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Household Food Security in Ethiopia: A Comprehensive Analysis on Drivers, Policies and Governance

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Dissertation Approval

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This is to certify that the dissertation prepared by Workicho Jateno entitled: *Household Food Security in Ethiopia: A Comprehensive Analysis on Drivers, Policies and Governance* is submitted in fulfillment of the requirements for the Degree of Doctor of Philosophy (PhD) in Development Studies (Rural Development) complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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Statement of the Author

I hereby declare to the College of Development Studies of Addis Ababa University that this dissertation entitled *Household Food Security in Ethiopia: A Comprehensive Analysis on Drivers, Policies and Governance* is my account of research. It entails its main content work not fully or partially submitted for a degree at any tertiary education institution. I fully acknowledged the materials and pieces of information used in the study. The reporting procedures do comply with the expected standards and regulations of the university.

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Abstract

Household food insecurity continued to be a development and policy agenda in Ethiopia. This study is initiated to assess the status and determinants of household dietary diversity and food security, and to evaluate policies, strategies and programs in terms of addressing the multi-dimensional features of food security in Ethiopia. It also evaluated the food security governance mechanism of the nation. It used data from the 4th wave of the Ethiopian socioeconomic survey. The survey included information from 3,115 rural households. In addition, qualitative data was generated from key informants and document reviews. The study dominantly adopted explanatory research design. Data were analyzed using a combination of qualitative and quantitative data analysis tools. Qualitative data analysis tools such as content analysis, narrations and direct quotation of informant's views were used. Quantitative data analysis tools such as mean, percentages, standard deviation, beta and ordinal logistic regression models were used. A composite household food security index was constructed using Principal Component Analysis (PCA). Using a multidimensional food security indicator, about 78% of rural households in Ethiopia are food insecure, with 90 % of them classified as moderately food insecure. Regional variations in magnitude of food insecurity are observed. Harari regional state and Diredawa city administration are relatively better than the other eight regions in the country. The study further revealed that the magnitude of food insecurity in Ethiopia is substantially higher than previous estimates done based on a uni-dimensional food security indicator. Dietary diversity of households is low. Cereals are the most dominant food groups consumed by 96.4% of the households followed by pulses consumed by 82% of the households. Nutrition-dense food commodities such as lean meat, vegetables and fruits were the least consumed food groups in Ethiopia. The study further identified the determinants of dietary diversity and household food security in Ethiopia. Demographic variables such as household head's sex and marital status; socioeconomic variables such as wealth status and education level of the household head; and location variable, i.e the regional state where the household lives significantly determined household's food security in Ethiopia. With respect to the determinants of consumption of diverse food stuff, female-headed households had 38% more chance of consuming diverse foods compared to male-headed ones. Household heads who completed secondary education and above had 62% more chance of consuming diverse foods compared to uneducated household heads. Household heads who were single had 37% less chance of consuming diverse foods compared to those household heads who were married. Those households located in Harari regional state and in the rural surroundings of Diredawa city administration had 6.56 times more chance of consuming diverse foods compared to those living in Tigray and Amhara regional states. The results also highlighted that households who were in the upper wealth category had 9 times more chance of consuming diverse foods compared to those households who were in the lower wealth category. Evaluation results of food security related policies, strategies, and programs revealed that improving the availability and access dimensions of food security were the main focus, with limited consideration of interventions that improve the utilization and stability dimensions of food security. Evaluation of the food security governance system of the nation showed that there are gaps in instituting effective coordination and accountability systems; ensuring coherence among policies, legal frameworks and directives; building the capacity of implementers at lower level of the governance tier; and ensuring active participation of food security actors. The study recommends that government and development partners address the multidimensional challenges of food security in Ethiopia by implementing interventions that build household assets and enhance the literacy levels of household heads. In order to address household dietary diversity, tailored interventions that consider context-specific needs and similarities in food consumption patterns and differences in dietary diversity among regions need to be implemented. Encouraging farmers to diversify agricultural production and providing nutrition education to promote consumption of livestock products is also recommended. Policies, strategies, and programs should adopt a comprehensive approach to include interventions relevant to address the four dimensions of food security. More importantly, an independent government entity with the resources and authorities should be formed with the necessary accountability and enforcement mechanisms.

***Keywords**: Dietary diversity, food security, Policy, Governance, Ordered logit, Beta Regression, Ethiopia.*

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Lists of Acronyms

ADLI	Agriculture Development Led Industrialization
AGP	Agricultural Growth Program
AIC	Akaike Information Criterion
ANOVA	Analysis of Variance
AOR	Adjusted Odds Ration
BIC	Bayesian Information Criteria
CAADP	Comprehensive African Agricultural Development
CI	Confidence Interval
COMCEC	Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation
CONSEA	National Council for Food and Nutrition Security
CSA	Central Statistics Agency
CSCR	Committee on Economic, Social and Cultural Rights
CWFS	Committee on World Food Security
DFID	Department for International Development
EA	Enumeration Areas
EPHI	Ethiopian Public Health Institute
ERHS	Ethiopian Rural Household Survey
ESS	Ethiopia Socioeconomic Survey
FAD	Food Availability Decline
FAO	United Nations Food and Agricultural Organizations
GHI	Global Hunger Index
GOE	Government of Ethiopia
GTP	Growth and Transformation Plan
HDDS	Household Dietary Diversity Score
HLPE	High Level Panel of Experts
IFPRI	International Food Policy Research Institute
JCA	Joint Correspondence Analysis

KII	Key Informant Interview
KMO	Kaiser Meyer Olkin
MCA	Multiple Correspondence Analysis
MoANR	Ministry of Agriculture and Natural Resources
MoARD	Ministry of Agriculture and Rural Development
MOFED	Ministry of Finance and Economic Development
MoH	Ministry of Health
NEPAD	New Partnership for African's Development
NGOs	Non-Government Organizations
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PCA	Principal Component Analysis
PSNP	Productive Safety Net Program
RDPS	Rural Development Policy and Strategy
SDPR	Sustainable Development and Poverty Reeducation
SLA	Sustainable Livelihood Approach
SNNPR	Southern Nations Nationalities and Peoples Region
TLU	Ownership of Livestock
UN	United Nations
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
VIF	Variance Inflation Factor
WASH	Water Sanitation and Hygiene
WB	World Bank

Chapter One: Introduction

1.1. Background of the study

Food security remains a development challenge and a complex issue that has been the subject of concern for policymakers, development practitioners, and the academia for decades. In the last few decades, there has been a number of efforts in terms of conceptualizing and understanding the causes of food insecurity in a bid to formulate policies, strategies and interventions. In this line, the 1974, First World Food Conference adopted a Universal Declaration on the Eradication of Hunger and Malnutrition understood food insecurity in terms of failure to achieve food self-sufficiency and shortage of food supplies (FAO, 1974). The declaration affirms that all human beings, irrespective of their gender, age or any other characteristic are entitled with inherent and inviolable right to be free from hunger and malnutrition. Earlier to the 1974 World Food Conference, Article 25 of the 1948 Universal Declaration of Human Rights also considered food security from a moral perspective in which everyone has equal right to get access to food (United Nations, 1948).

The concept of food security evolved in the past few decades. Its emphasis has been broadened from the availability and supply of food (FAO, 1974) to physical and economic access to food in 1983 (FAO, 1983). Following the World Bank's report on poverty and hunger in 1986, the distinction between transitory and chronic food insecurity was recognized (World Bank, 1986). Thus, the literature acknowledged the need to take into account temporal dynamics of food security, which formed the basis for the conceptualization of food security from stability aspect. The 1996 World Food Summit, popularly known as *the Rome Declaration on World Food Security*, provided a comprehensive understanding to the concept of food security by including availability, access, utilization and stability aspects of food (FAO, 1996).

The Food Availability Decline (FAD) model, pioneered by Amartya Sen in 1981 provided the foundation for the development of the entitlement theory, and it offered an approach to explain food insecurity in terms of economic, social, and political factors that limit access to food (Sen, 1981). Although the model improved the understanding about food insecurity (Maxwell & Smith 1992; Devereux 1993)

The conceptualization of food security has important implications to research and development. Identification of the magnitude and correlates of food security depends on the way we conceptualize the concept, and it has implications to policy formulations and design of strategies. In this respect, Sen and Williams (1982) developed the entitlement theory comprising of endowment set, entitlement set, and entitlement mapping. Household's or individual's endowment set composed of different capitals namely, natural capital (e.g land), physical capital (e.g equipment), social capital (e.g social network), financial capital (e.g saving), and human capital (e.g health and education) determines availability and access to different combination of life sustaining goods and services that individuals or households are entitled to consume, i.e the entitlement set. The entitlement mapping examines the rules and regulations that determines entitlement set and measures the rate of transformation of endowment set to entitlement set, which in turn affects the ability of individuals or households to get access to life sustaining goods and service. In this regard, entitlement mapping is linked to the concept of food security governance, which is a critical issue in determining food security.

Lappe et al. (1998) presented twelve myths about the drivers and cures of world hunger. Some of the myths are related to the argument of direct entitlement failure, i.e the failure to produce enough food. In this respect, the myths, namely, there is simply not enough food, nature is to blame, too many mouths to feed, the green revolution is the answer and food vs environment can be mentioned. Thus, improving the availability of food or addressing constraints related to the FAD is the cure to world's hunger (Sen, 2000). In connection to food availability decline, Thomas Malthus argued that due to imbalance between the geometric growth of population and arithmetic growth rate of resource availability, the world suffers from ensuring direct entitlements (Malthus, 1998).

Other myths are related to the argument of indirect entitlement failure, i.e. failure to address exchange entitlement. In this regard, the myths, namely, justice vs production, the free market can end hunger, free trade is the answer, too hungry to revolt, more United State aid will help the hungry, we benefit from their hunger and food vs freedom can be listed. In this respect, addressing constraints related to market exchange and the political economy of food can cure the world's hunger (Sen, 2000). In an argument aligned to the exchange entitlement failure, in his

book titled stuffed and starved, Patel (2012) argued that the global food system is divided between populations who suffer from obesity due to over consumption of foods and those who suffer from malnutrition due to starvation.

Addressing food insecurity is an important development agenda for Ethiopia. The country faced the worst famine in 1983 leaving many individuals impoverished. The famine was prolonged by conflict and drought, making the population susceptible to food insecurity throughout the mid-1990s (Webb and Von, 1994). Despite our profound understanding about the drivers of famine in general and food insecurity in particular, the challenge of food insecurity continued till to date in Ethiopia. According to the 2021 Global Hunger Index (GHI) report, the state of chronic food insecurity and malnutrition in Ethiopia is serious with GHI score of 24.1. In this respect, Ethiopia is ranked 90th out of the 116 (GHI, 2021). According to Degaga (2005), famine in Ethiopia is caused by natural hazards such as drought, pest, flooding and epidemics and by man-made factors such as policy failure and conflicts.

1.2. The research problem

Ethiopia has developed and implemented a number of food security related strategies and programme to address food and nutrition security challenges. Despite a declining trend, still the percentage of food insecure people in Ethiopia (32.7%) is significant. In 2023, more than 20 million people in the country need urgent humanitarian assistance (HRP, 2023). The problem of malnutrition is also challenging. For instance, one quarter of the Ethiopian adolescent girls and young women are undernourished (Wubshet et al., 2022).

Several factors contributed to the growing humanitarian needs in Ethiopia, including conflict, desert locust invasions, climatic shocks, COVID-19 pandemic, and macroeconomic instability such as huge trade and budget deficit, soaring food prices and high rates of unemployment (OCHA, 2021). These drivers negatively affect the availability of nutritious diets, with 75% of households being unable to afford to get access to nutritious diets (MoH et al., 2021).

In Food security analysis, it is essential to critically understand factors that undermine the four dimensions of food security, namely availability, access, utilization, and stability, and thus, it requires a comprehensive approach of addressing them. This calls for the adopting a combination of food security indicators (Sileshi et al., 2023). The use of harmonized food security indicators

can help identify households with different food insecurity problems that require different types of policy interventions (Ogundari, 2017). Ultimately, ending hunger and achieving food security require a concerted effort from different actors such as national governments, donors and local and international development partners (United Nations, 2015).

Several studies measured household food security status and identified the determinants. The studies done so far can be grouped based on their level of analysis and/or geographical coverage viz local (micro), regional (meso)[1] and national (macro) level; based on their unit of analysis viz individual and household; based on the conceptual breadth the studies covered viz availability, access, utilization and stability dimensions of food security; and based on the types of variables they addressed. Under the first group that examined food security status and determinants focusing on limited geographic locations and cases, we can find studies by Assefa and Abide (2023) in Lemo woreda, Worku (2023) in west Gojjam zone, Addisu (2015) and Mebrie and Ashagrie (2023) in Libokemkem woreda, Fikre and Zegeye (2022) in north Shewa zone, Gebissa & Geremew (2022) in Abay Chomen district, Getaneh et al. (2022) in north rift valley, Awoke et al. (2022) in central and north Gondar zone, Derso (2021) in Addis Ababa, Mohammed et al. (2021) in Kalu woreda, Eshetu & Guye (2020) in Gamo Gofa zone, Sani & Kemaw (2019) in Assosa zone, Agidew and Singh (2018) in south Wollo zone, Abi & Tolossa (2015) in Girar Jarso woreda, Hussien & Janekarnkij (2014) in Jigjiga district. Others such as Gelan (2022), Getaneh et al. (2022), Usman & Callo-Concha (2021), Shone et al. (2017), Zeray (2017) and Van & Tagel (2011) have also conducted food security studies focusing on specific cases.

Within the first group that examined status and/or determinants of food security at national level include studies by Wubetie et al. (2023), Mengistu and Kassie (2022), Mohammed (2021), Abegaz (2017), Abafita & Kim (2014) and Astemir (2014). We hardly found studies conducted at meso level that examined status and determinants of food security of the country. In terms of unit of analysis, almost all of the studies mentioned earlier were conducted considering households as a unit of analysis. Under the third group (i.e dimensions of food security), most of the studies examined status and determinants of food security using a uni-dimensional indicator of either availability or access. For example, Wubetie et al. (2023) adapted food consumption score to reflect differences in consumption culture, Assefa & Abide (2023) adopted calorie-based

[1] Meso level in this dissertation refers to federal states which are commonly termed as regional states in Ethiopia.

food consumption indicator, Mengistu & Kassie (2022) adopted food security index constructed based on per capita food consumption expenditure, Derso et al. (2021) used household food insecurity access scale, Mohammed et al. (2021) used calorie-based food security indicator, and Agidew & Singh (2018) adopted household food balance model as indicator of the average daily food available to each person used consumption expenditure.

There are some studies that attempted to construct a composite food security indicator using national level household surveys. For example, Mohammed (2021) used a three-year panel data from four regions in Ethiopia and constructed food security index using the four dimensions of food security. However, the geographical coverage of his study was limited to what is largely described as 'major' regions in the country, and thus can't provide complete picture of the country. Furthermore, his study didn't use recent dataset and thus may not reflect realities on the ground. More importantly, his study didn't investigate the correlates of food security beyond measuring the status of food security in the study regions. Analyzing the determinants of food security has an important contribution to the design of policy and development interventions. Under the last category of studies (i.e type of variables studied), almost all the studies focused on household characteristics, demographic variables, and socioeconomic and institutional variables. None of the studies in Ethiopia considered policies, strategies, and programs as well as food security governance as important aspects that influence food security situation in the country.

This study attempts to fill up existing knowledge gaps in the previous studies in the following ways. First, it attempts to broaden the geographic coverage of the study (10 administrative regions included), used the fourth-round national survey (relatively recent) and analyzed the determinants of food security, which will bridge the knowledge gap observed in the work of Mohammed (2021) in terms of geographic coverage, use of recent data and thematic coverage (i.e moving beyond studying status) respectively. Second, it attempted to fill up the knowledge gap observed in several other studies that fall under the first group of case-based examinations and use of uni-variate food security indicators by covering wide geographic area and looking into regional variations in food security status as well as by constructing food security index using variables that capture the four pillars of food security. So far, no study investigated regional variabilities in food security status measured based on the four pillar of food security. Moreover, to enhance our comprehension of household dietary diversity in rural Ethiopia, it is imperative to

broaden our research beyond isolated studies and explore regional differences. Engaging in comprehensive research that spans diverse geographical areas will enable a more nuanced understanding of the factors that impact dietary diversity. Previous studies have highlighted the importance of different determinants at localized levels, emphasizing the need for a more expansive approach to grasp the broader context (Geremew et al., 2019; Dereje et al., 2021; Workicho et al., 2016)). However, these determinants may manifest differently across regions due to varying cultural practices, access to resources, and geographical conditions.

Third, so far studies in Ethiopia examined status and determinants of food security by giving no/little focus to enabling environment. This study acknowledged this lacuna and attempted to examine process indicators of food security namely, policies, strategies and programs as well as the country's food security governance system. In this respect, Degaga (2005) argued that efficient policies and good governance are necessary to address food insecurity and hunger in Ethiopia. Goshme (2019) also highlighted that in Ethiopia the absence of suitable policies and institutions is a one of crucial factors contributing to food insecurity. Policy and institutional setup play important for government, donor agencies, civil societies, private sectors, and local communities to tackle food insecurity in Ethiopia.

Therefore, there is a need to conduct a study having wider geographical coverage and conceptual breadth that provides a comprehensive picture on the status of food security and dietary diversity in the country, and determinants. Successful implementation of food security programs requires an effective governance structure which past studies in Ethiopia didn't give it much emphasis. Therefore, this research work seeks to answer two broad research questions: (1) what are the status and determinants of food security and dietary diversity in Ethiopia disaggregated by administrative regions; and (2) to what extent food security-related policies, strategies and programs as well as food security governance mechanisms provided conducive environment in addressing food security challenges of the country. In view of addressing these broad research questions, the study has laid down the following specific objectives.

1.3. Objectives of the study

1. Measure status of rural household food security from multi-dimensional perspective in Ethiopia across regions.
2. Investigate determinants of household dietary diversity disaggregated by administrative regions in Ethiopia.
3. Investigate the correlates of household food security using multi-dimensional food security indicator in Ethiopia.
4. Examine Ethiopia's policies, strategies, and programs in addressing food security from multi-dimensional perspective.
5. Evaluate food security governance mechanisms in Ethiopia.

1.4. Significance of the study

The findings of this study have the significance of contributing to policy and improving development practices. The identification of food security status using multi-dimensional food security indicators provides realistic figure on the magnitude of food insecurity in Ethiopia that will further allow to draw the attention of national government, local and international development partners. The identification of the correlates of food security using multi-dimensional food security indicators also provide on which factors our interventions should focus on. Hence, it will improve our development interventions by way of making them realistic. The regional disaggregation of status of food security in Ethiopia allows development partners and national government to focus on administrative regions that have serious food security challenges, and hence enables to improve targeting. The findings of the study on the evaluation of policies, strategies and programs in adequately addressing the four pillars of food security allows to have closer examination on our food security-related policies, strategies and programs. Hence, it contributes to policy reform efforts of the country. The study's findings on the evaluation of food security governance system in Ethiopia will contribute to improving the governance system based on key shortfalls the study indicates. Further, it will contribute to improving development practices by addressing the key challenges of food security governance. Lastly, this study contributes to knowledge in the food security literature.

Finally, this study is relevant to different stakeholders. It is relevant to academia as it showed the practical application of food security index construction and application of econometric tools of analysis. It is relevant to national government as it provides realistic information on the status of

food security in the country using a multi-dimensional perspective as well as information on the strengths and weaknesses of food security-related policies and the food security governance system of the nation in addressing the multi-dimensional feature of food security. The study is also relevant to local and international development partners since it provides regionally disaggregated information on the status of food security, and the overall determinants of household level food security in the country.

1.5. Scope and limitations of the study

The conceptual scope of this study covers the four dimensions of food security. Geographically, this study covered 10 administrative regions of the country. Furthermore, the study didn't analyze the causal relationship between enabling environment such as policies, strategies and programs as well as food security governance system and household's status of food security. In addition, the evaluation of policies, strategies and programs didn't go beyond examining the design phase of the documents. That is to say, this study examined how far the different documents attempted to address the four dimensions of food security.

One major limitation of the study come from the data used for the study of status and determinants of food security. The study used a cross-sectional national survey data collected in 2018/19 which will not show the dynamics of food security over time. Furthermore, the dataset is four years old which may not show recent food and humanitarian crisis as a result of man-made (e.g conflicts in the different parts of the country), and natural shocks (e.g COVID 19, climate-related shocks in Borena, and desert locust in Amhara and Tigray).

1.6. Research philosophy

Debates about singular or universal truths in social research have been ongoing since ancient Western philosophy and continue to shape researchers' views of knowledge. In response to the complexity of research problems, mixed methods research has emerged as an approach that combines qualitative and quantitative methods. The primary philosophy of mixed research is pragmatism, which accommodates both approaches. Creswell's (2003) work on research design and his later work with Plano (Creswell & Plano, 2011) guide mixed methods research, and the ability of mixed methods research to provide a holistic understanding of a study is a commonly cited reason for using it (Greene, 2007).

