

**HOUSEHOLD FOOD SECURITY AND DIETARY PATTERNS IN URBAN SETTINGS
OF WAKISO DISTRICT, CENTRAL UGANDA**

BY

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DECLARATION

I **Linnet Betty Nakasiba** declare that this Dissertation titled “*Food security and Dietary Patterns in Urban Settings of Wakiso District Central Uganda*” is original work that hasn't been submitted for a prize to any other educational institution.

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APPROVAL

This attests to the fact that the dissertation was completed under our guidance and is now prepared for submission.

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DEDICATION

I dedicate this dissertation to my husband, Douglas Mutebi JJemba, who is my dearest friend, and to my children, Maria Norah Batanda, Isaac Namugala, Phoebe Ronah Nachwa, and Ezra Benjamin Mpaddwa, all of whom have been my constant support during this research.

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ACRONYMS

COVID-19	Corona Virus Disease 2019
CSI	Coping Strategy Index
DDS	Dietary Diversity Score
EPRC	Economic Policy Research Centre
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
FEWSNET	Famine Early Warning Systems Network
FFQ	Food Frequency Questionnaire
FSNA	Food Security and Nutrition Assessment
GHI	Global Hunger Index
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HH	Household
HLG	Higher Local Government
IFAD	International Fund for Agricultural Development
IPC	Integrated Food Security Phase Classification System

LSMS	Living Standards Measurement Study
MLHUD	Ministry of Lands, Housing and Urban Development
NDP	National Development Plans
OECD	Organization for Economic Cooperation and Development
REC	Research Ethics Committee
SDG	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
UBOS	Uganda Bureau of Statistics
UNCST	Uganda National Council for Science and Technology
UNHCR	United Nations High Commissioner for Refugees
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNHS	Uganda National Household Survey
VHTS	Village Health Teams
WFP	World Food Programme
WHO	World Health Organisation

ABSTRACT

Background: Food insecurity is a barrier to development that arises from a variety of causes in the local, national, regional, and worldwide domains of human existence. The general objective of the study was to assess the household food security situation, dietary patterns and associated factors among urban households in Wakiso district.

Methods: A cross-sectional design was used and two of the four municipalities participated. Using a multi-stage systematic random sampling procedure, data was collected from 217 households with 72 as a sampling interval. Data was analysed using the Statistical Package for Social Sciences (SPSS) computer software, version 29.0. Household Food Insecurity Access Scale (HFIAS), Coping Strategies Index (CSI), Dietary Diversity Score (DDS) and Food Consumption Score (FCS) were computed using World Food Programme (WFP) and Food and Nutrition Technical Assistance (FANTA) guidelines. Multivariate logistic regression was used to analyse relationship between the multiple dependent household variables and household food insecurity. Level of significance was set at 0.05 with a 95% level of confidence.

Results: The study results show 96.0% of the households experienced some level of food insecurity with mean (sd) food insecurity score being 10.8 (6.3). Portion reduction, portion limitation and getting food on credit emerged as the most commonly used coping strategies. Differences in household food insecurity scores were significant with gender of the household head ($p < 0.01$) and municipality of residence ($p < 0.01$). Households that skipped at least one meal were 52.2% with breakfast as the most skipped meal of the day. Household dietary diversity categorization showed 36.0% of the households had a desirable dietary diversity score of ≥ 6 food groups. Food consumption status indicated not a single household had an acceptable food consumption score. Differences in household dietary diversity scores were significant with existence of assets to supplement food sources ($p = 0.039$). There was a significant positive correlation between HFIAS and CSI ($r = 0.650$, $p = 0.001$), and a negative correlation between HFIAS and FCS ($r = -0.338$, $p = 0.001$) and HFIAS and DDS ($r = -0.385$, $p = 0.001$). Multivariate logistic regression showed that gender of the household head ($p = 0.002$) and existence of assets ($p = 0.041$) were significantly associated with household food insecurity.

Conclusions: Food insecurity and dietary diversity were significantly influenced by gender of the household head and existence of assets implying a gap in achieving food security. Gender-sensitive empowerment programmes could be desirable policy interventions that also enhances dietary diversity for urban settings of Wakiso districts and elsewhere in the country.

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, an approximation of 733 million people worldwide suffered from hunger in 2023 meaning about one in every eleven people worldwide faced hunger. Results for 2023 show 2.33 billion people, which is almost 28.9% of the worldwide populace struggled with uncertain food availability and this count has not changed much since the sharp rise in 2020 due to COVID-19 pandemic. From that number, a population exceeding 864 million people faced severe food insecurity, spending a full day or longer without anything to eat. A population suffering from hunger remained steady at 10.6 % after rising from 9.1% in 2019 to 2020 (FAO, IFAD, UNICEF, WFP, WHO, 2024). The conflict in Ukraine has also impacted on the energy and food markets (FAO, 2024).

The population of Africa's is predicted to double by 2050 and the largest proportion will dwell in urban environments (OECD/SWAC, 2020). Africa claims the biggest percentage people lacking food at 58.0% doubling the global average. There was a growing population experiencing undernourishment from 19.9% in 2022 to 20.4% in 2023 and one of the five people faced hunger. It is projected more 10 million people that is 18 % within the total populace will face persistent hunger by 2030 (FAO, IFAD, UNICEF, WFP, WHO, 2024). Not having enough food in urban areas is mostly because people do not have much money. So, when more people move to cities, it can affect how food is utilised because most people who live in these cities buy their food instead of growing it.

According to Uganda National Population and Housing Census data of 2024, the country's population reached 45.9 million, with 28.6 % residing in urban settings. Some districts of Uganda experience an urban population growth rate of 5% and this is attributed to persistent rural poverty

which is a leading cause of people leaving rural communities for urban settlements in search of better livelihoods.

In Uganda, nearly 10.9 million people experience acute food insecurity. A total of 9.3 million (26%) people across the various regions of the country are experiencing food security stress with Karamoja region being highly affected. A high degree of food insecurity was expected to be experienced by the poorest urban households, who mostly rely on temporary work in unofficial environment, in light of the ongoing global economic crisis (FEWS NET, 2023).

Many people in Uganda still struggle with not having enough food, even though the country has a lot of natural resources for farming and export a lot of food. Grebmer *et al.*, (2023) classified Uganda's food insecurity levels as 'serious' as it was placed 95th in a ranking of 125 nations with an overall score of 25.2. World Food Programme hunger map in January 2023 indicated 16.4 million Ugandans lacked sufficient food for consumption (FAO, IFAD, UNICEF, WFP & WHO, 2023).

Uganda's food insecurity is exacerbated by increasing population and urbanization at 26.2%, given the fact that many urban dwellers have limited means to produce or access to food. Urban residents face high risks of food insecurity since most of them do not engage in agriculture activities and are net food purchasers. In some other instances, low education levels of household heads, limited household assets, and low access to non-agriculture income sources might lead to food insecurity (Sseguya *et al.*, 2018).

Integrated Food Security Phase Classification (2020), noted 17% of (1,680,600) population in Kampala City and 15% of (1,511,699) population in Wakiso municipalities faced high acute food insecurity with markets remaining as the main sources of food. In Kampala, households consumed

one meal a day with a decreased consumption of matoke to a diet of stiff maize (posho) (Pottier, 2015). Urban and peri-urban farming can offer a broad spectrum of nutritious foods.

The study aimed at establishing household food security and dietary patterns in urban settings of Wakiso district Central Uganda.

1.2 Statement of the problem

As the population grows rapidly and urbanization increases, so does the demand for food supplies which is coupled with high cost of living and food insecurity threats among urban dwellers especially, those relying on casual jobs and the non-employed. Uganda has been experiencing a steady population increase over the past years. Wakiso district reported a population growth rate of 5.5 % between 2014 and 2024 (UBOS, 2024). Urban dwellers faced significant challenges in fulfilling their basic requirements due to inadequate income sources resulting into inability to afford food (FAO, IFAD, UNICEF, WFP & WHO, 2018). Considering the 2019/20 UNHS report findings, households in central Uganda, spent 34.9 % of their monthly share on food and non-alcoholic beverages. The Integrated Food Security Phase Classification (2023), January–March 2023 reported that 6% of Wakiso population had a decreased food consumption. According to the world food program hunger map of 2023, 10-20 % of households in Kampala and Wakiso district had insufficient food consumption. Residents’ diets were largely composed of staple foods like matooke, with restricted access to foods loaded with nutrients such as high biological value proteins, fruits and vegetables (Durairaj *et al.*, 2017). A study done in Kampala by Integrated Food Security Phase Classification (2020), June-August 2020 found that 17% of the city's 3.5 million residents struggled to access adequate food and made restricted food choices. According to FEWSNET (2024), a number of people between 1.5 and 2.0 million were likely to receive

humanitarian food assistance between October 2024 and May 2025 primarily those in refugee settlement and Karamoja.

However, a knowledge gap remains regarding food insecurity and dietary patterns in urban settings of districts constituting the Kampala Metropolitan Area, notably Wakiso district with 20.2% of its population residing in urban centres. Most of the documented data, emphasizes food security on urban refugees. Therefore, this study deemed it necessary to seek answers to food security situation and dietary patterns of the urban households in Wakiso District.

1.3 Objectives of the study

1.3.1 General objective

The general objective of the study was to assess the household food security situation, dietary patterns and associated factors among urban households in Wakiso district.

1.3.2 Specific objectives

The specific objectives of the study were to:

- i. Analyse factors associated with food security and dietary patterns of urban households in Wakiso district.
- ii. Assess the household food security situation of the urban households in Wakiso district.
- iii. Determine the coping strategies adopted by urban food-insecure households in Wakiso district.
- iv. Analyse the dietary patterns of urban households in Wakiso district.

1.4 Research questions

- i. What factors determined the food security situation and dietary patterns in Wakiso district?
- ii. What was the state of food security among urban households in Wakiso district?

- iii. What factors were associated with the commonly adopted food insecurity coping strategies by urban households in Wakiso district?
- iv. How adequate were the dietary patterns of urban households in Wakiso district?

1.5 Conceptual framework

The conceptual framework for this study is shown in Figure 1. The study's dependent variables were household food security and dietary patterns whereas household status and household demographic characteristics were the independent variables. Food security is food's accessibility by all individuals all the time for a healthy living (FAO, 2008). The adopted conceptual framework accounted for food security's definition (FAO, 2008). Food security availability dimension is the degree to which food is within easy reach for the household. The current study assumed that this was largely determined by either farming, purchasing or receiving food aid. Accordingly, household assets were considered to be important. Food availability also hinges on having accessibility to markets and a stable supply chain.

Food access is another related concern, where individuals or households aim at obtaining enough safe and nutritious food. As an indicator, a household's capacity to buy food and household assets to supplement food sources were considered important. During food scarcity, households used food insecurity mitigation measures to cope with food insecurity. People made changes in their eating habits, looked for food in the wild, and moved to find work in order to survive. They would also sell things from their home to get money (Sani & Kemaw, 2019). The choice and quality of diet could be influenced by household head's gender and availability of assets to supplement food sources. Likewise, choice and quality of diet could as well be used during food insecurity situations as coping strategies.

