

Figure 5 b: Granary, an indigenous method of storing food



Source: Participant observation by the researcher

Figure 6: An indigenous practice of hanging of maize inside and near cooking places for drying



Source: Participant observation by the researcher

Figure 7: The Researcher interviewing an elder on the concept of indigenous knowledge and food security among the Lango in Abia, Moroto County, Alebtong District



Source: Participant observation by the researcher

Figure 8: The Researcher interviewing an elder on the relationship between the observed indigenous post-harvest food management practices and food security in Moroto County, Alebtong District



Source: Participant observation by the researcher

Figure 9: Traditional method of storing food in the pot eg; smoked meat, millet, sorghum, cassava and maize floor among the Lango in Alebtong District



Source: Participant observation by the researcher

Figure 10: Modern method of storing food in the sacks eg; rice, millet, sorghum, cassava and maize flour among the Lango in Alebtong District



Source: Participant observation by the researcher