We adopted a mixed approach. Food insecurity is a complex issue shaped by social, economic, and political factors, and analysis is guided by the pragmatic philosophy. Given this complexity, mixed methods research that integrates quantitative and qualitative methods is effective in understanding and addressing food insecurity (Lynam & Dearden, 2017). Almalki (2016) emphasizes the importance of integrating the relevant philosophical worldview with the mixed research design and specific methods used in practice. Thus, the epistemology of mixed methods research is that knowledge is best acquired through a combination of both quantitative and qualitative methods in order to understand complex issues such as food insecurity.

1.7. Overall description of data, data source and analysis method

For this study data were collected from primary and secondary sources. The study utilized secondary data from the 2018/2019 Ethiopia Socioeconomic Survey (ESS), which was collected by the Ethiopian Statistical Services (the then Central Statistics Agency of Ethiopia) in collaboration with the World Bank. The survey covered both rural and urban households from 10 regions of Ethiopia, totaling 7,527 households from 565 Enumeration Areas (EA). Households were chosen using a multi-stage sampling method. Initially, specific areas (EAs) were randomly selected through a simple sampling procedure. Following this, households within these areas were chosen via systematic random sampling in the second stage. Although the dataset encompassed both rural and urban households, this study focused on rural households across all regions of the country. Consequently, the study included a total of 3115 households residing in rural areas. This secondary data served to analyze the status of food security and dietary diversity of households in Ethiopia. The study identified various independent variables that may affect household dietary diversity (referee detail on page 40) and multi-dimensional household food security (refer table 2.2. on page 23). Some important variables such as land size, dependency ratio, distance from market, frequency of extension contact, etc which are presumed to have effect on dietary diversity and food security were omitted from this study due to unavailability of the variables on the data set. The study used food security index as dependent variable to identify food security determinants and Dietary Diversity Score as dependent variable to identify factors affecting dietary diversity. Accordingly, to assess the status of food security among rural households in Ethiopia, the study utilized a multi-dimensional approach that considered the availability, access, utilization, and stability components of food security.

Principal Component Analysis (PCA) used to construct a food security index and used it as dependent variable and identified the determinants of food security using ordered logistic and beta regression models.

In order to examine Ethiopia's policies, strategies and programs in addressing food security from multi-dimensional perspective the study reviewed 11 different documents, namely, The Ethiopia Rural Development Policy and Strategy; Food Security Strategy and Programme; Poverty reduction programmes (SDPRP and PASDEP); The Growth and Transformation Plan I and II; The Agriculture Growth Program I and II; Food and Nutrition Security Policy and 10-Year Development Plan

The Content analysis is adopted as qualitative tool of data analysis to examine the strengths and gaps of these documents in addressing the four dimensions of food security. An analytical framework is adapted from FAO (2009) to evaluate the design of policies, strategies, and programs and identify gaps for improvement. Results are presented and discussed thematically following the four dimensions of food security.

Finally, the data to evaluate food security governance system of the country come from interview of key informants and by collecting data from relevant documents. Six key informants drawn from government bodies, civil society organizations, research institutions, the United Nations, and consulting firms, collectively encompassed a spectrum of expertise in designing and implementing food security-related policies and programs. The documents reviewed include Food Security Program, Food and Nutrition Security Policy, Productive SafetyNet programmes, and Policy and investment Framework (2020-2025). The data are analyzed qualitatively using thematic and content analysis and discussions are made through triangulations.

1.8. Conceptual framework

In the study of food security, the literature presents three major aspects namely, magnitude of food insecurity (which is an outcome indicator), the determinants of food security (which determines the outcome) and enabling environment such as policies, institutions and food security governance system (which are broadly classified as process indicators additionally determining outcome) (Pangaribowo et al., 2013).

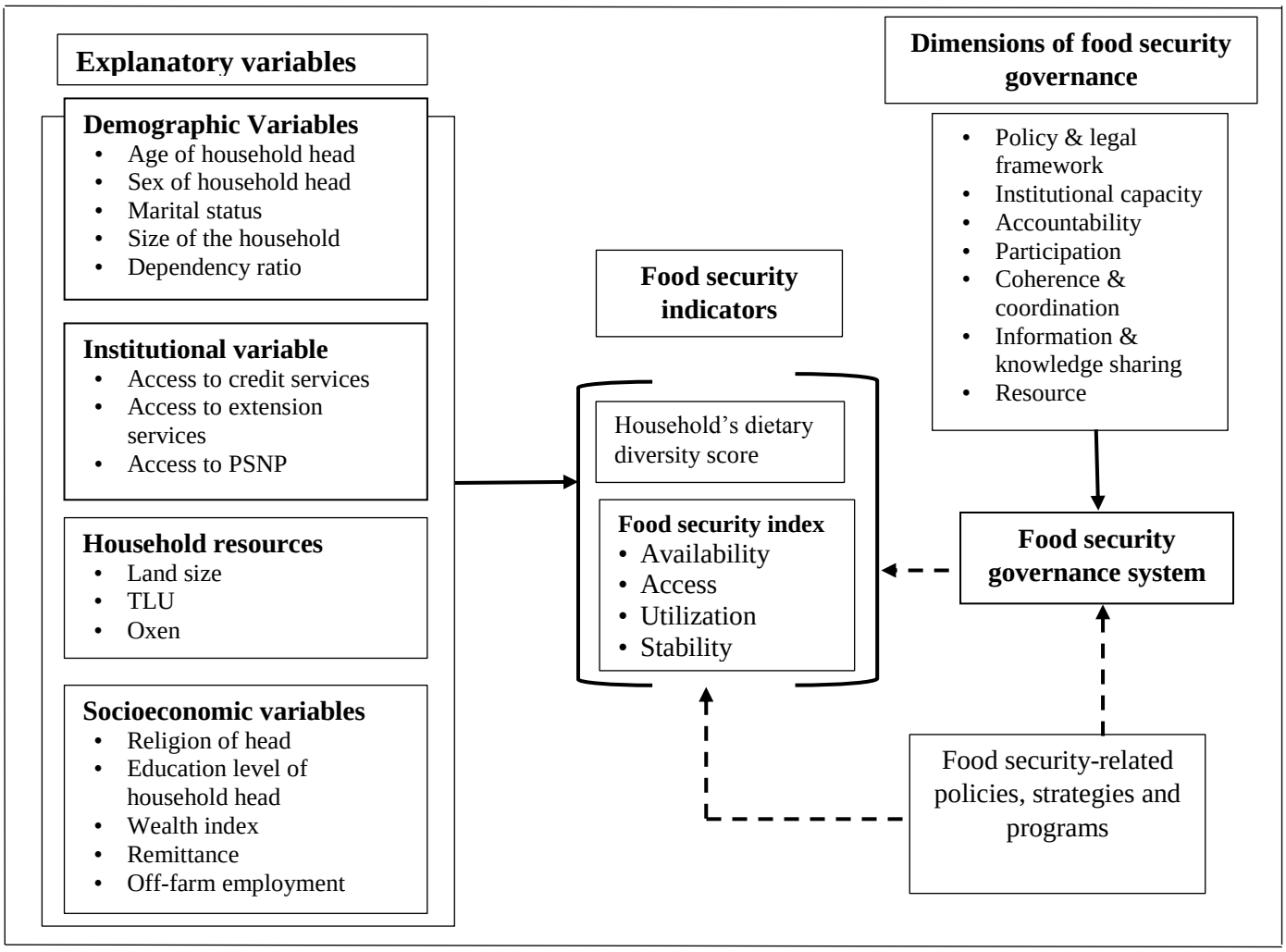

Figure 1. 1. Conceptual framework of the dissertation

Source: Own construction based on literature review (2023)

In this study, all the three aspects of food security are investigated. The conceptual framework presented in Figure 1.1 illustrates the three major conceptual components. Food security status is examined using indicators that capture the multi-dimensional nature of food security. As discussed in background section, four dimensions of food security are presented in the literature in the conceptualization of food security. In this study, a composite food security index is constructed using variables that measure the four dimensions of food security. In addition to the composite indicator constructed using the Principal Component Analysis (PCA), dietary diversity is used to gauge food security status of households in Ethiopia. Based on previous

studies, several variables that determine household food security status falling under four broad categories namely, demographic, institutional, resource endowment and socioeconomic are presented (Figure 1.1). Process indicators, which are generally known as enabling environment, will further affect outcome indicators.

In this study, however, the process indicators are evaluated in terms of addressing the four pillars of food security without establishing a cause-effect relationship between process indicators and outcome variables. As a result, in Figure 1.1, this is presented in a broken arrow. Food security governance system is evaluated using dimensions that best illustrate its effectiveness. Accordingly, dimensions such as presence of policy and legal framework, institutional capacity and resource availability in effectively implementing food security policies, strategies and programs, accountability mechanism put in place, coherence and coordination mechanisms among different entities that deal with food security issues and food security programs, participation of relevant stakeholders and sectors entrusted with the roles and responsibilities of addressing food security, and a system of knowledge and information sharing to make interventions and policy designs and reform efforts effective.

1.9. Structure of the dissertation

This dissertation is structured in six chapters. The dissertation is prepared based on standalone articles/manuscripts.

The second chapter examined status of household's food security in Ethiopia using an index constructed based on variables measuring the four dimensions of food security. It further examined regional differences in terms of food security status using a multi-dimensional indicator. In addition, it analyzed and discussed the correlates of food security in Ethiopia that determine household's food security status from a multi-dimensional aspect. The chapter is written based on an article published in the Journal of Social Economics. Details of the article is presented at the end of this section.

The third chapter examined dietary diversity across 10 administrative regions in the country. It attempted to analyze and discuss the status of these administrative regions in terms of consumption of diverse food stuff and the factors that determine dietary diversity. The chapter is

written based on an article published in PLoS One. Details of the article is presented at the end of this section.

The fourth chapter evaluated food security related policies, strategies and programs designed in Ethiopia in a bid to address food security challenges of the country. The chapter examined how far the design process of the policies, strategies and programs addressed the four dimensions of food security with the aim of showing gaps in the documents that will contribute to future reform efforts. The chapter is prepared based on an article published in the Journal of Social Sciences and Humanities. Details of the article is presented at the end of this section.

The fifth chapter deals with the evaluation of food security governance system of the country using a framework that included components that portray its effectiveness. The aim of the chapter is to present strengths, weaknesses and challenges in implementing food security programs with a potential outcome of further improving the food security governance system of the country.

Needless to say, a strong food security governance system enables the nation to successfully implement food security policies, strategies and programs with a positive effect on the outcome indicator (i.e status of food security). The chapter is prepared based on a manuscript submitted to the journal of Sustainability. The last chapter is synthesis. It provides brief summary of key findings in the context of addressing the key research question and specific objectives of the study, present concluding remarks based on available theories and paradigms and suggest policy implications that have to be considered in future efforts of addressing the multi-dimensional aspects8 of food security.

Below are the lists of published articles, manuscripts under review and manuscripts prepared for submission, which are used to prepare the dissertation.

Chapter 2: **Jateno, W.,** Alemu, B.A., and Shete, M. (2023). Unpacking Regional Variations of Multidimensional Food Security in Rural Ethiopia: Insights for Policy. International Journal of Social Economics. DOI: 10.1108/IJSE-02-2023-0139

Chapter 3: **Jateno, W**., Alemu, B.A., and Shete, M. (2023). Household dietary diversity across regions in Ethiopia: Evidence from Ethiopian socio-economic survey data. PLOS One. DOI: 10.1371/journal.pone.0283496

Chapter 4. **Jateno, W**., Alemu, B.A., and Shete, M (2023). Towards a comprehensive approach: Towards a Comprehensive Approach: Examining Ethiopia's Policies, Strategies and Programs using a Multidimensional Food Security Framework. Under review in the Ethiopian Journal of the Social Sciences and Humanities (EJOSSAH)

Chapter 5. **Jateno, W**., Alemu, B.A., and Shete, M (2023). Ethiopia's food security governance: Evaluation based on analysis of stakeholder's sentiments and document reviews: Submitted to Sustainability.

Chapter Two: Unpacking Regional Variation of Multidimensional Food Security in Rural Ethiopia: Insights for Policy

Abstract

***Purpose**: This study aims to measure the status of rural household food security across regions using multidimensional indicators. It also aims to identify the determinants of rural household food security in Ethiopia.*

***Design/methodology/approach**: The study adopted descriptive and explanatory designs. It used data from the 4th wave of the Ethiopian socioeconomic survey that has 3,115 respondents. We constructed household food security index using variables that capture availability, access, utilization, and stability dimensions of food security. We categorized households into relative food security groups, namely, alarming and moderately food insecure, as well as moderately and highly food secure. Beta regression model, which is widely used to analyze response variables that assume values between 0 and 1, is used to estimate the determinants of food security.*

***Findings**: The study finds that 77.7% of rural households are food insecure. Of this, 90% are moderately food insecure. Regional variations in magnitude of food security showed that Harari, Gambella and Benshanguel Gumuz regional states are relatively better-off than other regions in Ethiopia. The study identified sex, education level, marital status, location, and wealth status of households as significant determinants of food security.*

***Originality**: This study sheds light on regional variations in multidimensional food security in Ethiopia. It thus challenged previous estimates of food security using uni-dimensional indicator. It highlighted the need for region-specific analysis of determinants and a follow up of tailored regional interventions.*

Keywords*:* Multidimensional food security, principal component analysis, beta regression, determinants, Ethiopia

2.1. Introduction

Food security remains a development challenge, with the number of food insecure people continuing to be enduring and troubling. Recent estimates for Africa show that chronic hunger affected 278 million people in 2021, which is double the global chronically hungry people (FAO, 2021) suggesting that Africa is not on a good track to meet the Sustainable Development Goals target of ending hunger by 2030. In Ethiopia, although the national food poverty index has declined over the last two decades, 24.8 percent of the population suffers from food poverty (CDRC, 2019). More than 20 million people needed humanitarian assistance in 2022, highlighting the need for deeper reflection on how to address food security (OCHA, 2022).

The concept of food security is multidimensional by its nature. Thus, a comprehensive approach that captures physical availability, economic and physical access, utilization, and stability dimensions of food security is needed (Ogundari, 2017). Other authors (Eden et al., 2009; Barrett, 2010; Maxwell, 2013; Achenfe et al., 2016) recommended use of a composite indicator that captures all the dimensions of food security.

A number of studies analyzed food security in Ethiopia. Most of them are case studies focusing on limited geographical scope and mainly using a uni-dimensional food security indicator (see for example, Motbainor et al., 2016; Bogale and Shimelis, 2009; Mota et al., 2019; Aragie and Genanu, 2017). Some studies attempted to use a multidimensional approach to food security. Mohammed (2021), for example, used a three-year panel data from four regions in Ethiopia and analyzed food security status using the four dimensions of food security. However, the geographic coverage of his study is limited only to four regions, he did not use recent data, and his study did not examine the factors that determine multidimensional food security. Demeke et al. (2011) analyzed rural households' food security by constructing a time-variant food security index. They focused on the effect of rainfall shocks on households' food security and their vulnerability over time. Their study is limited in geographical scope and thematic focus. Abafita and Kim (2013) used a self-reported qualitative food security assessment technique to generate household food security index using principal components analysis, which could be biased due to perceptions.

For informing policy and practice, identifying the determinants of multidimensional food security is important. This study attempted to contribute to the literature by extending the works of Mohammed (2021) that attempted to examine status of multidimensional food security in the country. It addressed the four dimensions of food security and utilized a recent dataset collected at a national level, covering ten administrative regions in the country. This approach allows for an in-depth analysis of the regional variation in multidimensional food security status. Additionally, the study identified the determinants of household food security using beta regression model, which is practically efficient to model response variables such as food security indices that assume values between 0 and 1. The study, thus, provides a more comprehensive and nuanced understanding of the factors that contributed to multidimensional food insecurity in Ethiopia.

2.2. Literature review

2.2.1. The concept and measurement of food security

Food is a basic need and a human right issue. Adequate quantity and quality of food is vital for a national development (FAO, 2014a). Food security is a concept developed using various theories and perspectives. The Malthusian theory posits that population growth will surpass food production resulting in food shortages and famine (Malthus, 1798). The entitlement theory emphasizes the significance of economic and social factors in determining individual's access to food. Sen argues that entitlements such as income, employment, social support systems, and resource and market access influence people's ability to obtain food (Sen, 1981).

Different approaches also exist in framing the concept of food security. The livelihoods approach takes into account natural, physical, financial, human, and social capital and institutional mechanisms that determine household's capacity to cope up vulnerabilities from shocks (DFID, 1999). The food systems approach, on the other hand, considers the whole food system from production and distribution to consumption and waste. It recognizes the interconnectedness of various components such as agricultural practices, market dynamics, food processing, transportation, and consumer behavior (HLPE, 2014).

Both the Malthusian theory and Sen's entitlement thesis as well as the livelihood and food systems approach provided the basis for the conceptualization of food security.

The concept of food security initially focused on ensuring all people have enough food to eat. However, achieving food self-sufficiency alone is not sufficient for food security since it fails to address challenges related to access to food. To achieve household food security, challenges related to physical and economic access to food must be addressed (Pinstrup-Andorson, 2009). In connection to this, Maxwell and Smith (1992) identified four core concepts of food security viz sufficiency of food, access to enough food, utilization of safe and nutritious food, and security to food defined by vulnerability, risk, and insurance.

As with the conceptualization of food security, there are different ways of measuring food security. Napoli (2011) noted the need for using different indicators to capture the various aspects of food security. Among the indicators, calorie intake, dietary diversity, and indices of household coping strategies can be mentioned (Hoddinott, 2001).

The use of harmonized food security indicators can help identify households with different food insecurity problems that require different types of policy interventions (Ogundari, 2017). A combination of indicators is preferred to capture multiple dimensions of food security (Barrett, 2010; Wineman, 2016). The use of multi-dimensional food security indicators is advantageous as it can pick up both mild and severe manifestations of food insecurity and avoid the pitfalls of arbitrary quantitative food security cut-offs along a raw (Maxwell, 2013).

2.2.2. Empirical studies on status and determinants of household food security

Numerous studies assessed food security status and investigated factors influencing household food security. They used different methodologies and have identified different demographic and socio-economic factors as determinants of food security.

Studies conducted in Ethiopia focused on specific locations and investigated the status and determinants of food security by using a unidimensional indicator. To mention some, Motbainor et al. (2016) used household food security access scale in East and West Gojjam zones of Amhara regional state; Bogale and Shimelis (2009) used a calorie-based food security indicator in Diredawa; Teshager (2020) used anthropometric indicator in Ethiopia; Mota et al. (2019) adopted a Household Food Insecurity Access Scale in Damot Gale Woreda of Wolaita zone; Ramarkishna & Demeke (2002) used a food balance sheet and an aggregate household food security index in North Wollo; Aragi et al. (2017) used income-based expenditure in North

Wollo; and Muche et al. (2014) used the coping strategy index in Mana district of Jimma zone. Abebaw and Betru (2019) reviewed 35 studies conducted to identify causes, status, determinants, and coping mechanism of food insecurity in Ethiopia. Their review strengthened our argument that most of the studies in Ethiopia focused on specific locations by using uni-dimensional food security indicators.

Following the use of uni-dimensional food security indicator, the aforementioned studies mostly adopted logistic regression, ordered logit and probit models to estimate the determinants of household's food security. They came up with demographic variables (family size, dependency ratio, age and sex of household head), socio-economic variables (household income, access to credit, average monthly expenditure, non-farm income, access to irrigation facilities, education level of household head, access to agricultural extension services, proximity to service centers, input use, and volume cereals produced), asset-related variables (land size, soil fertility status, oxen number, livestock ownership, asset ownership) and variables related to man-made and natural shocks as correlates of food security.

Abegaz (2017) and Asenso-Okyere et al. (2013) studied the status and determinants of household's food security by covering four regional states using calorie-based food security indicator and pooled cross-sectional data. Similarly, Asenso-Okyere et al. (2013) studied the determinants of household food security in Oromia and Somali regional states using the availability of food for the last one month. However, both studies focused on uni-dimensional indicator of food security by adopting binary regression models, which may not reveal the true food security situation. A relatively better study that had better national coverage is a study by Mohammed (2021) who constructed food security index using PCA and analyzed the status of national food security using panel data. His study revealed that 67% of the households are transitory food insecure and 13% of them are chronically food insecure. While his study provided better picture in revealing the status of multidimensional food security, it did not address the determinants of multidimensional food security.

In this respect, our study aims to contribute to the understanding of household food security by using an index-based measurement of food security status. This approach allows us to capture various factors that influence it. Additionally, we employed Beta regression to examine the

relationship between explanatory variables and food security index. By doing so, we provided a comprehensive analysis of food security and its determinants at the household level.

2.3. Conceptual framework

To measure the status of food security among rural households across the ten administrative regions in Ethiopia, this study utilized a multi-dimensional approach that considered the availability, access, utilization, and stability components of food security (Figure 2.1). We selected indicators that describe the four dimensions of food security based on the work of previous studies such as Abafita & Kim (2013), Demeke et al. (2011), Mohammed (2021), Adjimoti and Kwadzo (2018), Napoli (2011), and Wineman (2016).

The dimensions of food security and the identification of the corresponding indicators for the construction of the food security index are presented in Table 2.1 following FAO (2006a).