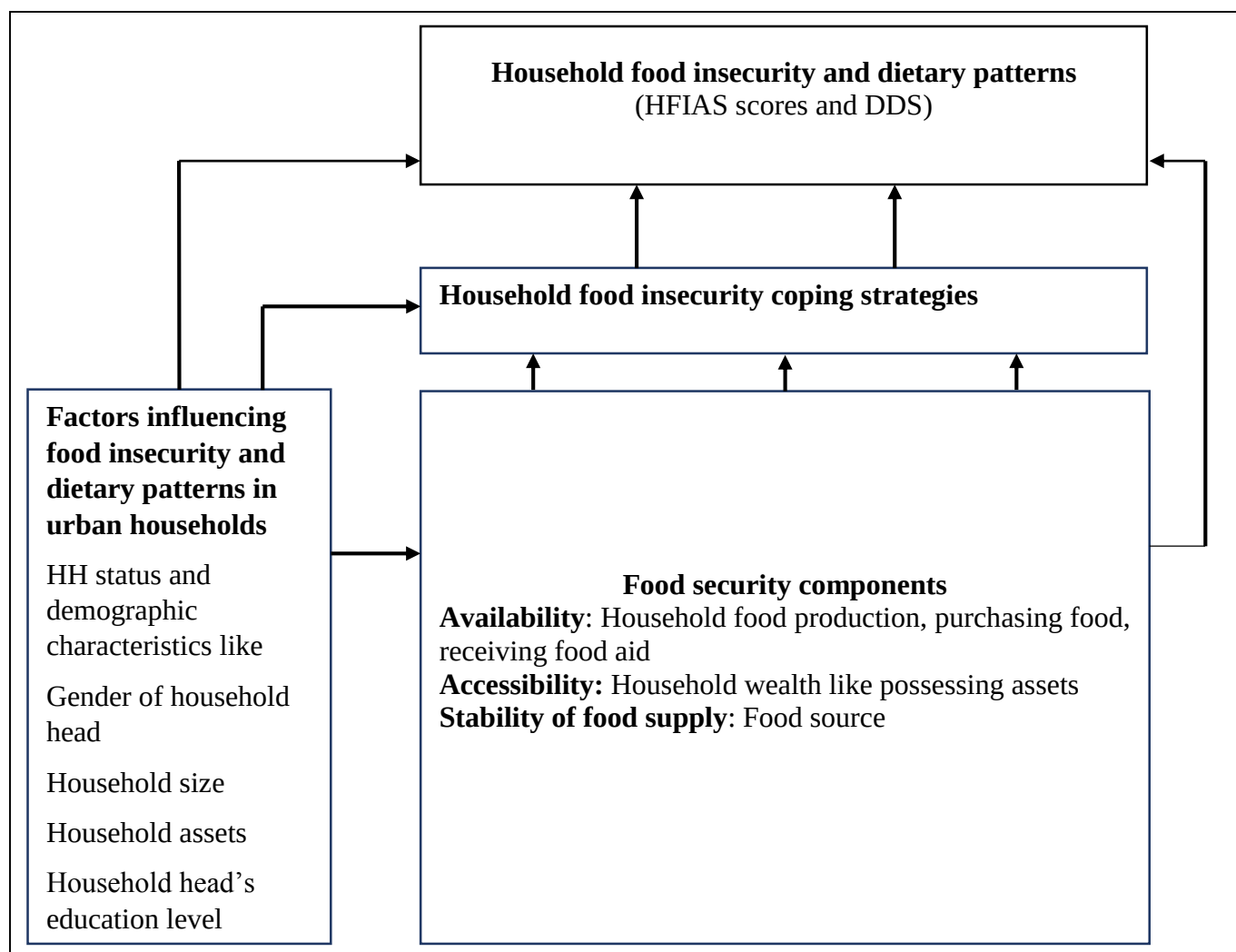


Figure 1: Adopted Food Security and Nutrition Analysis Unit Model

1.6 Significance of the study

This study contributed to the amount of data showing how well Sustainable Development Goal (SDG) 2, which aims at eradicating hunger in line with urbanization, was being achieved. The study held significance in analysing the accomplishment of other Sustainable Development Goals (SDGs), including SDG 1 on poverty reduction, SDG 3 on good health and well-being, SDG 5 on gender equality, SDG 11 on sustainable cities and communities, and SDG 12 on responsible consumption and production, among others. Furthermore, this study was among the limited studies exploring food access and dietary patterns in urban areas of Uganda.

Given the global nutrition transition, fuelled by urbanization among others, the study identified entry points for deeper understanding of dietary patterns in urban settings to inform future actions and interventions to strengthen the nutritional outcomes of urban populations.

The research findings contributed to the information bank that would inform future studies of a similar nature and context.

1.7 Scope of the study

1.7.1 Content scope

This study explored the food security situation, factors contributing to food insecurity, dietary patterns and coping mechanisms of households in urban settings of Wakiso district.

1.7.2 Geographical scope

The study was performed in Makindye Ssabagabo municipality and Entebbe municipality of Wakiso district which were randomly selected.

1.7.3 Inclusion and exclusion criteria

The inclusion criteria were households within the sampled municipalities of urban settings of Wakiso district. Heads of households participated in the study as respondents. These were the main respondents for the study due to their central role in food provision for their households. Households outside the sampled municipalities were excluded from the study and those heads who were not found at home on the second visit were treated as non-respondents.

1.7.4 Time scope

Ethical clearances from the University and District authorities were obtained in February 2022 while the Research Ethical Committee (REC) and Uganda National Council for Science and Technology (UNCST) formally accepted the study in April and May 2022 respectively. Research

assistants' training and pretesting data instruments were carried out in April 2022. Data collection started on 3rd May 2022 to 23rd May 2022 covering three weeks. The period from January 2023 to December 2023 was dedicated to data interpretation and dissertation writing.

CHAPTER TWO: LITERATURE REVIEW

2.1 Description of food security

Food is any substance consumed by an organism for nutritional support. Food gives us the nutrients we need to stay alive, grow, and be healthy. It also helps a country to grow and develop. Food is important for people to survive because it makes the body healthy and helps in the mind and social life. Having enough healthy food is really important for staying well (Fanzo *et al.*, 2020).

Food security is attained when all individuals have accessibility to wholesome safe food which is culturally essential to solve nutritional requirements and food choices by using dependable physical, social and economic resources (Gallegos *et al.*, 2023). With food security, there should be sufficient food amounts, being in position to acquire the recommended amounts, consistent supply and proper utilization. Consequently, it is critical to recognize that there are various degrees of food security and that cooperation across the four components is necessary to guarantee full food security (Peng & Berry, 2018).

Food insecurity is when people in a society lack sufficient food because they cannot physically get it, they cannot afford it, or they do not have the support they need to get it (FAO, 2008). When a family cannot get enough healthy food, they are food insecure. To make sure there is enough food for everyone in the household, we need to be careful about how we make and share food in our family. Household food security is seen as the most basic way to figure out how much food a person eats.

2.2 Global food insecurity

Worldwide, household food inaccessibility is still high. Nearly, 2.33 billion individuals, which is 28.9 % within the world's populace, struggled with moderate or severe food insecure in 2023. A

population between 713 and 757 million individuals across the globe lacked sufficient food for consumption. This indicated every eleventh person in the whole world found it hard to get sufficient food (FAO, IFAD, UNICEF, WFP & WHO, 2024). Food insecurity results from several factors, such as food unavailability, unaffordable food, and unequal distribution of food between household members and this leads to poor nutrition.

Globally, acute food insecurity continues to rise. From 2020 to 2021, individuals experiencing hunger grew by 46 million, reaching a total of 828 million and 49 million people in 46 countries were predicted to experience famine or famine-like conditions (FAO, IFAD, UNICEF, WFP & WFP, 2023). A global report on Food crisis alerts published in 2024, indicated 282 million people or 21.5 % across 59 countries or territories in 2023 were facing a crisis or worse acute food insecurity. Also, the war in Ukraine has made a bad hunger crisis even worse, causing a global food crisis that the world cannot handle. In 2023, approximately 713-757 million people worldwide were challenged with hunger (FAO, IFAD, UNICEF, WFP & WHO, 2024).

The widespread problem of food insecurity worldwide stems from the persistent macroeconomic challenges, coupled with high international commodity prices, organized violence and conflicts, weather extreme conditions, climate variability, and animal and plant pests and diseases. A country's economy getting worse makes it harder for the country to buy food from other places. Violence and fighting are still big reasons why people lack accessibility to plenty of food.

The Ukraine war and disparate global rebound from COVID-19 have caused food prices to go up and global economic conditions to get worse (World Bank, 2021). Conflicts between countries are on the rise and this disrupts the global food supply chain. The Russian Federation and Ukraine are large exporters of wheat, maize and vegetable oil and because of their conflicts, the global food

market has been disrupted leading to high agricultural commodity prices. Volumes of food exports from Russia and Ukraine have reduced affecting countries that depend on food imports (World Bank, 2021). Additionally, agricultural fertilizers have increased in price and this is expected to result in a decrease in their usage across the globe which will eventually affect yield harvests and the future availability of agricultural produce on the international market.

2.3 Food insecurity in Africa

African countries have been impacted by things like bad weather, fighting, or a mix of both, which has led to a lot of people not having enough food (FAO, ECA & AUC, 2021). Fighting, changing weather, and not enough food being grown, along with not enough money, have led to issues of buying healthy food. Consequently, many individuals are facing hunger and food shortages. Ukraine conflict coupled with other reasons have made it hard for African countries to have enough food. From 2018 to 2020, Africa got 44% of its wheat from Russia and Ukraine (World Bank, 2021). Ukraine war has resulted into rising food and fuel prices. This has pushed millions of people on African continent into starvation leading to widespread unrest and instability among many African countries. The 2024 Global Report on Food Crises identifies Ethiopia, Sudan, Nigeria and Congo -Kinshasa as countries with the most severe acute food insecurity affecting millions of people. Between 2021 and 2022, a proportion of Africans lacking financial access to wholesome food surged by 24.6 million, reaching 924.8 million. Eastern Africa had the largest population of 348.6 million people lacking economic access to wholesome food followed by West Africa with 297.5 million people (FAO, IFAD, UNICEF, WFP, WHO, 2024).

2.4 Food insecurity in Uganda

Even though Uganda is considered a food basket of the East African sub-region, several households are going hungry, especially the urban poor households. National COVID-19

containment measures between March and June 2020, reduced household incomes and the poor urban households were challenged with purchasing minimum food needs. Due to climatic shocks, Uganda experiences limited rainfall, low crop yields and demand for agricultural workers thus subsequently affecting market supply and household's income. Though inadequate rainfall allows subsistence farmers to produce and maintain adequate food availability, a reduction in income could result in food insecurity.

In Uganda, approximately 69 out of 100 individuals were minimally food insecure. Among the total population of the nation, 26 % encountered food security stress, with regional figures as 1.88 million for Eastern Central region, 1.24 million South Western, 1.1 million Teso region and 1.04 million for West Nile region. The country has 5 % of its total population facing gaps in food intake along with inadequate diet and elevated levels of malnutrition (IPC, 2017).

Uganda has the most refugees' numbers in Africa and these refugees are facing food reductions in food ratios or delayed distributions of food frequencies because of constrained funds World Food Program (WFP) is facing. United Nations High Commissioner for Refugees (UNHCR) and WFP, reported refugee's monthly food was reductions to 70 % and 60% from April throughout September and October respectively. This resulted in food consumption gaps in most refugee households (IPC, 2021).

2.5 Food insecurity in urban areas of Uganda

Urbanization is when more and more people move from the countryside to the city, making the city population grow. According to the World Bank (2020), 24.95% of people in Uganda live in cities. The growth of cities is changing how we get our food and what we want to eat, which is also changing how food is produced and given to us. For instance, the people in Kampala started

eating only one meal and changed from eating plantains to eating a thick maize porridge called posho (Pottier, 2015).

As more people live in cities, land that could be used for farming is turned into places for people to live. This makes it harder to produce food and causes not having enough food in cities. In Kampala, it's getting harder to grow enough food, so peri-urban areas are becoming more important for providing food. Urban agricultural activities play important roles in providing food for urban populations. In urban areas, high-income households demonstrated a stronger connection to local food systems through their active engagement in agriculture. In contrast, low-income earners primarily relied on retail markets that source food from rural Uganda, indicating a greater dependence on external food system (Hemerijckx *et al.*, 2023).

Mottaleb *et al.*, (2021) found that people are eating more corn, wheat, and rice because they are making more money from living in cities. According to the study, Uganda's food consumption patterns are projected to shift by 2030, with increased consumption of bananas, root crops, cereals, vegetables and animal proteins. These are all things that happen when people make more money and when the population changes.

Ugandans mainly consume, matoke (a staple plantain), root tubers and cereals accompanied by legumes, nuts and green vegetables. A study carried out in Kampala noted that food-insecure households reduced matoke consumption as a result of market price increases due to its unavailability (Pottier, 2015). Kampala residents consume a good share of vegetables, pork and poultry products produced in peri-urban areas (Sabiiti & Katongole, 2016).

FEWSNET (2022), reported that Uganda's government made rules to manage COVID-19. They made people stay in one place, shut down stores, and many people without work could not afford to buy food. This meant there was low demand for food in the cities. Many poor families in cities who depend on earning money every day to buy food have less money and cannot buy as much because they do not have other ways to make a living.

