ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

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CEREAL PRICE INFLATION AND ITS IMPACTS ON FOOD SECURITY OF URBAN HOUSEHOLDS: THE CASE OF ADDIS KETEMA SUB-CITY, ADDIS ABABA, ETHIOPIA.

BY:

SOLOMON KALBESSA

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ACRONYMS

FAO	Food and Agriculture Organization
HDDS	Household Dietary Diversity Score
HFIA	Household Food Insecurity Access
HFIAP	Household Food Insecurity Access Prevalence
HFIAS	Household Food Insecurity Access Scale
HH	Household Head
IFPRI	International Food Policy research Institute.
NGO	Non-Governmental Organization
VIF	Variance Inflation Factor
WFP	World Food Programme.

Key word: Cereal Price, Food Security, Household Head

ABSTRACT

The study conducted in Addis Ketema sub city, Addis Ababa, Ethiopia focuses on examining the impact of cereal price inflation on food security of urban households. Cereal price inflation has emerged as major challenges in Ethiopia, especially for urban households' food security. However there is little empirical evidence on how cereal price inflation impacts the urban f households' food security. This study aims to address this gap by analyzing the impact of cereal price inflation on food security of urban household. By using simple random sampling the primary data was collected from 120 household heads and analyzed by SPSS software. The result reveals that inflation in Ethiopia is driving up the prices of essential items impacting the affordability and accessibility of cereals for households. Among the respondents which counts 15 % were food secured, 6.67 % out of 120 households were severely food insecure, 35.83 % were mildly food insecure and maximum members of households 42.5 % were moderately food insecure. Factors such as housing situation, education levels, family size, and access to social protection, income disparities, and expenditure patterns all play critical roles in determining food security status of the respondents. Significant findings reveal that only higher education levels do not always guarantee food security, challenging traditional beliefs. Housing situations play a pivotal role, with households living in their own houses demonstrating higher food security. The study shows a dynamic relationship between economic factors, coping strategies, and shifting dietary preferences, shedding light on the nuanced factors influencing food security in urban environment. Addressing the multifaceted challenges posed by economic factors, cereal price inflation, and varying dietary preferences is key to enhancing food security among urban households in Addis Ketema sub-city, Addis Ababa, Ethiopia. The study emphasizes the importance of targeted interventions, resilience building strategies, and educational programs to promote healthier food security outcomes.

1. INTRODUCTION:

Cereals have a long history dating back to 8,000 years ago(Yarnell, 2008).Its definitions have evolved across various institutions and organization. Despite minor differences, these definitions all revolve around the core concept of cereal. According to Wikipedia, the term "cereal" is linked to the Roman goddess Ceres (Cereals; http://en.wikipedia.org/wiki/Ceral). Cereal is a grass cultivated for its edible grain. Cereals are the world's largest crops, and are therefore staple foods (Sarwar, 2013). Common cereals include rice, wheat, rye, oats, barely, and millet, with other grains like buckwheat, and quinoa being known as pseudo cereals.

The domestication of cereal has historic roots in different regions, with wheat and barley originating from the Fertile Crescent, rice from East Asia, and Sorghum and millet from west Africa (Cereals; http://en.wikipedia.org/wiki/Ceral). In other hand the Food and Agriculture Organization (FAO) defines cereals as annual plants, typically belonging to the gramineous family, that yield grains for various purposes such as food, feed, seed, and industrial use as per (FAO Statistics, January 2011). For the context of this study, the definition of cereal provided by Wikipedia was adopted.

Amazingly, the foods human beings eat most are grasses all around the world (Sarwar, 2013). Cereal grains were the first agricultural attempts by early man, and people still enjoy them today depending on where they live and what grows there well. Cereal grains are grown in greater quantities and provide more food energy worldwide than any other types of crops; there are therefore staple food crops. In their natural form, they are a rich in source of Vitamins, Minerals, Carbohydrates, Fats, Oils, and Protein (Sarwar, 2013).

Africa known as the center of origin and a major producer of several cereals such as sorghum, pearl millet finger millet, Teff, and African rice, has a rich agricultural heritage. Maize has emerged as another significant cereal, overtaken this traditional cereals, while wheat cultivation is prominent in North Africa, Sudan, and Ethiopia (Yarnell, 2008). The Green Revolution in the 20th century brought about a notable increase in cereal productivity. This initiative aimed fending off starvation and increasing yield per plant. However, these advancements placed less emphasis on the nutritional quality of the crops (Yarnell, 2008). The surge in cereal production has coincided with a rise in international trade, with certain countries becoming key suppliers of cereal to others (Yarnell, 2008).

Even though, the production of cereals increases by applying modern technologies; Africa cannot meet up with the growing demands for food in the content (Shittu et al., 2018). This challenge is closely linked to Africa's continuously growing, uncontrolled population, insufficient manpower, lack of access to mechanized farming technologies, soil degradation, and the impact of global climate change disrupting farming seasons. Due to the mentioned reasons most African countries rely on importing cereals from neighboring continents (Shittu et al., 2018).in order for Africa to survive the enormous ever increasing food demand and be able to feed herself and even export, she must learn and adapt appropriate and adequate farming practices.

According to Central Statistics Agency's (CSA's) 2018/19 agricultural Sample Survey, cereals 81% of Ethiopia's total grain crop area and over 88% of total grain production. Teff, maize, sorghum, wheat, and barely are the predominant staple crops in the country, making up about 24 %,19 %, 14%, 14%, and 6% of the total grain areas, and approximately 17% ,30 %,16%,15%, and 7 % of the total grain production, respectively. Over the past decade and a half (2006-2020), the production of these grain crops and cereals has increased by more than 150% (Tefesse et al., 2022)..

During the same period, there was significant growth in the production of major staples, with Teff experiencing a 165% increase, maize 189%, sorghum 142% and wheat 140 %, more than doubling their production. Similarly, pulses saw a 136% increase, oilseeds 73%, and vegetables 95%, and root crops a substantial increase of 281 % during this timeframe(Tefesse et al., 2022)..

The government's efforts to expand the share of land under irrigation beyond the major production season of Meher resulted in the production of 15 million quintals of wheat. However, there remains a concern about the lack of an increase in marketable surplus from smallholders production, as highlighted in the study by (Tefesse et al., 2022).

While impressive growth rates have been observed in cereal production over the years, it is essential to consider these rates in the context of the cumulative growth in population. Between 2006 and 2020, the population in Ethiopia grew by 46 %, from 78 million to approximately 125 million (WFP, 2020). Despite the significance increase in production during the same period, the majority of the smallholder producers, accounting for about 95% of the overall grain production in Ethiopia (Tefesse et al. 2022). A large proportion of what was produced was allotted for own consumption , with teff at 53%,wheat at 58 %, maize at 74%, barely at 64 %, and sorghum at 71%, (Tefesse et al. 2022).

In recent times, the Ethiopian government has been making substantial efforts to bridge the gap between production and demand by importing significant quantiles of food items. For instance, cereal imports in 2020/21 amounted to US$1, 34 million, showing a 59 % increase compared to the imports in 2019/20. Additionally, imports of other food items like cooking oil in 2020/21 reached US$ 843 million, making a 6 % increase from the previous year. (Tefesse et al. 2022).The trend shows that while the share of production for own consumption by smallholder producers has increased, the share of marketable surplus has remained relatively stable. This highlights the importance of commercial investments in food production, providing appropriate inputs, and expanding family planning services in rural areas to meet the growing demand and ensure food security in Ethiopia.

Cereal production and marketing play a pivotal role in the Ethiopian economy, constituting the largest sub –sector. Cereals contribute significantly to various aspects of the economy, including approximately 60 % of rural employment, 80 % of total cultivated land, over 40 % of a typical household's food expenditure, and more than 60 % of total caloric intake(Tefesse et al., 2022).Moreover, cereals make a substantial contribution to the national income, accounting for about 30 % of the Gross domestic Product (GDP). In terms of caloric intake, cereals dominate the diet of Ethiopian households. The food and agriculture Organization (FAO) estimates that an average Ethiopian consumes 1858 kilocalories, with maize, teff, wheat, and sorghum collectively contributing to over 60 % of total caloric consumption, where maize and wheat each represent 20 % (Rashid, 2010).

Interestingly, the relatively low share of teff in caloric consumption may come as a surprise to many Ethiopians, considering that teff is a predominant staple in middle and high –income households. This unique insight into the consumption patterns of cereals sheds light on the diverse roles these staple crops play in the nutritional landscape of Ethiopian households (Net & Dar, 2023).

There are distinct preferences and consumption pattern for cereals in Ethiopia. Maize is the least preferred cereal in urban areas, but it is the most widely consumed by the rural poor households. Sorghum is generally one of the cheapest cereals. Teff is central to Ethiopian culture as the most preferred cereal that, most Ethiopian households particularly in urban and some better off families in rural areas consume. Teff is sourced predominantly from domestic production (Net & Dar, 2023).

.cereals play a crucial role in the food system of Ethiopia, as highlighted by (Minten et al., 2014). Local cereal production serves as the primary source to fulfill the consumption needs of the Ethiopian

population, as emphasized in the study by (Minten et al., 2014). This reliance on local cereals underscores the importance of these staple crops in meeting dietary requirements and cultural preferences of Ethiopians across various regions (Minten et al., 2014)

Cereal price inflation refers to the increase in prices of staple grains like wheat, rice, and maize (Birhane and Hagos, 2012). This rise in prices can have significant implications for the food security of urban households. When cereal prices escalate, it becomes challenging for urban households, especially those with limited financial means, to afford a diverse and adequate diet. This situation can lead to reduced food security and various adverse outcomes for individuals and communities (Birhane and Hagos, 2012).Ethiopia has experienced a historically unprecedented increase in inflation, making it one of the highest in Sub-Saharan Africa (Durevall et al. 2013 ; Minten and Dorosh, 2019).

Food security is a crucial condition where individuals have access to enough safe and nutritious food to meet their dietary requirements and maintain good health (Simelane & Worth, 2020). The correlation between cereal price inflation and food security underscores the importance of understanding and addressing the impact of rising cereal prices on urban households to ensure their access to essential nutrition.

According to a study by(Minten & Dorosh, 2019) there is clear evidence of cereal price inflation in Ethiopia.in mid -2019; the prices of major cereals in Ethiopia were significantly higher compared to mid-2018. Maize prices rose by 32 percent, and the prices of Sorghum, teff, and wheat increased by 39, 35, and 32 percent, respectively. This persistent inflationary pressure can be attributed to various factors, including the mismatch between aggregate supply and demand, civil unrest in different parts of the country, high commodity prices in the global market, and loose monetary and fiscal policies(Minten et al., 2019)

The evidence provided by (Minten & Dorosh, 2019) highlights the significant and ongoing impacts of cereal price inflation in Ethiopia. The impact of cereal price inflation on urban food security is significant as rising prices can exacerbate food insecurity among urban households .when cereal price increases, it becomes more challenging for urban households, especially those with limited financial resources, to afford an adequate an diverse diet. This can result in decreased food access, increased vulnerability to food shortages, and a higher risk of malnutrition and other health issues.

Different recent articles from around the world provide evidence of the impact of cereal price inflation on food security. For example, as study conducted in Nigeria found that increases in cereal prices had a significant negative effect on household food security. Rising in cereal prices contributed to a decline in food access and dietary diversity worsen the food insecurity among urban households (Shittu et al., 2018).

Ethiopia has facing significant concerns regarding cereal price inflation. Headline inflation in February 2023 reached 32.0 %, almost three times higher than the government's annual average inflation target of 11.9 %, as reported by World Food Program (WFP, 2023). Despite the anticipated decrease in food price during the harvest season, the cost of teff, a staple food, experienced notable increase in March 2023. Teff prices were up by 67 % compared the previous year and 123 % higher than the Five-year average for the month. Furthermore, disruptions were observed in both the availability and pricing of wheat. With an estimated 15.3 million metric tons (MT) of wheat for the 2022/23 agricultural year, the government's implementation of a price ceiling exacerbated challenges in wheat availability and pricing (WFP, 2023).

This evidence highlights the immediate and urgent nature of cereal price inflation in Ethiopia, specifically impacting the urban food security situation. The upward trend in food inflation, accompanied by the sharp rise in teff prices and the wheat availability issue, pose significant challenges to households' access to affordable and diverse food options.

The highlighted findings emphasize the necessity for additional research to understand the implication of cereal price inflation on food security. To address this gap, this study utilized primary data and secondary data, analyzed through multiple regression analysis to assess the impact of cereal price inflation on the food security of urban households in Addis Ketema sub-city, Addis Ababa, Ethiopia. Aimed to provide a deeper understanding of how cereal price inflation impacts the urban households to access and afford nutritious cereals.

1.2 Problem statement:

Cereal price inflation is a pressing issue that can have significant implications for urban households' food security. The impact of cereal price inflation on urban households is particularly concerning because urban populations often rely on purchased food items rather than producing their own food (Yarnell, 2008).

In their 2014 study,(Birhane et al., 2014) conducted a Community Based Cross-sectional study in three sub-cities of Addis Ababa to investigate the impact of high food prices on households. They used descriptive and multiple logistic regression analyses to understand which type of households were affected by these high prices. Their findings revealed alarming statistics, with 75% of households being food insecure and 23 % experiencing hunger. To cope with the situation, households resorted to reducing meal sizes and shifting to lower quality.

While their study clearly showed that households were impacted by high food prices, a crucial gap in their research was the lack of exploration on how these high prices specifically affected the food security of urban households. This missing link is significant as it leaves unanswered questions about the direct implications of food price inflation on food security of urban households to access an adequate and nutritious diet and sustain their livelihoods. The study missed an opportunity to provide a comprehensive understanding how cereal price inflation challenges the urban households in ensuring their food security in the context of economic pressures and inflation. This research aims to bridge this gap by describing the nuanced ways in which high food prices impact urban household food security.