Table 2.1. Description and measurements units of selected food security indicators under each food security dimensions

Dimension	Indicator	Definition of variable	Unit
Availability	Cultivated land	The size of land owned by household for cultivation	Ha
	TLU	Number of livestock owned	Number
	Oxen ownership	Number of oxen owned by household	Number
Accessibility	Annual consumption	Amount consumed per year	Kg
	Meal frequency	Number of food meals taken per day on average in 7 days	Number
Utilization	Food variety score	Number of food verities consumed in the last 7 days	Number
	Toilet facticity	Type of toilet facticity a household use	Number
	Water source	Type of water source a household uses	Number
Stability	Shock frequency	Number of shocks a household experienced in the last 12 months	Number
	Food shortage	Experience of food shortage worries in last 7 days	Number
	Wealth index[2]	An index constructed using PCA by including asset	Score

Note: The indicators used to measure the four dimensions of food security are adapted from FAO (2006a)

[2] The wealth index was created based on the methods used in Ethiopia Mini Demographic and Health Survey, 2019.

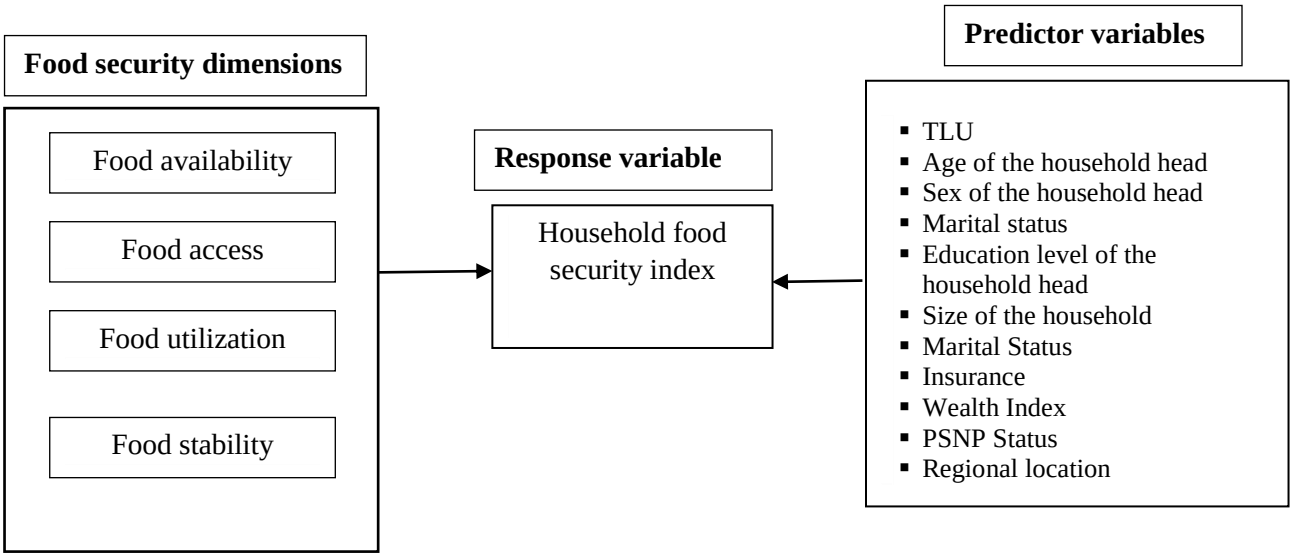

Figure 2. 1 Conceptual and analytical framework
Source: Authors construction (2023)

2.4. Methods

2.4.1. Data source

The data used for this study was obtained from the 4th round of the Ethiopia Socioeconomic Survey (ESS) conducted by the Central Statistics Agency (CSA) and the World Bank for the period of 2018/2019[3]. The ESS survey collected data from 7,527 households in both urban and rural areas, drawn from 565 Enumeration Areas (EAs)[4].

This study specifically focuses on rural households in the ten administrative regions of the country. Out of the total number of households, 3,115 households were from rural areas and thus included in this study.

2.4.2. Variables and hypotheses

After conducting a review of various empirical literature, we identified explanatory variables hypothesized to determine household food security in Ethiopia. The definitions of these variables and their expected signs are presented in Table 2.2.

[3] See: https://microdata.worldbank.org/index.php/catalog/3823#metadata-producers_sponsors for details
[4] EAs are the smallest statistical sampling units.

Table 2.2. Definition and measurement of explanatory variables

Independent variable	Definition	Expected sign
TLU	Tropical Livestock Units	+
Household size	Number of household members	+/ -
Sex of household head	A dummy variable measured in terms of 0, if male and 1 if female	+/ -
Age	Age of household head in years	+/-
Education	Level of education of household head measured as 0 if illiterate, 1 if primary complete, 2 if secondary and above	+
PSNP status	PSNP beneficiaries as, yes if participated, no if not participated	+
Wealth status	Wealth status of households constructed using PCA	+
Marital status	Marital status of household head as 0 if currently married, 1 if currently married and 2 if currently single	+/ -
Location of Household	The regional states in Ethiopia where the household is located	+/ -
Shock frequency	Number of shocks experienced by a household in the last 12 months	-
Insurance	Households with at least one member who have formal insurance	+

2.4.3. Method of data analysis

2.4.3.1. Specification of the Principal Component Analysis

To construct a food security index for each household, we used the Principal Component Analysis (PCA) using the variables presented in Table 1. Similarly, we used PCA to construct the wealth index. We included a set of variables related to household assets. In both cases, the variables were coded and analyzed using the PCA, resulting in factor scores for each household. The factor scores were summed up to produce the index. The distribution of the index was divided into five equal parts, or quantiles, with the first quantile representing the poorest households and the fifth quantile representing the richest households.

PCA is preferred for its ability to recover the underlying latent variable in a more effective way, while also eliminating the multicollinearity problem by combining highly correlated variables into a set of uncorrelated variables (Darnell, 1994). This approach is a type of factor analysis that can reduce dimensions or uncover latent variables by extracting linear combinations that best describe the co-variance among all elements (Abeyasekara, 2005).

The PCA method is preferred over Multiple Correspondence Analysis (MCA) or Joint Correspondence Analysis (JCA) because the variables are continuous. MCA/JCA is used for categorical variables. Furthermore, the PCA method better explains the maximum variance in the data using a minimum number of factors. Much of the variation in the data can often be contained in a small number of variables (called principal components) or linear relations of the original data, Z_1, Z_2,...Z_Q that are uncorrelated. The number of principal components were equal to the number of indicator variables, and selecting the first principal component having high amount of cumulative variance of the original data remains key. The specification of the PCA following (Abeyasekara 2005) is presented below:

$Z_1 = a_{11}X_1 + a_{12}X_2 + \dots a_{1NN}X_N$

$Z_2 = a_{21}X_1 + a_{22}X_2 + \dots a_{2NN}X_N \dots$

$Z_N = a_{N1}X_1 + a_{N2}X_2 + \dots a_{NN}X_N$ ..... (1)

One of the key properties of PCA is absence of correlations among the principal components indicating principal components measure different statistical dimensions of a given data. The weights or factor loadings (a_{ij}) applied to the variables X_j in equation (1) are chosen so that the principal components Z_i satisfy the following conditions: (i) they are uncorrelated (orthogonal); and (ii) the first principal component accounts for the maximum possible proportion of the variance of the set of Xs, the second principal component accounts for the maximum possible proportion of the remaining variance, and so on until the last of the principal components absorbs all the remaining variance not accounted for by the preceding components, and $a_{i1} + a_{i2} + \dots a_{iQ} = 1 (i = 1, 2 \dots N)$, where aij are the factor loadings; $x_1, x_2, \dots x_N$ are the variables (indicators), and *Q* the number of variables. PCA involves finding the eigenvalues λ_j , $j=1,\dots,N$, of the sample covariance matrix (*CM)*,

$$CM = \begin{bmatrix} cm_{11} & cm_{12} & cm_{1N} \\ cm_{21} & cm_{22} & cm_{2N} \\ & \dots & \end{bmatrix}$$

cm_{11} cm_{12} cm_{1N} …… (2)

Where, the diagonal element cm_{ii} is the variance of $|x_i|$ and cm_{ij} is the covariance of variables x_i and xj. The eigenvalues of the matrix *CM* are the variances of the principal components found by solving the characteristic equation $CM - \lambda i$ where i is the identity matrix with the same order as CM and λ is the vector of eigenvalues. There are *Q* eigenvalues, some of which may be negligible. Negative eigenvalues are not possible for a covariance matrix. An important property of the eigenvalues is that they add up to the sum of the diagonal elements of CM. That is, the sum of the variances of the principal components is equal to the sum of the variances of the original variables:

$\lambda_1 + \lambda_2 + \ldots + \lambda_o = cm_{11} + cm_{12} + \ldots + cm_{oo}$…….. (3)

After we develop the food security index, we categorized rural households in Ethiopia into four food security groups following Napoli et al. (2011). Thus, a household with food security index:

$Y_0 = 0 < FSI < 0.341$, is alarming food insecure;

$Y_1 = 0.342 < FSI < 0.435$, is moderate food insecure;

$Y_2 = 0.436 < FSI < 0.558$, is moderate food secure; and

$Y_3 = 0.559 < FSI < 1$, is highly food secure category.

2.4.3.2. Beta regression model for estimation of determinants of household's food security

Beta regression is widely used to analyze response variables (y) measured continuously in standard unit interval of $0<y<1$. It is practically applicable to model response variables such as rates, proportions and wellbeing indices (e.g food security and inequality indices) that assume values between 0 and 1. It effectively captures heteroscedasticity and skewness often found in data bounded between 0 and 1 (Cribari-Neto & Zeileis, 2010).

According to Ferrari & Cribari-Neto (2004), the basic assumption of beta regression model is the response variable follows a beta distribution and that its mean is related to a set of independent variables that can be explained by a linear combination of predictors using unknown coefficients and a link function. The model also includes a precision parameter, which either can be constant

or linked to a separate set of predictors through a link function. The beta distribution provides flexibility for modelling indices since its density can have quite different shapes depending on the values of two parameters (p and q) that index the distribution. Following Ferrari & Cribari-Neto (2004, p. 799-803), the beta density and beta regression model is specified as below:

$$\pi(y; p, q) = \frac{\Gamma(p+q)}{\Gamma(p)\Gamma(q)} y^{p-1(1-y)^{q-1}}, 0 < y < 1 \quad \text{..... (1)}$$

Where p>0, q>0 and $\Gamma(.)$ is the gamma function. The mean and variance of the response variable (y) can be estimated using the following functions:

$$E(y) = \frac{p}{(p+q)} \; ; \; var(y) = \frac{pq}{(p+q)^2(p+q+1)} \quad \text{..... (2)}$$

Beta regression models the mean of the response variable (μ), i.e $E(y) = \mu$, along with a precision parameter (ϕ), i.e $var(y) = \frac{V(\mu)}{1+\phi}$). With a different parameterization, the beta density can be presented as $\mu = \frac{p}{p+q}$ and $\phi = p + q$. Using the new parameterization, the density of y can be written as:

$$f(y; \mu, \phi) = \frac{\Gamma(\phi)}{\Gamma(\mu\phi)\Gamma(1-\mu)\phi)} y^{\mu\phi-1}(1-y)^{(1-\mu)\phi-1}, 0 < y < 1 \quad \text{.....(3),}$$

where $0 < y < 1$ and $\phi > 0$

In modelling the Beta regression, let's assume $y_{1,} \ldots\ldots, y_n$ represent independent random variables where each $y_t,\ t = 1, \ldots, n$ follows the density function presented in equation (3) with mean, μ_t, and unknown precision, ϕ. The beta regression model is obtained by assuming the mean of y_t as:

$$g(\mu_t) = \sum_{i=1}^{k} x_{1i}\, \beta_i = \eta_t \quad \text{.....(4)}$$

Where $\beta = (\beta_{1,\ldots}\beta_k)T$ is a vector of unknown regression parameters ($\beta \epsilon \mathbb{R}k$), $x_{t1,\ldots,}x_{tk}$ are observations on k covariates, and $g(.)$ is link function that maps (0, 1) into real numbers, $\mathbb{R}$.

The link function, $g(.)$, can be estimated using the logit specification, the probit function, the complementary log-log link function, or the log-log link function. According to Ferrari & Cribari-Neto (2004), the logit link function, $g(\mu) = log\{\mu|1-\mu)\}$, is particularly appropriate to estimate the link function. It can be presented as:

$$\mu_t = \frac{e^{x_t^T \beta}}{1+e^{x_t^T \beta}} \quad \text{...(5)}$$

Where $x_t^T = (x_{t1,\ldots,}x_{tk}), t = 1, \ldots, n.$

Specifications of beta link functions:

$$Logit\ link\ function: g(\mu_x) = \ln\left\{\mu_x/(1-\mu_x)\right\} \quad \text{... (6)}$$

$$Probit\ link\ function: g(\mu_x) = \phi^{-1}(\mu_x) \quad \text{...(7)}$$

$$cloglog: g(\mu_x) = \ln\{-\ln(1-\mu_x)\} \quad \text{..(8)}$$

$$loglog: g(\mu_x) = 1\ln\{-\ln(\mu_x)\} \quad \text{...(9)}$$

2.5. Results and discussion

2.5.1. Description of household characteristics

Results of descriptive statistics (Table 2.3) reveal important characteristics of households. The mean age of the household head was 44.4 years. In terms of household structure, 74% of the households were male-headed, while 26% were female-headed. The majority of household heads (65%) were illiterate, and 77% of them were married.

The wealth analysis revealed that a significant proportion of households in each wealth quantile were food insecure. Specifically, 50% of the poorest households (first quantile), 46 percent of the poorer households, 43% of the middle wealth households, 35% of the rich wealth households and 25% of the richest households (last quantile) were food insecure. This highlights the pervasive nature of food insecurity across different wealth groups in the study area.

Furthermore, the majority of households (78%) were not beneficiaries of the Productive Safety Net Program (PSNP), which is a major government initiative aimed at improving food security and reducing poverty. It may imply that the program may not effectively reach out the most vulnerable households.

2.5.2. Status of household's food security in Ethiopia

The results of PCA showed that six components were able to explain 70% of the original variables used to construct the food security index. Additionally, the Kaiser-Meyer-Olkin (KMO) test, with a value of 0.5 verified the suitability of the data for sample adequacy.

The study revealed that 77.7% of rural households in Ethiopia are food insecure. Among them, 51% were moderately food insecure, and 49% of them were alarmingly food insecure. More than 70% of households experienced food insecurity in Amhara, Oromia, Tigray, SNNPR, Somalia, and Afar regional states, as well as Diredawa city administration. In emerging regions such as Harari, Gambela and Benshagul Gumuz, the proportion of food insecure people are relatively lower. The highest level of food insecurity (94.72%) was observed in Somali regional state (Table 2.3).

Table 2.3. Households' food security status and characteristics

	Food Insecure				**Food Secured**						
	Alarming		**Moderate**		**Moderate**		**Highly**		**Total Households**		**Chi^2 (F) value**
Characteristics	N	%	N	%	N	%	N	%	N	%	
Sex of household head											44.25***
Male	785	68.8	867	73.79	513	83.01	40	83.33	2205	74	
Female	356	31.2	308	26.21	105	16.99	8	16.67	777	26	
Age of household head											
Mean	44		43.46		43.89		43				2.12*
(SD)	(15)		(15.13)		(1533)		(12.52)				
Education level of household head											190.16***
Illiterate	878	76.95	730	62.13	307	49.68	25	52.08	1940	65.06	
Primary	353	19.37	221	30.37	221	35.76	13	27.08	808	27..1	
Secondary and above	42	3.68	92	7.83	90	14.56	10	20.83	234	7.84	
Marital status of household head											
Currently married	829	72.72	919	78.28	516	83.5	43	5	2307	77.42	32.01***
Currently single	311	27.28	255	21.72	102	16,5	5	10.42	673	22.58	
Household size											14.04
1—3	379	33.22	351	29.87	173	27.99	9	18.75	912	30.58	
4—5	344	30.15	418	35.57	212	34.3	19	39.58	993	33.3	
6 or more	418	36.63	406	34.55	233	37.7	20	41.67	1077	36.12	
Wealth Index			7								751.86***
Poorest	427	37.42	146	12.44	24	3.88	4	8.33	601	20.16	
Poorer	294	25.77	238	20.27	59	9.55	5	10.42	596	20.62	
Middle	234	20.51	263	22.4	99	16.02	2	4.17	598	19.99	

Richer	126	11.04	287	24.45	175	28.75	9	18.75	597	20.03	
Richest	60	5.26	240	20.44	261	42.23	28	58.33	589	19.2	
PSNP status											62.78***
Yes	322	49.92	243	0.375	78	12.03	5	0.008	648	21.73	
No	819	35	931	39.89	540	23.14	43	1.8	2333	78.27	
Region											298.57***
Tigray	109	29.540	182	49.32)	74	20.05	4	1.08	369	13.09	
Afar	154	51.68	106	35.57)	36	12.08	2	0.67	298	10.57	
Amhara	180	38.22	194	41.19	96)	20.38	1	0.21	471	16.71	
Oromia	150	34.09	177	40.23	107	24.32	6	1/360	440	15.61	
Somali	200	66.01	87	28.71	15	4.95	1	0.33)	303	10.75	
Benshanguel Gumuz	27	16.36	85	51.52	46	27.88	7	4.24)	165	5.86	
SNNPR	161	39.08	169	41.02	76	18.45	6(	1.46	412	14.62	
Gambella	49	25.13	85	43.59	55	28.21	6	3.08	195	6.92	
Harari	52)	28.57	46	25.27	73	40.11	11	6.04	18	0.64	
Diredawa	59	40.14	44	29.93	40	27.21	4	2.72	147		

*** *Sig at p<0.01;* ** *Sig at p<0.05;* * *Sig at p<0.1*

Our estimation of the magnitude of food security in Ethiopia is closer to the estimation of Mohammed (2021) who reported that 75% of households in Ethiopia were food insecure in at least one dimension. Other studies that used uni-dimensional food security indicators provided different estimations. For instance, using pooled cross-sectional data of the Ethiopian Rural Household Survey (ERHS) in 2004 and 2009, Abegaz (2017) showed that 87.74% in Tigray, 44.87% in Amhara, 57% in Oromia, and 74.8% in SNNPR were food insecure based on calorie-based food security indicator. Using household food security access scale, Motbainor et al. (2016) estimated that 55.2% of households in Amhara regional state were food insecure. Using self-reported measurement, Jemal (2014) estimated that 51% of households in Ethiopia were food insecure. Similarly, Aragie & Genanu (2017) estimated that 42% of households in North Wello, were food insecure based on food calorie indicator. Misgina (2014) estimated that 68.8% of households in Miyechew Wereda of Tigray regional state were food insecure using the access dimension of food security.

Table 2.3 presents the results of the analysis that explored the association between household food security status and various household characteristics. The results revealed that most of the household characteristics examined were significantly associated with household food security status.

Household wealth was positively related to food security status, indicating that wealthier households were more likely to be food secure than poorer households. Education status was associated with household food security, with 45% of illiterate households being categorized as alarmingly food insecure. In contrast, household size was negatively associated with food security, with large-size households more likely to be food secure than smaller households. The majority of households that did not participate in the PSNP were better off in terms of food security than those who participated in the program (Table 2.3).

2.5.3. Determinants of household food security in Ethiopia

We estimated four beta regression models with logit, probit, cloglog and loglog link functions (Table 2.4). Link regression allows relating the predictors to the mean of the beta distribution. The Beta regression estimation results highlighted that out of 11 predictors 9 variables significantly determined household's food security in Ethiopia. The overall performance of the four beta regression models was significant at $p<0.01$ (Prob>chi2 =0.000), indicating that the model fits were better than the null hypotheses that all of the regression coefficients in the model are equal to zero.