In Uganda, people who live in the countryside and their connections with others are important for city dwellers to get food. In areas with weak connections between rural and urban areas, as in Kampala, there may be more cases of severe malnutrition due to increasing differences in food access (FEWSNET, 2022). Sabiiti and Katongole (2016) said that there is some food grown in Kampala, but most of the food people eat there comes from the countryside. Mugisa and his colleagues (2017) found that growing crops in and around cities in central Uganda helped households in urban areas have more food and money.

2.6 Measurement of food insecurity

2.6.1 Food insecurity measurement issues

There are many ways to see if people have enough food to eat. However, there is no agreement on best way to measure food insecurity (Ahn & Norwood 2021; Sumsion *et al.*, 2023). Many families around the world do not have enough food because the prices are very high. This makes it hard for mothers and children to stay healthy, and many people are not getting enough to eat because they are poor and vulnerable (FSIN, 2024). Dangers in the environment and challenges people have, can make it harder to get and eat food, which can make a person more at risk. Common dangers include things like droughts, floods, landslides, and wars.

It is important to check if a family has enough food and to understand how it affects each family member and how they cope with not having enough food (Farzana *et al.*, 2017). The national income distribution, consumer expenditure statistics, and the balance sheet are the three primary indicators used to quantify the amount of food insecurity in families (Russell *et al.*, 2018). To make sure there is enough food and people are eating enough energy-giving foods, we need to use measures that show the connection between hunger and not getting enough food. It is hard to measure if a household does not have enough food because there is no universal agreed upon method to do and therefore different people measure it differently (Sumsion *et al.*, 2023).

It is important to find ways to tell which households have enough food and which do not, and to understand why individuals face food inaccessibility (Onah *et al.*, 2021). World Food Programme (2008), supported using a gauge that could sufficiently approximate the severity of food insecure households by using the Household Food Consumption Approach (HFCA) which uses multiple gauges and ways to categorize insecure food households using households' food security dimensions.

2.6.2 Household Food Insecurity Access Scale

The number of households that lacked sufficient food in the preceding month is determined using Household Food Insecurity Access Scale (HFIAS) (Castell *et al.*, 2015). The HFIAS has nine questions relating to food accessibility and these are categorized into three; worries regarding food scarcity, poor food quality consumption and its impacts, and low food supplies (Pandey & Bardsley, 2019). The measure believes that the food security situation can be estimated, computed and ascertained by categorizing households at individual levels basing on their food inaccessibility (Salman *et al.*, 2023). Use of internal reliability, standard procedure and rationality for evaluation of HFIAS measurements leads to correct food insecurity results (Daneshi-Maskooni *et al.*, 2017).

2.6.3 Household Coping Strategies Index

The Household Coping Strategies Index (CSI) assesses the capacity of a household to cope with food insecurity by examining the coping mechanisms put in place to resolve food scarcity. The CSI has a number of questions put a cross to evaluate how a household reacts to situations when there is insufficient food. The CSI gauges household food insecurity by responses (Sumsion *et al.*, 2023). The CSI score indicates if food insecurity in a household is getting better or worse.

The different coping strategies, reduce the impact of not having enough food at home and these help to make a bad event have less of an impact after it happens (Diamini *et al.*, 2023). People use different ways to deal with not having enough food and these include eating cheaper or less favourite food, asking to borrow food from friends or family, finding wild food, hunting or picking food before it is fully grown, eating seeds that were meant for planting, sending some family members to eat somewhere else, eating smaller portions, letting children eat instead of adults, eating less often, enduring a day of hunger, and asking neighbours or friends for food.

In Sierra Tarahumara Mexico, during food insecurity situations, eating less, skipping meals and giving children more food than adults were common practices. Eating seeds meant for planting, making and selling crafts and moving to different area to work as temporary labourers were used as temporary ways to deal with insufficient food situations however, collecting wild plants and asking for food were uncommon coping strategies for food insecurity (Cordero-Ahiman *et al.*, 2018).

2.6.4 Household dietary diversity

According to Kolliesuah *et al.*, (2023), dietary diversity is described as a practice of consuming a diverse array of foods over time. The dietary diversity score reflects a diverse diet an individual consumes within a certain time frame. The survey gathers information on the types of food an

individual typically consumes. It helps to figure out how varied a household's diet is by looking at the different types of food they eat (Swindale & Bilinsky, 2006). The set time can be from one to seven days. The household diversity score shows if a household ate different kinds of food. Having a lot of different types of food in a household's diet means it's more likely that the household has enough to eat (Vhurumuku, 2014).

Household dietary diversity measurements depend on surveys and monitoring activities. Identifying the most food insecure households, using this measure would be more effective after the scarcity period has ended (Nabuuma *et al.*, 2021). Some authors have not approved of the effectiveness of this method as it focuses on food quantity and ignores its quality (Antwi *et al.*, 2022). However, household dietary indicator is a good gauge of households that consume mostly grain foods (Swindale & Bilinsky, 2006).

2.6.5 Household food consumption scores

Food Consumption Score (FCS) indicator was launched in 1996 (WFP, 2008). Household food frequency tracks how often different foods were relished by household members in the past seven days. To calculate FCS, foods are categorized based on data from a typical week, reflecting the usual eating habits. The total food frequency for each group is determined (up to a maximum of 7), then multiplied by the group's assigned significance value. The continuous household FCS is transformed to a categorical variable by aggregating weighted scores from various dietary groups, including primary staples (2), fruits and vegetables each assigned (1), first class proteins (4), sugar and lipids each (0.5) (Data4Diets, 2023). According to the WFP (2008), the HFCS employs three threshold values: 0 – 21 is taken to be poor, between 21.5 – 35 is considered borderline, while above 35 is deemed acceptable. It is believed that DDS and FCS are simple to test and provide

reliable information therefore they are useful indicators of food inaccessibility at household level (Miller *et al.*, 2020).

2.7 Determinants of household food insecurity

2.7.1 Household size

Household size refers to the total number of individuals, including persons of all ages, who reside together and sharing food from a unified source (UBOS, 2024). A large family unit sharing a common residence, will probably eat more food than small families. Akello and Mwesigwa (2023), found that when a family gets bigger, it's harder for them to have enough food. Having more people in the family means less money and resources for each person. This is because larger families need more food, which can make it harder for each person to have enough to eat (Antwi & Lyford, 2022). Rukundo *et al.*, (2016) revealed a big number of people in a family had a higher likelihood of lacking sufficient food, especially if they did not eat a variety of foods. Additionally, families with many people had less food security than families with fewer people (Sahu *et al.*, 2017).

2.7.2 Household income

Household income means all the money that a household makes in a given period from different sources (World Bank, 2020). How much money a family makes is very important for making sure they have enough food at home. Low-income households often struggle to access sufficient food due to financial constraints (Sahu *et al.*, 2017). In Ethiopia, Agidew and Singh (2018) used logistic regression to see how money affects whether a household has enough food. They found that having more money usually means resulted into food secure households. This means that earning a higher income can provide greater financial stability, making it easier to access adequate food. According to Mango *et al.*, (2014), revealed a significant disparity in food security, with those having lower incomes being four times more probable to struggle with food access. Sometimes, people without

a lot of money need help from the government and charities to decrease food insecurity levels and poverty (WFP, 2020)

2.7.3 Gender dynamics

Research indicates households headed by females were disproportionately challenged with food insecurity, with higher likelihood of experiencing food scarcity in comparison with male-headed households (Zhou *et al.*, 2019). Women take care of big families and sometimes do not eat so that their family household members can have food when there is scarcity. The majority of single parents are women, who often bear the primary caregiving responsibilities. Research by Lutomia *et al.*, (2019) revealed a notable gender gap in long-term food insecurity among Kenyan households, with female-headed households facing greater challenges.

2.7.4 Age of the household head

Households led by older individuals may experience increased vulnerability to being food insecure due to age-related challenges. Young people who take care of their households are thought to be more likely to work and try new, difficult jobs than older people who take care of their households. Elderly people who are in charge of their households are more likely to struggle to have enough food. This is because they are no longer working and have less money coming in, and they have to feed other older people in their families (Sani & Kemaw, 2019). However, Berning *et al.*, (2022) revealed due to sufficient time available to the elderly households, it was easy to adopt strategies which helped them to have better food security.

2.7.5 Educational level

Kundu *et al.*, (2021) indicated highly educated household heads had diverse and nutritious diets. Level of educational achievement is a crucial element to accessing sufficient food. This can happen because these households have better chances of securing better paying jobs to support and

improve their family members' lives. Highly educated household heads involved in farming tend to have a good impact on making agriculture better and can easily access financial resources to improve their production. This helps them earn more money for their households and makes sure there is enough food for everyone in the household (Zhou *et al.*, 2019).

2.8 Coping strategies related to food insecurity at the household level

Coping strategies are behavioural changes used to manage stressful food situations (WFP, 2008). During food shortage situations, households use different coping strategies and these include eating cheaper or less favourite food, asking to borrow food from friends or family, finding wild food, hunting or picking food before it's fully grown, eating seeds that were meant for planting, sending some family members to eat somewhere else, eating smaller portions, letting children eat instead of adults, limiting day's meals, enduring a full day without food and asking neighbours or friends for food. According to Tomayko *et al.*, (2017) when people did not have enough food, they used strategies like getting help from food programmes and families to have enough to eat. Furthermore, they also found that rural families hunted for food, gathered wild plants, and shared their food or grew fruits and vegetables in their gardens to help add more food to their diet.

CHAPTER THREE: METHODOLOGY

3.1 Study design

The study adopted a cross-sectional survey design, which focused on quantitative approaches allowing for efficient collection of data on multiple factors at once, providing a detailed picture of the situation (Aggarwal & Ranganathan, 2019).

3.2 Study area

Urban settlements of Wakiso district served as the study's area. Geographically, Wakiso district was part of central Uganda. It was bordered by different districts with Luweero and Nakaseke in the Northern, Mukono and Kalangala in the Eastern and Southern respectively, then Mpigi and Mityana in Southwest and Northeast. The coordinates of the District are 32 29 E and 00 24 N (UBOS, 2020).

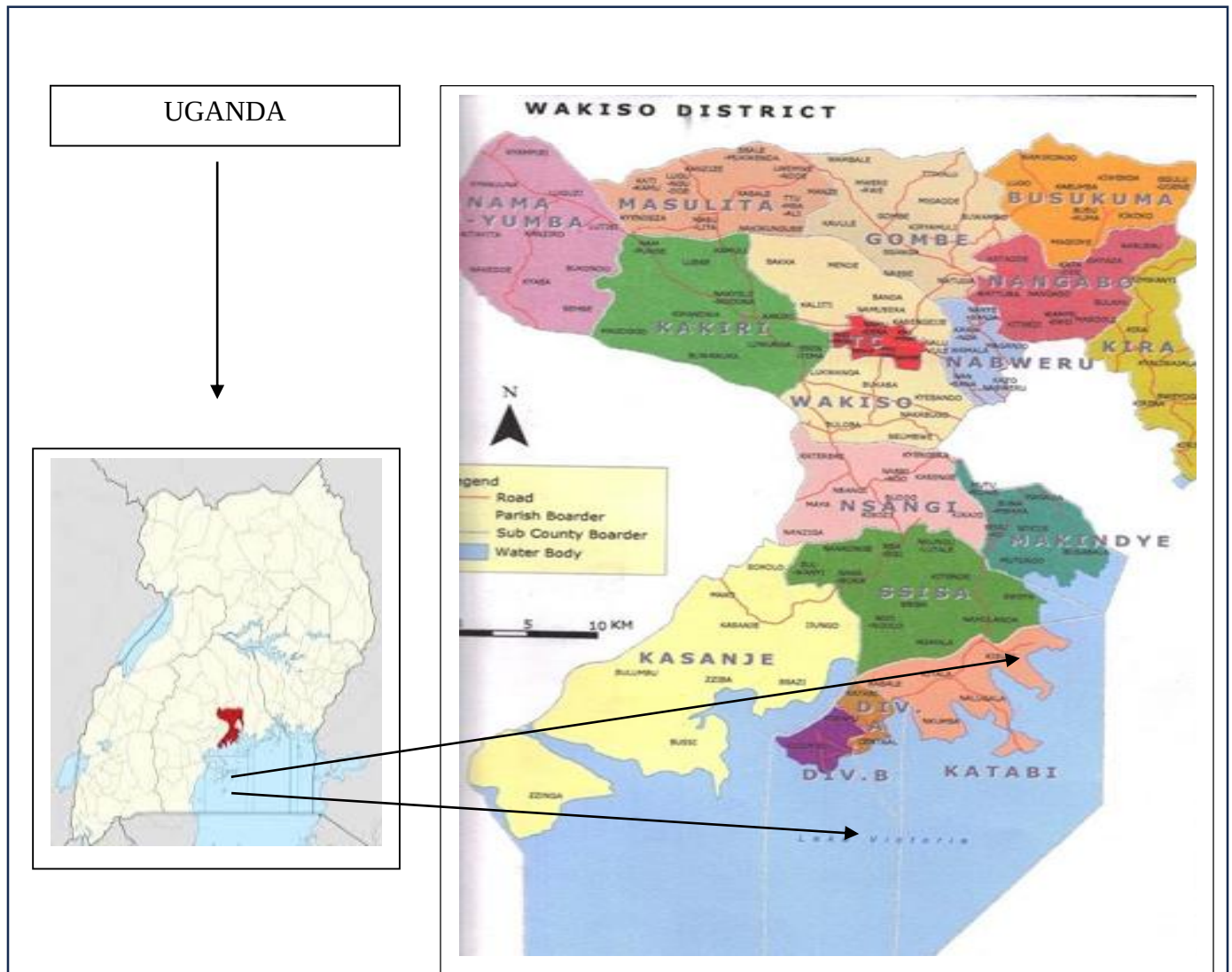
The district occupies 1,884 square kilometres in total size. It was one of the most populous Higher Local Government (HLG) in the Buganda region with 3,397,565 million residents.