There is limited knowledge regarding the impact of cereal price inflation on urban household food security, while a significant body of literature exists on the determinants of food security, focusing on factors such as income, gender, well-being, access to access to clean water, sanitation, and access other socio-economic factors (Birhane et al., 2014). Past studies in Ethiopia, including those by (Tolina, et al 2020) and (Terefe, 2021), have primarily centered on identifying populations affected by rising food prices and result on food insecurity. However, a notable research gap exists concerning how households experience the impact of cereal price inflation, and overall food security specifically in urban areas of Ethiopia.

According to the World Food Program's latest report in 2022, domestic food price inflation as a February 2022 remained high (above 5 percent) in Six out of the Ten East African countries, Four of which is equivalent to 60 percent of the countries, Four of which experiencing double digit food inflation (13 percent in Somalia, 16 percent in Brundi, 42 percent in Ethiopia, and 258 percent in Sudan). In particular, Ethiopia has seen a significant increase with a food inflation rate of 42%. Given that over 80 % of Ethiopian urban households are market dependent and food access is a function of household income and market price, which together determine purchasing power (Estibel, 2022). .

While previous studies by (Estibel, 2022), have focused on the determinants of food security for urban households food status, utilizing order logistic regression, it shows that who is affected by determinants of food security. As it was indicated above the order logit regression cannot shows the relationship between the dependent and independent variable, and the previous studies do not address how the food price inflation impacts the food security of urban households.

Unlike the order logistic regression model used in previous studies, this research employed multiple regression model to cover the relationship between the dependent (food security) and independents, to answer how the cereal price inflation impacts the food security of urban households in Addis Ketema sub city, Addis Ababa.

As a result, this current research aimed to address this gap by utilizing time series data on cereal price inflation and primary data from household heads through semi structured questionnaires, and conducting multiple regression analysis. The objective was to offer in-depth insights into how cereal price inflation impacts the food security of urban households in Addis Ketema sub-city, Addis Ababa, Ethiopia, with the aim of contributing valuable insights to the existing knowledge base on the topic.

1.3 General Objective

To analyzes the impact of cereal price inflation on food security of urban household in Addis Ketema Sub -city, Addis Ababa, Ethiopia.

1.3.1 Specific Objectives:

1. To assess the impact of cereal price inflation on food security levels in urban households in Addis Ketema Sub-city, Addis Ababa, Ethiopia.

2. To assess the relationship between urban household ability to afford and access nutritious food on food security.

3. To analyze the strategies employed by urban households to cope with and mitigate the impact of cereal price inflation on food security.

1.4 Research Question:

1. How does cereal price inflation impact food security in urban households in Addis Ketema sub-city Addis Ababa?
2. How does the urban household's ability to afford and access nutritious food influence food security outcomes in the context of urban settings?
3. What coping strategies are utilized by urban households to deal with and reduce the effects of cereal price inflation on food security, and how effective are these strategies in maintaining food security levels?

1.5 Hypothesis

H0: There is no significant effect of cereal price inflation on food security in urban households.

H1: cereal price inflation negatively affects food security in urban households.

1.6 Scope of the study:

The study was conducted was centered on the sub city of Addis Ketema sub city, Addis Ababa, Ethiopia, which was selected by using a multi stage sampling technique involving sub city, woreda, and cluster. The study was concentrated on four specific types of cereals: Teff, and Wheat, Maize, and Sorghum. To shed light on inflation in Ethiopia the study also included an analysis of general inflation trends as well as specific inflation patterns related to food and non-food items within Ethiopia. The secondary data from the Ethiopian Statistics service covers a broader range of inflation categories, including general inflation, food and non-food inflation, and non-food inflation. To analysis the data the study was used multiple regression analysis to show the impact of cereal price inflation on food security of urban household heads in Addis Ketema sub city, Addis Ababa, Ethiopia.

1.7 Limitations of the study

The study was limited only in Addis Ketema sub city, Addis Ababa, Ethiopia include the specific scope focused on particular cereals and urban areas, potentially limiting broader applicability. External factors beyond inflation's impact on food security were not fully considered. The oversight of contextual and

long term trends and the cross sectional design limiting causal relationships were acknowledged. Future research should address these gaps for improved validity and relevance to inflation, food security.

1.8 Significance of the study

The significance of this study within the context of Addis Ketema sub city lies in its focus on addressing the unique needs and challenges faced by urban households in specific geographic area. By concentrating on specific cereal types, the study ensures its relevance to the food consumption patterns and livelihood strategies of households within Addis Ketema Sub city.

Utilizing a combination of secondary data from the Ethiopians Statistical Service on the trend and patterns of inflation in Ethiopia and primary data collected directly from household heads enhances the comprehensive and in-depth analysis. This approach allows for a comprehensive understanding of the factors influencing food security,

Overall, the significance of this study lies in its ability to generate relevant insights and data-driven solutions that address the specific needs and challenges faced by urban households in Addis Ketema sub city, ultimately contributing to the improvement of livelihoods in the area. .

1.9 Ethical Consideration:

This study takes participants privacy and willingness into account. Participants in the study were informed about the study's objective, which emphasizes that the data was used solely for academic purposes. The data was collected using questionnaire with the participants' full consent. The study paid close attention to respecting the participants' rights and maintaining data confidentiality and acknowledging the source of information.

1.10 Organization of the study: The thesis was organized into five chapters. Chapter one contains introduction, statement of the problem, objective of the study, scope and limitation of the study and significant of the study. Chapter two is literature of the study, Chapter three contains methodologies, Chapter four is result of the study, analysis part, and chapter five contains conclusion and recommendations.

CHAPTER TWO

2. Review Literature

2.1 INTRODUCTION

This literature review aims to provide a comprehensive overview of the empirical, theoretical, and conceptual literature on cereal price inflation and its impact on food security, with focus on the factors that contribute to these issues and the policy interventions that have been implemented to address them. By synthesizing the existing literature, this review seeks to inform future research and policy initiatives to improve urban food security in the face of cereal price inflation.

2.2. Basic concepts of cereal price inflation its impact on urban household food security:

1. Cereal price Inflation: Refers to the sustained increase in price of cereal crops, such as maize, wheat, rice, sorghum, or millet. Cereal crops are staple foods for many households worldwide, and fluctuations in their prices can significantly impacts access to food (Birhane et al., 2016).

2. Food security: Food security is a concept that encompasses the availability, accessibility, utilization, and stability of food to ensure that all individuals have physical and economic access to sufficient, safe, and nutritious food for an active and healthy life.(Simelane & Worth, 2020)

Mildly food insecure (access) household head: worries about not having enough food sometimes or often, and/or is unable to eat preferred foods, and/or eats a more monotonous diet than desired and/or some foods considered undesirable, but only rarely. But it does not cut back on quantity nor experience any of three most severe conditions.

Moderately food insecure household head: sacrifices quality more frequently, by eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes. But it does not experience any of the three most severe conditions. Household head face moderate food insecurity when they are uncertain of their ability to obtain food and have been forced to reduce, at times over the year, the quality and/or quantity of food they consume due to lack of money or other resources.

A severely food insecure household head : has forced to cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating), even as infrequently as rarely.

3. Urban Households: Refers to households residing in urban areas or cities. Urban households often have different characteristics, challenges, and opportunities compared to rural households, and their food security dynamics may be influenced by factors such as income levels, employment patterns, and access to markets(Central Statistical Agency (CSA), 2021).

4. Nutritious Food: It refers to food that contains essential nutrients necessary for a healthy diet and promotes overall well-being. Nutritious food includes a diverse range of fruits, vegetables, whole grains, proteins, and dairy products that provide balanced nutrition.

5**. Impact**: refers to the effect or consequences of a particular phenomenon or event in this case, it pertains to the influence of cereal price inflation on the food security of urban households, both in terms of their access to food and the quality and nutritional value of the food they can afford.

6. Food Accessibility: The state of households and individuals with in households having sufficient means and /or resource to obtain the food required for a nutritionally complete diet is referred to as accessibility (Weingarten and Klenert, 2005). Physical accessibility and financial accessibility are the two most important aspects of food access. The availability of resources such as capital (to pay for the food), human mobility (to physically obtain the food), this implies that adequate food access is determined not only by households' ability to produce food, but also by their ability to get to and purchase food from the market. Thus even if a household can produce food, its ability to generate income is critical to achieving food and nutritious access. Simply put, food accessibility ensures that people can obtain food both physically and economically, through a variety of methods such as growing , purchasing, gifts, food aid, and bartering or trading(Riely et al ., 199). So I chose the food accessibility dimension of food security to measure food security status using HFIAS.

7. Food utilization: Food utilization is defined as a a person's body's ability to assimilate nutrients from consumed food. A person's optimal calorie and nutrient consumption is the result of good care and dietary habits, food preparation, diet variety, and intra-household food distribution. All of these factors, when combined with good biological utilization of food consumed, determine an individual's nutritional

status (Prices, 2008). Another aspect of utilization is the socioeconomic aspects of food, which include knowledge, habits, and decision making (which are greatly influenced by culture and education levels) about what food to buy, how to prepare it, and most importantly, who in the household consumes what food and when with an eye toward fair distribution (world overview of Conservation Approaches and Technologies, 2018). Because HFIAS does not include nutrition data, I am unable to adopt this dimension of measuring food security.

8. Food availability: Riely et al (1999) defines availability as the physical presence of (potentially obtained) food, either from own farm produce or purchased from off-farm sources (e.g. from markets). This definition makes it clear that, particularly in the case of self-production, land and other means of production such as funds, workforce, knowledge, and skill are critical components of availability, and thus, food security. At the national level, food availability is determined by a combination of commercial production, household production, food imports, international donations, and domestic food stocks. Food availability is most commonly used to refer to food availability at the household or regional level. Individually, it is rarely considered. Food availability at these three levels is influenced by and is influenced by national food availability. However, as previously stated, a household can be food and nutrition secure even if a region or nation is not. As a result, determining food availability is complicated, and it is frequently difficult to distinguish between household food availability and national or regional food availability. Of course, food availability alone does not imply food security because it represents only potentially accessible food in a society. The availability of food does not necessarily imply that individual households or individuals within households can be access, use, and utilize the food (Riely et al, 1999).

These concepts provide a foundation for understanding and discussing the relationship between cereal price inflation and food security in urban households. By delving into these key concepts, the study can explore the complexities, challenges, and potential solutions related to the topic.

2.3 Basic Theories of cereal price inflation and its impact on urban household's food Security:

1. Demand and supply Theory: The demand and supply theory plays a crucial role in understanding the dynamics of cereal price inflation and its effect on food security. According to this theory, fluctuations in the supply and demand of cereal can directly influence their prices in the market.

When there is an increase in demand for cereals but a limited supply, prices tend to rise, affecting the affordability and accessibility of food for households. This theory suggests that changes in the demand and supply of cereal crops can causes the fluctuations in their prices. Increase in cereal price due to factors such as scarcity or increased demand can impact the purchasing power of urban households, affecting their access to affordable food and potentially leading to food insecurity.

2. Income and Expenditure Theory: The income and expenditure theory focuses on how changes in household income and spending patterns can impact food security in the context of cereal price inflation. As cereal prices increase, households may face higher expenses for basic food items, reducing their purchasing power and ability to accesses nutritious food. This theory highlights the importance of considering household income levels, expenditure priorities, and budget constraints when analyzing the impact of inflation on food security. Rising cereal prices can increase households' expenditure on food, leaving less income available for other essential needs. If the household's income is not sufficient to cope with the increased cost of cereals, it can lead to reduced food security.

3. Engel's Law: Engel's law states that as income increase, the proportion of income spent on food decreases. However, if cereal price rise significantly, it can strain household budgets and force them to allocate a large proportion of their income towards food, potentially compromising their food security. The quality of the food basket, based on the luxury-necessity distinction of consumption, increases with income, but the elasticity is small. That rich countries have little to fear from hunger is a simple consequence of Engel's Law; consumers have a substantial buffer of non-food expenditures to rely on, even if food prices rise sharply.

4. Coping Strategy Theory: coping strategy theories provide insights into how households adapt and respond to challenges posed by cereal price inflation and its effects on food security. These theories explore the resilience and adaptive mechanisms that households employ to mitigate the impact of rising food price and ensure food access during period of inflation. Coping strategies may include adjusting consumption patterns, seeking in income-generating activities, or relying on social support networks to address food insecurity concerns. Understanding these coping strategies is essential for developing targeted interventions and policies that support households in managing the impact of cereal price inflation on food security outcomes. This theory focuses on the actions and strategies adopted by households to mitigate the impact of cereal price inflation on their food security.

These theories provide a foundation for understanding and exploring the relationship between cereal price inflation and food security of urban households. They can guide the analysis and interpretation of data and help identify potential mechanisms and factors influencing the impact of rising cereal prices on urban food security.

The theory of demand and supply is more appropriate for studying the impact of cereal price inflation on the food security of urban households. This theory examines how changes in the demand and supply of goods, in this case, cereals, can lead to fluctuations in prices and subsequently impact food security. When cereal prices increase due to factors such as scarcity or increase ed demand, it can reduce the purchasing power of urban households, making it harder for them to afford an adequate and diverse diet. This can lead to reduced food security and potential nutritional deficiencies.

In this current research, the study align with the economic theory of supply and demand by examining how fluctuations in cereal prices, influenced by factors such as production, consumption, and market forces, impact the food security of urban households in Addis Ketema sub-city, Addis Ababa, Ethiopia.

Additionally the theory of demand and supply can also help explore how changes in food prices influence the behavior of households. For example, households might adjust their consumption patterns or seek alternative food sources when faced with rising cereal prices.