Table 2.4. Estimation results of beta regression using link functions

	Link functions			
Variables	**Probit**	**Logit**	**Cloglog**	**Loglog**
TLU	-0.00476***	-0.00781***	-0.00647***	-0.00461***
	(0.00100)	(0.00174)	(0.00153)	(0.000832)
Household size	0.0148***	0.0240***	0.0192***	0.0151***
	(0.00344)	(0.00562)	(0.00452)	(0.00346)
Sex of household head	-0.00230	-0.00374	-0.00307	-0.00229
	(0.0122)	(0.0198)	(0.0158)	(0.0124)
Age of household head	5.19e-05	9.34e-05	9.38e-05	3.15e-05
	(0.000314)	(0.000510)	(0.000408)	(0.000320)
Education (base=No education)				
Primary education	0.0340***	0.0552***	0.0439***	0.0349***
	(0.0109)	(0.0177)	(0.0141)	(0.0112)
Secondary and above	0.0729***	0.118***	0.0937***	0.0750***
	(0.0170)	(0.0273)	(0.0210)	(0.0183)
PSNP status (Base=yes)				
No	0.0191*	0.0316*	0.0267*	0.0181*
	(0.0108)	(0.0175)	(0.0141)	(0.0109)
Wealth index (Base= Poor)				
Middle	0.0985***	0.160***	0.129***	0.0998***
	(0.0154)	(0.0254)	(0.0212)	(0.0150)
Rich	0.215***	0.349***	0.278***	0.222***
	(0.0154)	(0.0253)	(0.0212)	(0.0151)
Marital status (Base= Currently married)				
Currently single	-0.0333**	-0.0543**	-0.0439***	-0.0334**
	(0.0130)	(0.0212)	(0.0170)	(0.0133)
Region (Base=Tigray)				
Afar	0.0225	0.0367	0.0297	0.0223
	(0.0185)	(0.0303)	(0.0247)	(0.0185)

Amhara	-0.00844	-0.0134	-0.0102	-0.00915
	(0.0127)	(0.0206)	(0.0162)	(0.0133)
Oromia	-0.0201	-0.0322	-0.0247	-0.0216
	(0.0146)	(0.0236)	(0.0187)	(0.0151)
Somalia	-0.0821***	-0.135***	-0.112***	-0.0805***
	(0.0203)	(0.0334)	(0.0275)	(0.0200)
Benshangul Gumuz	0.0691***	0.111***	0.0869***	0.0728***
	(0.0190)	(0.0305)	(0.0236)	(0.0202)
SNNPR	0.00201	0.00251	0.000147	0.00384
	(0.0164)	(0.0265)	(0.0209)	(0.0170)
Gambella	0.0603***	0.0970***	0.0748***	0.0643***
	(0.0196)	(0.0317)	(0.0246)	(0.0207)
Harari	0.0832*	0.134*	0.104**	0.0880*
	(0.0433)	(0.0695)	(0.0525)	(0.0472)
Diredawa	0.0201	0.0326	0.0266	0.0202
	(0.0212)	(0.0342)	(0.0269)	(0.0221)
Shock frequency	-0.0398***	-0.0647***	-0.0519***	-0.0403***
	(0.00427)	(0.00701)	(0.00571)	(0.00423)
Insurance (Base=Yes)				
No insurance	0.0304**	0.0485**	0.0363**	0.0335**
	(0.0140)	(0.0227)	(0.0177)	(0.0148)
Constant	-0.524***	-0.847***	-1.028***	-0.187***
	(0.0317)	(0.0515)	(0.0414)	(0.0323)
Scale (Constant)	3.393***	3.393***	3.392***	3.395***
	(0.130)	(0.130)	(0.130)	(0.129)
Observations	2,979	2,979	2,979	2,979

Note: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Akaike Information Criterion (AIC) and Bayesian Information Criteria (BIC) were applied to evaluate the performance of the four beta regression models. Lowe AIC and BIC values suggest better model fit and lower complexity. Accordingly, the beta regression model with cloglog link function has the lowest AIC (6121.345) and BIC (-5983.36) values in absolute terms, thus it was selected for interpretation.

After the post-estimation test using AIC and BIC, we run marginal analysis for the beta regression model with cloglog link function (Table 2.5). Interpretation of marginal effects of the predictor variables on the response variables is discussed below.

Table 2.5. Marginal effects for beta regression with cloglog link function

Variables	_Coefficients	Marginal Effects
TLU	-0.00647***	-0.0019***
	(0.00153)	(0.0004)
Household size	0.0192***	0.0055***
	(0.00452)	(0.0013)
Sex of head	-0.00307	-0.0009
	(0.0158)	(0.0046)
Age of head	9.38e-05	0.00003
	(0.000408)	(0.0001)
Education (Base= no education)		
Primary (grades 1-8)	0.0439***	0.0127***
	(0.0141)	(0.0041)
Secondary and above	0.0937***	0.0274***
	(0.0210)	(0.0062)
PSNP status	0.0267*	0.0077*

	(0.0141)	(0.0041)
Wealth (Base=poor)		
Middle	0.129***	0.0358***
	(0.0212)	(0.0058)
Rich	0.278***	0.0801***
	(0.0212)	(0.0059)
Marital status (Base= Currently married)		
Currently unmarried	-0.0439***	-0.0125***
	(0.0170)	(0.0048)
Region (Base= Tigray)		
Afar	0.0297	0.0086
	(0.0247)	(0.0072)
Amhara	-0.0102	-0.0029
	(0.0162)	(0.0046)
Oromia	-0.0247	-0.0070
	(0.0187)	(0.0053)
Somali	-0.112***	-0.0312***
	(0.0275)	(0.0076)
Benishangul Gumuz	0.0869***	0.0255***
	(0.0236)	(0.0070)
SNNPR	0.000147	0.00004
	(0.0209)	(0.0060)
Gambella	0.0748***	0.0219***
	(0.0246)	(0.0073)
Harari	0.104*	0.0306*
	(0.0525)	(0.0159)
Diredawa	0.0266	0.0077
	(0.0269)	(0.0078)
Shock frequency	-0.0519***	-0.01493***
	(0.00571)	(0.0016)
Insurance (Yes=1)	0.0363**	0.01052**
	(0.0177)	(0.0052)
Constant	-1.028***	
Scale (Constant)	(0.0414)	
	3.392***	
	(0.130)	
Observations	2,979	2,979

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Ownership of livestock (TLU) is negatively associated with food security in Ethiopia. A one-unit increase in TLU decreases food security by 0.002. The labour demanding nature of maintaining livestock while it has low productivity may explain the negative association. It will crowd out the time of households to participate in other income generating activities with positive effect on food security. Household size has positive association with household's food security. An increase in household size by one-member increased households' food security by 0.006. Large-size households with better labour availability may engage in off farm activities that improves food security. The finding is consistent with Teshager (2020), Aragie & Genanu (2017) and Muche et al. (2014).

Head's education level has significant association with food security. Being educated at a level of secondary education compared to being illiterate increased food security by 0.027. Similarly, being educated at a primary level compared to being illiterate increased food security by 0.013. This finding is in line with Abafita & Kim (2013), Demeke et al. (2011), and Abiyodun (2013). Educated households are more likely to use agricultural inputs and technologies that improve agricultural productivity with increased likelihood of better food availability.

Wealth index has significant association with household's food security in Ethiopia. Households in the rich wealth category have increased food security by 0.08 compared to poor households. In the same manner, households falling in the middle wealth category have increased food security by 0.036 compared to those in the poor wealth category. Wealthier households may have better capacity to cope with shocks and improve the stability of their food consumption. This result is consistent with Yazdanpanah et al. (2021) in southern Iran and Manlosa et al. (2019) in southwest Ethiopia who asserted the positive relationship between livelihood assets and food security.

Marital status is significantly associated with households' food security status. Being currently unmarried decreased food security by 0.013 compared to being currently married. Married households may have better chance of preparing and consuming diverse foods at household level on top of having better chances for increased income by the family. This finding is consistent with Abiyodun (2013).

In this study, food security status of households was examined across nine federated states and one city administration in Ethiopia to explore regional variability in food security. The administrative regional states where households are located was significantly associated with food security. Being located in Afar, SNNPR, Diredawa, Amhara and Oromia regions have no significant difference in terms of household's food security compared to being located in Tigray region (i.e the reference region). On the contrary, being located in Somali, Benshangul Gumuz, Gambella, and Harari regions increased household's food security compared to being located in Tigray region. As reported in the descriptive statistics section, although multi-dimensional food insecurity is prevalent in all the ten administrative regions, households located in emerging regions such as Harari, Gambela, and Benshagul Gumuz exhibited relatively better food security

status. Alem and Söderbom (2012) also highlighted the impact of regional variability on household food security status in Ethiopia.

Participation in PSNP has significant association with food security in Ethiopia. PSNP is a program that targets destitute households who are chronically food insecure, with a focus on improving household access to food. This study examined nationally sampled households who may not be necessarily chronically food insecure and compared the PSNP targeted households as a reference group. Participation in PSNP reduced food security of households by 0.008 compared to being a non-participant. The result may not be surprising as this particular study did not compare similar groups (i.e chronically food insecure), but with different participation level in PSNP. Bahru et al. (2020) reported that participation in PSNP did not improve household's food insecurity in Ethiopia, which calls for further examination of the contribution of PSNP to household food security.

The number of shocks experienced by a household in the past 12 months has significant association with food security. As shock experience increases by one unit, food security decreases by 0.015. The finding is consistent with Onyango et al. (2021) and Abegaz (2017). The later study revealed that crop and rainfall shocks increased food insecurity in Tigray region compared to other regions. Households with at least one member having formal insurance has significant relationship with food security in Ethiopia, improving food security by 0.011. With formal insurance, the likelihood for consumption smoothing improves.

2.6. Conclusions and implications for policy

Food security is a complex concept. It, therefore, requires adopting a comprehensive approach that allows to unpack its multi-dimensionality. This study unraveled the food security situations of in Ethiopia across ten administrative regions using multidimensional food security indicators. A food security index was constructed capturing the four pillars of food security. In addition, the study identified the determinants of household food security by estimating four link functions of beta regression model with food security index as the dependent variable.

The results revealed high prevalence of household food insecurity in Ethiopia, with 77.7 percent of households experiencing food insecurity. Of these, 49 percent of them experienced alarming food insecurity situation. There is significant variation in food security status across the ten

administrative regions in the country. Livestock ownership, household size, education level, wealth status, marital status, participation in PSNP, location of households, and shock frequency significantly determined household food security.

Although Ethiopia has implemented food security strategy over the past few decades, our findings indicated alarming level of multidimensional food insecurity. This calls for addressing household food security from a multidimensional perspective. Therefore, it is recommended that the government should strengthen efforts that improve the literacy levels of households, promote activities that improve the wealth status of households, design and implement interventions that consider the specific needs and unique circumstances and challenges of administrative regions, and promote insurance schemes.

The current study examined the determinants of multidimensional food security at national level. It did not identify the determinants food security at regional level. Since spatial variation is a significant determinant of multidimensional food security, future research should unpack the determinants of multidimensional food security at regional level.

Chapter Three: Household Dietary Diversity Across Regions in Ethiopia: Evidence from Ethiopian Socio-economic Survey Data

Abstract

Background: Household food and nutrition insecurity continued to be a development and policy agenda in Ethiopia. Assessing the patterns and determinants of household dietary diversity is an important area of research given its importance for policy uptake in the country. This study is, therefore, initiated to identify the dominant food groups consumed by households and to investigate the determinants of household dietary diversity in the country.

Method: We used data from the 4th wave of the Ethiopian socioeconomic survey. The survey data for this study included 3,115 households living in rural areas (hereafter called 'rural households'). Household Dietary Diversity Score (HDDS) was calculated and categorized as per the FAO's recommendation: low HDDS category for those who consume three or less food groups, medium HDDS for those who consume four to six, and high HDDS for those who consume seven and more food groups during the past seven days. Ordinal logistic regression model was employed to estimate the determinants of rural household's dietary diversity.

Results: Cereals were the most dominant food group consumed by 96.4% of the households followed by pulses, which was consumed by 82% of the household's Nutrition-dense food commodities such as lean meat, vegetables and fruits were the least consumed food groups by households in Ethiopia. In terms of determinants of dietary diversity, female headed households have 38% more chance of consuming diverse foods compared to their male-headed counterparts (AOR = 1.38, 95 % CI: 1.10, 1.73). Household heads who completed secondary education and above have 62 % more chance of consuming diverse foods compared to uneducated household heads (AOR = 1.62, 95 % CI: 1.2, 2.30). Household heads who are single have 37% less chance of consuming diverse foods compared to those household heads who are married (AOR = 0.63, 95 % CI: 0.50, 0.80). Those households located in Harari regional state and in the rural surroundings of Diredawa town have 6.56 times more chance of consuming diverse foods compared to those households living in Tigray and Amhara regional states (AOR = 6.56, 95 % CI: 4.60, 9.37). The results also highlighted that households who are in the upper wealth category have 9 times more chance of consuming diverse foods compared to those households who are the lower wealth category (AOR = 8.54, 95 % CI: 6.79, 11.98).

Keywords: Dietary diversity, nutrition security, food security, determinates of dietary diversity, Ordered logit, Ethiopia.

3.1. Background of the study

The concept of household food security is a more recent development. The bulk of literature dated from 1980s equated national food security with food self-sufficiency. Food self-sufficiency is an essential but not a sufficient vehicle for solving household level malnutrition and food insecurity problems (Rukuni, 2002) Food security is a concept that evolved over time. It is defined as the availability and access of food to all people at all times, as well as utilization and stability of foodstuff for a healthy life. More specifically, *food security is achieved when all people at all times have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy* life (Committee on World Food Security, 2013). Literature provides frameworks (e.g Sen's entitlement framework), approaches (e.g the Sustainable Livelihood Approach) and conceptual models (e.g UNICEF's model of malnutrition) to analyses and explain food and nutrition security situation of families. In this regard, Sen (1983) presented four entitlements namely, production-based entitlement, trade-based entitlement, own-labour entitlement, and inheritance and transfer entitlement. According to him, families endowed with these entitlements can escape from famine trap. Production-based entitlement improves food security situation of families through improving availability of food, and trade-based entitlement, own labour entitlement, and inheritance and transfer entitlement improve food security situation of families by creating access to food. Similarly, the Sustainable Livelihood Approach (SLA) presented by Chambers & Conway (1991) gave a broader perspective of Sen's entitlements (known as natural, human, social, financial and physical capital). The five capitals presented in SLA also serve to explain food security situation of families. Households endowed with natural and physical capital will have the potential to produce more food, which increases food availability. Financial, social and human capitals improve the capacity of families to access food.

Nutrition security, on the other hand, emphasizes on the utilization dimension that focuses on the intake of a wide range of foods. Therefore, nutrition is an integral component of food security (Frankenberg, 1995). A conceptual model developed by UNICEF (2020) highlighted that resources and societal norms are important determinants of improved availability and utilization of foods, which in turn improves dietary diversity of families. Furthermore, in the conceptualization of food and nutrition security, there is a need to bring the two aspects together.

The food security framework emphasizes on economic approach in which food is considered as a commodity while nutrition framework adopts a biological approach in which human beings are the starting point. Hence, in order to address improved household nutritional status, one has to deal with food security aspect, which is improving access for diversified food (Rainer et al., 2000).

Achievement of optimum consumption of diversified foods is important in developing countries, such as Ethiopia, to contribute to the efforts of ending all forms of malnutrition (Sarka, 2014; Geremew et al., 2019). The study by Hoddinott and Yohannes (2002) highlighted that dietary diversity correlates with household's per capita consumption implying that households that consume more diverse foods, they also have more access to food. Hence, consumption of variety of food groups is associated with greater energy intake (Kant, 2004; Rose et al., 2002). Besides, household's dietary diversity is meant to provide an indication of household's economic access to food. An increase in dietary score means consumption of increased number of food groups (FAO et al., 2022). Moreover, evidence show that household-level dietary diversity is strongly associated with household's per capita income and energy availability suggesting that dietary diversity could be a useful indicator of the access dimension of food security (Ruel, 2003).

Ethiopia is one of the countries with the highest malnutrition problems. Thirty-eight percent of children under 5 are stunted, 10% are wasted, and 24% are underweight (CSA, 2022). Ethiopia accounts for one of the countries with the large malnutrition burden in Africa. Based on the 2021 Global Hunger Index, Ethiopia is positioned 90^{th} out of the 116 countries in terms of the rate of malnutrition. Furthermore, the burden of micronutrient deficiencies, notably iron, iodine, zinc and vitamin A, is among the highest in the country (EPHI, 2013). This is partly due to consumption of less diverse foods (i.e, low dietary diversity) as Ethiopian diets are particularly low in chicken, fruits, vegetables, and red meat (GoE, 2020).

There are a number of socioeconomic and demographic factors affecting dietary diversity of households. In Ethiopia, some studies have been conducted in order to analyze the determinants of household's dietary diversity (Geremew et al., 2019; Dereje et al., 2021; Workicho et al., 2016) Although these studies revealed the importance of household size, age, sex, level of education of household and land size as factors determining rural household's dietary diversity, they are case studies focusing on limited geographical scope. Undertaking research accounting

for regional variations would help to pinpoint directions for national policymaking, as lifestyles in rural Ethiopia cannot be considered uniform. The policy actions that help achieve food and nutrition security in one context may not yield the same result elsewhere. Towards this end, there is a need to get a nuanced understanding as to whether regional differences correlate with dietary diversity with the implications of designing and implementing region-specific food and nutrition security programs. This study is, therefore, designed with the objective of identifying the dominant food groups consumed among rural households in Ethiopia, and to investigate the determinants of household dietary diversity across regions in the country. The findings would contribute to evidence-based policy development, and craft relevant interventions by government and development partners.

3.2. Methods

3.2.1. Data source and variables

The data for this study came from the 2018/2019 Ethiopia Socioeconomic Survey (ESS) collected by the Central Statistics Agency of Ethiopia (CSA, now renamed as Ethiopian Statistical Services) in collaboration with the World Bank (World Bank, 2021). The ESS survey was conducted in 10 regions of the country. It included 7, 527 households (both rural and urban) from 565 Enumeration Areas (EA). EA is smallest statistical sample unit. The households were selected through multi-stage sampling procedures. In the first stage, the EAs were selected using a simple random sampling procedure. In the second stage, the households to be surveyed from each of the EAs were selected using systematic random sampling. While the data set included households living in rural and urban areas, the scope of this study focused only on rural households in all regions of the country. Accordingly, only 3115 households residing in the rural parts of the country were included.

The concept of household food security is multidimensional by its nature. It, thus, require different approaches and indicators of measurement. Hoddinnott (2001) and Hoddinott & Yohannes (2022) presented four methods of measuring household food security: individual calorie intake, household caloric consumption, dietary diversity, and indices of household coping strategies. Household Dietary Diversity (HDD) is measured using the number of food groups consumed over a reference period. It reflects that consumption of variety of foods and food

groups ensures adequate intake of essential nutrients (FAO, 2010). In this study, 10 food groups were included to assess the dietary diversity of rural households in Ethiopia. A single point was given to each of the food groups consumed over the past seven days giving a maximum sum of 10 points for the total dietary diversity score for each household. Following this, Household Dietary Diversity Score (HDDS) was developed for each respondent. According to FAO (2010) when households consume three or less food groups in the past seven days, they are categorized under low HDDS. Similarly, those households that consume four to six food groups and seven or more food groups are categorized under medium HDDS and high HDDS category respectively. According to Swindale and Paula (2006) HDDS measures the access component of household's food security. As the HDDS increases, the access to diversified food groups also increases. Commonly, food security studies in Ethiopia adopted individual calorie intake/ household caloric consumption, which focuses on the total caloric intake by households than dietary quality. In our study, since the focus is on dietary quality rather than on total energy intake, we used the HDDS that takes into account consumption of diverse foods. The indicator provides a more nuanced understanding of dietary quality than the calorie consumption method, which only considers total energy intake. The measurement indicator (i.e dietary diversity) is also scientifically supported by various studies (FAO, 2010; Swindale & Paula, 2006) as a suitable indicator of dietary quality. Therefore, this study adopted the HDDS method of measuring household's food security.

In this study, the independent variables included to explain household's dietary diversity where household size, sex of the household head, education level of the household head, marital status of the household head, religion of the household head, participation in the Productive Safety Net Program (PSNP), location of the household, and wealth index. As one of the explanatory variables, this study constructed household's wealth index using the Principal Component Analysis (PCA). In the construction of wealth index using the PCA household assets, such as livestock, type of house and house ownership, household assets and agricultural land ownership were included. In developing the index, first, the variables were coded, then entered into Stata software, and then analyzed using the PCA technique. The variables that have a communality value of greater than 0.5 were used to produce the factor scores. Finally, the factor scores were summed up to produce the index. After the wealth index was constructed, we further categorized

the households into successive quantiles. The first quantile constituted the poorest households, the second quantile make up the poorer group of households, the third quantile constituted the middle wealth group, and the fourth and fifth quantiles constituted the rich and the richest households respectively.

Ethics Statement

We have used the fourth round of a panel dataset produced at national level in Ethiopia, which is publicly accessible. The secondary data were produced by the Federal Democratic Republic of Ethiopia (through the Central Statistics Agency of Ethiopia) funded by the World Bank, Bill and Melinda Gates Foundation and the Foreign Commonwealth and Development Office (see: https://microdata.worldbank.org/index.php/catalog/3823#metadata-producers_sponsors) (World Bank, 2021). The production of the panel dataset was conducted with the applications of ethical elements such as participant's consents and confidentiality of personal information. Consents of participants were asked verbally. This can be objectively verified from the following link, which states that some participants were not willing to participate in the survey, which reduced the response rate to 85% (refer to the section, 'Response rate' in the following link: https://microdata.worldbank.org/index.php/catalog/2783) (World Bank, 2021). Key confidentiality statements such as: (i) names of the respondents, (ii) village and constituency names, (iii) descriptions of household dwelling and agricultural field locations, (iv) phone numbers of household members and their reference contacts, (v) GPS-based dwelling and agricultural field locations, (vi) names of the children of the head/spouse living elsewhere, (vii) names of the deceased household members, (viii) names of individuals listed in the network roster, and (ix) names of field staff were not included (see: https://microdata.worldbank.org/index.php/catalog/3823#metadata-disclaimer_copyright)[20].

3.2.2. Method of data analysis

First, we downloaded the dataset for the study from the World Bank Microdata Library (see: https://microdata.worldbank.org/inde_fromx.php/catalog/3823) (World Bank, 2021). Then, we extracted the study variables, coded and recoded them, created new variables (Example, wealth index), worked on missing values and outliers. We used descriptive statistics such as mean, standard deviation, median, interquartile range and percentage to describe the data. We examined

association/difference between variables using chi-square test, Fisher exact test, independent t-test, one-way analysis of variance (ANOVA), and the Wilcoxon signed rank test.