Wakiso district's population density stood at 1,803 people per square kilometre, growing at an impressive rate 5.5% per annum from 2014 to 2024 (UBOS, 2024).

The district is made up of four municipalities and nine town councils consisting of indigenous people and immigrants from all over Uganda, who are involved in various economic activities. It is a residential area for many people who own small, medium and big business enterprises in the country's capital city. According to the National Census and Household survey of 2014, 69 % of the households practised subsistence farming while 27% depended on earned income.

Two of the four municipalities participated and these were Makindye Ssabagabo municipality and Entebbe municipality. Wakiso as a district was particularly taken into consideration for this study

because of its diverse settings and complex socio-economic factors. Wakiso district is uniquely positioned and partially surrounded and accommodated the largest workforce that commutes to Kampala, Uganda's capital city. The area also played a vital role in supporting Kampala with food (Sabiiti & Katongole, 2016).



Source: UBOS (2020).

Figure 2: Map showing the study area

3.3 Study populations

The study population were households from urban settings of Wakiso district in the municipalities of Makindye Ssabagabo and Entebbe. Wakiso district residents live an urban life style since the district encircles Kampala city. Given its geographical location, there is a rapid rate of urbanization with a diverse population in the social and economic class, different levels of education attainment, various employment status, different cultures and tribes working and staying there (UBOS, 2018).

3.4 Sampling

3.4.1 Sample size determination

To obtain the representative sample population, Fisher's formula was used (Fischer *et al.*, 1998). The prevalence estimator (p) of food insecurity reported at 17% in urban settings of Kampala city was used (FEWSNET, 2020). It was considered desirable given the close proximity of Kampala city and Wakiso district, with the later regarded as part of the Kampala Metropolitan Area (MLHUD, 2021/22).

That is;

$$N = \frac{(Z)^2 p(1-p)}{e^2}$$

Where:

N = Sample size

Z = confidence level = 1.96

p = prevalence = 0.17

e = margin of error = 5% = 0.05

$$N = \frac{(1.96)^2 0.17(1-0.17)}{(0.05)^2} = \frac{3.842 \times 0.17 \times 0.83}{0.0025} = 217 \text{ households.}$$

To account for potential non-response, an extra seven households (3%) were added to the sample. The study, therefore, targeted 224 households.

3.4.2 Sampling procedures

This study used a four-stage sampling procedure to draw samples for the study and it was conducted as follows:

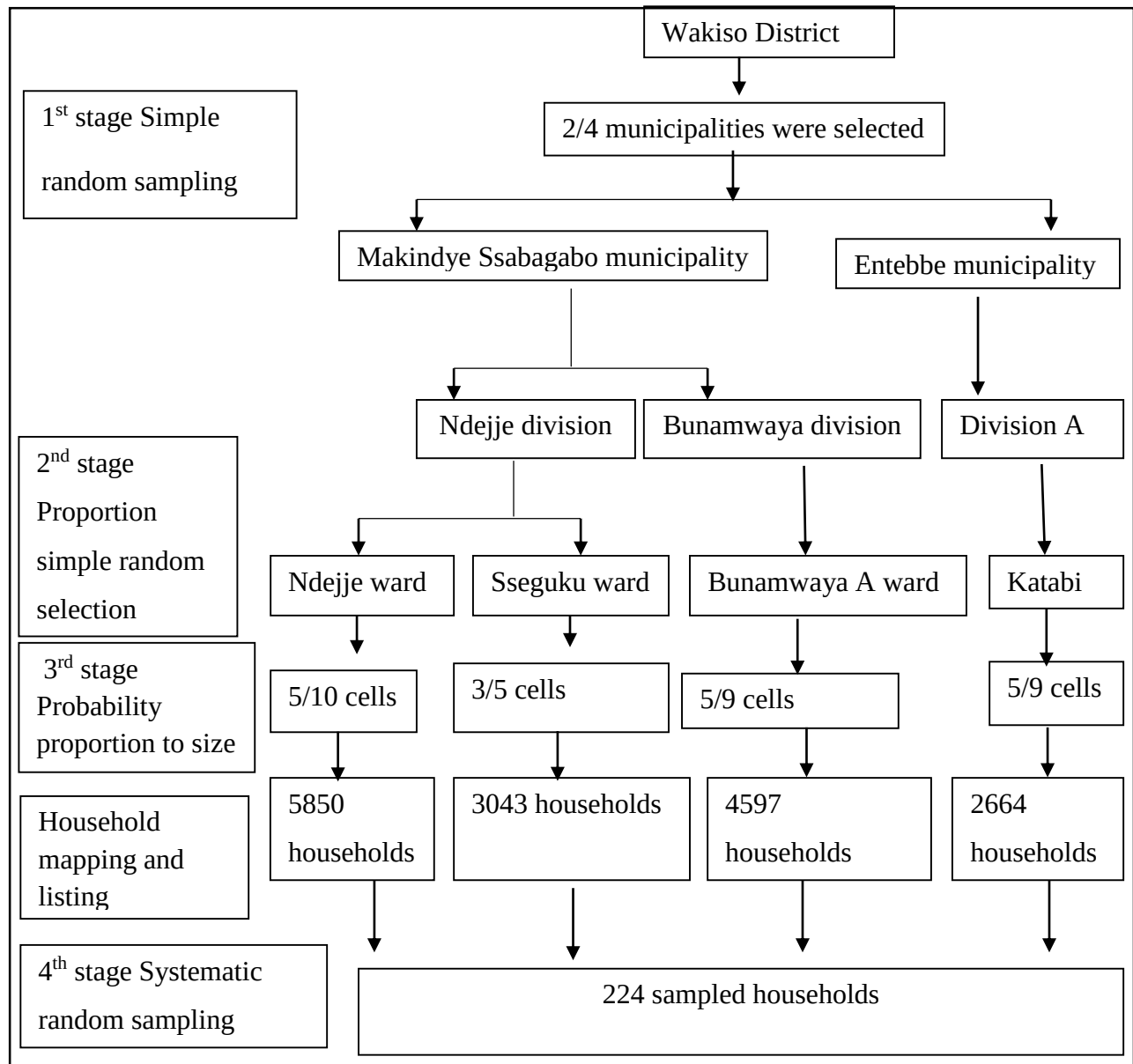


Figure 3: Sampling technique for the study

- (i) First stage: Two out of four towns were picked by simple random sampling using a ballot approach. Four pieces of paper were cut, and the names Nansana, Makindye Ssabagabo, Entebbe and Kira were written on them. The papers were folded, placed in a box, and then shaken. Two pieces were chosen from the box without looking. The names on the papers were found to be Makindye-Ssabagabo and Entebbe.
- (ii) Stage two: Makindye-Ssabagabo and Entebbe municipal constituencies has three and two divisions respectively, using proportionate simple random selection two divisions (Ndejje and Bunamwaya) were selected from Makindye-Ssabagabo and one (Division A) from Entebbe municipal constituency for this study. Out of the two municipalities selected from Makindye-Ssabagabo, Ndejje has three wards and Bunamwaya has two wards, still using simple random sampling two (Ndejje and Sseguku) and one ward (Bunamwaya A) were selected from Ndejje and Bunamwaya respectively. Entebbe division A has two wards central ward and Katabi. From these two wards, Katabi was selected through a simple random approach. A total of four wards from three divisions were used in this study.
- (iii) Stage three: Using probability proportion to size, eighteen cells were selected from the four wards within the sampled divisions. Using UBOS (2017), Ndejje ward had ten cells out of which five were selected, Sseguku ward had five out of which three cells were selected, Bunamwaya ward had nine out of which five were selected and Katabi had nine out of which five were selected. These cells had the following number of households Ndejje (1240, 1102, 1185, 1400, 923), Sseguku (1023, 1000, 1020), Bunamwaya (921,880, 960, 936, 900) and Katabi (536, 532, 600, 490, 506). The eighteen cells within the four wards accounted for a total of 16154.

- (iv) Final stage: A systematic random sampling approach was employed to get sample households from the 16154 households. The wards were arranged in alphabetical order. Using lists from the chairman/woman of Local Council 1, sampling frames/lists were created and organized alphabetically by ward to create a single list that included every household. Unique identity (ID) numbers 001 to 16154 were allocated to the listed households. In order to find (K) as a sampling interval, the overall total count of 16154 households was divided by the total sample count of 224 households. This resulted into a sampling interval of 72 which was employed for selecting households. The sample unit selection process began with a blind selection of any number between 001 and 072. 072 was chosen as the initial number. Starting from a random point, every 72nd household was picked from the population list to obtain a total of 224 households for this study.

The formula below illustrates how the 224 households were systematically sampled.

$$n=N/K$$

Where;

N= Population size

K=Sampling interval

n = Sample size

$$n=16154/72$$

$$n=224$$

3.5 Data collection

3.5.1 Methods of data collection

Prior to interviews rapport was sought, involvement in the study was voluntary and only those heads of households who consented were included (Annex 1). Structured interviews were carried out in the respondents' homes preferably with the heads of the households. Heads of households who were not at home at the time of interviews were visited the second time. Non-response households, on the other hand, were those who were unwilling to be interviewed or those who were unavailable during the two visits.

3.5.2 Study instruments

A semi-structured questionnaire was used as the main research instrument. The survey integrated previously approved instruments for evaluating diet and food insecurity. This was changed to better suit the research field. The study questionnaire was made up of 5 sections; socio-demographics, food security, dietary diversity, food consumption and coping strategies. Food insecure households were measured using HFIAS and CSI. Adjustments to food insecurity situations, were reflected by coping strategies used by a household. Dietary Diversity Scores and FCS were utilized to evaluate dietary patterns.

3.6 Data validity and reliability

3.6.1 Pre-testing the study questionnaire

To verify the instruments for research, a pilot study using the semi-structured questionnaire was done in randomly sampled ten households from the town councils of Kyengera and Kajjansi. The study did not take these town councils into account. To determine and guarantee the homogeneity of results, the pilot study was carried out in two separate town councils on alternate days. Experience obtained helped to adjust the tool in terms of clarity of questioning and relevance of

the questions and this increased the instrument's face, content and construct validity with consistency. After the pre-test phase, there was revision of the questionnaire to include more response spaces and to clarify some of the ambiguous questions.

3.6.2 Use of trained research assistants

Eight research assistants from the four study wards received training on how to introduce oneself and state the goal of the study. They also received training on conventional interview procedures for gathering data. The research assistants also engaged in practice and rehearsal interview sessions on asking questions and probing skills using a questionnaire translated into Luganda before actual data collection.