Considering the focus on cereal price inflation and its impact on food security, the theory of demand and supply provides a framework. It allows for the examination of changes in prices, availability, and access to cereals, and how these factors interact with household food security in Addis Ketema sub city, Addis Ababa, Ethiopia.

2.4 Empirical Literature

Cereal price inflation poses a significant challenge to the food security of urban households in many regions, including Ethiopia. In the context of Addis Ketema sub city, Addis Ababa, Ethiopia, there is a substantial research gap pertaining to the specific experiences of households how cereal price inflation influences food security. Therefore, this empirical literature aims to provide insights into the impact of cereal price inflation on food security of urban households.

According to Derso et al (2021)the odds of food insecurity among those with a low household income were nearly 5 times higher than those with a high household income; additionally, households with a

medium income were 10 times more likely to experience food insecurity than households with a high income at the 95 percent confidence interval. They concluded that households headed by uneducated person were 2.56 times more likely to be food insecure than households headed by individuals with an education above the secondary level, and the odds of food insecurity among household headed by a person with a completed secondary –level education were 3.22 times greater than those headed by someone with an education above the secondary level. The proportion of household's income spent on food and food related items were greater than 75 %. Due to lack of resource 75% of the respondents were unable to eat their preferred food in the four weeks preceding the interview, 76.1% had eaten a limited variety of food in four weeks preceding the interview, Households that had eaten less at a meal than preferred in four weeks preceding the interview were 70.2 %.The study does not addrees the effect of cereal price (food price inflation) on food security, so this study aims to address this gap.

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(Birhane et al., 2014) urban food insecurity in context of high) conducted A community based cross-sectional study in Three sub-cities of Addis Ababa in context of high food prices. A community based cross sectional study was conducted and the data was analyzed by using univariate and bivariate analysis and investigated which type of households is affected by high food price. They found that 75% of households were food insecure and 23 were in state of hunger. Reduction in meal size and shifting to poor quality/ less expensive food is among the coping strategies. Their results indicate that households with low income, uneducated households, daily wagers, and government employed households were affected by high food prices. In contrast they did not show how this high food prices impacts the food security of urban households. Thus, knowledge gap clearly exist, with this regard this study by triangulating the qualitative and quantitative data using multiple regression analysis tries to fill this gap.

Empirical studies examining the impact of cereal price inflation on food security of urban household's data are rare in literature. The study that examined the short- term impact of price shocks on food security evidence from urban and rural Ethiopia by (Matz et al., 2015) by using quarterly household survey panel data set and price data the result indicates that increases in cereal prices are generally, but always, associated with households having a lower number of meals and switching to less preferred foods. Diet diversity and calories consumption, however, show no clear response to grain price change. This paper only focus on short term dynamics and the study was unable to capture the long-term impact of price sock on food security as evaluation was undertaken at a time when cereal price inflation was still ongoing. Further analysis of the extent to which cereal price inflation impacts the food security

remained outside the scope of the study. Given this back ground, this paper aims to fill this knowledge gap by using time series data of food inflation and analysis how it impact the food security of urban households in the study area.

2.5 Conceptual Frame work:

The study seeks to address the substantial research gap that exists in understanding how households specifically experience the effect of cereal price inflation on their food security.

Food security stands on the tripod of these sets of factors and the analytical frame work can be developed as in fig.1

The food availability at the aggregate level is through agricultural production and stocks, imports and as food aid in the case of most developing countries. The interplay of these factors also determines incomes level. Similarly, food aid availability in markets affects the prevailing prices (presuming the prices are not controlled). Household purchasing power is determined by its income levels and the prevailing prices the former having direct relation while the later having inverse relation with purchasing power. A household with 'necessary and sufficient' purchasing power has access to food. Individual food access, on the other hand, depends on intra household's food distribution. The final utilization of food by an individual is the function of the actual food intake.

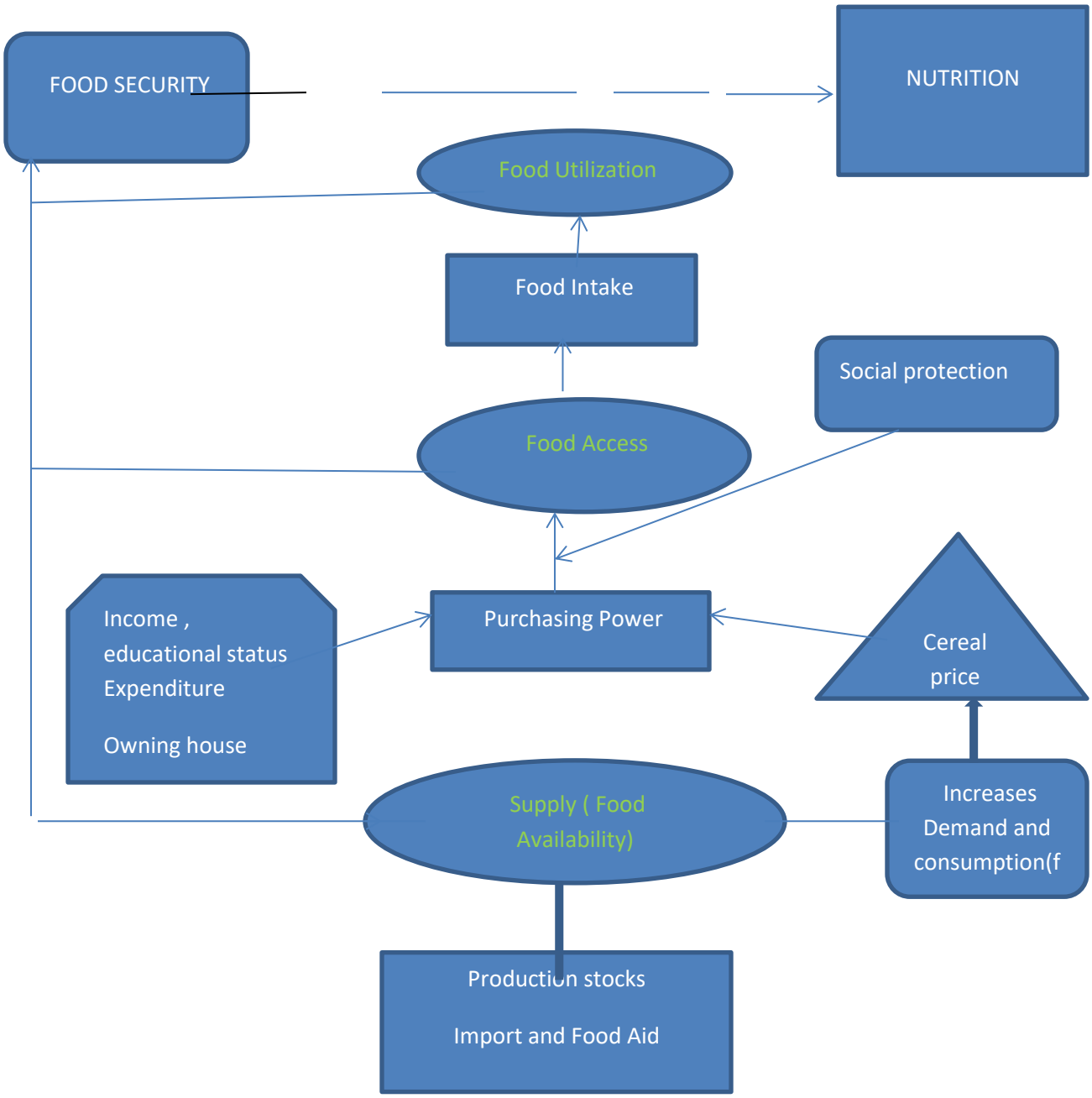


Figure 1: Conceptual Framework of Urban Food Security

Source: Adopted from WFP (2009), Food security and vulnerability study in selected urban centers of Ethiopia

CHAPTER THREE

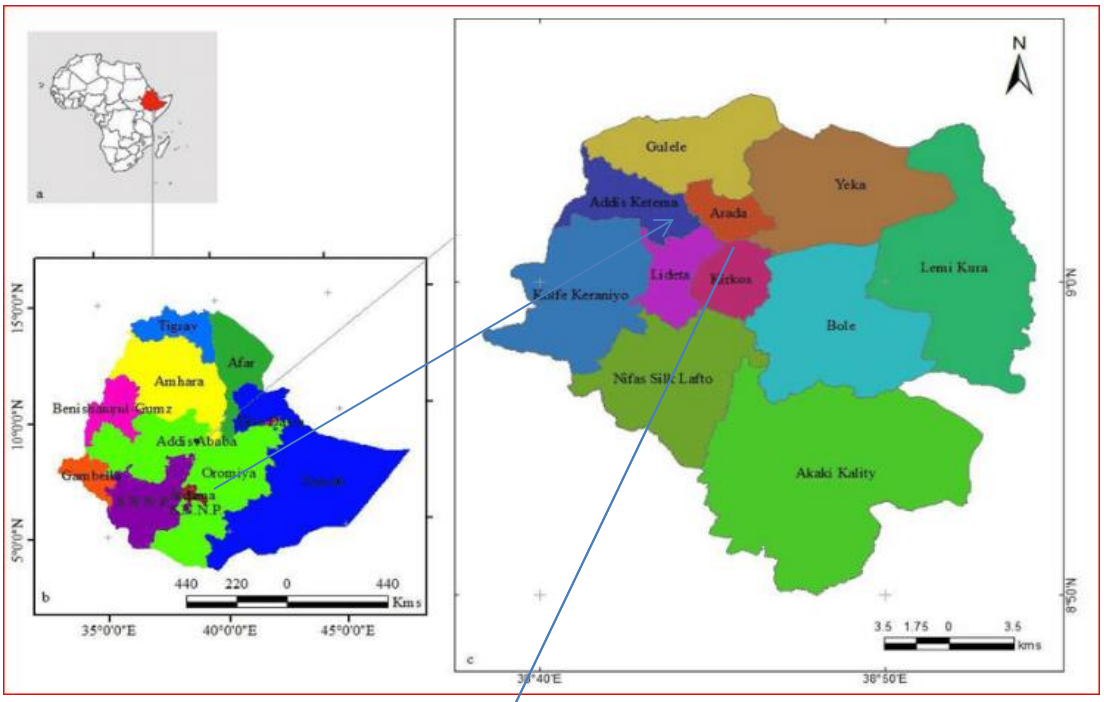
3. METHODOLOGY OF THE STUDY

3.1 Description of Study area:

The study was conducted in Addis Ketema sub city, which is one of the 11 sub cities that make up the city of Addis Ababa, Ethiopia. Among these 11 sub cities by simple random sampling Addis Ketema sub city was selected as the focus area for the research.

Addis Ketema sub city is located in the northern part of Addis Ababa, sharing borders with Gullale in the North, Arada in the East, Kolfe Keraniyo in the West, and Lideta in the South. It has a total area coverage of 742 hectares and a population size of 350,735 as reported by the Ethiopia Statistical Services in the 2022.It is important to note that the population size exhibits an annual population change of 2.3 percent during the period of 2007- 2022.

Addis Ketema sub city has a diverse population, both in terms of ethnicity and religion, contributing to its cultural richness. This sub city is characterized by socio-economic challenges, including low incomes and limited access to essential services. These socio-economic challenges and low income levels shape the context in which the study on cereal price inflation and its impact on urban household food security will be conducted.



Map of Addis Ababa, with sub cities.

Source: Ethio GIS (2022)

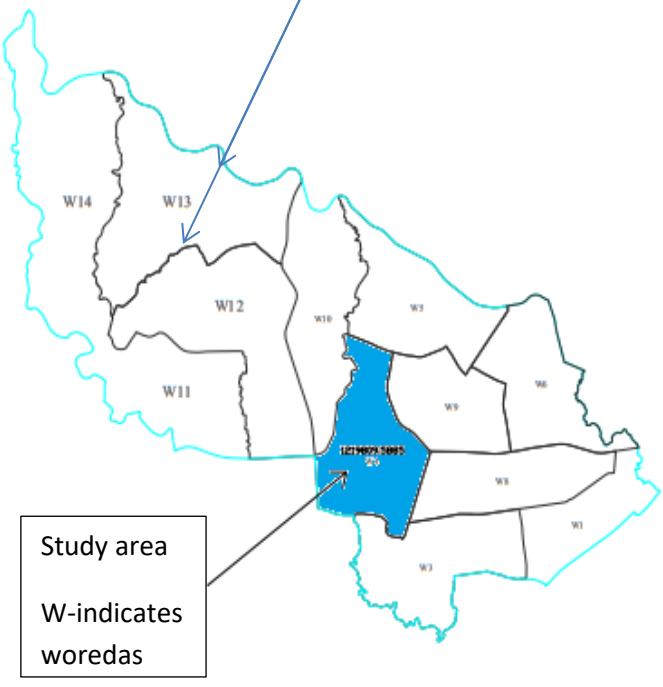


Figure 2: map of Addis Ketema sub city, Addis Ababa

Source: Addis Ketema sub-city plan Commission, Addis Ababa, Ethiopia (2024)..

3.2 Study Design and Approach: The study design for this study was descriptive. While the study approach was a household heads cross-sectional study using both quantitative and qualitative approach. Quantitative data facilitates the identification of statistical relationship between variables and findings obtained from a sizable sample can be applied to a broader population. Qualitative data allows gathering rich, detailed insights into people's experiences, behaviors, and perception

3.3 Source Population:

All household heads in Addis Ketema sub-city, woreda 4 (Cluster 4, and Cluster 9).

3.4 Study Population:

The study was conducted on Household heads from Cluster 4, and Cluster 9, woreda 4, Addis Ketema sub-city, Addis Ababa, Ethiopia.