In examining the determinants of HDD, literature suggests three different analytical models. These are poison regression model by considering HDD as a count data (FAO et al., 2022; Ochieng et al., 2017); ordered logit model by considering HDD as ordered values (Taruvinga et al., 2013) and multinomial logit model by considering HDD as categorical but non-ordered values (FAO et al., 2022) In this study, we adopted the ordered logit model to estimate the determinants of HDD since the dependent variable has an ordered nature – low, medium, and high dietary diversity. The ordered logit model estimates the underlying tendency of an observed phenomenon taking into account a vector of explanatory variables and a random error term (Green, 2008). Variance Inflation Factor (VIF) was employed to test multicollinearity problem among independent variables. Variables with VIF values less than 10 are considered to have no multicollinearity problem. Conversely, those with VIF values above 10 are considered to have problem of multicollinearity and should be excluded from the model. In this study, the VIF test results showed that there is no problem of multicollinearity. We have also checked the proportional odds assumption of the ordered logit model using the Brant test. The result showed that the model did not violate the proportional odds assumptions. All the analyses were conducted using STATA version 14.

3.3 Results and discussion

3.3.1 Household characteristics

The statistical evidence in Table 3.1 shows that the mean household size is 5 while the mean age is 44.4 years. About 32% of the age of the households falls above 50 years. Out of the households, 73.5% were male-headed while the remaining 26.5% were female-headed. In most cases a household headed by females are better in the consumption of diverse foods compared to male-headed households due to the cultural responsibility of females in Ethiopia in the preparation of foods. They have also better knowledge on variety of foods than males (Beatrice, 1996).The result for the marital status of household heads indicated that the majority of the households are currently married (77%). Those households who follow Christianity as a religion are found to be more than 50 percent. The proportion of Muslims constituted 46.4% followed by

Orthodox Christians who make up 36.6%. A study by Kalle et al. (2016) disclosed the importance of religion in the study of household diets among Ethiopian. During fasting seasons among Orthodox Christians in Ethiopia, vegetables are more consumed than dairy products compared to period of non-fasting period (D'Haene et al., 2021; D'Haene, 2019). Anecdotal evidence also show that among the Muslim believers, consumption of milk and animal proteins are common during fasting periods. Education level of household head indicated that the majority of households (65.6%) are illiterate. Education is presumed to increase access to diverse foods from purchases through improved labour-based entitlement. It also affects the level of awareness of families on the benefits of consuming diverse foods. The wealth index analysis revealed there is significant difference among the wealth groups ($F= 4.59$; $p<0.01$). Those households who fall under the poorest wealth category have 0.58 asset score while the richest households have an asset score of 1.12. Furthermore, it was found that the majority of households (77.8%) were not beneficiaries of PSNP.

Table 3.1. Description of household demographic and socioeconomic characteristics

Characteristics	Frequency	%	Mean (Std. Dev)
Household head sex			
Male	2290	73.50	
Female	825	26.50	
Age of household head			44.4 (15.4)
Education level of household head			
Illiterate	2042	65.55	
Primary	833	26.74	
Secondary and above	240	7.70	
Marital status of household head			
Currently married	2396	76.97	
Currently single	717	23.03	
Religion of household head			
Orthodox	1138	36.57	
Muslim	1443	46.37	
Protestant and others	531	17.06	
Household size			5 (2.29)
1—3	969	31.10	
4—5	1029	33.00	
6 or more	1117	35.90	
Regions			

Tigray	393	12.62	
Afar	299	9.60	
Amhara	479	15.38	
Oromia	453	14.54	
Somali	355	11.40	
Benishangul Gumuz	169	5.43	
SNNP	422	13.55	
Gambela	195	6.26	
Harar	190	6.10	
Dire Dawa	160	5.14	
Wealth Index			
Poorest	623	20.03	0.58 (0.52)
Poorer	622	19.99	0.73 (0.55)
Middle	622	19.99	0.82 (0.55)
Richer	622	19.99	0.91(0.53)
Richest	622	19.99	1.12(0.56)
PSNP status			
Yes	2423	77.78	
No	692	22.22	

3.3.2 Patterns of household's dietary diversity in Ethiopia

The overall analysis of dietary diversity of households indicated that about 91% of the households (65% under medium and 26% under low category) fall between low and medium dietary diversity category with only 9% of them falling under high dietary diversity category. This reveals the fact that the majority of the rural households in Ethiopia have limited dietary diversification. On average, the mean number of food groups consumed by rural households in Ethiopia was found to be five commodities with a dietary diversity ranging between two to ten food commodities.

Table 3.2 presents the results of chi-square analysis to examine differences in the status of household dietary diversity against the characteristics of the study respondents. The finding highlighted the existence of statistically significant differences in household dietary diversity across regions ($P<0.01$). Except for Harari and Diredawa, the majority of households fall under medium dietary diversity (more than 60%). In general, in these regions, those who fall under high dietary diversity are below 15 percent. In the case of Harari and Diredawa, 29% of them fall under high dietary diversity. The possible reason would be those households from these two regions reside in proximity to the towns, and hence, able to get access to diverse foods from

markets. Second, they may have also better employment opportunities that increases their incomes that further improve their purchasing ability to access to diverse foods from the markets. Third, due to cultural differences compared to households in Amhara, Oromia and Tigray regional states, food habits of families in these areas may improve the propensity of consuming diverse foods.

Table 3.2. Percentage distribution of household DD according to the characteristics of the study respondents and households, Ethiopia, 2018/19

Characteristics	Low dietary diversity		Medium dietary diversity		High dietary diversity		
	N	%	N	%	N	%	Chi^2
Sex of household head							8.87**
Male	568	24.80	1501	65.60	221	9.70	
Female	247	29.90	511	61.90	67	8.10	
Age of household head	815	26.16	2012	64.59	288.0	9.25	29.48***
<=30	166	24.5	421	62.1	91	13.4	
31-40	190	23.3	549	67.3	77	9.4	
41-50	165	26	416	66	52	8	
>50	294	29.7	628	63.4	68	6.9	
Education level of household head							99.62***
Illiterate	612	29.97	1295	63.42	135	6.61	
Primary	168	14.58	153	63.75	52	21.67	
Secondary and above	815	26.16	2012	64.59	288	9.25	
Marital status of household head							32.18***
Currently married	569	23.75	1591	66.40	236	9.85	
Currently single	245	34.17	420	58.58	52	5.25	
Religion of household head							25.16***
Orthodox	332	29.17	729	64.06	77	6.77	
Muslim	359	24.88	917	63.55	167	11.57	
Protestant and others	122	22.98	365	68.74	44	8.29	
Household size							20.24***
1—3	302	31.17	589	60.78	78	8.05	
4—5	249	24.20	672	65.31	108	10.50	
6 or more	264	23.63	751	67.23	102.0	9.13	
Regions clustered							267.02***
Tigray and Amhara	301	34.52	535	61.35	36	4.13	
Oromia and SNNP	194	22.17	602	68.80	79	9.03	
Benshangul Gumz and Gambela	98	26.92	220	60.44	46	12.64	
Somali and Afar	183	27.98	446	68.20	25	3.82	
Diredawa and Harare	39	11.14	209	59.71	102	29.14	
Wealth Index							333.61***

Poorest	271	43.50	344	55.22	8	1.28	
Poorer	199	31.99	392	63.02	31	4.98	
Middle	163	26.21	411	66.08	62	9.97	
Richer	166	18.65	444	71.38	62	9.97	
Richest	65	10.45	420	67.52	137	22.03	
PSNP status							9.63**
Yes	204	29.48	441	63.7	47	6.79	
No	611	25.22	1571	64.8	241	9.25	

*** Significant at p<0.01; **Significant at p<0.05; * Significant at p<0.1

The findings further showed that there are significant differences in household's dietary diversity that have different socio-economic and demographic characteristics. The analysis of age of households indicated that as age of heads of the households moves from the highest age bracket (i.e >50) to the lowest age bracket (i.e <=30), the proportion of households who fall under high dietary diversity increases from 6.9% to 13.4%. This implies that households headed by younger heads have the tendency of consuming more diverse foods than households headed by older heads. In the case of education, those heads of households who completed primary education are proportionally better to fall under high dietary diversity category (26.67%) compared to the other two groups (illiterates who constituted 6.61%, and secondary school completed who constituted 9.25%). The finding further highlighted that the majority of households who did not participate in PSNP (64.8%) fall under medium dietary diversity category. Generally speaking, it was found that those households who did not participate in the PSNP fall under higher category compared to those who participated (Table 3.2).

The result in Figure 3.1 highlights the outcome of the analysis of different type of food groups consumed by households. Cereal was the most dominant food group consumed by 96.4% of the households. This is in line with the findings of (EPHI, 2013; Workicho et al., 2016). Pulses are the second dominant food group consumed by 82% of the households. On the other hand, consumption of meat and egg were least consumed food group among the households, which are also in line with the findings of (Workicho et al., 2016). Furthermore, households in Ethiopia do not dominantly consume nutrition-dense food commodities such as lean meat, vegetables and fruits. In developing countries like Ethiopia, dietary diversity is a challenge among rural people. In most cases, their diets are based on starchy staples with inadequate animal products, fresh fruits and vegetables. Due to resource constraints, they lack access to adequate and diversified

diets (Quisumbing et al., 1998). Our findings also highlighted similarity of food group consumption patterns between regions in Ethiopia. More specifically, similarities are observed between Amhara and Tigray; Somali and Afar; Oromai and SNNPR; Benshagul Gumze and Gambela; and Harari and Diredawa (Figure 3.1).

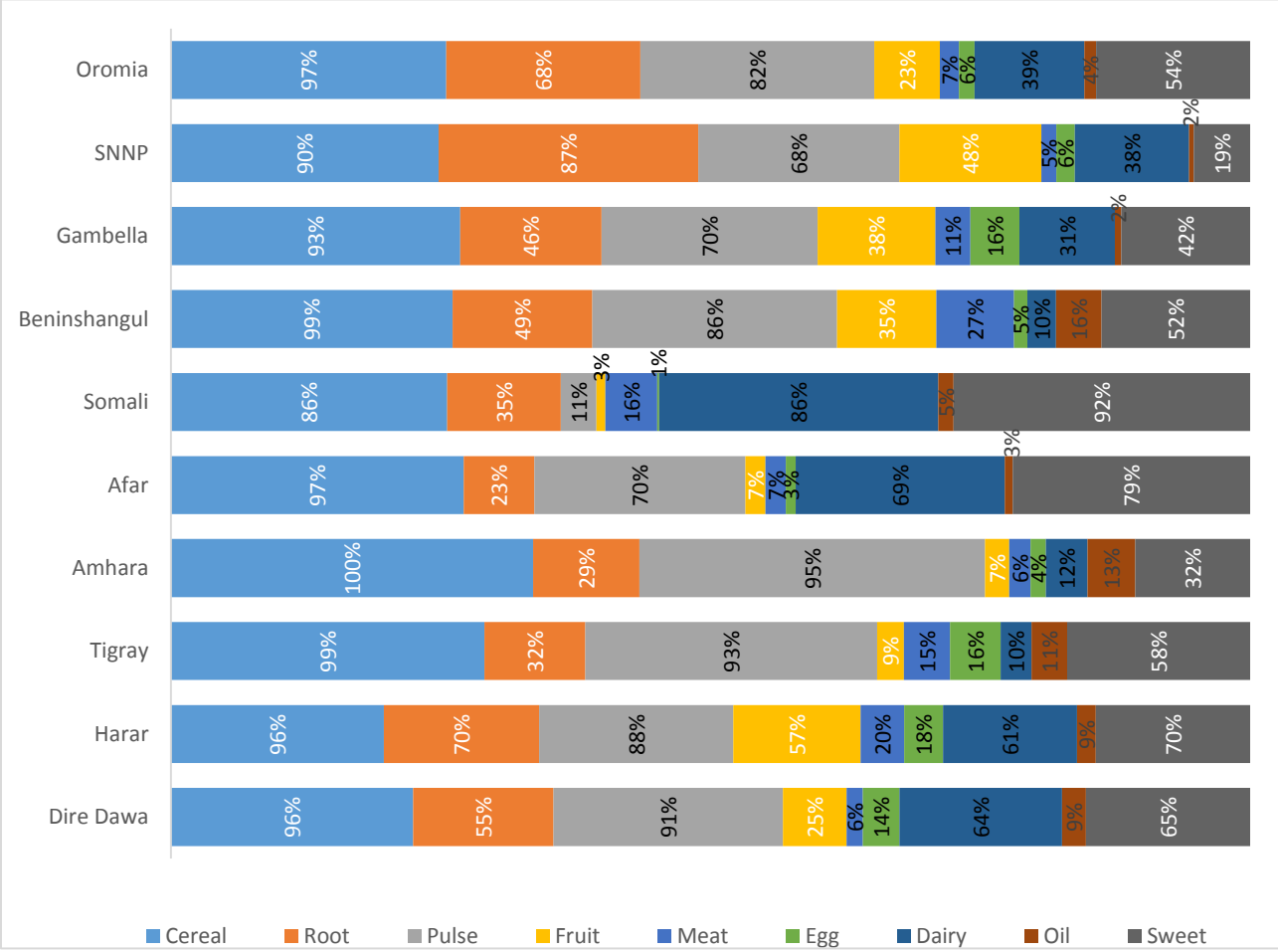

Figure 3. 1. Food groups consumed across regions in Ethiopia.
Source: Authors' (2023)

3.3.3 Determinants of Household Dietary Diversity (HDD)

This part of the article focuses on the identification of socio-economic and demographic factors affecting household dietary diversity.

Sex of Household Head: The finding of this study indicated that female headed households have 38 percent odds of consuming more diverse foods compared to male headed households, which

is significant at p<0.01 (Table 3.3). This means that households headed by females have better dietary diversity than male-headed households do. They have a 4.99 mean dietary diversity value that falls under high dietary category compared male-headed households who have a dietary diversity value of 4.77. The finding of this study is consistent with the study of (Taruvinga et al, 2013). The possible explanation for this finding would be those households who are headed by females spend more on more diverse foods and take the responsibilities of preparing different types of foods in the Ethiopian cultural context. Besides, women are in a better position in terms of familiarity with the nutritional benefits of different foods. They can, therefore, will have better information to make decision as to how to allocate family's budget on high quality foods (Quisumbing, 1998).

Education of Household Head: The findings showed that education level of household head has significant correlation with consumption of diverse foods. This study showed that the odds of consuming diverse foods increase by 62% for those households who have completed secondary and above level of education compared to those households headed by illiterates. Similarly, the odds of dietary diversity increases by 35 percent for those households who have completed primary education compared to those households headed by illiterates (Table 3.3). This indicates that when the educational status of household heads increases, the chance of consuming diverse foods will also increase. Our finding is in line with the findings of (Geremew et al. 2019; FAO et al., 2022; Sanjit, 2014). Evidence also showed that as the education status of rural household heads increase, their awareness about the importance of consuming diversified food increases (Andrew et al., 2014).

Marital status: The result of the marital status as predictor of household dietary diversity found to be significant (P <0.01). Those households who are currently single have a 37% less chance of consuming diverse foods compared to those household heads who are currently married, implying that being married has positive implication for improved dietary diversity at household level (Table 3.3). The finding is consistent with (Wynand, 2015). The possible explanation can be those married households probably have responsibilities to diversify and increase incomes to access diverse foods.

Household Size: The result indicated that household size is a significant predictor of consumption of diverse foods. This result indicated that households whose members are 6 and

above have 43% chance of consuming diverse foods compared to households whose members are three and below. Similarly, households with four and five family members, their odds of dietary diversity increases by 33% compared to those households with three and below family members (Table 3.3). As size of families increase, the propensity to generate incomes outside farming increases, which also increases access to diverse food commodities. The find of this study is in line with the work of (Sanjit, 2014; Cordero-Ahiman et al., 2021).

Table 3.3. Estimation results of the ordered logit model

	Odds Ratio	Std. Err	Z-Value	95% CI
Household head sex				
Male	Ref			
Female	1.38	.16	2.81***	1.10; 1.73
Age	0.998	0.00	-0.53	.99; 1.00
Education				
No education	Ref			
Primary	1.35	0.14	3.00***	1.11; 1.64
Secondary and above	1.62	0.27	2.88***	1.2; 2.30
Marital status				
Currently married	Ref			
Currently single	0.63	0.078	-3.73***	0.50; 0.80
Religion				
Orthodox	Ref			
Muslim	0.97	0.12	-.022	0.76; 1.25
Protestant and others	1.18	0.17	1.2	0.90; 1.60
Household size				
1—3	Ref			
4—5	1.33	0.13	2.81***	1.09; 1.60
6 or more	1.43	0.15	3.44***	1.17; 1.75
Region, Clustered				
Tigray and Amhara	Ref			
Oromia and _SNNP	2.05	0.26	5.59***	1.60,2.64
BNG and Gambela	1.96	0.30	4.34***	1.44,2.65
Somali and _Afar	2.58	0.42	5.86***	1.88,3.54
Diredawa and Harare	6.56	1.19	10.35***	4.60,9.37
Wealth Index				
Poorest	Ref			
Poorer	2.06	0.25	5.88***	1.62; 2.62
Middle	3.29	0.43	9.07***	2.54; 4.26
Richer	4.77	0.65	11.51***	3.65; 6.21

Richest	9.01	1.30	15.18***	6.79; 11.98
PSNP status				
Yes	Ref			
No	0.990	0.01	-0.94	0.80; 1.21

*** *Significant at p<0.01;* ** *Significant at p<0.05;* * *Significant at p<0.1*

Location of Household: Regions were clustered based on the food consumption pattern as observed in Figure 1. Regional cluster was considered as a variable to capture the effect of locational factor on household dietary diversity. The analysis of the location variables is significant at p<0.01. Those households located in Harari regional state and in the rural surroundings of Diredawa town have 6.56 times more chance of consuming diverse foods compared to those households living in Tigray and Amhara regional states. Similarly, those households living in Afar and Somalia regional states have 2.6 times more chance of consuming diverse foods compared to households living in Tigray and Amhara regional states (Table 3.3).

Wealth Index: The finding of this study indicated that there was a significant association between the wealth status of households and dietary diversity. The finding indicated that households who are in the upper wealth category have 9 times more chance of consuming diverse foods compared to those households who are the lower wealth category (P <0.01). In the same manner, Table 3 shows that the middle wealth group households have 3 times more chance of consuming diverse foods compared to the poorest group (P <0.01). This finding is in line with the study of (Sutapa et al., 2019; Orkhan et al., 2021; Seid et al., 2019). It is intuitive that rich households have better purchasing power to access a variety of foods and also engage in the production of diversified food items.

3.4 Conclusions and policy implications

This study estimated the status and determinants of household dietary diversity in Ethiopia. The findings indicated that dietary diversity among rural households is low. Though livestock production is one of the dominant livelihood sources for rural households in Ethiopia, consumption of livestock products is very low. The result further highlighted that household size, wealth status, location, education status, marital status and sex of heads of the household significantly determined dietary diversity in Ethiopia. The findings of this study are supported by Sen's entitlement thesis, the sustainable livelihood approach and UNICEF's nutrition analysis

conceptual model. In this line, wealth status captures trade-based entitlement, which further improves access to diverse foods. Similarly, education and household size are factors that improves labour-based entitlement, which again improves access to diverse foods. The SLA and UNICEF's conceptual models also supported our findings of marital status and sex of household heads in determining dietary diversity in Ethiopia. More specifically, marital status and sex of household head are aspects of social capital and societal norms in which married families and female-headed households prepare and consume more diverse foods, *citrus paribus*, they have access to incomes. The location factor is also explained by UNICEF's analytical model. In this line, location factor captures differences in societal norms, which affects food preferences and choices. On the contrary, participation in PSNP is found to have no significant effect on household's dietary diversity though the program was designed to improve the livelihood of poor households in Ethiopia.

Based on the findings, it is recommended that the government and development partners need to take into considerations context specific interventions whenever they design and implement program that aim at improving household dietary diversity. This is to say, food consumption patterns were similar in Afar and Somali; Amhara and Tigray; Oromia and Southern nations and nationalities; and Benshangual Gumuz and Gambella regional states, and the level of dietary diversity among the cluster regions were significantly different. Hence, the study recommends the need for addressing similarities in food consumption patterns and differences in dietary diversity among these cluster regions while designing program interventions. In addition to encouraging farmers to diversify agricultural productions, it is also important to consider nutrition education for improved dietary diversity particularly consumption of livestock products. The finding calls for further in-depth study to investigate the relevance of PSNP interventions in view of improving household dietary diversity in Ethiopia.

Chapter Four: Towards a Comprehensive Approach: Examining Ethiopia's Policies, Strategies and Programs using a Multidimensional Food Security Framework

Abstract

Ethiopia has been grappling with food insecurity despite implementing several policies, strategies, and programs aimed at addressing the issue in the past few decades. The problem of food insecurity has multi-faceted nature, and tackling it requires a coordinated and comprehensive approach. Designing of policies, strategies, and programs related to food security need to be comprehensive by addressing the four dimensions of food security, namely food availability, access, utilization, and stability. This study analyzed eleven policy, strategy, and program documents related to food security using content analysis method. The review found that interventions included in the documents mainly focused on improving the availability and access dimensions of food security, with little/no consideration of interventions that improve the utilization and stability dimensions of food security. Revision or new design of policies, strategies and programs with the aim of addressing food insecurity in Ethiopia should adopt a comprehensive approach that identifies and includes interventions relevant to address the four dimensions of food security. Implementation of such approach is arguably believed to improve food security situation of the country and promote sustainable development of the nation.