3.7 Data entry quality control

All questionnaires filled per day were checked to ensure all questions were answered appropriately before leaving the household. Data entry and cleaning were carried out to improve its quality and make it suitable for analysis.

3.8 Data analysis

3.8.1 Scoring and categorization of household food insecurity

Household Food Insecurity Access Scale had nine questions that pertain to instances of food insecurity that have transpired in the last thirty days and provided information on a household's food insecurity for the preceding month (Borku *et al*, 2024).

Basing on the frequency count for a given experience in the past month. Participants were questioned, whether the condition in the question happened at all in the past four weeks (yes or no). Points were awarded depending on the response never =0, rarely (once or twice a week) =1, sometimes (three to ten times) =2, often (more than ten times) = 3 points (Swindale & Bilinsky,

2006). If all the nine questions were answered in the affirmative, they would receive a highest score of 27 points, representing extreme food insecurity levels.

Table 1: Categories of food insecurity

HFIAS score	Food security status
1	Food secure
2-7	Mild food insecurity
8-10	Moderate food insecurity
11-27	Severely food insecure

Source: FANTA, (2007)

3.8.2 Household coping strategies index scoring and categorization

When a household does not have enough food, they do things to try to manage the situation. The CSI showed if a household had enough food and was related to other ways of measuring food insufficiencies. It includes questions about how households dealt with food insufficiencies and a score was awarded based on the answers. According to FAO (2009) and WFP (2010), CSI used four common ways that households could deal with problems. These ways could be used by any household, no matter where they lived. The four ways people coped with problems and how serious they were included: (i) changing what they ate= 1.0, (ii) getting more food for the short term= 2.0, (iii) having fewer people around= 3.0, and (iv) rationing what they had= 4.0. A higher score denoted severe food insecurity adaptive strategies.

Participants in the study, were asked about the frequency of their household's coping strategy in a week- long span. The frequency of each answer was then multiplied by its corresponding weight, and then the results were summed up to calculate the total score. Score classification guidelines

were, food secure with No or low coping (between 0 and 2), (3-12) for mildly food insecure, and moderately/severely food insecure with high coping (≥ 13) a higher score meant high food insecurity level (Sumsion et al., 2023).

Table 2: Coping Index Score Descriptions

CSI Score	Category description
0-2	Food secure
3-12	Mildly food insecure
≥ 13	Moderately/Severely food insecure

Source: FAO, (2009)

3.8.3 Scoring dietary diversity and food consumption

Measuring the range of foods eaten by households, HDDS was calculated, providing a comprehensive assessment of household-level dietary diversity. The DDS gathers information on dietary diversity for the entire household not just one person during a typical 24-hour period. The tool included 12 distinct food groups, with a range of 0 to 12 scores, where 0 was the minimum and 12 maximum score (Swindale & Bilinsky, 2006; Yohannes *et al.*, 2023).

Food groups consisted of: (i) grains and cereals; (ii) pulses and legumes; (iii) tubers and starchy roots; (iv) vegetables; (v) fruit juices and fruits; (vi) poultry and products; (vii) meat and products; (viii) milk and products; (ix) lipids; (x) fish and fish products; (xi) sugars and confectioneries; and (xii) condiments, spices and non-alcoholic beverages.

The data for the HDDS was gathered through a historical recall approach, where the household head reported array of consumed foods by the household in the last day. The respondents were asked about how many meals incorporating the food item each member of the family had eaten in

the last 24 hours, specifically about the food(s) from the listed groups. In the absence of food in the preceding 24 hours, a zero score would be awarded for “no” while 1 would be awarded for “yes”. A household’s consumption of food items in all food groups, the total score would be 12 as the maximum with zero score being the minimum score. The HDDS, which was classified using the cut-off points as indicated in the table below, were created considering the total score (FAO, 2007).

Table 3: Cut-off points for Dietary Diversity Score

Dietary Diversity Score	Dietary Diversity Status
≤ 3	Low dietary diversity
4-5	Medium dietary diversity
≥ 6	High dietary diversity

Source: FAO, (2007)

Dietary pattern assessment was also done using the FCS. The tool featured eight separate food groups with their corresponding weights; 2 for main staples, 3 for pulses, each vegetables and fruits 1, animal proteins (meat/fish and milk) 4, while sugar and lipids (fats/oils) each weighted 0.5. Over the previous seven days, participants were asked questions regarding whether their households consumed any of the eight food groups.

The number of times a household consumed every single food, the tally was multiplied by a predetermined weight factor, to generate a weighted frequency score. Total scores for the various food groups determined the FCS. A household with a higher FCS was more probable to food security an indication of consuming a variety of food groups. A lower FCS indicated potential food insecurity because a household may not be eating enough of some food kinds.

The table below shows how the FCS and household food consumption were categorized into various levels (WFP, 2008).

Table 4: Food Consumption boundaries

Food Consumption Score	Food consumption status	Interpretation
0-21	Poor	Limited dietary patterns/high consumption of low nutrient-dense food groups
21.1 – 35	Borderline	Average consumption of nutrient dense food groups
≥ 35	Acceptable	Greater intake of many foods' groups /higher consumption of nutrient dense food groups

Source: WFP, (2008)

3.8.4 Statistical analysis

Version 29.0 of the Statistical Package for Social Sciences (SPSS) computer software was used to analyse the data. Data was first loaded in Epi Data version 3.1, and then exported to SPSS for analysis. To analyse the respondents' socio-demographic traits, descriptive statistics were employed. HFIAS, CSI, HDDS and FCS were computed using the WFP and FANTA guidelines.

Bivariate analysis that consisted of One-way analysis of variance (ANOVA), Chi-square tests of independence and Pearson correlation coefficient (r) were run to uncover the association between the socio-demographic characteristics and household food security status. Chi-square test was used to compare categorical variables, Analysis of variance (ANOVA) compare the differences in the means of the dependent household variables broken down by the levels of the HFIAS, CSI, DDS and FCS. Pearson correlation coefficient (r), was used to measure relationship between the food insecurity tools. Multivariate regression analysis was utilised to analyse relationship between the multiple dependent household variables and household food insecurity.

With household food insecurity access scale, household food security status was categorized as; food secure, mild food insecure, moderate food insecure and severely food insecure. Coping strategies index was divided into two, those below the average mean score and the ones above. Dietary diversity state was classified into three categories, low, medium and high dietary diversity. Food consumption status was categorized into three, acceptable, borderline and poor status depending on the food consumption scores.

For multivariate logistic regression, HFIAS scores were categorised as; food secure and food insecure. Food secure and food insecure were coded as zero and one respectively. Food insecure was the outcome. Collinearity was assessed before variables were used for multivariate logistic regression. Level of significance was set at < 0.05 with a 95% level of confidence. Food insecurity was assessed using HFIAS and CSI while dietary patterns were reflected by number of meals, DDS and FCS.

3.9 Ethical consideration

Research authorization and application were submitted to Kyambogo University. The Directorate of Graduate Training and Research at Kyambogo University provided a letter of authorization to undertake research (Annex 3). This was followed by ethical approval from Mbale Regional Referral Hospital Ethical Research Committee (reference MRRH-2022-180) (Annex 4) and Uganda National Council of Science and Technology approved the study (reference SS1271ES) (Annex 5). Approval to gather data within the district was sought from the Chief Administration Officer at the district headquarters (Annex 6). All the other relevant heads at the different administrative levels of the municipality (Annex 7) were notified and approved the study. Preceding data collection, respondents were made aware that the study was basically for educational purposes. Participants gave voluntary signed agreement to take part in the study. They were given assurances about the security and confidentiality of personal information during study home visits.

CHAPTER FOUR: RESULTS

4.1 Characteristics of the study population

4.1.1 General characteristics of household members

In this study, 217 households were interviewed out of the 224 that were targeted. Table 5 displays characteristic aspects of research population. The majority of respondents were male, married, and had completed secondary school. Their average family size consisted of four individuals, and their mean (SD) age was 36 (13.1) years.

Table 5: Characteristics of the study population

Characteristics	n (%)	Mean (SD)
Sex		
Male	144 (66.4)	
Female	73 (36.6)	
Age (years)	217 (100)	36 (13.1)
Education		
No education	15 (6.9)	
Primary level	44 (20.3)	
Secondary level	90 (41.5)	
Tertiary	68 (31.3)	
Marital status		
Bachelors/Spinsters	38 (17.5)	
Married	133 (61.3)	
Widowed	16 (7.4)	
Divorced	4 (1.8)	
Single – mothers	26 (12)	
Occupation		
Farming	15 (6.9)	
Salary employed	54 (24.9)	
Self-employed	108 (49.8)	
Casual labourer	28 (12.9)	
Jobless/retired	12 (5.5)	
Family type		
Nuclear	105 (48.4)	

Extended	72 (33.2)	
Female-headed	25 (11.5)	
Male-headed	15 (6.9)	
Household size	217 (100)	4 (1.94)

4.1.2 Socio-demographic characteristics in the two municipalities compared

Table 6 indicates the characteristics of households in each municipality. Makindye Ssabagabo municipality had a higher number of respondents than Entebbe municipality this is because Makindye Ssabagabo municipality had more divisions than Entebbe municipality. A notable difference was observed between Makindye Ssabagabo and Entebbe municipality in terms of gender distribution, with Makindye ssabagabo having a significantly higher proportion of male respondents. However, no significant differences were found between the two municipalities regarding other household characteristics.

Table 6: Socio-demographic characteristics by municipality

Characteristics	Makindye Ssabagabo n=157 (%)	Entebbe municipality n=60 (%)	Total
Gender			
Males	116 (73.9)	28 (46.7)	144
Females	41 (26.1)	32 (53.3)	73
Occupation			
Farming	14 (8.9)	1 (1.7)	15
Salary	37 (23.6)	17 (28.3)	54
Self-employment	77 (49)	31 (51.7)	108
Day labourers	24 (15.3)	4 (6.7)	28
Jobless/retired	5 (3.2)	7 (11.7)	12
Marital status			
Bachelors/Spinsters	19 (12.1)	19 (31.7)	38
Married	109 (69.4)	24 (40)	133
Widowed	10 (6.4)	6 (10)	16
Divorced	3 (1.9)	1 (1.7)	4
Single mothers	16 (10.2)	10 (16.7)	26
Household size			
1- 6 members	128 (81.5)	53 (88.3)	181
7-10 members	29 (18.5)	7 (11.7)	36

4.2 Household food insecurity in the study area

4.2.1 Household food insecurity scores

Using HFIAS, the mean (SD) score was 10.8 (6.3). With HFIAS scores, 9 (4.1%) were considered to be food secure with 1 score whereas 99 (45.6%) were severely food insecure with > 11 scores (Table 7).

Table 7: Household food insecurity in the study population

Variable	n (%)	Mean (SD)
HFIAS		
Mean (SD) HFIAS		10.8 (6.3)
Food Secure (1 score)	9 (4.1)	
Mild Food Insecurity (2-7 scores)	85 (39.2)	
Moderate Food Insecurity (8-10 scores)	24 (11.1)	
Severe Food Insecurity (11-27 scores)	99 (45.6)	

4.3 Household food insecurity coping strategies

4.3.1 Household food insecurity coping strategies practised in the study area

All food insecurity coping strategies were found to be practised in the study areas. Reducing in the meal numbers and limiting portion sizes were the most practised while food begging and feeding on wild food were the least practised household coping mechanisms (Table 8).

Table 8: Household food insecurity coping Strategies

Consumption Coping Strategies of Respondents	Frequency	Percentage
Reduce the number of meals eaten in a day	2180	27.9
Limit portion size at meal times	1940	24.8
Restrict consumption by adults for small children to eat	940	12
Purchase food on credit	856	11
Rely on less preferred and less expensive food	676	8.7
Borrow food, or rely on help from a friend or relative	298	3.8
Feed working members of HH at the expense of non-working members	248	3.2
Skip entire days without eating	230	2.9
Consume seed stock held for next season	182	2.3
Send household members to eat elsewhere	114	1.5
Gather wild food, hunt, or harvest immature crops	92	1.2
Send household members to beg	56	0.7

4.3.2 Household Coping Strategies Index scores

By use of CSI the mean (SD) score was 35.7 (30.9) with a minimum of 0 and maximum of 158 scores. The highest number of households were below the mean score, implying the highest number of households employed coping strategies during food insecurity situations (Table 9).