3.5 Sampling Technique and sample size

Sampling refers to the process of selecting a subset of individuals from a larger population in order to gather data and draw inferences about the population as a whole. For the purpose of this study based on homogeneity of the settlement patterns of house hold heads, sampling the participants who share similar living arrangements or residential characteristics was used. For these study the three Multi –stage sampling technique was used for this study. According to data from the Ethiopia Statistics service population projection of 2022 (Population Projection of Nepal 22, n.d.), it was found that among 11 sub-cities in Addis Ababa, Kolfe Keraniyo sub city, Bole sub city, and Addis Ketema sub city were the most highly populated. First Through a simple random sampling lottery technique, Addis Ketema sub-city was selected as the sub city for further sampling. This choice was made due to its high population density.

Second Within Addis Ketema sub city which consists 0f 8 woredas with a homogeneous settlement patterns (kebele housing, private housing, and informal housing (housing without document), woreda 4 was selected through simple random sampling. This woreda was chosen to represent the broader characteristics of the sub city for the study

Third woreda 4 has 9 clusters (Kebele's) with homogeneous settlement patterns. By using a sampling interval approach Cluster 4 and 9 were selected from where sample household heads were randomly selected proportionally to the size of the household heads population in each cluster. A total population

of 498 household heads was identified from these clusters, from which a sample of 120 was drawn, through simple random sampling.

The sample size for collecting quantitative data for this study was determined by using Cochran's formula.

$$n_0 = \frac{(t)^2 * (p)(q)}{(d)^2}$$

$$n_0\text{-} = \frac{(1.96)2 * (.5)9.5)}{(0.05)2 = 90}$$

Where t= value for selected alpha level of .025 in each tail= 1.96

(p) (q) = estimate of variance = maximum possible proportion (0.5) produce maximum possible sample size

d= acceptable margin of error for proportion being estimated = 0.05

Therefore, for a population of 498 household heads, the required sample size is 90. However, since this sample size exceeds 5% of the population (520x .05= 26), Cochran's (1977) correction formula was used to calculate the final sample size.

$$n1 = \frac{no}{(1+ no/population)}$$

$$n1 = \frac{90}{(1+90/498) = 76}$$

60% 0f 76 +76= 120

Cluster 4 the population is 228 household heads and the cluster 9 is 270. For cluster 4 the sample size is .45 percent * 121= 55 sample and the cluster 9 is 270 i.e. .54 %121 =65. The sample size of 120 household heads was estimated using Cochran's formula.

3.6 Data collection Method and measurement tools:

In order to collect the information on Household food security and socio economic and demographic of the respondents semi structured questionnaire was developed. House hold food security level was determined using standardized set of questions derived from version 3 of the Household Food Insecurity Access Scale (HFIAS) measurement guide. This guide which was developed by the USAID's consists of nine occurrence questions that represent a generally increasing level of severity of food

insecurity (access) and nine "frequency of occurrence" questions that are asked as a follow up to each occurrences question to determine how often the condition occurred.

3.7 Method of Data Analysis:

Data was entered into SPSS version 20 for analysis. The method of analysis that was used in this study was descriptive and multiple regression analysis. The Statistical analysis was used to analyze the quantitative data through statistical methods such as: Descriptive statistics, regression analysis, correlation analysis, and hypothesis testing to identify the relationship between cereal prices and food security, while thematic analysis will be used to analyze the qualitative data, and triangulation can be used to compare and contrast the findings of both type of data.

3.8 Model Specification:

The explanatory variables of the model were extracted from empirical studies, literature and economic theory. They include socioeconomic, demographic characteristics of the household and food security status. The explanatory variables were checked for the existence of Multi-collinearity through Variance Inflation Factor (VIF).

Table 1: Dependent variable: Food security status

Category	Food Security Status	Criteria based on appendix I (section 2)
1	Food Secure	If (Q2.1a=0 or Q2.1a=1) and Q2.1 – Q2.9 = 0
2	Mildly Food Insecure	If (Q2.1a=2 or 3 or Q2.2a=1 or 2 or 3 or Q2.3a=1 or Q2.4a=1) and Q2.5- Q2.9=0
3	Moderately Food Insecure	If (Q2.3a=2 or 3 or Q2.4a=2 or 3 or Q2.5a=1 or 2 or Q2.6a=1 or 2) and Q2.7- Q2.9=0
4	Severely Food Insecure	If (Q2.5a=3 or Q2.6a=3 or Q2.7a=1 or 2 or 3 or Q2.8a=1 or 2 or 3 or Q2.9a=1 or 2 or 3)

Source**:** Adopted from Household Food Insecurity Access Scale (HFIS)

Independent variables:

The independent variables which are expected to impact the dependent variable include demographic and institutional factors. The description of each variable is presented below.

Sex of household head (sex): sex of the household head is an important variable that influences food security of a household. It is a dummy variable \ (coded as a male took the value 1, and 2 for female) (Birhane & Hagos, 2012)conclude that sex of household head has no significant association with food security status.

Education level of household head: It is the year of formal instruction received and successfully completed. This variable is expected to have positive relation with food security of a household. According to (Birhane & Hagos, 2012) household headed by those uneducated, and with primary education were more food insecure than those headed with diploma and above respectively.

Family size: it is total number of person lives a given household. This variable is expected to have positive relation with food security of a household. That means more family size is likely be food secured than family having less member. According to (Derso et al., 2021), household food security is lower for households with more family size comparing to those with having less family (Birhane & Hagos, 2012) conclude that family size does not have significant effect on household food security.

Household income: It is a continuous variable measured in birr which is the sum of all monthly monetary income regardless of the source (all income from employment, business, remittances, rent etc.). according to (Derso et al., 2021), household with high income are food secure than those having low income, so, this variable expected to have positive relation with food security of households.

Housing situation: This variable determines where a specific household living in. According to (Derso et al., 2021), those households who live in kebele rental house are more likely to be food insecure than those who have their own private house while those who live in government rental house are less food insecure than those who live in the their private house .The researcher's expectation is not different from what (Derso et al., 2021) has concluded.

Expenditure on cereals: It is a continuous variable which is measured by adding up total monthly expenditure on cereals in Ethiopian birr. The food component of consumption includes only Teff, Maize, Wheat, and Sorghum only.

Access from social protection program: access from cooperative financial organization owned and operated by and for its members, according to democratic principles, for the purpose of encouraging savings, using pooled funds to extend loans to members at reasonable rates of interest and providing retailed financial services to enable members improve their economic and social well-being (Tumwine et al, 2015). It is expected to have a positive relationship with food security.

Y = 4.665 +0.158E - 0.627I +0.134 Ed - 0.135 FS — 0.285 OH + 0.474 S-e

Where Y= Represent the dependent variable Food security.

E= Represent the expenditure on cereals.

I= Represent Income

ED= represent Educational status

FS= Represent Family Size.

OH= Represent House Ownership

S= represent Sex of household head

e=standard error.

3.9 Validity test:

To ensure the validity of the study's questionnaire, Content validity can be assessed by ensuring that the questionnaire items adequately cover the constructs of interest, including the impact of cereal price inflation on food security.

3.10 Reliability Test:

Internal consistency will be evaluated using techniques like Cranach's alpha to assess the extent to which the questionnaire items are measuring the same underlying construct consistently.

Table 2: Case Processing Summary

Reliability Statistics

Cronbach's Alpha	N of Items
.759	20

Source: survey result, 2024

The Cronbach's Alpha value of 0.759 indicates a high level of internal consistency reliability among the items in the questionnaire.

CHAPTER FOUR

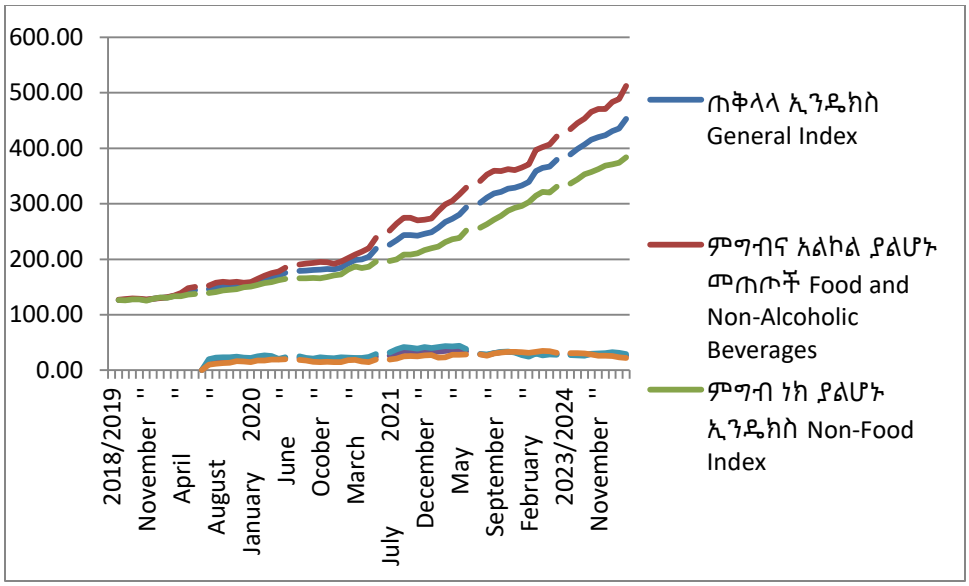
4. RESULTS AND DISCUSIONS

4. 1 Introduction

This chapter concentrates on the data analysis and discussion. The data analysis is organized in Five sections; introduction, shed light on trends and patterns of inflation in Ethiopia, Descriptive, econometrics model analysis, and Discussion part. Concerning the trends and pattern of inflation in Ethiopia the data obtained from Ethiopia statistical service is presented, while the descriptive statistics of demographic and socio-economic characteristics of sample households are presented with appropriate statistical tools like mean, standard error, percentage, and frequency distribution. For econometrics model the result of multiple regression analysis is presented, and finally the outputs are discussed by aligning with research objectives and research questions.

4.2 The trends and pattern of inflation in Ethiopia.

The purpose of assessing the trend and pattern of inflation in Ethiopia before analyzing the data is to establish a comprehensive understanding of the economic landscape and price dynamics in the country. Inflation trends play a crucial role in shaping consumer behavior, market conditions, and overall economic stability. By examining the historical data on inflation rates, food and non-alcoholic beverages, and non-food indices, gives insights into how prices have evolved over time and the potential impact on household budgets and purchasing power. Understanding the trend and pattern of inflation provides a context for interpreting the findings of primary data analysis related to cereal price inflation and its impact on urban food security.



Source: The summary of raw data from Ethiopia Statistics Service

Figure 3 Trend and patterns of inflation in Ethiopia

Food and non-food alcoholic beverages the upward trend and position above the other indices suggest a consistent increase in prices for essential items like food and beverages. This indicates potential challenges for consumers in affording these necessities and may impact food security and household budget.

General index reflects an overall increase in prices across a wide range of goods and services it is being positioned in the middle and also trending upwards. This signifies a general rise in costs that can influence consumer spending patterns and economic conditions on a broader scale.

Non- food index despite being below the food and non-alcoholic beverage and general indices, the upward trend indicates gradual increases in prices for non-food items. The slower growth in non-food prices compared to food prices could signify relative stability in non-essential goods costs, impacting consumer choices and market dynamics in these sectors. The above trend suggests that prices for essential items like food and beverages are increasing at a faster rate, followed by a general rise in costs across the economy, while non-food prices are also on the rise but at a slower pace.

4.3 Features of Household heads

This study aimed to assess the impact of cereal price inflation on urban household's food security. So, conducting descriptive analysis before estimating the model is important to know the behavior of study variable. Additionally, descriptive analysis was employed to obtain some information about the distribution of the variables and to obtain some information about the characteristics of the households.

4.3.1 Characteristics of the households

The demographic and socio-economic characteristics of the sample household include Sex of household heads, family size of the household heads, situation of housing, monthly income, access fro m social protection program.

4.3.2 Food Security status of households:

As it indicated below the food security status of the sample households is as follow; when the data was undertaken the household was specifically requested about their food security status earlier to the data collection time. Among the respondents which counts 15 % were food secured, 6.67 % out of 120 households were severely food insecure, 35.83 % were moderately food insecure, and maximum members of households 42.5 % were moderately food insecure as shown on the figure 4 below. From the result above, eight out of each nine are food insecure in Addis Ketema sub city, Addis A baba.

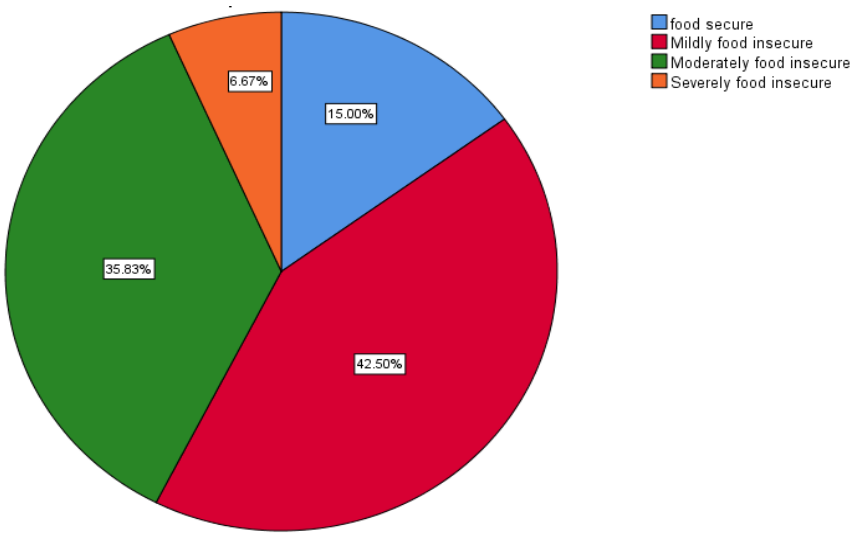


Figure 4: Food security status in Addis Ketema sub city, Addis Ababa, June, 2024 (n=120)

4.3. 3 Sex of house hold:

Gender is an important variable which determine household's food security status. The majority of the household head in this study 34.78% of them were female and male accounts 65.22 %.