Keywords*:* Multidimensional food security; policy; comprehensive approach; Ethiopia

4.1. Introduction

Ethiopia has made impressive economic progress over the past decade, with an average annual growth rate of 10% between 2007 and 2017, resulting in a reduction in extreme poverty and hunger rates from 61% in 2007 to 31% in 2017. Despite the implementation of various policies, strategies, and programs aimed at addressing food insecurity, large proportion of the population are food insecure. In 2022, an estimated 22.4 million people are suffering from abject of food insecurity in Ethiopia (WFP, 2022). Food insecurity is growing due to adverse weather events, locust invasion, conflict, and global conditions leading to high inflation of food prices. Frequent severe weather events alongside long-term impacts of climate change undermine agriculture and pastoral livelihoods as well as food security (World Bank, 2022).

To effectively tackle food insecurity, policies and programs should focus on improving food availability, enhancing access to adequate food, ensuring safe and nutritious food utilization, and strengthening resilience for sustained access to food (CWFS, 2012a and 2012b; CWFS, 2013). This implies that a "twin-track" or "multiple-track" approach should be adopted to address food security objectives and improve impact of interventions. National poverty reduction strategies are expected to incorporate food security objectives to address the close link between poverty and food insecurity (FAO, 2006b). Country experiences also taught us addressing food insecurity should be comprehensive. For example, Brazil's (Chmielewska & Souza, 2011), India's (Mehrotra, 2013) and South Africa's (Hall, 2016) experiences showed the importance of adopting a comprehensive approach which addresses the multidimensional nature of food insecurity.

Food security policies, strategies, and programs should undergo a continuous process of evaluation to ascertain whether they have laid down relevant interventions that can effectively address the multidimensional nature of food security. In this regard, a comprehensive approach is needed to evaluate whether food security policies and programs focus on food availability, access, utilization, and resilience (FAO, 2013). Evaluation of policies can be conducted at different phases, namely at design, implementation, and post-implementation. Evaluation of policies, strategies and programs at design phase should consider if multidimensional approach is adopted in its development so as to address the complex and interrelated factors that contribute to food insecurity (FAO, 2013; Committee on World Food Security, 2012). Such approach allows

implementers to address the complex challenges of food insecurity and improve the likelihood of achieving food security outcomes.

In Ethiopia, several policies, strategies and programs aiming at improving food security situation of the country have been designed and implemented in the past three decades. Studies so far evaluated the impacts of program interventions (see for example, Tadesse & Zeleke, 2021; Keba & Kedir, 2020; Wordofa et al., 2020; Alemu and Adugna, 2019; Gebrehiwot & Holden, 2017; Woldie et al., 2016; Devereux et al., 2015; Daniel et al., 2009) or assessed performance of program implementation (MoFED, 2002; MoFED, 2005, MoFED, 2007; MoFED, 2010; UNDP Ethiopia, 2018; National Planning Commission, 2016). There is scanty of evidence on the evaluation of design of policies, strategies and programs as to whether they have comprehensively addressed the different dimensions of food security. This claim is also supported by different authors (Gilligan, 2008; Debela, 2014; Berhane et al., 2015; Hailemariam, 2021). This article, therefore, aims to fill up this lacuna by critically evaluating food security related policies, strategies and programs in Ethiopia that have been designed and implemented since 1991.

4.2. Methods

In Ethiopia, eleven different documents (i.e, policies, strategies and programs) which are relevant to address food security problems of the country were designed since 2002. Brief description of policies, strategies and programs included in this review is presented in Table 4.1. This study adopted a qualitative research approach using a content analysis method of data analysis as suggested by Bowen (2009). It examined the strengths and gaps of the documents in terms of identifying and including interventions that can potentially address the four dimensions of food security. Results of the review are presented and discussed thematically following the four dimensions of food security. Policy analysis involves analysis of design, implementation, outcomes of interventions, and the enabling environment (FAO, 2009). However, our assessment is limited to evaluation of the design of policies, strategies and programs as to whether they have comprehensively addressed the four dimensions of food security using an analytical framework adapted from FAO (2009) (see Figure 4.1). The framework guided the researchers to identify gaps for possible recommendations for improvement. The analytical framework presented in Figure 4.1 underpins the organizing schema that scaffolds the analysis.

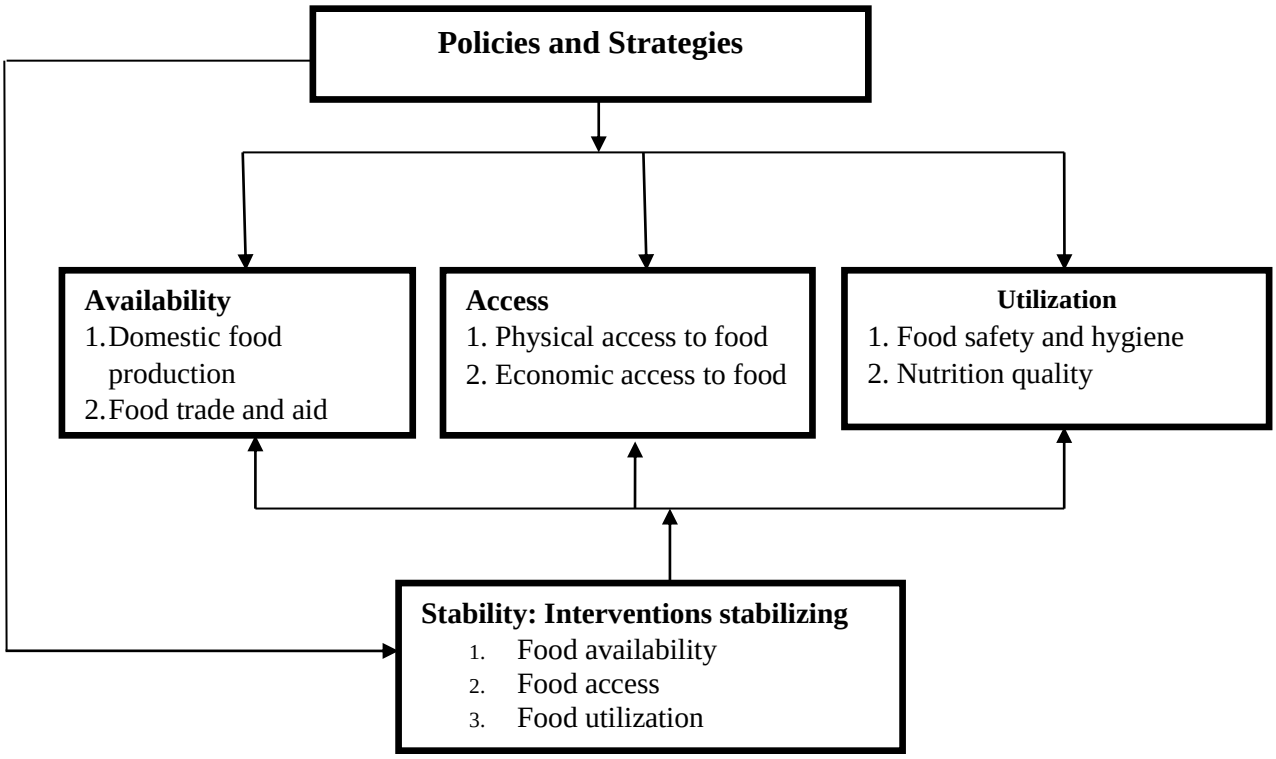

Figure 4. 1. Analytical framework
Source: Adapted from FAO (2009, P.9)

Box 4. 1. Description of food security policy and programs analytical framework

Availability: interventions related to domestic food production (agricultural production, agricultural technology development and dissemination, and optimal utilization of resources (land, water, and oxen), agricultural practices, agricultural extension services), food trade (food imports and exports) and food aid.

Access**:** interventions that increase physical access to food (e.g infrastructure and transportation services, reducing food loss and food waste) and economic access to food (e.g income, labor market, and social protection programs).

Utilization**:** interventions that improves food safety and hygiene (clean water, safe food preparation, food storage), and nutrition quality (nutrition education, dietary diversity, consumption of nutrient dense foods, food culture).

Stability**:** interventions stabilizing food availability (e.g. promoting resilience of food production, crop and livestock insurance schemes, emergency seed, etc) food access (e.g. credit service for

consumption smoothing, emergency assistance, and schemes promoting saving culture), and food utilization (mainstreaming of nutrition education in curriculum, WASH interventions)

Source: Author's description based on literature (2023)

4.3. Results and discussion

This section presents the evaluation results of the eleven-food security related policies, strategies and programs using the analytical framework presented in Figure 1. The results and discussions are presented thematically following the four dimensions of food security, namely food availability, access, utilization and stability. Our content analysis of policies, strategies and programs related to food security such as Ethiopia's food security strategy, the country's poverty reduction plans, the Growth and Transformation Plans, and the government's flagship Agriculture Programs highlighted that the documents sufficiently incorporated interventions that can potentially security dimensions. Documents reviewed are indicated in Table 4.1 below.

Table 4. 1. Policies, strategies and programs reviewed for the study

No	Year	Document	Description	Source
1	1994	Ethiopia Rural Development Policy and Strategy	This document outlines the government's policy and strategy for rural development in Ethiopia, with a focus on poverty reduction, economic growth, and sustainable natural resource management.	MoFED (2003)
2	2002	Food Security Strategy	This strategy is a government policy document that outlines the country's approach to achieving food security.	FDRE (2002)
3	2009	Food Security Program	The Food Security Program of Ethiopia is a government program document that outlines the country's commitment achieving food security.	MoARD (2009)
4	2002	Sustainable Development and Poverty Reduction Program (SDPRP)	This document is a government plan that outlines Ethiopia's strategy for achieving sustainable development and reducing poverty.	MoFED (2002)
5	2005-2010	Plan for Accelerated and Sustained Development to End Poverty (PASDEP)	The Plan was a government plan designed as a successor to SDPRP and was aimed at accelerating the country's progress towards achieving the United Nations Millennium Development Goals.	MoFED (2005)
6	2010-2015	The Growth and Transformation Plan I (GTP I)	This plan was a government plan that was implemented in Ethiopia which was designed as a successor to PASDEP	MOFED (2010)
7	2015-2020	The Growth and Transformation Plan II (GTP II)	This plan is a government plan document that was implemented in Ethiopia was designed as a successor to GTP I	National Planning and Development Commission

				(2016)
8	2011-2016	The Agriculture Growth Program I (AGP I)	This program was implemented in Ethiopia as one of flagship program to bust agricultural production for food security.	Ministry of Agriculture (2010)
9	2016-2020	Agriculture Growth Program II (AGP II)	This is an ongoing program in Ethiopia, was designed as a successor AGPI	Ministry of Agriculture (2016)
10	2019	Food and Nutrition Security Policy	This policy is Ethiopia is a government policy document that outlines the country's strategy for ensuring food and Nutrition Security	FDRE (2019)
11	2021-2030	10-Year Development Plan	This is an overarching development Plan of the government of Ethiopia guiding its implementation in the coming ten years	National Planning and Development Commission (2021)

4.3.1. Food availability

In the standard definition of food security, food availability is defined as supply of sufficient quantities of food with acceptable quality and safety through domestic food production and/or imports (FAO, 2020a; FAO, 2018a). In line with this definition, the analytical framework used in this study (Figure 4.1) identified interventions that can potentially increase the physical availability of foods through domestic food production, food trade and food aid. Interventions that can boost domestic food production include extension support activities, technology development and dissemination, and tapping available resources that enhance agricultural production. Proper utilization of available resources such as land, water, and trees, and the application of farm inputs and technologies are some of the activities that can increase domestic food production and availability. Policy interventions such as promoting agricultural extension support activities and introducing and disseminating new farming technologies should be included in a policy document to improve domestic food production. Furthermore, trade and aid policies that facilitate the availability of food can also contribute positively to improve the food availability dimension of food security. Therefore, policymakers should consider these factors when designing policies, strategies and programs aimed at improving food availability, and thereby ensure food security for all.

Table 4.2. Interventions included and gaps identified in view of addressing the availability dimension of food security

No	Document type	Interventions included	Gaps identified
1	Ethiopia Rural Development Policy and Strategy	• Improved technologies and practices • Irrigation and water management systems • Soil conservation and land management practices • Infrastructure development • Production of high-value crops and livestock • Land reform and land tenure security	• Limited interventions on marketing of foods and food transfers • The importance of agricultural extension services not explicitly mentioned
2	Food Security Strategy	• Production of high-value crops • Conservation-based agriculture • Livestock development • Fruit trees production • Livestock production • Environmental protection • Agro-forestry	• The strategy is silent about food transfers and food marketing. • The importance of agricultural extension services not explicitly mentioned
3	Food Security Program	• Drought-resistant crops and agricultural practices • Extension services and input subsidies • Improving access to water for agriculture and livestock	• The program has little/no interventions on food marketing
4	Sustainable Development and Poverty Reduction Plan (SDPRP) (SDPRP)	• Extension packages • Rural financing for food production • Markets for agricultural inputs and outputs • Support farmers cooperatives and agricultural research • Water harvesting and small-scale irrigation	• The plan has little/no intervention on food transfers. • The plan has little/no intervention on agricultural extension services.
5	Plan for Accelerated and Sustained Development to End Poverty (PASDEP)	• Marketable farm products • Commercialization of agriculture • Development of large-scale commercial agriculture • Fertilizer and seeds provision • Small-scale irrigation:	• The plan has little/no intervention on food transfer. • Little attention to staple food crops production • The plan has little/no intervention on agricultural extension services
6	GTP I	• Irrigation development • Soil and water conservation • Livestock development	• The plan has no intervention on food marketing and food transfers
7	GTP II	• Promoting productivity and quality of	• The plan has no

		staple food crops production • Focus on high value crops. • Irrigation-based agriculture • Livestock, and fisheries development	intervention on food marketing and food transfers
8	AGP I	• Scaling up of best practices • Market and agri-business development	• Since the flagship programs are targeting high potential areas, the program has no intervention on food aid
9	AGP II	• Increase food production. • Support sustainable farming practices. • Improve markets. • Develop agro-industries	• Since the flagship programs are targeting high potential areas, the program has no intervention on food aid
10	Food Security and Nutrition Policy	• Improve access to resources and inputs for food production. • Climate-resilient food production	• The policy has no intervention on food marketing and food aid
11	10-Year Development Plan	• Crop and horticulture production using improved seeds, fertilizer, and irrigation. • Production of livestock (milk, chicken, honeybee, etc) and fisheries • Increase the proportion of milk cows with improved	• No explicit intervention on the importance of agricultural extension services

Source: Authors' analysis (2023)

Ethiopia's Rural Development Policy and Strategy was designed following a mixture of the conservation approach and the high pay-off model of agricultural policies as suggested by Ruttan & Hayami (1984) and Ruttan (1984). It is popularly known as the Agriculture-Development Led Industrialization (ADLI) strategy of the nation. It focused dominantly on the diffusion and adoption of technologies, and utilization of land and water resources. The interventions include increasing agricultural productivity through improved technologies and practices, improving access to irrigation and water management systems, promoting high-value crops and livestock, and encourage sustainable land use practices. It also identified interventions increase domestic food availability through facilitating food marketing such as building infrastructure for transportation, storage facilities, and marketing of agricultural product (Table 4.2). As presented in the analytical framework (Figure 1), domestic availability of food can be increased through improving food production, food marketing and food aid. Although the strategy appeared to have considered key interventions that boost domestic food production, it gave little emphasis on marketing of foods and food aid. Our claim is supported by Shikur's (2020) investigation on the positive impact of technology dissemination and expanding irrigation facilities on domestic food production and consumption in Ethiopia. Dercon et al. (2019) also argued that the primary goal of

the rural development policy and strategy is to achieve food self-sufficiency through the enhancement of agricultural productivity and output.

Our analysis also showed that the food security strategy focused mainly on availing inputs and technologies for improved crop and livestock production for increased domestic food production. The conservation model of agricultural policy (Ruttan, 1984) inspired the food security strategy of the nation. It emphasized on food production through adoption of relevant technologies (e.g irrigation, conservation agriculture, etc.), and thereby to increase domestic food availability in drought-prone areas of the country. However, the strategy did not fully capitalize on the importance of agricultural extension and on the need for adoption of innovative practices that have the potential to improve food production and productivity of the nation. Furthermore, the review highlighted that the document did not fully delve on the mechanisms as to how to tap the potential of productive resources that can potentially improve domestic food production for improved food availability. The strategy was also silent on the mechanisms of increasing domestic food availability through market promotion and food aid.

From the review, it was learnt that the two poverty reduction plans, the SDPRP and PASDEP, focused mainly on building institutions to provide inputs and technologies for improving production and productivity (Table 4.2). The plans acknowledged the importance of optimizing the use of productive resources such as land and water in agricultural production. Following the classifications of Ruttan & Hayami (1984) and Ruttan (1984), we can argue that the Ethiopian poverty reduction plans are motivated by a combination of the diffusion model and the frontier approach. To realize anticipated impacts of such plans that build on diffusion model, strong extension advice and institutional support in the form of credit services and input supply are needed. However, the extension aspect for improved production was not envisaged in these two documents.

The first and the second Growth and Transformation Plan (GTP I and GTP II) were anchored on the frontier and resource exploitation model of agricultural policies (Ruttan & Hayami, 1984; Ruttan, 1984) in which tapping of uncultivated land resources boosts agricultural production of the nation. The World Bank's report on *Rising Global Interest in Farmland* also emphasized on the importance of promoting large-scale commercial farming to increase food production using untapped land and water resources (Deininger et al, 2011). GTP I was holistic in its approach to

food production with key interventions aimed at improving food availability. These include activities for improved domestic food production through proper use of available resources like irrigation development, soil and water conservation activities, and taping the potential of the livestock sector. GTP II, however, focused more on promoting exports, although food production for domestic consumption was not abandoned. The plan also emphasized on the use of water resources for irrigation development for food production (Table 4.2).

The government's flagship agriculture programs (AGP I and II) gave emphasis to demonstrating and scaling up of technologies and practices to improve agricultural production and to increase domestic food availability (Table 4.2). According to Ruttan (1984), policies and/or programs inspired by the diffusion model emphasize on dissemination and diffusion of agricultural technologies. Although such approach requires strong agricultural extension support and input dissemination, but flagship programs were not explicit on the importance of strengthening extension support.

The food and nutrition security policy and strategy, which was developed in 2019 considered a number of interventions that can potentially improve domestic food availability. Relatively speaking, the policy document was strong in adopting a food systems approach and focused on availing improved agricultural inputs and technologies for increased food production (Table 4.2).

The last document reviewed was the government's over-arching 10-Year's Development Plan, which was designed for the period of 2021 to 2030. The plan gave significant emphasis on improving agriculture production and productivity. Specifically, the plan aims to improve crop production through increased access to inputs such as improved seeds and fertilizer. The plan also prioritized irrigation development and horticultural development, as well as improving productivity of the livestock and fisheries sectors. The plan seems to recognize the importance of agriculture in improving domestic food availability.

In sum, while the reviewed policies, strategies, and programs in Ethiopia sufficiently considered interventions that aimed at improving domestic food availability, there is still a need for a more holistic approach that takes into account the potential of innovative practices, the importance of agricultural extension, and the optimal use of productive resources to increase food production and availability. Effective agricultural extension services are critical for disseminating knowledge

and promoting the adoption of best practices among farmers. As argued by Buehren et al. (2017), strong extension service has a positive impact on agricultural production for domestic consumption and for markets. Besides, maximizing the use of productive resources, including land, labor, and capital, is essential to ensure sustainable and equitable food production and distribution (Tafesse et al., 2019).

While food availability can be increased through domestic food production, it can also be increased through food trade and food aid. With the exception of GTP I and II, the policies, strategies and programs examined in this policy paper are either silent or weak in identifying appropriate interventions that can increase domestic availability of foods through trade and aid (see the gaps in Table 4.2). GTP I and II have emphasized on the need to promote commercialization of the agricultural sector, which indirectly pointed out the trade impacts of domestic food availability.

4.3.2. Food access

Physical access to food can be enhanced through interventions such as development of market infrastructure and facilities, building road and transportation system, etc. However, economic access to food depends on individual's purchasing power and food transfers through safety net (Barrett, 2010). Economic access to food can be improved through interventions that increase and diversify income, create employment opportunities, and address economic barriers.

The Rural Development Policy and Strategy document developed in 1994 was comprehensive in laying down the interventions that can potentially address physical and economic access to food. Dercon (2019) also argued in the same vein that the strategy document was comprehensive by its design. The strategy document (also known as ADLI) also included plans for broader socio-economic progress, such as investing in infrastructure, improving financial resources, enhancing local government capabilities, and promoting agro-processing industries (Mellor and Dorosh, 2010), which all potentially improve physical and economic access to food.

The government’s food security strategy to ensure food security is based on the ADLI strategy, and it emphasizes the significance of physical and economic access to food. The strategy identifies various measures to improve physical access to food, including building farm-to-market roads and resettlement efforts. It also aims to enhance economic access to food by supporting

smallholder dairy, meat, hides, and skin production, which can generate income and employment opportunities. Additionally, the plan seeks to expand market access and establish agricultural credit markets to improve overall food security (see Table 4. 3 for details).