Table 9: Household food coping strategies by scores

Variable	n (%)	Mean (SD)
CSI scores		
Mean (SD) CSI		35.7 (30.9)
Below the mean score	126 (58.1)	
Above the mean score	91 (41.9)	

4. 4 Dietary patterns in the study area

Dietary patterns were examined and recorded by using meal patterns, HDDS and FCS.

4.4.1 Meal patterns in the study area

In this study, 48.8% of the households were found to consume three meals per day and these meals included breakfast, lunch and supper. However, 51.2% of households skipped at least one meal per day. The most commonly skipped meal in a day was breakfast as reported by (42.7%). On the other hand, supper was the least skipped meal at (24.3%) (Figure 4).

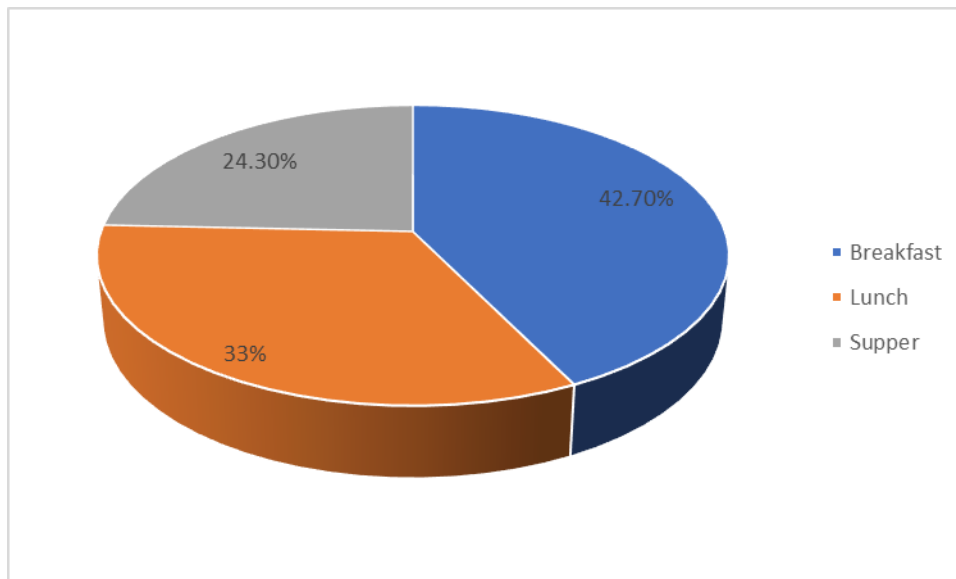


Figure 4: Households skipping of meals

4.4.2 Household dietary diversity in the study area

The mean (SD) household DDS was 5 (2.1) with a range of 0 to 10. From this study, it was indicated that 36 % had a relatively high dietary diversity score (consumed ≥ 6 food groups) in the past 24- hours before the study while low dietary diversity score (≤ 3 food groups) and medium dietary diversity scores (4-5 food groups) were equally distributed (32%) in the respective households as shown in figure 5.

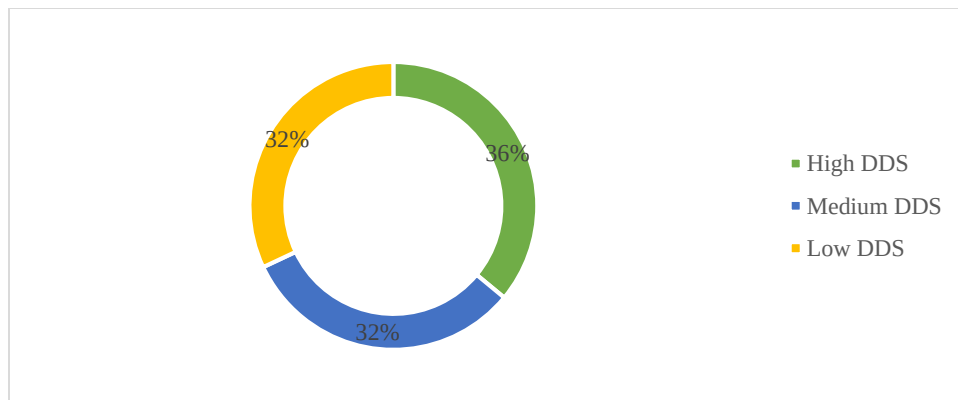


Figure 5: Dietary Diversity Score of the study population

In the urban settings of Wakiso, cereals were reportedly the most consumed foods by (88.9 %) of the households. These were followed by the consumption of other vegetables like tomatoes at (71.4 %). More households consumed legumes (56.7 %) than nuts (38.2 %). Eggs (29.0 %) and dairy (33.6%) had the lowest consumption rate Figure 6.

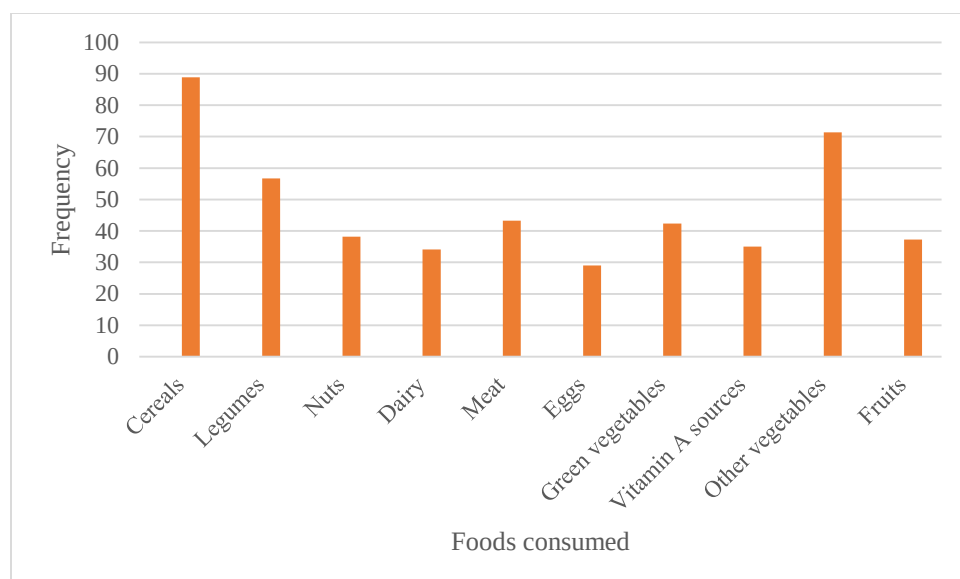


Figure 6: Proportion of food groups consumed by households in the previous 24 hours

4.4.3 Household food consumption status in the study area

Households in the study area consumed all foods but with varying frequencies. Cereals the main staples accompanied by legumes were frequently consumed. The most commonly consumed foods were cereals (88.9%), followed by legumes (71.4%) and other vegetables like tomatoes (56.7%). However, eggs (29.0%), dairy (33.6 %) and other fruits (37.3%) were the least consumed foods in a week.

Household's food consumption scores varied between 17 and 30, with a mean (SD) score of 27.8 (3.1). However, no household achieved an acceptable food consumption score. The majority (90.3%) had borderline scores in the previous seven days before the study. Those with poor food consumption scores were (9.7%) as shown in Table 10.

Table 10: Household food consumption status in the study population

Variable	n (%)	Mean (SD)
FCS		
Mean (SD) FCS		27.8 (3.1)
Acceptable (≥ 35 scores)	00 (0.0)	
Borderline (21.1 - 35 scores)	196 (90.3)	
Poor (0 - 21 scores)	21 (9.7)	

4.5 Correlation of household food insecurity, coping strategies, dietary diversity and food consumption scores

Higher mean (SD) food insecurity scores were significant by gender of the household head ($p < 0.01$). Municipality of residence showed a significant association with food insecurity categorization ($p < 0.01$). Gender of the household head ($p < 0.01$), marital status ($p = 0.02$), occupation of the household head ($p < 0.01$) and municipality of residence ($p < 0.01$) were significantly associated with Coping Strategies Index. Existence of assets ($p = 0.002$), municipality of residence ($p < 0.001$) and occupation of the family head ($p = 0.03$) showed a significant association with household coping strategies categorization. Gender of the household head ($p < 0.001$) and marital status showed a significant association with skipping meals. Existence of assets to supplement food sources ($p = 0.03$) was significantly associated with DDS categories. Household head's occupation ($p = 0.002$) reflected a significant association with food consumption scores.

A Pearson correlation coefficient (r) was computed to assess the relationship between HFIAS, CSI, DDS and FCS. The study showed moderate negative correlation between DDS and food

insecurity thus, this indicated increased DDS resulted into decreased food insecurity. Further, moderate negative correlation between FCS and food insecurity was showed, an indication increased FCS resulted into decreased food insecurity. Strong positive correlation was shown between CS and food insecurity indicating increased coping strategies meant increased food insecurity (Table 11).

Table 11: Correlation between food insecurity indicators

Parameters	HFIAS	
	r- value	p-value
Dietary Diversity Scores	-0.385	< 0.01
Food Consumption Scores	-0.338	< 0.01
Coping Strategies Index Score	0.650	< 0.01

4.6 Multivariate logistic regression between food insecurity and socio-demographic

Table 12 presents a multivariate logistic regression analysis for socio-demographic characteristics and food insecurity. From the table, household food insecurity was significantly associated with existence of assets ($p = 0.041$) and gender ($p = 0.002$). Households with assets were less likely to experience food insecurity compared to those without assets. Male-headed households also showed reduced odds of food insecurity compared to female headed ones. In addition, households with extended families demonstrated higher odds of food insecurity compared to nuclear families, but this association did not reach statistical significance. Other socio-demographic factors, including marital status, occupation, municipality of residence and socio-support did not show any

significancy association with food insecurity in the adjusted model. This model indicates a moderate variance level of 35%, level of significance was regarded at 0.05 with a 95% level of confidence.

Table 12: Multivariate associations of household food insecurity and socio-demographic

Variable	Coefficients (B)	p-value	Exp (B)	95% Cl. For Exp (B)
Social support				
Yes	Ref (1)			
No	18.565	0.997	115486.05	0.054, 1.160
Gender				
Females	Ref (1)			
Males	-0.212	0.002**	0.229	0.068, 9.593
Marital status				
Bachelors/spinster	Ref (1)			
Married	-0.903	0.575	0.405	0.017, 9.498
Single mothers	0.174	0.915	1.190	0.048, 29.298
Type of Family				
Nuclear	Ref (1)			
Extended	2.259	0.060	9.577	0.909, 100.877
Assets				
No	Ref (1)			
Yes	-1.769	0.041	0.170	0.31, 0.928
Municipality				
Entebbe	Ref (1)			
Makindye	-18.522	0.997	0.006	0.000, 0.569
Occupation				
Self-employment	Ref (1)			
Salary employment	-1.079	0.209	0.390	0.063, 1.830
Jobless	-0.648	0.453	0.523	0.096, 2.838

CHAPTER FIVE: DISCUSSION

5.1 Household food insecurity

Using HFIAS and CSI, two distinct levels of food access were determined. Some households had adequate food access while majority limited food access. The results align with the research Sahu *et al.*, (2017) did in Nagaland, India. They reported a coefficient of variation of 3.60 % and 47 % using the Self Assessed Food Security Scale (SAFSS) and HFIAS respectively. The findings are consistent with the notion that varying approaches to measuring food access could lead to different results.

The research showed that most households faced challenges in accessing sufficient food aligning with Yikii *et al.*, (2017), results but diverges from the conclusions of Zhou *et al.*, (2019) of having minority of households lacking food. The findings implied that urban households were highly food insecure. One possible explanation for food insecurity in urban household was the urban households' reliance on market-based food systems, which could be unaffordable for low-income urban households due to high food prices (Birhane *et al.*, 2014)

The study revealed a substantial gender disparity in food insecure households, with households having females as their heads having more struggles with accessing food. A significant correlation between food insecurity, household head gender and existence of assets to supplement food sources was shown. Earlier research in different locations supports these results, indicating that households led by males and those with assets as means to supplement food sources, had higher food security levels (Anand *et al.*, 2019; Sahu *et al.*, 2017; Mutea *et al.*, 2019; Semazzi and Kakungulu 2020; Yohannes *et al.*, 2023; Zhou *et al.*, 2019). The possible explanation is that, in Uganda, men attain higher levels of education than women therefore, more men are employed in the labour force and paid employment than women who are engaged in family work (UBOS,

2018). But also, males in Uganda possess more assets that supplement food sources than females. Study results contradicted the conclusions drawn by (Ngabirano *et al.*, 2023) which indicated households led by males were more food insecure.