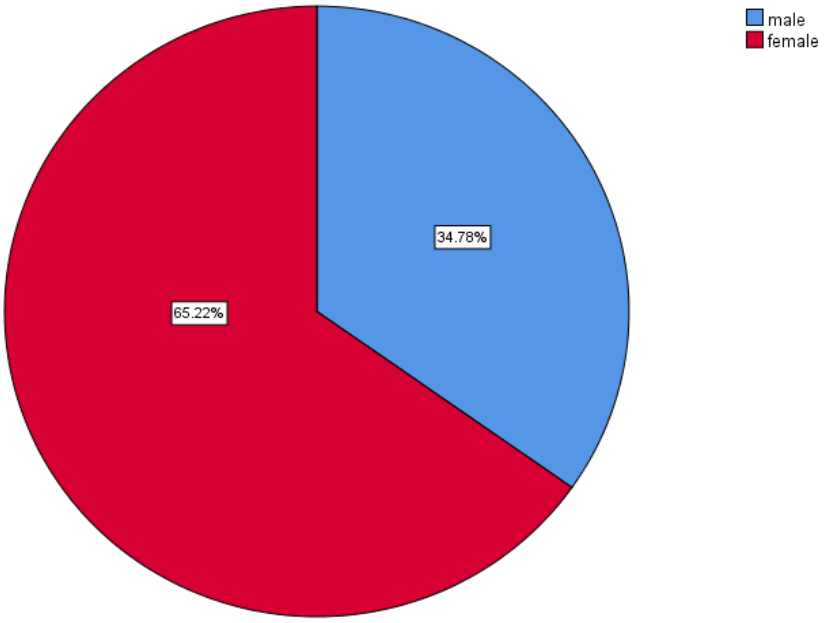


Figure 5 Respondents sex category, in Addis Ketema sub city, Addis Ababa, June, 2024 (n= 120)

4.2.4 Housing Situation of the household

As shown in the table 3 out of total respondents, 10.8% of the households are living in informal house (house without document). 24.2% of the households are living in kebele rented house, 27.5 % of the households are living in their own house, and 37.50 % of the households are living in private rented house.

Table 3 Housing situation

	Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percent[a]			
					Bias	Std. Error	95% Confidence Interval	
							Lower	Upper
Own	33	27.5	27.5	27.5	.1	4.2	19.2	36.7
kebele rent	29	24.2	24.2	51.7	-.3	4.1	15.8	31.7
informal(housing without document)	13	10.8	10.8	62.5	.0	2.8	5.8	16.7
rent from private	45	37.5	37.5	100.0	.1	4.6	28.4	47.5
Total	120	100.0	100.0		.0	.0	100.0	100.0

Source: Survey Result, 2024.

As table 3 shows that in the study area private rented household heads are higher than the household heads that are living in their own house. All of the total household live in informal house (without document) totally are not food secured, 5.0 % of them were mildly food insecure, 15.3% of them were moderately food insecure, 20.0 % of them were severely food insecure. All of the total households those who live in Kebele rented house are totally not food secure, 10.0 % of them were mildly food insecure, 40.0 % of them were moderately food insecure, 44.1 % of them were severely food insecure.. Out of total household those live in private rented house 25.4 % of them were moderately food insecure, 33.3 % of them were food secure, 33.3 percent were moderately food insecure, and 35.0percent were mildly food insecure. Out of total household heads those live in their own house 6.7 % were severely food insecure, 15.3 % are moderately food insecure, 50.0% were mildly food insecure, and 66.7% of them were found to be food secure. This implies that those who live in their own house are more to be found food secure than others. Therefore, housing situation of household has association with food security status.

Table 4: Housing situation of respondents and food security status

			food secure	Mildly food insecure	Moderately food insecure	severely food insecure	Total
who is the owner of the house you live in	Own	Count	4	15	3	1	23
		% within in the past 4 weeks did you worry that your household would not have enough food	66.7%	37.5%	5.1%	6.7%	19.2%
	kebele rent	Count	0	6	23	5	34
		% within in the past 4 weeks did you worry that your household would not have enough food	0.0%	15.0%	39.0%	33.3%	28.3%
	informal(housing without document)	Count	0	0	5	4	9
		% within in the past 4 weeks did you worry that your household would not have enough food	0.0%	0.0%	8.5%	26.7%	7.5%
	rent from private	Count	2	19	28	5	54
		% within in the past 4 weeks did you worry that your household would not have enough food	33.3%	47.5%	47.5%	33.3%	45.0%

Total	Count	6	40	59	15	120
	% within in the past 4 weeks did you worry that your household would not have enough food	100.0%	100.0%	100.0%	100.0%	100.0%

Source: survey result, 2024.

4.3.5 Educational level of household head

As presented on Table 5 below 4.2 % of household head were illiterate (at least they cannot read and write), 17.5% of household heads were graduate of their first degree and above, and 31.7 % attend the secondary school and diploma holders have the same percentage.

Table 5 Educational level of house hold heads

					Bootstrap for Percent			
							95% Confidence Interval	
	Frequency	Percent	Valid Percent	Cumulative Percent	Bias	Std. Error	Lower	Upper
Illiterate	5	4.2	4.2	4.2	.1	1.8	.8	8.3
Primary	18	15.0	15.0	19.2	.3	3.4	8.4	22.5
Secondary	38	31.7	31.7	50.8	.2	4.8	22.5	41.6
Diploma	38	31.7	31.7	82.5	-.7	3.8	22.5	37.5
first degree and above	21	17.5	17.5	100.0	.1	3.2	10.0	24.1
Total	120	100.0	100.0		.0	.0	100.0	100.0

Source: Survey Result, 2024

4.3.6 Access to social protection

Social protection program is an important variable which determine house hold food security status. The household who had access to social protection program (safety net) were 10.0 % and of 90.0 % households does not have access to social protection program.

Table 6 Access to social protection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	109	90.8	90.8	90.8
	Yes	11	9.2	9.2	100.0
	Total	120	100.0	100.0	

Source: Survey result, 2024

4.3.7 Family size:

As shown below in fig 6 from the total sample size 3.39 % of them have two family members, 11.02 % have family members of > 5. 14.41% have three family members, 33.90. % of them has 5 family members, and 37.29 % of them have 4 family members.

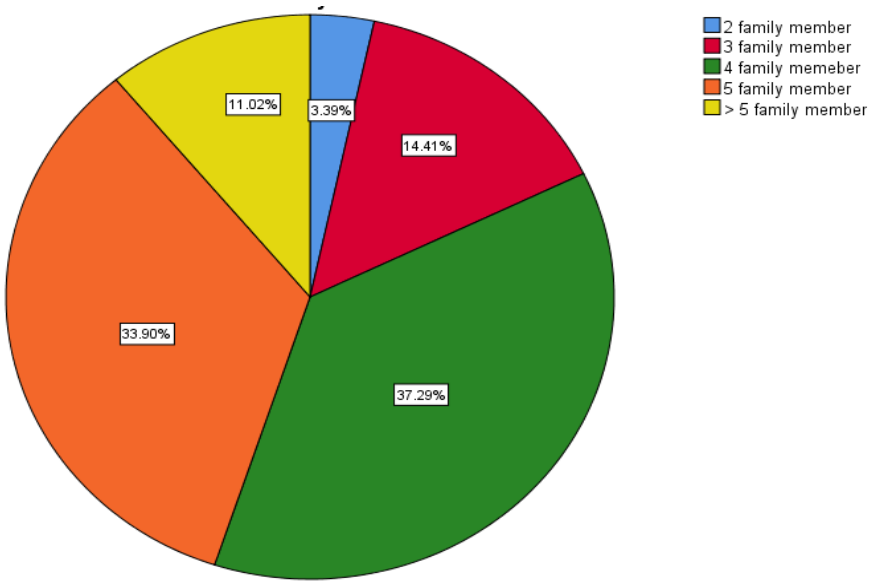


Figure 6 Family size in Addis Ketema Sub city, Addis Ababa, June, 2024(n=120)

4.3.8 Income level and household food security status:

The income of a household is all monetary income. Income is an important determinant of food security status for a specific household. Finding from table 7 showed that the respondents who earn 3,000.00 birr and 5000.00 birr per month were even not secure the mildly food insecurity status, respondents who earn 7,000.00 birr per month only 5% were achieve the mildly food insecure status. Only 10% of the respondents who earn 10,000-15,000.00 birr per month were food secured. 90% of the respondents who earn on average more than 15,000.00 birr per month were food secured

Table 7 Income level and food security status

		food secure	Mildly food insecure	Moderately food insecure	severely food insecure		frequency
what is your monthly average income	3000birr			1.9%$_{a}$	6.3%$_{a}$	1.7%	3
	5000 birr			1.9%$_{a}$	6.3%$_{a}$	1.7%	7
	7000birr		5.0%$_{b}$	33.3%$_{a, c}$	50.0%$_{c}$	23.3 %	15
	8000-10,000 birr		2.5%$_{b}$	48.1%$_{c}$	25.0%$_{a, c}$	25.8%	26
	10,000-15,000	10.0%$_{a}$	85.0%$_{b}$	3.7%$_{a}$		30.8 %	36
	More than 15,000,00 birr	90.0%$_{a}$	7.5%$_{b}$	11.1%$_{b}$	12.5%$_{b}$	16.7 %	33
Total		100.0%	100.0%	100.0%	100.0%	100.0 %	120

Source: Survey result, 2024.

4.3.9 Expenditure of households per month on cereals:

As indicated in the Fig 7 out of the total 120 household's respondents, 5% of households had an expenditure of 6,000-10,000.00 birr per month for cereals. 11.7 % of the households had the highest expenditure (more than 10,000.00 birr per month for cereals, 14.2% households had an expenditure of 2,000.00 birr per month for cereals. 30.8% households had an expenditure of 5,000.00 birr per month for cereals, and finally 38.3% household had an expenditure of 3,000.00 birr per month for cereals. From

the fig 7 the mean value of 2.62 birr and St. Dev 1.154 birr provide insights into the average spending level and variability in cereal expenditure per month across the household's income.

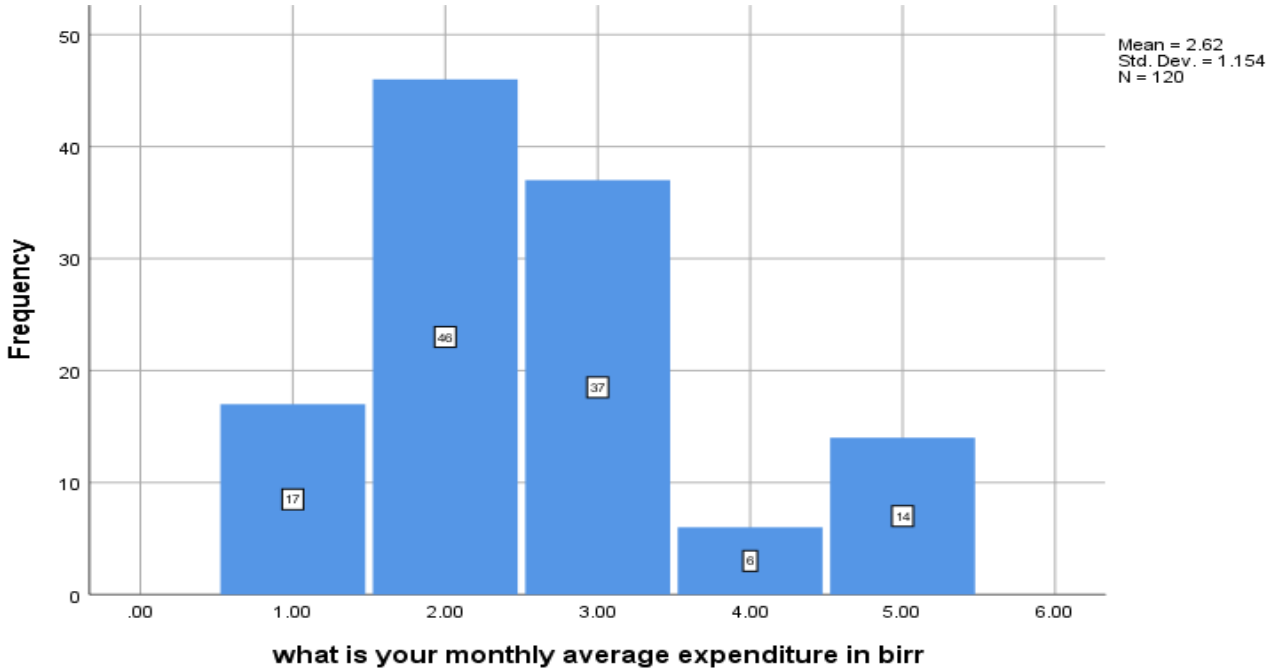


Figure 7 Monthly expenditure on cereals in Addis Ketema sub city, Addis Ababa, June, 2024 (n=120)

4.3.10 Rank of dietary preferences in the Study area: As indicated on fig. 8. The dietary preferences of dwellers in the study area 9.57 % of the respondents rank their dietary preferences Teff, Wheat. Maize, and sorghum, 21.74 % of respondents rank their dietary preference Maize, Sorghum, Wheat and Teff, and 68.70 % of the dwellers dietary preferences were Sorghum, Maize, Wheat, and Teff. The reason behind this was the dwellers used less nutritious and relatively cheap cereal as coping strategies for cereal price inflation.