Table 4.3. Interventions included and gaps identified in view of addressing the access dimension of food security

No	Document type	Interventions included	Gaps identified
1	Ethiopia Rural Development Policy and Strategy	• Credit and financial services • Rural infrastructure • Rural markets and value chains • Social safety nets and food aid • Access to education and health services	• No major gap identified
2	Food Security Strategy	• Income diversification • Resettlement • Market information • Support service cooperatives • Improving livestock marketing • Constructing farm-to-market roads • Developing agricultural credit markets • Agro-processing industries.	• No major gap identified
3	Food Security Program	• Food and cash transfers • Market infrastructure • Market information • Public works	• No major gap identified
4	Sustainable Development and Poverty Reduction Plan (SDPRP) (SDPRP)	• Rural financing • Markets for agricultural inputs and outputs • Strengthen farmers cooperatives	• Less attention to physical access to food
5	Plan for Accelerated and Sustained Development to End Poverty (PASDEP)	• High-value export crops: • Farm-to-market roads • Market integration: • Credit service • Extension services • Export crops • Improving land tenure security and making • Agricultural markets and institutions: • Extension support • Demonstration centers: • Off-farm income generating initiatives:	• No major gap identified
6	GTP I	• Improving agricultural marketing	• Less attention to physical

		systems	access to food
7	GTP II	• Support schemes for smallholder farmers • Educated farmers and private investors	• Less attention to physical access to food
8	AGP I	• Institutional strengthening to improve market • Market infrastructure	• No major gap identified
9	AGP II	• Credit and financial services • Social safety net programs	• Less attention to physical access to food
10	Food Security and Nutrition Policy	• Improving income • Social protection programs	• Less attention to physical access to food
11	10-Year Development Plan	• Assist productive smallholder farmers to become investors. • Expand the participation of private investors in agriculture. • Create job opportunities in rural areas	• No major gap identified

Source*:* Authors' analysis (2023)

The poverty reduction plans (SDPR and PASDEP) mainly aimed at improving food security by enhancing physical and economic access to foods. The SDPR focused on improving economic access to food through initiatives such as rural financing, market access, and establishing farmer cooperatives for marketing of produce. The focus of PASDEP shifted to further improving economic access to food through the production and export of high-value food crops, strengthening market linkages, and promoting commercialization. Additionally, physical access was emphasized, particularly through the construction of farm-to-market roads. Similar claims are made by the Ethiopian Agricultural Transformation Agency (2011), Ethiopian Ministry of Agriculture and Rural Development (MoARD) (2010) and USAID (2010).

Similarly, the GTP plans (both GTP I and II) highlighted the access dimension of food security through improving marketing and extension systems of the nation. The second GTP highlighted for smallholders to have support schemes, creating educated young farmers, and promoting private investment in agriculture. The schemes increase economic access to food as educated young farmers have better access to improved farming practices and technologies, which can increase agricultural productivity, have better employment opportunities and market linkages compared to uneducated ones (FAO, 2014b). The AGP I and AGP II initiatives focused on improving physical and economic access to food by providing institutional support, developing community-owned warehouses, constructing market shades, and improving feeder roads.

Additionally, AGP II included interventions to assist vulnerable households through access to credit and financial services, as well as implementing social safety net programs. These programs have demonstrated strong capabilities in addressing the critical dimension of food security related to physical and economic access to food.

The food and nutrition security policy has been unveiled with a primary emphasis on enhancing economic access to food. This is planned to be achieved through targeted interventions that aim to increase income levels and establish stronger market linkages. However, the policy does not currently address the issue of physical access to food, including measures to improve the transportation and distribution of food, or to decrease food loss and waste (Table 4.3).

The overall findings indicate that the Ethiopian government has developed comprehensive policies and strategies aimed at improving food security by enhancing physical and economic access to food. The Rural Development Policy and Strategy document, poverty reduction plans (SDPR and PASDEP), and Growth and Transformation Plans (GTP I and II), as well as the Agricultural Growth Program (AGP) initiatives, have all emphasized the importance of physical and economic access to food. These policies and strategies have implemented measures such as building farm-to-market roads, improving market linkages, supporting smallholder agriculture, and providing institutional support to improve physical and economic access to food. While the recently unveiled food and nutrition security policy primarily focuses on enhancing economic access to food, it does not currently address the issue of physical access to food. Overall, these policies and strategies have demonstrated strong capabilities in addressing the critical dimension of food security related to physical and economic access to food in Ethiopia.

4.3.3. Food utilization

Food utilization refers to the ability of people to access and use nutritious food to meet their dietary needs. The Ethiopia Rural Development Policy and Strategy (RDPS) has recognized the importance of addressing this dimension of food security and has included interventions that promote nutrition education and awareness campaigns, improving access to clean water and sanitation facilities, and promoting livestock vaccination. While the strategy has been successful in increasing agricultural productivity and improving access to markets, and including interventions that promote nutrition education, it has not been as effective in developing

comprehensive interventions that promote the utilization of nutritious food to meet the dietary needs of the population (Table 4.4).

Table 4.4. Interventions included and gaps identified in view of addressing the utilization dimension of food security

No	Document type	Interventions included	Gaps identified
1	Ethiopia Rural Development Policy and Strategies	• Nutrition education • Access to clean water and sanitation facilities • Livestock vaccination and disease control programs	• Interventions that promote utilization of nutritious and dietary diverse foods not explicitly included
2	Food Security and Nutrition Policy	• Food safety and quality control • Food processing technology training, post-harvest management	• No major gap identified
3	Food Security Strategy	• No activity included	• No major gap identified
4	Food Security Program	• Nutrition education • Hygiene and sanitation practices • Use of micronutrient-rich	• No major gap identified
5	Sustainable Development and Poverty Reduction Plan (SDPRP) (SDPRP)	• No activity included	• Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods
6	Plan for Accelerated and Sustained Development to End Poverty (PASDEP)	• No activity included	• Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods
7	GTP I	• No activity included	• Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods
8	GTP II	• No activity included	• Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods

9	AGP I	•	No activity included	•	Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods
10	AGP II	•	No activity included	•	Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods
11	10-Year Development Plan	•	No activity included	•	Missed interventions which improve food safety, dietary diversity and food hygiene, nutrition quality and consumption of nutrient dense foods

Source: Authors' analysis (2023)

Upon further thorough review of the policies, strategies, and programs related to food security in Ethiopia, it is evident that the initiatives have not adequately addressed the utilization dimensions of food security. For instance, the Food Security Strategy, PASDEP, GTP I, and AGP I and II did not have explicit activities that directly enhance food utilization. However, the food security program has prioritized improving food safety and hygiene, as well as enhancing nutrition quality through various activities such as nutrition education, promoting hygiene and sanitation practices, and encouraging the consumption of micronutrient-rich crops in diets. However, there is no indication of interventions that promote the consumption of diversified food. Moreover, the Food and Nutrition Policy has included interventions that aim to improve the utilization dimensions of food security. These interventions focus on enhancing food safety and hygiene by establishing systems for food safety and quality control, promoting food processing technology, and advocating for value addition and post-harvest management for improved nutrition quality. Therefore, these interventions are considered key to addressing the utilization dimensions of food security (Table 4.4).

In general, the analysis highlighted that food utilization is an essential but overlooked dimension of food security in Ethiopia. While some initiatives have prioritized improving food safety and hygiene and promoting nutrition quality, comprehensive interventions that promote the consumption of diversified food is missing. Reports also highlighted that food security policies, strategies, and programs in Ethiopia had limited focus on the utilization dimension of food (FAO, 2018b & 2016; MoANR, 2017).

4.3.4. Stability dimension of food security

Based on the definition provided by the Food and Agriculture Organization (FAO) that the stability dimension of food security refers to the ability of individuals and communities to maintain access to sufficient and nutritious food over time, without the risk of sudden and unpredictable disruptions to food supplies (FAO, 2020b and 2020c), we conducted a review of policies, strategies, and programs using the analytical framework presented in Figure 4.1.

Our analysis revealed that many of these initiatives have not adequately addressed the stability dimension of food security. For instance, policies such as the Food Security Strategy, the Plan for Accelerated and Sustained Development to End Poverty (PASDEP), and the Growth and Transformation Plan (GTP) I and II, as well as the Agricultural Growth Program (AGP) I and II, did not explicitly include activities that directly enhance stability dimension of food security. However, some policies such as the Food Security Program, the Sustainable Development and Poverty Reduction Plan (SDPRP), the Ethiopia Rural Development Policy and Strategies, the Food Security and Nutrition Policy, and the 10-Year's Development Plan did highlight interventions that address the stability dimension of food security (Table 4.5). Studies conducted in Ethiopia support our findings. Tadesse et al. (2020) found that the Food Security Program did not adequately address stability in food supply. The International Food Policy Research Institute (IFPRI) (2019) reported that Ethiopia's food system was vulnerable to disruptions, and policies aimed at enhancing food security had not addressed this adequately.

Table 4.5. Interventions included and gaps identified in view of addressing the stability dimension of food security

No	Document type	Interventions included	Gaps identified
1	Ethiopia Rural Development Policy and Strategies	• Developing early warning systems • Supporting disaster risk reduction and mitigation programs • Crop diversification and livestock production systems • Encouraging non-farm rural livelihoods	• No major gap identified
2	Food Security and Nutrition Policy	• Emergency response and rehabilitation	• No major gap identified
3	Food Security Strategy	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
4	Food Security Program	• Building resilience to shocks and stressors. • Providing social protection and support to vulnerable households • Developing early warning systems • Improving the coordination and collaboration among partners	• No major gap identified
5	Sustainable Development and Poverty Reduction Plan (SDPRP)	• Promote water harvesting and small-scale irrigation. • Agro-ecology based interventions	• No major gap identified
6	Plan for Accelerated and Sustained Development to End Poverty (PASDEP)	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
7	GTP I	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
8	GTP II	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
9	AGP I	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
10	AGP II	• No activity included	• Interventions are not included to address stabilizing food availability, food access and food utilization
11	10-Year Development Plan	• Make agriculture more resilient to climate change.	• No major gap identified

		• Reduce annual soil pollution and raise the rate of annual increase of soil carbon. • Catchment treatment enhance sustainable natural resources development, management and conservation. • Enhance the reduction of greenhouse gas emissions	

Source*:* Authors' analysis (2023)

4.4. Conclusions and implications for policy

After analyzing the food security policies, strategies, and programs in Ethiopia from 1994 to 2019, we found that none of the documents comprehensively addressed all four dimensions of food security. While the majority of them focused on availability and access to food, few addressed the utilization and stability dimensions. This highlights the need for a more holistic approach to food security policies.

Given the challenges faced by Ethiopia, including malnutrition and drought, addressing all dimensions of food security is crucial. It is not enough to ensure that there is enough food available and accessible to people; we must also ensure that it is of good quality and that people have the knowledge and resources to use it effectively. Additionally, measures to increase the stability of food supply in the face of shocks such as drought are necessary.

In conclusion, Ethiopia's food security policies, strategies, and programs have made progress in addressing some aspects of food security, but there is still much work to be done. A comprehensive approach that addresses all dimensions of food security is needed to ensure that Ethiopians have access to nutritious and sustainable food. Based on the analysis of Ethiopia's food security policies, strategies, and programs, the following specific recommendations can be forwarded:

1. Develop a comprehensive food security policy that addresses all four dimensions of food security, including availability, access, utilization, and stability. This policy should be regularly reviewed and updated to reflect the changing needs of the population and the country's evolving food security situation.
2. Prioritize interventions aimed at improving the utilization of food and addressing malnutrition. This can include promoting dietary diversity, improving the quality of food, and providing nutrition education and counseling.

3. Increase investment in agricultural research and development to increase productivity and ensure the availability of diverse and nutritious food by promoting the use of climate-smart agriculture practices and the development of drought-resistant crops.
4. Strengthen social safety nets and emergency response mechanisms to address the stability of food supply during times of crisis, such as droughts and other natural disasters.

By implementing these recommendations, Ethiopia can take a more comprehensive and sustainable approach to food security that addresses the needs of its population and promotes long-term development.

Chapter Five: Ethiopia's food security governance: Evaluation based on analysis of stakeholder's sentiments and document reviews

Abstract

The challenges of addressing food insecurity are escalating worldwide, and evidence show that the number of food insecure people has risen globally. Ethiopia, in particular, has been grappling with food insecurity for decades, with millions of people requiring food aid. Addressing food insecurity is a complex issue which requires to consider not only technical and environmental factors, but also social, institutional, economic, and political aspects. This study aims to examine food security governance in Ethiopia, which is among the drivers of food security. The study utilized both secondary and primary data. Secondary data was generated from relevant food security documents, while primary data was collected from key informant interviews. Primary data takes into account the retrospective views of stakeholders. The findings of the study highlighted that there is key challenge in food security governance in Ethiopia. There is capacity limitation in the implementation of the food security polices strategies and programs designed to address food security challenges. The finding also highlighted that there are gaps in the design and implementation of food security programs in terms of putting in place effective coordination mechanism, institutionalizing accountability and enforcement mechanisms, and in ensuring active participation of stakeholders. For an effective food security governance, an autonomous government entity that are accountable to food security achievements is suggested to be instituted. The entity needs to have the powers and duties to make decisions, raise and manage resources, and coordinate different actors.

Keywords*: food security, governance, policy and legal framework, accountability, coordination, participation, Ethiopia*

5.1 Introduction

Governance as a concept encompasses the establishment of conducive policy and legal frameworks, accountability mechanisms, institutional arrangements, knowledge sharing mechanisms, implementation capacity, resource allocations, and coordination (Hossain & Bose, 2017).

FAO (2011 & 2019) defined food security governance as the rules, processes, and decisions made by public and private actors at local, national, and global levels to ensure food and nutrition security. This involves both formal and informal mechanisms that sustain and execute strategies for achieving food security for all. Pérez-Escamilla et al. (2017) emphasized on four essential conditions for equitable food security governance: clear, participatory, and responsive planning, decision-making, and implementation; efficient, effective, transparent, and accountable institutions; respect for the rule of law, equality, and fairness in resource allocation and service delivery; and coherence and coordination among policies, institutions, and actions related to food security.

Good governance for food security entails national governments prioritizing the eradication of hunger, malnutrition, and food insecurity among vulnerable populations. This includes allocating significant funding, crafting policies, plans, and programs and reshaping approaches at various levels, be it humanitarian, developmental, national, bilateral, or multilateral (High-Level Task Force on the Global Food Security Crisis, 2010).

The ultimate objective of food security governance, as highlighted by Candel (2014), is to ensure the availability, access, utilization, and stability of food over time. To achieve this, Shamah (2017) emphasized on the importance of implementing permanent or long-term strategies that facilitate ongoing evaluation and reflection on the effectiveness of food and nutrition governance. In this context, good governance discourages corrupt or inefficient practices, promotes sustainable food security, and involves efficient management of public resources by public officials (Kanyol, 2012).

Food security governance analysis encompasses several critical aspects such as the complexity of governability, the efficacy of institutional structures, the need for coherence and coordination across scales, diverse perspectives and conflicts, and the requirement for adequate resources

allocation and democratic values (Jeroen, 2014). The need for ongoing evaluation and reflection on the effectiveness of food and nutrition governance remains crucial (Shamah-Levy et al., 2017). Kanyol (2012) further highlighted that good governance discourage corrupt or inefficient practices, efficient and effective management of public resources by public office holders and promoting sustainable food security.

The persistent global challenges of eradicating hunger, food insecurity, and malnutrition continue to escalate. Recent evidence highlights a concerning trend. In 2022, the number of people worldwide who are unable to afford a healthy diet increased by 112 million, and reached nearly 3.1 billion (FAO et al., 2022). In Ethiopia, food insecurity has remained a persistent challenge for decades, with approximately 20 million people require food assistance in 2023 due to compounding impacts of climate change-induced droughts, conflicts, and poverty (OCHA, 2023).

Addressing the multifaceted issue of food security necessitates not only consideration of technical and environmental factors, but also recognition of social, institutional, economic, and political aspects (FAO, 2013). Furthermore, creating an enabling environment for effective food security governance is equally essential. This involves developing appropriate policy and legal frameworks and establishing institutions that facilitate effective coordination and participation (Degaga, 2005). According to authors, enhancing food security governance requires navigating its complexities and bringing greater coherence, integration, coordination, inclusivity, and knowledge sharing (Candel 2014; FAO, 2011; FAO, 2019).

For security governance of particular importance is the effective participation of stakeholders, which forms the bedrock. The concerted efforts of various actors must align coherently and holistically, minimizing trade-offs and duplication of efforts while ensuring that the actions of one actor does not hinder the progress of others (FAO 2009; High-Level Task Force on the Global Food Security Crisis, 2010). The success of such coordination depends on the establishment of a national focal body to spearhead and coordinate these efforts (COMCEC, 2020).

Furthermore, Duncan & Claeys (2018) advocated for the deliberate politicization of participation in multi-stakeholder processes, distinguishing clearly between states and other stakeholders, as

well as between categories of non-state actors. Kanayo (2012) highlighted the growing importance of new actors, including the private sector and philanthropic organizations, in global development for effective food security governance. Additionally, Ajulor (2018) emphasized on the critical roles of end users in food security governance, particularly in policy development, to drive meaningful and lasting solutions.

In recent years, commendable strides have been taken to address food insecurity in Ethiopia, with collaborative efforts between the Government, international development partners, and NGOs However, the true effectiveness of these endeavors rests upon a delicate interplay of governance structures, policy coherence, regulatory frameworks, stakeholder engagement, and resource allocation.

Given these pressing concerns, embarking on an all-encompassing evaluation of food security governance in Ethiopia is not only timely but imperative. Such an inquiry is crucial to identify deficiencies, inefficiencies, and promising areas for improvement within the existing system. The significance of delving into food security governance in Ethiopia lies in the multifaceted nature of the challenge, which extends beyond mere agricultural production to encompass intricate aspects of policy formulation, institutional dynamics, equitable distribution, climate change adaptation, and socio-economic disparities. Thus, unraveling the dynamics of food security governance takes on paramount importance. Additionally, studies further emphasized the importance of legal and regulatory frameworks in supporting effective food security governance (Tembo et al., 2017; Osei-Kwasi et al., 2019).

Scholars have increasingly recognized the significance of governance in food security (Paarlberg, 2002; Ybabe & Assefa, 2014; Nayioma, 2016; Thow et al., 2018; COMCEC Coordination Office, 2020; Asare-Nuamah et al., 2022). Current knowledge on food security governance, however, remains fragmented (Candel, 2014) and scarce (Palmeira et al, 2020). There are two broad arguments in the level of food security governance. Some argue that governance of food security should transcend beyond national-state jurisdiction in the age of globalization (Held, 1996), while others argue that the governance system put in place should appreciate local realities to create enabling environment at local levels within a nation (Hines, 2000). Palmeira et al. (2020) also argued that food security governance is mostly designed based on theoretical arguments rather than formulation based on empirical findings that reflect local

realities. Paarlberg (2002) supported the idea that national level food security governance should be strengthened as much of the deficiencies in food security are observed at local rather than global levels.

Various studies offered some insights into food security governance. For instance, Brazil's National Council for Food and Nutrition Security (CONSEA) and National Food and Nutritional Security Policy (PNAN) exemplify a coordinated approach engaging multiple stakeholders in the decision-making processes (CONSEA, 2017). Palmeira et al. (2020) investigated the government's initiatives at local levels in Brazil to address food and nutrition security situation at local levels. Their studies underscored the importance of decentralized food security governance that enhance local capacity in various areas. In South Africa, Thow et al. (2018) came up with incoherence of different policies dealing with food and nutrition security in South Africa and concluded the importance of having policy coherence in the governance of food security. In Jimma zone of Ethiopia, Jiren et al. (2021) argued similarly stating that incoherence policy goals and challenges related to institutional structures incompatible with the complexities of food security and nature of governing institutions as key food security governance challenges in the area.

Despite availability of the studies shedding light on various facets of food security governance in various parts of the world, critical gaps in the literature impede a comprehensive understanding of the intricate governance mechanisms that underpin food security outcomes. Against the backdrop of the gaps, the central objective of this research is to evaluate the strengths and gaps of food security governance in Ethiopia using a framework developed by Hossain & Bose (2017). By shedding light on the complexities of governance, this article aims to play a pivotal role in shaping more potent, inclusive, and sustainable food security governance mechanism capable of creating better enabling environment for successful implementations of food security projects and programs in the nation. It will, therefore, inform policymakers to address areas of weaknesses in the food security governance of the country with ultimate goal of improving positive impacts of food security related interventions on food security outcomes.

5.2 Methods

5.2.1 Analytical framework

The study adapted Hossain & Bose's (2017) analytical framework for food security governance in Ethiopia. The framework has seven dimensions. Box 1.1 provides brief description of the sub-themes of each dimension.