The results reveal a spatial disparity in food insecurity, with a given municipality experiencing high food insecurity levels than the other. This suggests that geographical location is a key factor when it comes to attainment of food security. Those located in Entebbe municipality were more food insecure than those of Makindye Ssabagabo. The UBOS (2017) report indicated 3.9% of Entebbe municipality residents engaged in subsistence farming out of the overall majority (69%). This is possible because Entebbe Municipality is located near the shores of Lake Victoria meaning that more households could be more engaged in fishing activities other than subsistence urban farming which was a primary source of food in fighting food insecurity. It was possible that these households lacked adequate capital to invest in mega fishing industries and mainly participated in small-scale fishing operations which resulted into low incomes. It was also possible that the local policies governing fishing activities hindered residents from earning enough resources to spend on food.

Furthermore, poor housing and sanitation facilities in Entebbe municipality could lead to ill health as 81% of the municipality's population were not residing in decent dwellings and 0.3% lacked any toilet facilities (UBOS,2017). This could result into poor health hindering participation in income generating activities and also spending on treatment compromising household's resources and food access.

Food insecurity was strongly linked to reduced dietary diversity and lower food consumption scores highlighting how households experiencing inadequate food access shift towards monotonous less dense energy diets that lack essential nutrients. The positive correlation

between HFIAS and CSI further reinforces the notion that as food insecurity intensifies, households are compelled to adopt negative coping mechanisms and similar patterns have been reported by (Mutea *et al.*, 2019).

The study found no significant impact of social support, marital status and family type on the food security outcome, suggesting that these factors did not hold significant importance in this context. The absence of statistically significant relationships suggests that these factors were not key contributors to explaining food security in the metropolitan areas.

Interestingly, the findings on social support in this study deviated from previous research (Agidew & Singh, 2018; Yamchi *et al.*, 2020), which suggested that households in rural appear to be more food secure because of stronger social support networks. In contrast, this study reveals that social support may not necessarily mitigate limited food access in rural areas. It is worth mentioning the study was under taken in an urban setting with a distinct focus and methodology that differed from the previous research, particularly in its limited examination of the quality and quantity of social support received. This difference in scope and design may contribute to contradictory insights into the connection between social support and food insecure households. The findings may also be attributed to the fact that many urban households lack strong social connections with their neighbours, a vital component of social support (Murrell., 2022). This could be a result of urbanization's negative impact on the community ties, highlighting the need to address social isolation and build stronger support networks in urban areas. Social relationships are vital in bridging and maintaining strong social connections to ensure access to necessary support and resources (Semazzi & Kakungulu., 2020).

5. 2 Household food insecurity and coping strategies

The findings of the study, revealed that households with food accessibility challenges, employed several coping mechanisms to manage the situation. These finding support the findings of Sani and Kemaw (2019) where diversified coping mechanisms were adopted during household food in-access situations. This implied that most households who were faced with a food insecurity crisis adopted different coping strategies.

The findings indicated that portion reduction and portion limitation were commonly practised coping strategies. The results of this study aligned with earlier work which had their top two coping mechanisms as reducing meal size and reducing frequency of meals (Biadgilign, 2023; Elolu *et al.*, 2023; Sani and Kemaw, 2019). Other studies indicated resorting to less preferred affordable food options and taking part in off-farm activities as the most top two practised coping strategies (Kisi *et al.*, 2018; Melese *et al.*, 2021). The findings suggest households employed different coping mechanisms to combat food insecurity risks, and that these strategies varied across different areas, with local contexts influencing the adoption of specific coping tactics and their relative importance.

The study also indicated that households headed by females suffered higher food insecurity levels reflected by their mean (SD) CSI scores, although male-headed households had a greater proportion of households with CSI scores above the mean. This result suggested a multifaceted and intricate connection between household headship and food accessibility. The study finding was in line with that of Kairiza and Kembo (2019) which indicated that households with females as their heads struggled with food insecurity and employed consumption adjustments other than livelihoods diversifications. This could possibly be because both females and males use coping strategies during food insecurity situations but due to socio-culture settings females could easily

adopt consumption-based coping strategies like foregoing their own consumption to feed others while males are good at livelihoods-based coping strategies like migrating to work in other places (Kairiza & Kembo., 2019).

Study findings showed a positive association between HFIAS and CSI. This meant that household food insecurity rose along with coping mechanisms. The study's outcome was consistent with Farzana *et al.*, (2017) research, which showed that increased CSI scores correlated with higher food insecurity levels. However, by employing coping mechanisms, households could decrease household's exposure to food insecurity, highlighting the importance of proactive measures in mitigating its impacts.

5.3 Dietary patterns of households in urban areas

Majority of the study population skipped at least one major meal and it is not known whether they did it intentionally or due to other reasons. From these meals, breakfast was the most commonly skipped meal. This study's findings align with Sincovich *et al.*, (2022) research results which indicated skipping breakfast was more common among females. Skipping meals is part of unhealthy behaviour which could lead to lower daily energy intake and poor mental health.

From this study, more households exhibited a high dietary variety score. This is in line with Kolliesuah *et al.*, (2023) study which revealed that households exhibited a diverse eating pattern distinguished by a high frequency of cereal and legume consumption, while eggs and milk-based products were the least frequently eaten food groups during the week indicating a reliance on plant-based staples. Uganda's food system was reliant on starchy staples, supplemented by cereals and legumes as both staples and protein sources (FEWSNET, 2017). This was further reinforced by data from the Annual Agricultural Survey (2018), which indicated that beans and maize were

highly prioritized crops, underscoring their significance in the country's food culture and agricultural practice.

Study findings showed that the male gender and existence of assets within a household were associated with high dietary diversity score. Accordingly, more men were employed in the labour force and paid employment than women who engaged in family work and that men possessed more assets than women (UBOS, 2018). With this at hand, once men move out to work and given more income, they could easily buy and eat different food items. This highlighted the significance of gender dynamics and financial resources in influencing food choices.

The study revealed that households primarily relied on cereals and legumes, with limited consumption of other nutrient-dense foods the reason for a noticeable suboptimal food consumption in most households posing it as a unique challenge faced by these households. The finding contradicted the results of Nabuuma *et al.*, (2021, which indicated households had high consumption of nutrient-dense foods. Furthermore, occupation was found to be a crucial factor in shaping food consumption scores, as it directly affected earning potential and, in turn, influenced food expenditure. Farmer-headed households had better food security than those having heads in other occupations like traders and civil servant (Shaibu *et al.*, 2023). This finding underscored the pivotal role of socioeconomic factors in influencing food security.

5.4 Strengths and limitations of the study

The primary findings of this study highlighted the pressing food insecurity challenges in Wakiso's urban areas, setting the stage for future studies. This research laid the underground work for further investigation into the complex issues surrounding food insecurity, ultimately informing strategies to address and mitigate its impacts on valuable populations.

The positive correlation between food insecurity indicators was a significant finding, as it revealed the nature and extent of the association between these indicators. These helped to confirm a strong connection between the food insecurity indicators, providing a foundation for further analysis.

The findings of this study could inform legislative efforts to address food insecurity in urban households, enabling policy makers to target and monitor key issues more effectively. To further enhance the accuracy of food insecurity assessment, further research should prioritize the analysis and integration of multiple variables to establish a comprehensive food security index. Currently, absence of a universal accepted method for assessing food inaccessibility, underscore the need for a more nuanced and multifaced approach to measuring this complex issue.

The study's limitations were worth mentioning. One potential concern was that HFIAS assessment could be influenced by social approval bias, as they were subject to report bias. Salman *et al.*, (2023) pointed out, that this bias could impact the accuracy of food security assessments, due to inaccurate reports from respondents because of social norms or stigma. However, steps were taken to reduce the impact of this limitation by thoroughly explaining the purpose and objective of the study.

A cross-sectional design allowed for identification of association and potential causal relationship between variables under study in a single snapshot. These findings identified correlations and associations that existed at one moment, providing a static of the relationship between the variables which could not allow to track trends over time. Lack of qualitative data limited contextual understanding and failure to capture complexity of broader themes and relationships thus missing a larger focus on information that might have been beneficial. This resulted into, difficulty in interpreting results, and inability to identify emerging themes. These affected the study's validity, reliability and comprehensiveness.

Additionally, the study's sample is not a typical representation of all urban households in Wakiso district since only two out of the four municipalities participated (Faber & Fonseca 2014). Therefore, if the socioeconomic structures of other urban areas in the district differ, the results could not be comparable. Therefore, the unique characteristics of the study and settings may limit generalizability to other urban settings of the country.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Gender and household asset-ownership associations with food insecurity point a possible gap in addressing inclusivity during economic empowerment of the urban dwellers. The study underscored the entrenched challenge of food insecurity affecting urban communities in Uganda, underscoring the need for sustained attention and action to address this critical concern. Accurate data on household food insecurity is vital in developing nations, where food insecurity is prevalent and has significant implications for nutritional well-being. The study's finding suggested that household food insecurity was largely shaped by the social dynamics and structures within households, highlighting the importance of considering the social context in understanding food access challenges.

Urban food insecurity and undesirable coping strategies associated with socio-economic landscape point to inadequate social safety nets to address urban food access challenges. In addressing food insecurity, households activated various coping mechanisms to reduce the vulnerability and hardships linked to food scarcity, revealing the resourcefulness and adaptability of households in managing food-related risks. Several households used different coping mechanisms like limiting and reducing portion meal sizes to cope up with food insecurity. While asking for food was the least common mechanism among the households in the study, portion reduction, portion limiting, and receiving food on credit were the most frequently used coping strategies. This suggested a potential shortfall in efforts to attain household food security, highlighting the necessity for further investigations for fundamental reasons for food insecurity. The undesirable dietary patterns and food consumption patterns could be pointing to a deeper gap in nutrition knowledge and economic constraints in access to diverse nutritious food. None of the

households reached the acceptable food consumption threshold, suggesting a shortfall in dietary quality. The analysis of dietary diversity revealed a dominance of cereals and legumes, with eggs being the least consumed food item, indicating a limited intake of essential nutrients from animal sources. This was a common trait among low-income households and underscored the need to confront the challenges of urban poverty and ability to obtain wholesome foods.

Over half of the households skipped at least one meal per day, with breakfast being the most frequently skipped meal. This raised concerns about the adequacy of food security measures and had significant implications for public health. Specifically, this behaviour could lead to increased risks of low energy levels, food cravings and nutrient deficiencies, with possible lasting effects on health and overall well-being.

6. 2 Recommendations

To effectively address food access challenges in the study area,

- (i) Government should prioritize urban women economic empowerment initiatives that target improving food security and self-sustenance
- (ii) Urban households' social protection and income generation programmes should be integrated in municipality and town case development budgets and support activities
- (iii) Government should increase awareness on optimal diet and food consumption.
- (iv) The enabling environment for households to have access to micro-credit schemes could also be improved.

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ANNEXES

Annex 1: Information and consent form

Study title: “Food insecurity and dietary patterns in urban settings of Wakiso District Central Uganda”

Consent statement

Dear respondent,

I seek for your consent to participate in this study "My name is _____, I am part of a team of research assistants for an academic research project for a student (**Linnet Betty Nakasiba**) of Kyambogo University offering Master of Science in Human Nutrition. This is academic research aimed at evaluating drivers of food insecurity and dietary patterns in urban settings of Wakiso District central Uganda. The methods of data collection are non-invasive and will not affect your health. I would like to ask you some questions which will take about 30 minutes. Your participation is voluntary, but we hope you will participate since your views are important. All information collected will be handled with confidentiality. If you agree to participate in this study, please sign in the space below.

Do you have any questions?