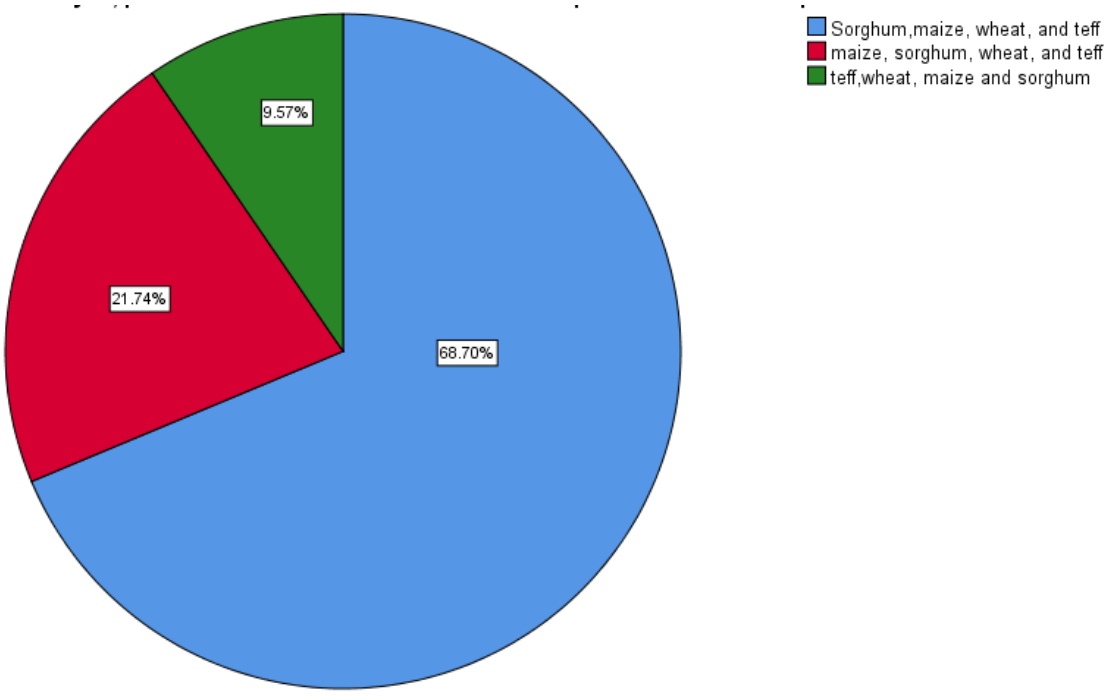


Figure 8 Rank of dietary preferences in Addis Ketema sub city, Addis Ababa, June, 2024 (n=12)

4.3 11 The relationship between food security and access to nutritious food:

The correlation between expenditure and income being 0.642 * indicates a statistically significant relationship between these two variables. A positive correlation coefficient of 0.642 suggests that as household expenditure increases, income also tends to increase. This positive relationship indicates that higher expenditures are associated with higher incomes within the households. Similarly, the correlation coefficient of 0.642* between income and expenditure reinforce this finding, indicating a strong positive relationship in the opposite direction. This means that as household income increases, expenditures also tend to rise. The statistical significances denoted by the asterisks enhance the reliability if these associations observed in data.

Overall, these results suggest a mutually reinforcing relationship between household income and expenditure, where higher incomes are linked to increase spending and vice versa. The correlation between household income and expenditure can indirectly reflects aspects of the relationship between food security and access to nutritious food.

Table 8 correlation between food security and access to nutritious food

		what is your monthly average expenditure on food in your household in birr	average monthly household head income in birr
what is your monthly average expenditure on food in your household in birr	Pearson Correlation	1	.642**
	Sig. (2-tailed)		.000
	N	120	120
average monthly household head income in birr	Pearson Correlation	.642**	1
	Sig. (2-tailed)	.000	
	N	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between ability to afford and access nutritious food on food security:

Household ability to afford: by using average expenditure as a proxy for the household's ability to afford nutritious food. Higher expenditure may indicates better affordability and potential access to healthier food options.

Access to nutritious food: The correlation between average expenditure and other variables such as family size (0.416*), income (0.642*0, and social protection (-0.155*) .These shows how affordability influences access to nutritious food items within households.

Food security the indicators such as income (-0.484*), housing situation (-0.173*), and access to social protection (-0.155*) offers a representation of overall food security status within the households, considering financial, housing, and social welfare aspects.

Positive correlation between average expenditure and access to nutritious food implies improved affordability leads to better access to healthy food, subsequently enhancing overall food security.

4.3.12 The relationship between coping strategies employed:

Expenditure positive correlation (0.642*) with income and (0.416*) with family size. Suggest higher coping strategies with increased expenditure, income, and family size. Use less nutritious cereals negative correlation (-0.365*) with expenditure indicates a tendency to opt for less nutritious options as expenditure increases. Income positive correlation (0.642*) with expenditure and (0.287*) with family size. Shows higher income associated with increased expenditure and larger family size. Negative correlation (-0.484*) with access to social protection, indicates lower income linked to reduced access to social protection. Access to social protection has negative correlation (-0.484*) with income shows less access to social protection for lower-income households. Family size positive correlation (0.416*) with expenditure and (0.287*) with income. Indicates larger families tend to spend more and have higher incomes. Less nutritious cereal negative correlation (-0.326*) with expenditure and (-0.326*) with income suggests a tendency to choose less nutritious cereals as expenditure and income increase.

Table 9 correlation between coping strategies

		what is your monthly average expenditure on food in your household in birr	average monthly household head income in birr	Did you have access from social protection program	family size of the household head	can you use less nutritious and cheaper cereal as a coping strategies during time of cereal price inflation
what is your monthly average expenditure on food in your household in birr	Pearson Correlation	1	.642**	-.155	.416**	-.365**
	Sig. (2-tailed)		.000	.091	.000	.000
	N	120	120	120	118	120

average monthly household head income in birr	Pearson Correlation	.642**	1	-.484**	.287**	-.326**
	Sig. (2-tailed)	.000		.000	.002	.000
	N	120	120	120	118	120
Did you have access from social protection program	Pearson Correlation	-.155	-.484**	1	.066	.092
	Sig. (2-tailed)	.091	.000		.481	.317
	N	120	120	120	118	120
family size of the household head	Pearson Correlation	.416**	.287**	.066	1	-.115
	Sig. (2-tailed)	.000	.002	.481		.216
	N	118	118	118	118	118
can you use less nutritious and cheaper cereal as a coping strategies during time of cereal price inflation	Pearson Correlation	-.365**	-.326**	.092	-.115	1
	Sig. (2-tailed)	.000	.000	.317	.216	
	N	120	120	120	118	120

**. Correlation is significant at the 0.01 level (2-tailed).

4.4 Results of the Econometrics Model Analysis

4.4.1 Diagnostic Checking

Before estimating the model, test the severity of correlation within explanatory variable is an important diagnostic test to check the appropriateness of the model. Because two or more variables giving rise to the same piece of information may be included, that may have redundant information or unnecessarily included related variables.

The F-value of 19.184 indicates that the regression model as a whole is statistically significant, suggesting that the independent variable collectively have a significant impact on the dependent variable (food security level in urban households in the study area).R value of 0.679 indicates that approximately 67.9 % of the variance in food security levels in urban households in the study area can be explained by the independent variables included in the model. Durbin-Watson statistics (1.887) being close to 2 indicates no significant autocorrelation in the residuals, supporting the assumption of independence in the model.VIF values almost all variables have values below 2 indicating lower levels of multicollinearity, except expenditure and income have moderate VIF values. The distribution of residuals in the regression model follows a normal bell shape, which is positive indication of meeting the assumption of normality in the residuals, additionally, significance level of 0.000 suggests that the normality of the distribution is statistically significant, further supporting the conclusion that the residuals exhibits a normal bell shaped distribution.

The value of standard deviation of .71321 indicates that the residuals are relatively close to the regression line. This suggests a good fit of the model. These suggest that the model is accurately predicting outcomes with consistent error margins, showing a good level of accuracy and reliability.

Based on these out puts and considering the study objective and research questions, the results suggest that the regression model is significant over all to explain the food security level of the households in the study area, in addition, p-value of 0.000 indicates the results are highly statistically significant, so the observed data would be extremely rare under the null hypothesis assumption of no effect. It implies strong evidence to reject the null hypothesis in favor of the alternative hypothesis. Given this positive outcomes from the assumption testing and the indicators in regression model, it was in good position to proceed with conducting multiple regression analysis for modeling the relationship between the dependent variable (food security) and independents.

4.4.2 Hypothesis testing

Hypothesis

H0: There is no significant effect of cereal price inflation on food security in urban households.

H1: cereal price inflation negatively affects food security in urban households.

Table 10 Hypothesis testing model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.679[a]	.461	.437	.76390	1.887

Source: Survey Result, 2024.

The significant p-value supports the rejection of the null hypothesis, indicating that cereal price inflation have significant impact on urban household food security. The F- value suggests that the model explains a significant amount of variance in the dependent variable, of the relationship cereal price inflation impacting food security. The sum of squares represents the variability explained by the model, with the high value of 0.679 indicating a substantial proportion of the total variability explained by cereal price inflation considered in the regression analysis.

Overall, the AVOVA result provides strong evidence to support the alternative hypothesis that cereal price inflation negatively affects food security in urban households.

Table 11 Hypothesis testing result Anova

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	55.973	5	11.195	19.184	.000[b]
	Residual	65.357	112	.584		
	Total	121.331	117			

Source: Survey Result, 2024.

Based on the ANOVA F value significance and the strong R value correlation, the data supports rejecting the null hypothesis (There is no significant effect of cereal price inflation on food security in urban households) in favor of the alternative hypothesis (cereal price inflation negatively affects food security in urban households). This means that there is statistical evidence to suggest a significant negative relationship between the cereal price inflation and food security.

4.4.3 Multiple regression analysis results:

This allows analyzing how the independent variables collectively influence the dependent variable (food security status).

4.4.3.1 Analysis of impact of cereal price inflation on food security levels of study area

Table 12 Impact of cereal price inflation on food security level model summary

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.649[a]	.421	.406	.631	.421	28.120	3	116	.000	1.929

Source: survey result.

For the strength of relationship as shown above the R value of 0.649 suggests a moderately strong positive relationship between the independent variables and the food security and for model fit the R-squared value of 0.421 and adjusted R-squared value of 0.406 indicates that around 42.1% of the variance in food security level can be explained by the independent variables in the model

Table 13 Anova result for impact of cereal price inflation on food security

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.627	3	11.209	28.120	.000[b]
	Residual	46.239	116	.399		
	Total	79.867	119			

Source: Survey Result, 2024.

The F statistic of 28.120 is significant, indicating that the independent variables together have an impact on predicting the food security level in the study area.

4.4.3.2 Coping strategies and mitigation of cereal price inflation:

Table 14 Coping strategies and mitigation of cereal price inflation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.839[a]	.704	.640	.61056	1.841

Source: Survey Result, 2024.

The very high R value of 0.839 indicates an extremely strong positive correlation between the independent variables and the dependent variable. The R- squared value of 0.704 suggests that approximately 70, 4 % of variable is explained by the independent variable in the model. The adjusted R-squared value of 0.640 accounts for the number of predictors in the model and indicates that around 64% of the variance in the dependent variables are explained. A Durbin-Watson statistics of 1.841 suggests no significant auto correlation in the residuals, supporting the assumption of independence.

Finally, the model demonstrates an extremely strong correlation between the variables, with high explanatory power and statistical significance.

The very strong positive correlation and high R-squared value suggest that he model has an excellent fit in explaining the relationship between the independent and dependent variables. The adjusted R-squared value provides a more conservative estimate of the model fit, considering the number of predictors in the model. Durbin- Watson statistics suggests no significant autocorrelation in the residuals, supporting the validity of the model.

Table 15 Anova result for coping strategies

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	86.768	21	4.132	11.084	.000[b]
	Residual	36.532	98	.373		
	Total	123.300	119			

Source: Survey Result

The Anova result for coping strategies, with an F-value of 11.084 with a significance level of 0.000 indicates that the overall regression model is statistically significant. This result implies that the coping strategies have a significant impact on the outcomes being studied, providing valuable insights for understanding and potentially improving coping strategies.

4.5 Discussions

In relation to the research objective of assessing the impact of cereal price inflation on food security levels in urban households in Addis Ketema sub city, Addis Ababa, Ethiopia, the results of the multiple regression analysis provide valuable insights. The findings indicate that both cereal price and economic factors have a significant influence on food security levels in these urban dwellers. Specifically, changes in cereal prices and economic conditions are associated with changes in the food security status of households in Addis Ketema sub city.

The research question 'How does cereal price inflation impacts food security in urban households in Addis Ketema sub city?' can be answered by the analysis results, which show that cereal price inflation plays a substantial role in this specific urban area. By focusing on addressing the impact of cereal price inflation through policy intervention or economic measure, stakeholders can work towards improving food security in Addis Ketema sub city, Addis Ababa. Overall, the multiple regression analysis highlights the importance of considering cereal price inflation and economic factors when assessing food security levels in urban households.

The correlation between household income and expenditure can indirectly reflect aspects of the relationship between food security and access to nutritious food. When household income increases, it signifies a greater ability to afford food, including nutritious options. This positively impacts food security by ensuring that households have the financial means to access an adequate and balanced diet, thus improving food security levels. The correlation between expenditure and income suggests that as households spend more their income also tends to increase. This further contributes to improved food security by enabling the purchase of a wider variety of quality nutritious food items. The relationship between income, expenditure, and their mutual influence can be indicative of how financial resources impact both food security and access to nutritious food within households. The R- value of 0.649 indicates a moderate to strong positive correlation between cereal price inflation and food security level. This means that there is a noticeable relationship between the increase in cereal prices and its impact on

the food security status of households. R-squared (Coefficient of determination= 0.421) s 42.1 % of the variability in food security level can be explained by changes in cereal price inflation. This indicates that cereal rice inflation accounts for a significant portion of the variation seen in food security levels among households in the study.

Adjusted R-squared = 0.406 is slightly lower than the R-squared value but still provides a robust indication of the model's goodness of fit. This adjusted value considers the number of predictors in the model and accounts for its complexity, showing that the model adequately explains the relationship between cereal price inflation and food security level. The F-value (=28.120) demonstrates the overall significance of the regression model. With a higher F value, the model is statistically significant in predicting food security level based on changes in cereal price inflation on food security outcomes.

The regression analysis reveals a meaningful and significant relationship between cereal price inflation and food security level among households in the study. The strong r value and significant F value support the conclusion that changes in cereal prices have a notable impact on food security levels, as evidenced by the moderate R-squared value indicating the variability in food security that can be explained by cereal price inflation. These findings provide valuable insights into the dynamics of how economic factors such as inflation can influence food security outcomes in the context of the study.

Considering the research objective of analyzing coping strategies employed by urban households to manage and reduce the impact of cereal price inflation on food security, the regression model's strong correlation, high explanatory power, and statistical significance indicates that the identified strategies are effective in addressing the challenges posed by inflation. The strategies of reducing meals and shifting to less nutritious and cheaper cereals are recognized as essential coping means adopted by households to navigate food insecurity during economic fluctuations. Ultimately, understanding these coping strategies is crucial for enhancing households' resilience and food security in urban environments,

Overall, regarding the coping strategies the correlations suggests that expenditure, income, family size, and access to social protection play significant roles in coping strategies and food choices. Lower income is associated with decrease access to social protection while lager families tend to have higher spending. The negative correlations with less nutritious cereals indicate potential dietary compromises base on financial factors. These findings highlight the complex interactions between socioeconomic variables and coping strategies in household food choices

The study conducted by (Birhane & Hagos, 2012), on Assessment of Household Food Security and Nutritional Status of Women in the Context of High Food Price in Addis Ababa, by using Multiple logistic regression and finds that Households headed by those uneducated, and with primary education were more food insecure than those headed with diploma and above respectively. But, this study finds that the household educational level alone does not have guarantee for the food security of urban household, because the marginal increase in price of cereal is incomparable with the return on higher education of specific household head which is almost fixed for long time of period., but the price of cereal is increased from day to day.

As information obtained from the respondents during the open ended data collection and from the analysis of housing situation illiterate household head that has his own house was more food secured than more educated household head. As the respondents opinion the reason behind is that house rent shows increment from time to time which is much higher than the day to day increments of cereal price. On other hand the aggregate impact of the two (house rent increment and cereal price inflation) fall on the rented house hold head. This opinion align with findings of this study under housing situation of the household .That is, in the study area rented household heads are higher than the house hold heads who have their own house and rents for other as source of income. Additionally, those who live in their own house are more food secure than others. Therefore, regarding housing situation cereal price inflation has no impact on the food security of household head who have his own house because he/she adjust his/her house rent , but has negative impact on food security of household head who live in private rented house.

According to IFPRI (Economics & Library) the nutritional contents of cereals indicates that Teff is the dominant, Wheat is second, Maize is 3rd, and Sorghum is the Fourth. In addition to this the study conducted by (Net & Dar, 2023), confirms that Teff is central to Ethiopian culture as the most preferred cereal that most Ethiopian households particularly in urban and some better of families in rural areas consume and maize is the least preferred cereal in urban areas. But, according fig 4.6 the findings of this study shows that 10 % of the respondents' cereal preferences is Teff, Wheat, Maize, and sorghum, 28.8% of respondents' cereals preference was Maize, sorghum, Wheat, and Teff, on contrary to the nutrition contents rank 69.2% of respondents cereals preferences was Sorghum, Maize, Wheat and at

last Teff. The triangulated qualitative data confirms the shift of cereals preference from high nutritious to less nutritious and relatively less expensive cereal was due to cereal price inflation.

4.6 Summary of Findings:

The trend and pattern of inflation in Ethiopia, particularly for essential items like food and beverages, indicate challenges for consumers in affording these necessities, potentially impacting food security and household budgets, the data shows varying levels of food insecurity among household heads, with a significant portion of households experiencing moderate to severe food insecurity. Housing situation appears to be associated with food security status, with those living in their own houses more likely to be food secure. Regarding demographics, there is a gender imbalance among household heads, with a majority being male. Education levels vary, with a mix of illiterate individuals and those with various levels of education. Access to social protection is limited, and family sizes vary among respondents. Income and expenditure patterns show some correlation with food security status, with higher income levels associated with better food security.

The ranking of dietary preferences suggest that households may prioritize cheaper and less nutritious cereal as a means to cope with cereal price inflation. The statistical model indicates a significant impact of cereal price inflation and economic factors on food security, highlighting the importance of household affordability and access to nutritious food in influencing food security.

The very strong positive correlation and high R-squared values suggest that the model has an excellent fit in explaining the relationship between the independent and dependent variables. The adjusted R-squared value provides a more conservative estimate of the model fit, considering the number of predictors in the model. The P-value from the ANOVA test indicates that the independent variables have a significant effect on the dependent variable (food security).The Durbin-Watson statistics suggests no significant autocorrelation in the residuals, supporting the validity of the model. The null hypothesis is rejected,

Based on these statistics, the model appears to have a very strong fit in explaining the relationship between the variables, with a high percentage of the variance in the dependent variable explained by the independent variables, the statistical significance of the model and lack of autocorrelation in the residuals further support the validity of the results.

CHAPTER FIVE

5.1 Conclusion

This research was motivated to assess the cereal price inflation and its impact on urban household food security in Addis Ketema sub city, Addis Ababa, Ethiopia. The findings high lights the significant impact of economic factors such as income levels, education, housing situation, family size, and access to social protection, on urban households food security by cereal price inflation. The data reveals how these factors interact to shape households ability to afford and access nutritious food, highlighting the complex nature of food security dynamics in urban settings.

There is varying levels of food insecurity among household heads, with a significant portion of households experiencing moderate to severe food insecurity. Housing situation appears to be associated with food insecurity status, with those living in their own houses more likely to be food secure. Regarding the demographic, there is a gender imbalance among household heads, with a majority being male. Education levels vary, with a mix of illiterate individuals and those with various levels of education. Access to social protection is limited, and family sizes vary among respondents. Income and expenditure patterns show some correlations with food security status, with higher income levels associated with higher food secure.

The ranking of dietary preferences suggest that households may prioritize cheaper and less nutritious cereals as a means to cope with cereal rice inflation. The statistical model indicates a significant impact of cereal price inflation and economic factors on food security, high lighting the importance of household affordability and access to nutritious cereals in influencing food security.

Unexpected trends where higher education levels do not always guarantee food security among urban households in Addis Ketema challenging conventional beliefs. The study reveals a reverse relationship between education and food security, emphasizing the need for a nuanced understanding of the factors influencing household food security beyond education alone. Additionally, the shifting preferences ranking of cereals reflects the impact of cereal price inflation on dietary choices, with households prioritizing cheaper but less nutritious options as coping strategies. Understanding these shifts and addressing economic challenges are crucial for promoting healthier food choices and improving overall food security in urban settings like Addis Ketema sub city.

Addressing challenges posed by inflation, particularly in essential food items, and improving access to social protection and education, alongside promoting affordable and nutritious cereal choices, can potentially enhance food security among households in Addis Ketema Sub-city. Coping strategies play a crucial role in navigating these challenges, emphasizing the importance of sustainable resilience building measures. The shift in dietary preferences towards cheaper but less nutritious cereals underscores the need for targeted interventions to promote balanced dietary choices. By addressing the complex challenges posed by economic factors, cereal price inflation, coping strategies, and shifting dietary preferences, stake holders can develop strategies and sustainable solutions to enhance food security among urban households in Addis Ketema sub city. Implementing targeted interventions, promoting resilience strategies, enhancing educational programs, and advocating for healthier dietary practices are essential steps towards addressing the complex interaction between economic factors and food security in urban environments. These efforts aim to create a supportive environment where households can make their food choices, and achieve sustainable food security outcomes.

5.2 Recommendations

Based on the overall result and conclusion of the study the following recommendations are forwarded:

Enhanced Social Protection Programs:

Develop and implement social protection programs that specially target households experiencing moderate to severe food insecurity. This can include interventions such as a cash transfer programs, food assistance initiatives, and nutritional support aimed at improving access to nutritious food.

Education and skill building programs:

Invest in education and skill- building programs to improve the employment prospects and income levels of individuals in households facing food insecurity. This can help enhance food items and mitigate the impact of inflation on their food security status.

Affordable Housing Solution: explore strategies to provide affordable housing options for households, as housing situation has been linked to food security status. Enhancing access to secure and affordable housing can positively impact the overall food security of households.

Policy Coherence and Coordination:

Ensure coherence and coordination among relevant policy sectors, including agriculture, health, education, and social protection, to address the multifaceted challenges of inflation and food security effectively. This can help maximize the impact of interventions and resources in improving food security outcomes.

Data –driven Decision Making:

Strengthen data collection and analysis mechanisms to monitor and evaluate the effectiveness of interventions aimed at addressing food security challenges. This will facilitate evidence-based decision making and enable policymakers to tailor interventions based on the evolving needs of the population.

By implementing these practical recommendations and considering the policy implications outlined above, stakeholders and policymakers can work towards enhancing food security and address the complex challenges posed by cereal price inflation, and shifting dietary preferences in urban environments like Addis Ketema Sub city, Addis Ababa, Ethiopia.

5.3 Limitation and further research: Here are some limitations and potential areas for future research.

Limitations:

Sample size and representativeness: the study's sample size and representativeness of the population in Addis Ketema sub-city , Addis Ababa may impact the generalizability of the findings to the wider Addis Ababa context. Consideration of a larger and more diverse sample could enhance the stud's external validity.

Causality vs Correlation: While the study identifies correlations between variables such as cereal price inflation, economic factors, and food security, establishing causality may be challenging. Future research could explore causal relationships through longitudinal or experimental studies.

Future research Directions:

Longitudinal studies: Conducting longitudinal studies to track changes in food security status, inflation rates, and household factors over time can provide insights into the dynamics of these relationships and the long-term impact of interventions.

Qualitative research:

Complementing quantitative findings with qualitative research, such as interviews or focus groups, can offer a deeper understanding of the experiences and perspectives of households facing food insecurity in Addis Ketema sub-city, Addis Ababa.

Policy evaluation: evaluating the effectiveness of existing policy interventions aimed at addressing food security and inflation challenges in Ethiopia can inform future policy decisions and interventions. Assessing the outcomes and impacts of current initiatives is essential for evidence- based policymaking.

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APPENDIX

Questionnaire

Dear respondent, this questionnaire is intended to collect data on "Cereal Price Inflation and Its impact on Urban Household's Food Security: The Case of Addis Ketema sub-city, Addis Ababa, Ethiopia." The data is going to be used as an input for this research, and it will be submitted to St. Mary University College Addis Ababa for partial fulfillment of a Masters in Development Economics. Therefore, I request you to give your genuine answer voluntarily. The study will use your responses for only educational purpose. Your responses will be kept confidential.

Thank you in advance for your cooperation!!!

Appendix A

Section 1: Questions about general households' Economic and demographic characteristics

No	Questions	Respond	Code
1.1	Sex of Household head	1. Male 2. Female	
1.2	What is the family size of your Household	1. 2 members 2. 3 members 3. 4 members, 4. 5 and above members	
1.3	What is the educational status of household head?	[1] Illiterate [2] primary,[3]Secondary,[4] Diploma, [5] First degree and above	
1.4	Who is the owner of the house you live in?	1. Own 2. Kebele 3. . Informal (house without document) 4. Private rent	
1.5	Average monthly household income (in Birr)		
1.6	What is the average monthly expenditure on cereals		

1.7	Did you have access from Social protection program?	1 No 2. Yes	
1.1	Can you use less nutritious cheaper cereals as coping mechanisms during times of cereal price inflation?	1.No 2.Yes	
1.2	If yes, please rank these less nutritious cheaper cereals based on preferences?		
1.3	11 did you use reducing consumption as coping strategy	1.No 2. yes	

Section 2: Occurrence and Frequency of Household Food Insecurity

No	Questions	Respond options	Code
2.1	In the past four weeks, did you worry that your HH would not have enough food?	0 = No (skip to Q2). 1 =Yes	
2.1a	How often did this happen?	1 = Rarely (once or twice in the last 4 weeks) 2 = Sometimes (3-10 times) 3 = Often (more than ten times.)	
2.2	In the past four weeks, were you or any HH member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	
2.2a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	
2.3	In the past four weeks, did you or any HH member have to eat a limited variety of foods due to a lack of resources?	0= No (skip to Q4) 1=Yes	
2.3a	How often did this happen?	How often did this happen? 1 = Rarely (once or twice) 2 = Sometimes (3-10 times)	

		3 = Often (more than ten times)	
2.4	In the past four weeks, did you or any HH Member has to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0= No (skip to Q5) 1=Yes	
2.4a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	
2.5	In the past four weeks, did you or any HH member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	
2.5 a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	
2.6	In the past four weeks, did you or any other HH member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes	
2.6a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	
2.7	In the past four weeks, was there ever no food to eat of any kind in your HH because of lack of resources to get food?	0 = No (skip to Q8) 1= Yes	
2.7a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	
2.8	In the past four weeks, did you or any HH member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	
2.8a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	

2.9	In the past four weeks, did you or any Member go a whole day and night without eating anything because there was not enough food?	0 = No 1 = Yes	
2.9a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	

Open ended Questionnaire

1. What challenges do you face in the affording cereal during periods of price inflation?
2. What strategies do you use to ensure your household remains food secure despite fluctuations in cereal price?
3. Have you ever had to compromise on the quality of food due to high cereal prices? If so, how often does this occur?
4. In your opinion, what could be done to better support urban households during times of cereal price inflation to enhance food security?
5. Can you share your personal experiences or observations regarding how cereal price inflation has impacted food security among urban households in Addis Ketema sub city, Addis Ababa?