May I begin the interview now?” (If the response is “**yes**”, proceed with the interview; if the response is “**NO**”, go to the next Household)

Names.....

Phone contact.....

Signature.....

Annex 2: Household questionnaire

Questionnaire Number	Interview date	Municipality	
Division	Ward	Cell	House hold ID

SECTION A: SOCIO-DEMOGRAPHIC & SOCIAL- ECONOMIC CHARACTERISTICS

01	Gender household Head	1= Male 2= Female
02	Age of family head	1= ≤ 40 years 2= >40 – years
03	Education of family head	1= No education 2= Primary level 3= Secondary level 4= Above secondary
04	Marital status of household head	1= Single 2= Married 3= widowed 4= Divorced 5= single mother

05	Family structure	1= Nuclear family 2= Extended family 3= Female-centered family 4= Male-centered family
06	Household size	1= 1-3 members 2= 4-6 members 3= 7-10 members
07	Occupation of family head	1= farming 2= Salary employment 3= Self-employment 4= Day laborer 5= Jobless/retired
08	Existence of assets that complement food source (commercial farm land, buildings, motorcycle, livestock or poultry)	1= Yes 2= No
09	Received government money/ food aid in the six months preceding the interview	1= Yes 2= No
10	What is your total expenditure on food per/ Day/Week/ Month	1= Per day: UGX..... 2= Per week: UGX..... 3= Per month: UGX.....

11	Did you receive any social support	1=Yes 2=No
	If yes from who?	

SECTION B: Household Food Insecurity Access Scale (HFIAS) Measurement Tool

No.	Questions	Response options	Code Yes=1 and No=0
1.	In the past four weeks, did you worry that your household would not have enough food?	0=No (skip to Q2) 1=Yes	☐
1a.	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	☐
2.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0=No (skip to Q3) 1=Yes	☐

2a.	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
3.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0=No (skip to Q4) 1=Yes	
3a.	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
4.	In the past four weeks, did you or any household member have to eat some	0=No (skip to Q5) 1=Yes	

		2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
6.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0=No (skip to Q7) 1=Yes	☐
6a.	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	☐
7.	In the past four weeks, was there ever no food to eat of any kind in your household because of	0=No (skip to Q8) 1=Yes	☐

9.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0=No (end of questionnaire) 1=Yes	
9a.	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	

SECTION C: Dietary diversity Score (DDS)

Please indicate if you ate any of the foods in the following groups in the last 24 hours.

(One, “1” in the space if the food in question was eaten and a zero, “0” if the answer is no).

No.	Food categories	Descriptions	Consumed 1=Yes, 0=No
01	Cereals	All types of breads and flat breads, stiff porridges of maize, sorghum, millet or pasta.	

02	legume and Pulses (beans, peas and lentils)	Common beans, broad beans, pigeon pea, chick pea, cow peas, lentils, soybean/soybean products or other legume products	☐
03	Nuts and seeds	Cashew nuts, macadamia nuts, common nuts such as almond, peanut/ground nut, sesame, sunflower, pumpkin seeds	☐
04	Dairy	Milk from cows, goat, sheep, soft and hard cheeses, yoghurt, tinned, powdered/UHT milk	☐
05	Meat, poultry and fish	Organ meats, meat, poultry, fish/sea food	☐
06	Eggs	From any type of domestic and wild birds classified with small protein foods	☐
07	Dark green leafy vegetables	Cassava leaves, pumpkin leaves, amaranth leaves	☐
08	Other vitamin A rich fruits and vegetables	Orange-fleshed sweet potatoes, carrot, pumpkin, ripe mango, ripe pawpaw	☐
09	Other vegetables	Stems, fruits, flowers such as cucumber, tomato, okra	☐

10	Other fruits	Any other fruits such as apples, pineapple, watermelon, oranges, lemon, passion fruit	☐
11	Did you miss any of the following meals yesterday, breakfast, lunch, supper?		
	If yes, which one?		
12	Do children between 6-24 months have special meals?		

SECTION D. RESPONSES TO FCS

Please indicate if you ate any of the foods in the following groups in the past seven days (week)

(One, “1” in the space if the food in question was eaten and a zero, “0” if the answer is no).

No	Food group	CODE 0= Not consumed 1= Consumed
1	Main staple	
2	Pulses	
3	Vegetables	
4	Fruits	
5	Meat/ fish	
6	Milk	
7	Sugar	
8	oil	

SECTION E: CONSUMPTION COPING STRATEGY RESPONSES (CSI)

In a week, if there have been times when you did not have enough food or money to buy food, how many days has your household had to		Frequency: Number of days in a week: (Use numbers 0 – 7 to answer number of days; Use NA for not applicable)
1	Rely on less preferred and less expensive foods?	
2	Borrow food, or rely on help from a friend or relative?	
3	Purchase food on credit?	
4	Gather wild food, hunt, or harvest immature crops?	
5	Consume seed stock held for next season?	
6	Send household members to eat elsewhere?	
7	Send household members to beg?	
8	Limit portion size at mealtimes?	

9	Restrict consumption by adults in order for small children to eat?	
10	Feed working members of HH at the expense of non-working members?	
11	Reduce number of meals eaten in a day?	
12	Skip entire days without eating?	

THANK YOU.

Annex 3: Approval by Kyambogo University



P. O. BOX 1 KYAMBOGO

Tel: 041 - 4286792 Fax: 256-41-220464

Website: www.kyu.ac.ug Email: drgt@kyu.ac.ug

Directorate of Research and Graduate Training

Office of the Director

25th February, 2022

CAO - WAKISO DISTRICT

TO WHOM IT MAY CONCERN



RE: MS. NAKASIBA LINNET BETTY

Dear Sir/Madam,

This is to introduce to you the above named student Reg: No **19/U/GMHN/19026/PD** pursuing a Master of Science in Human Nutrition, Department of Nutritional Sciences and Dietetics, Kyambogo University.

She intends to carry out research on **"Food Security and Dietary Diversity in urban settings of Wakiso District"** in partial fulfillment of the requirements for the award of Master's Degree.

The purpose of this letter therefore is to request you to grant her permission to carry out her study in your institution.

Any assistance rendered to her will be highly appreciated.

Yours sincerely,

Prof. Bosco Bua
AG. DIRECTOR

Annex 4: Approval by Research Ethics Committee

Telephones: General Line: 039-3280584
041-4671162

E-mail: mrrhrec@gmail.com



MINISTRY OF HEALTH
MBALE REGIONAL HOSPITAL
P.O. BOX 921
Mbale – Uganda

THE REPUBLIC OF UGANDA

In any correspondence on this
Subject, please quote: MRRHREC-OUT- 011/2020

Date:

MRHREC ACCREDITED BY THE UNCST, REGISTRATION NUMBER UG-REC-011

To: Betty NAKASIBA

11/04/2022

Kyambogo University
2567727391

Type: Initial Review

Re: MRRH-2022-180: Food security and dietary diversity in urban settings of Wakiso District Central Uganda, v1, 2022-02-01

I am pleased to inform you that at the 15 convened meeting on 07/04/2022, the Mbale Regional Referral Hospital REC, committee meeting, etc voted to approve the above referenced application. Approval of the research is for the period of 11/04/2022 to 11/04/2023.

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

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of 11/04/2023 in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Mbale Regional Referral Hospital REC:

No.	Document Title	Language	Version Number	Version Date
1	Informed Consent forms	English	v1	2022-02-01
2	Data collection tools	English	v1	2022-02-01
3	Protocol	English	v1	2022-02-01

Yours Sincerely

Fred Bulamba

For: Mbale Regional Referral Hospital REC

Annex 5: Approval by Uganda National Council for Science and Technology



Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS127IES

5 May 2022

Betty NAKASIBA
Kyambogo University
Wakiso

Re: Research Approval: Food security and dietary diversity in urban settings of Wakiso District Central Uganda

I am pleased to inform you that on **05/05/2022**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **05/05/2022** to **05/05/2023**.

Your research registration number with the UNCST is **SS127IES**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project. As the Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. Keeping all co-investigators informed of the status of the research.
2. Submitting all changes, amendments, and addenda to the research protocol or the consent form (where applicable) to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local REC for review with copies to the National Drug Authority and a notification to the UNCST.
4. Unanticipated problems involving risks to research participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST notification after review by the REC.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

Annex 6: Permission by the Wakiso District Local Government



The Republic of Uganda

WAKISO DISTRICT LOCAL GOVERNMENT

OFFICE OF THE CHIEF ADMINISTRATIVE OFFICER

P.O. BOX 7218, Kampala Uganda, Tel: 0414670687

Email: cao@wakiso.go.ug / Website: www.wakiso.go.ug



FOR ANY CORRESPONDENCE ON THIS SUBJECT,
PLEASE QUOTE CR/220/1

29th April 2022

The Executive Secretary;
Uganda National Council for Science and Technology (UNCST);

PERMISSION TO CARRY OUT FIELD RESEARCH FROM WAKISO DISTRICT

This is to inform you that Nakasiba Linnet Betty a student at Kyambogo University Reg No.19/U/GMHN/19026/PD pursuing a Master of Science in Human Nutrition, Department of Nutritional Sciences and Dietics has been permitted to carryout research on "Food Security and Dietary Diversity in Urban settings of Wakiso District".

Byamukama Alfred

FOR: CHIEF ADMINISTRATIVE OFFICER, WAKISO



COPY TO: The AG. Director, Directorate of Research and Graduate Training.
Ms. Nakasiba Linnet Betty.

Annex 7: Permission by the municipalities

His Worship the Mayor : 256 – 414-666-073
The Town Clerk : 256 – 414-696-185
Email : townclerk@entebbe.go.ug
 : mayor@entebbe.go.ug
Website : www.entebbe.go.ug



OFFICE OF THE TOWN CLERK

ENTEBBE MUNICIPAL COUNCIL

**P O Box 34
ENTEBBE – UGANDA**

CR/220/1

May 3, 2022

The Director
Directorate of Research & Graduate
Training
Kyambogo University
P.O Box 1
Kyambogo

PERMISSION TO CONDUCT RESEARCH IN ENTEBBE MUNICIPALITY DIVISION A

We have received your letter dated February 25, 2022 requesting for permission for Ms. Nakasiba Linnet Betty to carryout research entitled *"Food Security and Dietary Diversity in urban settings of Wakiso District"*.

Permission is hereby granted on condition that she observes the COVID-19 SOPs as issued by Ministry of Health, while carrying out her study.

By copy of this letter, the Medical Officer of Health is requested to offer her the necessary assistance.


Kitenda Aisha
FOR: TOWN CLERK



C.C Medical Officer of Health – **E.M.C**

C.C Senior Assistant Town Clerk – **Division A**



MAKINDYE SSABAGABO MUNICIPAL COUNCIL

OFFICE OF THE TOWN CLERK
P.O. BOX 1872, Kampala Uganda, Tel: 0414691125
Email: makindyessabagabomcgmail.com



CR: MSMC 220/1

12th May, 2022

The Ag. Director
Directorate of Research and Graduate Training
Kyambogo University
P.O. Box 1
Kyambogo.

PERMISSION TO CARRY OUT RESEARCH

We refer to your letter dated 5th/2/2022. We are pleased to inform you that Miss. Nakasiba Linnet Betty pursuing a Master of Science in Human Nutrition has been permitted to carry out research on **"Food Security and Dietary Diversity in urban settings of Wakiso District" in Ndejje and Bunamwaya Divisions, Makindye Ssabagabo Municipal Council.**

During her study, she is expected to treat all information gathered in a confidential manner and for study purposes only.

The attention of the researcher is drawn to section J-f of the **Uganda Public Standing Orders and Circular Standing Instructions No. 3 of 2011 relating to Internship Placement in the Public Service.**

Please note that the Municipality shall not be in position to facilitate her research costs. You will be under the supervision of the Senior Assistant Town Clerks of Ndejje and Bunamwaya Divisions and you will be required to submit a report on a monthly basis.

Nantege Faridah
For Town Clerk

- Cc. His Worship the Mayor, Makindye Ssabagabo Municipality
- Cc. The Municipal Senior Health Inspector, Makindye Ssabagabo Municipal Council
- Cc. The L.C.III Persons, Ndejje and Bunamwaya Divisions
- Cc. Miss. Nakasiba Linnet Betty