APPENIX B

Secondary Data on Inflation pattern and trend in Ethiopia from Ethiopian Statistical service, 2024

ወርና ዓመት Month an Year	ጠቅላላ ኢንዴክስ General Index	ምግብና አልኮል ያልሆኑ መጠጦች Food and Non-Alcoholic Beverages	ምግብ ነክ ያልሆኑ ኢንዴክስ Non-Food Index

2011	***2018/2019***						
ሐምሌ	**July**						
2010	**2018**	126.70	127.11	126.23			
ነሐሴ 2010	**August ''**	127.05	128.16	125.78			
መስከረም							
2011	**September ''**	128.45	129.38	127.39			
ጥቅምት							
2011	**Ocober ''**	128.11	128.58	127.59			
ህዳር 2011	**November ''**	126.72	127.76	125.53			
ታህሳስ							
2011	**December ''**	128.83	128.63	129.07			
ጥር 2011	**January 2019**	130.68	130.09	131.36			
የካቲት							
2011	**February ''**	131.09	131.47	130.66			
መጋቢት							
2011	**March ''**	133.98	134.33	133.59			
ሚያዝያ							
2011	**April ''**	136.41	139.16	133.26			
ግንቦት							
2011	**May ''**	142.25	147.62	136.08			
ሰኔ 2011	**June ''**	144.26	150.16	137.48			
2012	***2019/2020***				General Infilation	Food and Non-Alcoholic Beverages Inflation	Non-Food Inflation
ሐምሌ	**July**						
2011	**2019**	146.33	152.56	139.16	15.49	20.02	10.25

ነሐሴ 2011	**August** ''	149.80	157.59	140.83	17.91	22.96	11.97
መስከረም 2012	**September** ''	152.35	159.54	144.08	18.61	23.31	13.10
ጥቅምት 2012	**Ocober** ''	152.09	158.40	144.84	18.71	23.19	13.51
ህዳር 2012	**November** ''	153.05	159.10	146.10	20.78	24.53	16.39
ታህሳስ 2012	**December** ''	153.97	157.86	149.50	19.51	22.72	15.83
ጥር 2012	**January 2020**	155.11	158.72	150.95	18.69	22.01	14.91
የካቲት 2012	**February** ''	159.51	164.53	153.75	21.68	25.15	17.67
መጋቢት 2012	**March** ''	164.25	170.45	157.12	22.59	26.89	17.61
ሚያዝያ 2012	**April** ''	167.62	175.18	158.92	22.87	25.89	19.25
ግንቦት 2012	**May** ''	170.52	177.62	162.34	19.87	20.32	19.30
ሰኔ 2012	**June** ''	175.45	184.83	164.65	21.62	23.09	19.76
2013	***2020/2021***						
ሐምሌ 2012	**July 2020**	178.97	190.66	165.52	22.31	24.97	18.94
ነሐሴ 2012	**August** ''	179.78	192.19	165.51	20.02	21.96	17.52
መስከረም 2013	**September** ''	180.80	193.36	166.36	18.68	21.20	15.46
ጥቅምት 2013	**Ocober** ''	181.49	195.15	165.77	19.33	23.20	14.45
ህዳር 2013	**November** ''	182.18	194.32	168.20	19.03	22.14	15.13

ታህሳስ 2013	**December ''**	181.97	191.51	170.98	18.18	21.31	14.37
ጥር 2013	**January 2021**	184.95	195.46	172.86	19.24	23.14	14.51
የካቲት 2013	**February ''**	192.45	201.99	181.47	20.64	22.76	18.03
መጋቢት 2013	**March ''**	198.36	208.43	186.77	20.77	22.28	18.87
ሚያዝያ 2013	**April ''**	200.02	213.59	184.40	19.33	21.92	16.03
ግንቦት 2013	**May ''**	204.40	220.14	186.29	19.87	23.94	14.75
ሰኔ 2013	**June ''**	218.63	238.32	195.96	24.61	28.94	19.02
2014	***2021/2022***						
ሐምሌ 2013	**July 2021**	226.27	251.72	196.98	26.43	32.03	19.00
ነሐሴ 2013	**August ''**	234.46	264.41	199.97	30.41	37.58	20.82
መስከረም 2014	**September ''**	243.76	274.52	208.35	34.82	41.98	25.24
ጥቅምት 2014	**Ocober ''**	243.84	274.54	208.50	34.36	40.69	25.78
ህዳር 2014	**November ''**	242.34	269.90	210.61	33.02	38.89	25.22
ታህሳስ 2014	**December ''**	245.80	271.24	216.51	35.08	41.63	26.62
ጥር 2014	**January 2022**	248.68	273.55	220.05	34.45	39.95	27.29
የካቲት 2014	**February ''**	257.05	286.54	223.09	33.57	41.86	22.94
መጋቢት	**March ''**	267.25	298.99	230.71	34.73	43.45	23.53

2014							
ሚያዝያ							
2014	**April '' **	273.13	305.16	236.26	36.55	42.87	28.12
ግንቦት							
2014	**May '' **	280.36	316.78	238.42	37.16	43.90	27.98
ሰኔ 2014	**June '' **	293.01	329.01	251.56	34.02	38.05	28.37
2015	***2022/2023***						
ሐምሌ	**July**						
2014	**2022**	302.00	341.17	256.90	28.81	29.03	28.47
ነሐሴ 2014	**August '' **	310.77	352.27	262.99	27.49	28.32	26.23
መስከረም							
2015	**September '' **	318.56	359.64	271.26	30.64	31.00	30.10
ጥቅምት							
2015	**Ocober '' **	321.24	358.69	278.12	32.56	32.90	32.05
ህዳር 2015	**November '' **	327.44	362.09	287.56	33.22	33.49	32.82
ታህሳስ							
2015	**December '' **	328.89	360.37	292.66	32.26	31.74	33.00
ጥር 2015	**January 2023**	333.08	365.42	295.85	29.58	27.53	32.61
የካቲት							
2015	**February '' **	339.42	371.27	302.77	27.00	24.17	31.23
መጋቢት							
2015	**March '' **	358.76	397.18	314.55	31.35	30.15	33.14
ሚያዝያ							
2015	**April '' **	364.67	402.22	321.44	30.07	26.97	34.82
ግንቦት							
2015	**May '' **	366.74	406.90	320.51	30.81	28.45	34.43
ሰኔ 2015	**June '' **	378.95	421.01	330.53	29.33	27.96	31.39

2016 ሐምሌ 2015	***2023/2024*** **July 2023**	388.94	434.33	336.69	28.79	27.31	31.06
ነሐሴ 2015 መስከረም 2016	**August** ''	398.39	445.66	343.97	28.19	26.51	30.79
ጥቅምት 2016	**September** ''	406.80	453.62	352.89	27.70	26.13	30.09
ህዳር 2016 ታህሳስ 2016	**Ocober** ''	415.17	465.34	357.42	29.24	29.73	28.51
ጥር 2016 የካቲት 2016	**November** ''	420.29	470.64	362.33	28.35	29.98	26.00
መጋቢት 2016	**December** ''	423.35	470.59	368.97	28.72	30.59	26.08
	January 2024	431.11	483.45	370.85	29.43	32.30	25.35
	February ''	435.31	488.48	374.09	28.25	31.57	23.56
	March ''	452.59	512.46	383.66	26.15	29.03	21.97

APPENDEX 2. Diagnostic testing

Multicollinearity testing

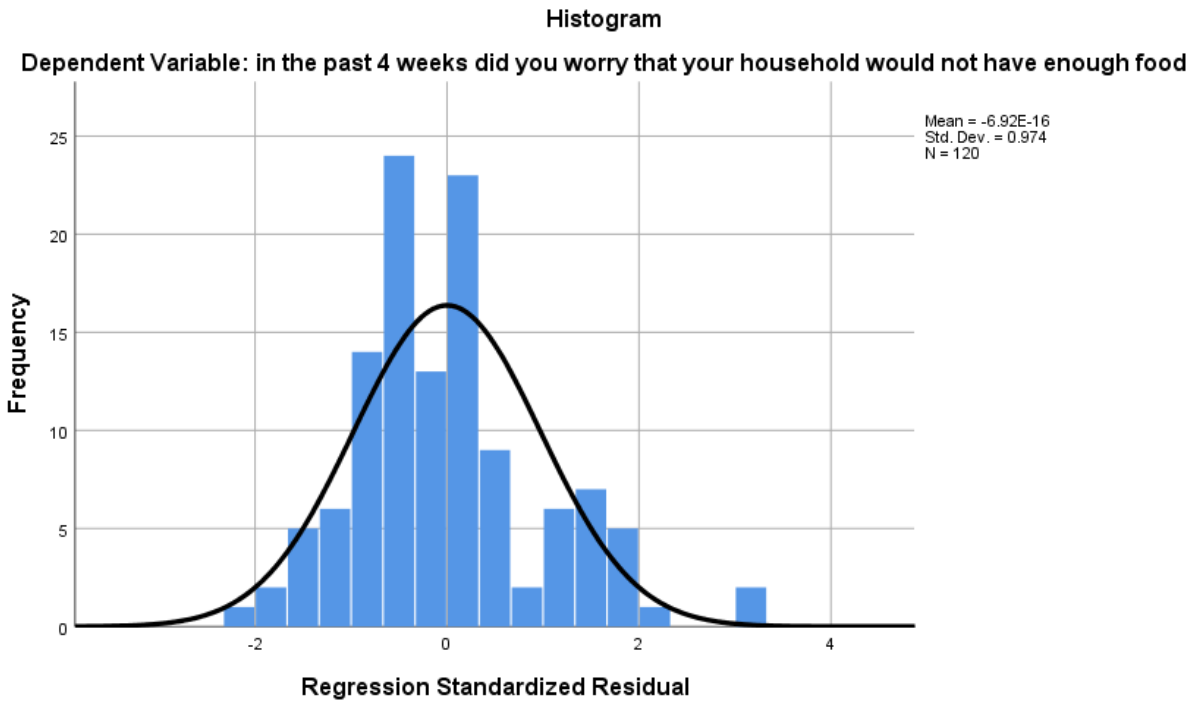
Coefficients[a]

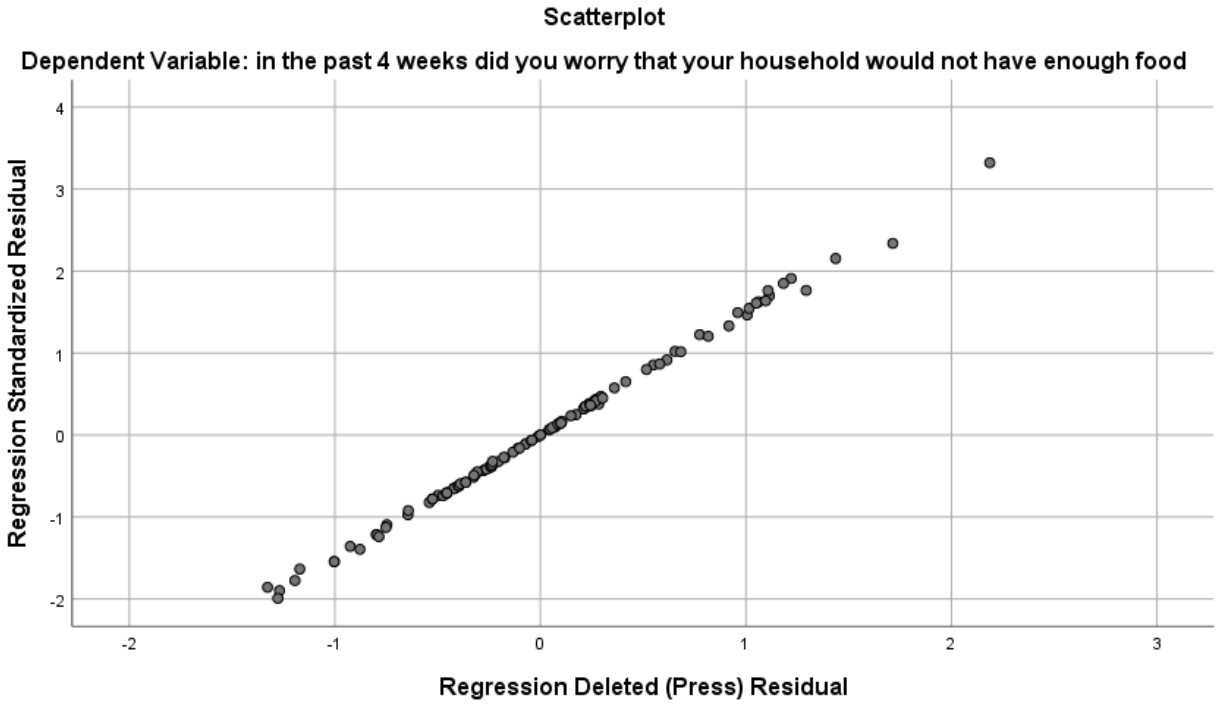
Model		Collinearity Statistics	
		Tolerance	VIF
1	Education status of household heads	.535	1.869
	who is the owner of the house you live in	.920	1.087

	average monthly household head income in birr	.361	2.774
	what is your monthly average expenditure on food in your household in birr	.537	1.861
	Did you have access from social protection program	.643	1.556

Anova for multicollinearity test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.769	5	12.554	23.643	.000[b]
	Residual	60.531	114	.531		
	Total	123.300	119			


Histogram
Dependent Variable: in the past 4 weeks did you worry that your household would not have enough food
Mean = -6.92E-16
Std. Dev. = 0.974
N = 120
Frequency
Regression Standardized Residual


Scatterplot
Dependent Variable: in the past 4 weeks did you worry that your household would not have enough food
Regression Standardized Residual
Regression Deleted (Press) Residual