Box 5. 1. Dimensions of food security governance

Policy and legal frameworks*: This dimension focus on the design and implementation of policies, laws, and regulations that support effective implementation of food security programs. Key elements include the availability of national food security strategies, and legislations that protect the rights of vulnerable groups. It also examines coherence among policies, strategies and directives.*

Institutional capacity: *This dimension focuses on the capacity of government to design, implement, and monitor food security policies and programs. Key elements include the availability of skilled staff, organizational set up to effectively coordinate food security interventions, and adequate financial resources.*

Accountability*: This dimension of food security governance examines the presence of mechanisms to hold decision-makers working on food security policies and development programs accountable for their actions.*

Participation: *This dimension focuses on the mechanisms put in place to ensure effective participation of stakeholders appropriate in food security policy design and implementation as well as in the design and implementation of food security programs. It also focuses on the mechanisms to ensure participation of key stakeholders in the decision-making process. Availability of transparent and participatory processes and mechanisms that promote citizen engagement and feedback are also areas of focus.*

Coordination: *This dimension of food security governance focuses on the coordination mechanism put in place to bring synergetic coordination of different actors and sectors mandated in the implementation of food security programs.*

Information and knowledge*: This dimension focus on the availability and accessibility of information and knowledge related to food security. Key elements include the availability of reliable information and data about food security issues, effective communication channels, and mechanisms to promote knowledge sharing and learning.*

Resource*: This dimension focuses on the availability of financial and non-financial resources that facilitates successful implementation of food security initiatives and programs. Key elements include the availability of public and private financing mechanisms, and the mobilization of resources from both domestic and international sources.*

5.3 Data sources and methods of analysis

This study generated primary and secondary data collected from key informants (see Annex 5.1) and various food and nutrition security policy and strategy documents of the country (see Annex 5.2), respectively. The key informant interviewees constitute individuals from various organizations including the government, civil society organizations, research institutions, the United Nations, and individual consulting firms who have experience in design of food security related policies, strategies, programs as well as in the implementation of thereof. To ensure the effectiveness of the interviews, interview guide was developed based on the sub-themes of the dimensions food security governance presented in Box 5.1.

Data were analyzed following two methods. Data obtained through document reviews was thematically analyzed following the food security governance dimensions. The data collected through key informant interviews was carefully recorded and transcribed to ensure that the views of the informants are properly captured. Besides, the supervisors checked the recording and interpretations of the responses. The findings from the interviews were similarly organized and presented under the sub- themes of food security governance. As needed, emerging themes were presented in the relevant dimensions of the governance framework. Results from key informant interviews were presented concurrently with the content analysis of the document reviews. By comparing and contrasting the findings from primary and secondary data sources, the article sheds light on a more comprehensive and nuanced evaluation of the food security governance mechanisms of the nation.

5.4 Results and Discussion

This section presents the results and discussion of the analysis done based on the dimensions of food security governance. The dimensions of food security governance served to present results thematically. Sub-themes are developed based on the responses from key informants and document review. Under each major theme and sub-themes, results are presented in narrative statements, and direct quotations are also included to substantiate results from content analysis.

5.4.1 Policy and legal frameworks

Findings from key informant interviews provide inconclusive results. While half of the key informants showed a positive sentiment implying that the existing policies, laws, and regulations practically support Ethiopia's food security strategies/policies, the remaining half disfavoured this claim. The former is of the opinion that there is effort from the government in putting in place food security policies and legal frameworks in Ethiopia. Contrarily, the latter contend that the implementation of these policies and strategies is a practical challenge.

Substantiating the pitfalls, KII 2 argued that Ethiopia failed to acknowledge past experiences and lessons while designing new ones which contributed to the failure of new policy initiatives from being effectively implemented as they are less informed. Compounding with this is the fact that there is a problem of stability of hosting organizations. As KII 2 noted, the Ethiopian experience demonstrates frequent change of organizational set up entrusted to lead and implement designed policies and strategies which brought difficulty in realizing policy objectives. Comparison of Latin American and African countries experiences in show that countries in Latin America have relatively stronger and more stable institutions compared to the African context (Pérez-Escamilla et al., 2017). Similarly, Boratyńska and Huseynov (2017) argued that institutions are relatively stable in developed countries compared to developing countries contributing to better food security outcomes.

Similarly, as KII 4 argued, not only are hosting organizations unstable, but also there is no clarity of mandates**.** The key informant underscored that policies and legal frameworks that form the basis for the implementation of key food security programs fail to clearly provide clear mandates to different implementing organizations. There are also cases of overlapping mandates among implementing partners. For example, the Food and Nutrition Policy give the mandates to the Ministry of Health and Ministry of Agriculture; and Climate change, Disaster Risk Management and food security issues were within the mandates of several ministries including the then Ministry of Agriculture and Rural Development, Environmental Protection Agency, Ministry of Water Resources, Ministry of Health; Ministry of Mine and Energy and Ministry of Trade and Industry (Ethiopia CAADP, 2010). With weak coordination mechanisms (discussed in section 4.5), overlapping mandates waste meagre available resources and complicates accountability.

Furthermore, the key informant argued that there is lack of having comprehensive food security policy and legal framework at the national level that can strengthen and support the whole effort of reducing food insecurity at national level.

According to KII 5, there is limited institutional flexibility. The key informant argued that food security policies and strategies are weak in terms of putting in place provisions that can accommodate unforeseen challenges that directly compromise efforts addressing food security challenges in the country. Balancing and reconciling institutional stability and flexibility are important to make governance effective (Perrie, 2012; North, 1990). Institutional stability allows to learn from experiences, helps to assess risks and enables to have institutional memories, while flexibility allows to respond to changing food security situations in a particular setting (Young et al., 2018).

KII 3 indicated that there is problem of adopting innovative alternative solutions to food security challenges. Globally, different countries moved in adopting innovative policy directions to address multi-faceted nature of food security. In this regard, Boratyńska and Huseynov (2017) suggested the need to adopt innovative food security policies including interventions that bring structural changes in relative prices and targeted food subsidies, as well as measures that improve agricultural infrastructure (e.g irrigation), and provision of farm technologies that boost food production. Abdulai (2000) also argued the need to consider policies that improve market integration, policies that promote trading by state and private agents, in addition to ensuring higher productivity and output levels. Ethiopia, however, adopted a business-as-usual approach to address food security challenges giving little emphasis to market orientation, openness to private sector and adoption of technologies that address production and productivity challenges.

Results of the document review highlighted the fact that Ethiopia has been keen to set up policies and strategies supporting food security programs in the country. Nevertheless, the key challenge identified is manly related to effective implementation of the policies, strategies and programmes owing to absence of good governance. According to Peter (2022), presence of legal framework minimizes corruption, promotes transparency, accountability and the rule of law. The practice of good governance manifested through appropriate policies and legal framework boosts the implementation of food security programs and it is capable of promoting sustainable development. Ajulor (2018) also argued that the design of food security policies needs to be

realistic in terms of recognizing the implementation capacity of stakeholders to achieve set policy goals. Besides, putting in place sustainable organization structure with clear mandates is of paramount importance for successful implementation of the existing food security policies and programmes. In the case of Ethiopia, document reviews and key informant interviews showed that there is absence of clear mandates compounded with frequent changes in the structure and accountability of organizations, consequently leading to limited implementation of food security programmes. Given that food security is complex and dynamic, flexible mechanisms are needed to respond to complexities and changes. The document review revealed that there is problem of policy coherence in Ethiopia. For example, while Article 90 of the Ethiopian constitution (FDRE, 1995) recognized the right of its citizen's access to food, the agricultural investment directive no. 10 issued by the Ministry of Agriculture and Rural Development (MoARD) gives priority to allocate investment lands to the cultivation of non-food crops such as palm oil, date and rubber trees, cotton, etc than to the cultivation of food crops (MoARDa, 2010).

5.4.2 Institutional capacity

Evaluation on the capacity of institutions in Ethiopia was carried out as one important dimensions of food security governance in Ethiopia. Institutional capacity plays a pivotal role in formulating, executing, and monitoring food security policies and program initiatives.

The overall finding revealed that the majority (62.5 %) of the key informants believed that the Ethiopian government lacks the necessary institutional capacity for the implementation and monitoring of food security policies and programs. On the contrary, 12.5% of them aired positive perception about the available capacity of the government with the rest of them (25%) maintaining a neutral position. The results of the document review supported the views of the majority. For example, the food and nutrition security policy of the government highlighted institutional capacity limitation among key challenges and presented provisions for human resource development in the area of implementation, monitoring and evaluation (MoH, 2019 page 24). Similarly, the food security strategy of Ethiopia appreciated the need for building institutional capacity of the nation for effective implementation of food security programs (FDRE, 2002 page 28). Emphasizing the importance of institutional capacity in food security governance, Asare-Nuamah et al. (2021) argued that achieving food security goals in Ghana is affected by weak institutional capacity prevalent in the country. Babu et al. (2020) also

recognized institutional capacity problems in Africa to design and implement successful food security policies and programs.

A detailed analysis of key informant interviews further highlighted areas for institutional capacity constraints. In this regard, KII 2 argued that the Ethiopian government has failed to consider local realities in terms of financial capacity, availability of non-financial resources, and organizational arrangement when designing policies, legal frameworks, and strategies, which are meant to address food security challenges of the country. In the same vein, KII6 said the issues of capacity as follows:

> In relation to the issue of limited capacity for the implementation, my feeling is different. I feel that the design phase of the policy and programme in most cases does not took seriously the capacity to deliver. In Ethiopia, we refer the capacity limitation in the implementation of policies and programs as key factor for failure to implement commitments. Why not we considered the capacity gap during the design phase? Why do we design a policy and programme which we do not have capacity to implement? I think limited capacity is becoming an excuse for our fulgurites. I think this is a key factor for the lack of the proper implementation of food security policies and programmes and need to be taken in to account.

KII 6 questioned the competence of the existing food security leadership in managing and coordinating the food security efforts in the country arguing that food security is complex and multi-dimensional phenomenon that requires engagement of various stakeholders through strong coordination and collaboration among them. Corroborating evidence is obtained from KII 3 who pinpointed that weak leadership capacity is prevalent at lower level compounded with frequent staff turnover with the resultant effect of loss of institutional memory. This means that implementation capacity gets thinner as one moves to the lower level of the federal state arrangement. In fact, KII 3 noted that there are improvements in setting up the needed organizational structure with adequate quantity and quality of human power, which calls for intervention through training.

Contrary to the aforementioned assertions, KII 2 argued that there is a capacity at the government level, but the problem has to do with the utilization of the existing capacity**.** The key informant went to argue that despite availability of ample human capital resources who can effectively implement designed policies and strategies, those who have the needful capacity are side-lined from contributing to successful implementation of food security policies. Therefore,

the challenge is a problem of nurturing available capacity and capability, which could result in effective outcomes. Capitalizing on the pitfalls, key informant KII 4 argued that there is lack of system-based capacity for effective M&E. The experience in Ethiopia showed that monitoring and evaluation of food security interventions hinges on individual program/projects rather than adopting a robust system of M&E that can provide a holistic picture of the status of food security program/project implementations.

Overall, the findings from both document reviews and key informant interviews paint an interesting picture highlighting that there is capacity limitation in food security governance in Ethiopia, which is manifested not only through limited technical and financial capacity, but also through effective utilization of existing capacity and lack of systematic capacity building mechanisms. These findings are in line with the claims made by Goshme (2019) and Kassahun & Bezabih (2020).

5.4.3 Accountability

The content analysis of program documents and perceptions of key informants were invariably in parallel. While program documents claim that there will be mechanisms to strengthen emphasis on government accountability, with clear roles and responsibilities defined for all agencies and staff involved in the program (e.g PSNP 5), the findings from key informants showed that 67% of respondents showed negative sentiment with the rest being neutral pertinent to the existence of mechanisms to hold decision-makers accountable for their actions. More specifically, they are of the opinion that there are no clear roles, responsibilities and accountability and enforcement mechanisms for the implementation of food security programs in Ethiopia which is among the critical challenges in the governance of food security in the country.

Findings from key informant interviews further highlighted a number of challenges in relation to accountability for food security governance. According to KII 6, there has been frequent changes in government structure and staffing, which is among the challenges in the operationalization of accountability mechanisms in project-based food security interventions. On the other hand, KII 4 emphasized on the lack of enforcement mechanisms with the sole responsibility hinges on the Ministry of Agriculture even though food security is a multi-faceted phenomena that requires roles and responsibilities of several other stakeholders. Similarly, KII 3 argued that there are

limited efforts to make responsible actors accountable beyond simple naming and blaming s during times when the country face severe food security crisis. For example, the food crisis that happened in Borena due to prolonged drought didn't bring accountable actors accountable. Describing the situation, KII 3 states as:

> The issue is visible. There is no accountability. For instance, the food security crisis in Borena following consecutive drought episode should have been manged. The issue is what lessons we learned; what remedial actions we took to address the challenge and who is accountable. Mechanisms to address these issues are not in place. You see, the number of food insecure people are increasing year after year in this country. We accepted it as a norm. We shamefully accepted such crisis as a norm. I can tell you that no one is accountable for not addressing food security crisis of the country.

KII 1 also provided similar argument in that though accountability mechanism is instituted for some programs (e.g PSNP 5), its functionality and enforcement are very limited due to poor follow up mechanisms. The findings further highlighted that there is limited transparency. KII 3 revealed that due to transparency problem, enforcing accountability is a challenge in the country. The general public may have limited access to information as to what has happened in relation to (un)successful implementation of programs designed to address food security in the country. Among the key challenges in materializing the promises indicated in the program documents is limited transparency. Findings from Nigeria (Ufua et al., 2020) and Ghana (Asare-Nuamah et al., 2021) revealed that due to poor accountability mechanism, food insecurity has increased in the countries significantly.

5.4.4 Participation of stakeholders

Review of program documents indicated that the design process of PSNP 5 was participatory involving stakeholders from both government and civil society organizations. Findings from the document review further revealed that regional governments were deeply involved at every stage of the design by contributing ideas and reviewing proposals through multiple rounds of consultations. The document further indicated that a multi-stakeholder Executive Committee and technical working groups led the technical discussions underlying the design of the program. During the preparation of the PSNP 5 program, relevant GoE policies and strategies were reviewed to ensure program alignment with GoE's priorities and proper assignment of institutional roles and responsibilities making the design process inclusive of the various stakeholders (MOA, 2020).

Nevertheless, findings from key informant interviews are mixed with different perspectives. For instance, according to KII 4, the current arrangement is largely state dominated with very limited engagement of relevant partners in addressing food security challenges. Notably, the involvement of the private sector is negligible, which has created significant gaps in addressing problems of food security in the country. Similarly, KII 5 argued that stakeholders passively participate in various platforms of policy formulation and program design without playing active roles and being accountable for failure or success. Therefore, accountability relies on the moral rather than legal accountability mechanisms whenever food security crisis mounts. Contrarily, KII 2 argued that due to limited resource availability to manage such participatory forums, only some stakeholders are usually invited to participate during the last phase of program design. The informant further argued that the state intentionally limits the participation of some stakeholders to reduce 'unwanted interferences' by some stakeholders. Further substantiating this argument, KII 1 highlighted that limited allocation of resources curtailed active participation of stakeholders. The key informant further noted that the amount of resource allocated to partnering institution intensifies for active participation - Those who receive a good amount of resource are encouraged for active participation. In this respect, the informant highlighted that much resource in addressing food security is allocated to the Ministry of Agriculture, discouraging other partners to have active participation.

The promotion of active participation of relevant stakeholders in the food security related engagements have large impact on the effectiveness, relevance and legitimacy of the programmers, strategies and policies (Kepple & Segall-Corrêa, 2017) including the realization of results and their sustainability (Muhafidin, 2022). Towards this end, the participation of the end users for the food security governance particularly in policy development is very essential to bring about meaningful and sustainable solutions (Kanayo et al., 2012; Ajulor, 2018). However, the findings from Ethiopia emerged to be on the contrary suggesting to the government to exert concerted efforts in ameliorating the challenges. Shisia (2016) noted similar problems of limited participation of stakeholders in Kenya which has negatively affected successful implementations of food security programs.

5.4.5 Coordination

To achieve effective food security governance, it is essential to have an efficient coordination mechanism. Coordination plays a crucial role in ensuring that food security policies and programs are effectively implemented and that key stakeholders are actively engaged in decision-making processes.

The excerpt from document reviews outlines a hierarchical structure of accountability and coordination mechanisms for the implementation of the Food Security Program (FSP) in Ethiopia. The document clarifies that the Ministry of Agriculture and Rural Development (now Ministry of Agriculture), as well as its regional and woreda counterparts, are responsible for managing the program and its components, while the Food Security Coordination Directorate plays a critical role in facilitating coordination at all levels. The Ministry of Finance and Economic Development (now Ministry of Finance) manages the program's finances.

Findings from key informant interviews also seem to suggest this to be the case with half of the respondents having a negative sentiment while the remaining half being neutral with respect to the effectiveness of the food security coordination mechanisms in Ethiopia. Key informants highlighted weak coordination at lower levels of the government structure, suggesting that coordination efforts are not effectively reaching the local level. This weak coordination can hinder the implementation of food security interventions and prevent them from effectively addressing the needs of local communities.

Weak coordination mechanism brought limited participation of actors. In this regard, KII 2 and KII 4 highlighted that the private sector and civil society organizations were identified as passive actors in the decision-making processes due to weak coordination mechanism. Their limited involvement can lead to a lack of diverse perspectives and innovative solutions in addressing food security challenges. CAADP Ethiopia (2010) also acknowledged that while there is well-developed coordination mechanism within the Ministry of Agriculture at different levels such as federal, regional and woreda, weaknesses mount in putting in place instruments to coordinate ministries and partners outside the Ministry of Agriculture. With overlapping mandates, poor coordination among ministries will bring loss of synergy and resource wastages.

The complexity of the issue of food security further intensifies the need for a well-coordinated approach. Local conditions are characterized by a multitude of stakeholder interests, including farmers, traders, consumers, and local authorities. In order to address these diverse interests and effectively tackle food security challenges, a multidimensional approach is necessary, as highlighted by Jiren et al.. (2019). This implies that coordination efforts should not only focus on government-led interventions, but also actively involve other actors, such as non-governmental organizations and community-based organizations (Jiren et al., 2019).

As indicated in the foregoing discussions, while coordination mechanisms are stipulated in some of the documents (e.g PSNP 5), the document review revealed existing gaps that need to be addressed. These gaps include ambiguities in roles and responsibilities, inadequate communication channels, or a lack of clarity on decision-making processes implying that it is crucial to address these gaps to ensure effective coordination thereby the successful implementation of food security policies and programs.

Overall, the findings highlighted that the coordination mechanism for food security governance in Ethiopia requires improvement to enhance its effectiveness. This can be achieved by addressing weak coordination at lower levels, encouraging active participation of stakeholders, and adopting a multidimensional approach. Moreover, addressing the identified gaps in coordination mechanisms outlined in the documents is essential. As argued by Muhafidin (2022), coordination is very important to realize and ensure food security outcomes, and further improve the quality of life of the people. In the meantime, the coordination mechanism will serve as guiding framework for maximizing synergy between government bodies and civil society (Nkwana, 2015). By doing so, Ethiopia can enhance its food security governance and work towards improving the quality of life for its population.

5.4.6 Information and knowledge sharing

The mandates to generate data and information rests with the Ministry of Agriculture and Central Statistical Agency (now Ethiopian Statistical Services). This section analyzes the communication and knowledge management mechanisms related to Ethiopia’s food security governance. Specifically, it investigates whether mechanisms are put in place to promote knowledge sharing and learning that facilitates effective implementations, and M&E of food security programs. We

explored documents and interviewed key informants to assess if the food security governance system has put in place a system of knowledge sharing and learning. In this respect, 67% of the key informants have indicated that effective mechanisms for information and knowledge sharing is missing with the remaining respondents maintaining a neutral position on the issue.

The key informants argued that although Ethiopia has developed and implemented different food security-related policies, strategies and programs, there are significant shortcomings in the areas of knowledge generation and utilization of lessons learned from past implementation endeavors. The informants, however, didn't go without acknowledging efforts to put in place system of information-sharing in the recently designed and implemented programs, such as the Productive Safety Net Program (PSNP) (KII 6). However, this informant emphasized that there is still a significant gap in implementing systematic mechanisms that facilitate learning for improvement. Furthermore, KII 2 highlighted that there is poor documentation of past knowledge, which hampered use past lessons in policy and program designs. KII 4 also raised concerns on the reliability of data and information. This key informant argued that there is limited availability of recent and reliable food security-related data, which hinders the design of interventions to address the country's food security challenges. Additionally, due to the sensitive nature of food security, data and information are either withheld raising concerns on the accessibility of reliable information that will pose significant challenges to address the country's food security problems.

In general, the results revealed that Ethiopia's food security governance faces obstacles in terms of information and knowledge management where most of the key informants expressing their dissatisfaction with the existing mechanisms for sharing information and knowledge. The findings highlighted that the food security governance of the country is being challenged by lack of availability of reliable information and lack of proper information sharing mechanisms and knowledge generation to use it for future design of policies and programs. Therefore, it is evident that there is a need to improve the availability of reliable information, establish effective information-sharing mechanisms, and enhance knowledge generation processes for use in the design of policies and programs aimed at addressing food security challenges in the country.

5.4.7 Resource Allocation

This section delves into the dedication of the Ethiopian government in terms of allocating essential resources to address food security of the country. The allocation of necessary resources by the government to the food security sub-sector is pivotal for the successful execution of food security initiatives. The Comprehensive Africa Agriculture Development Program (CAADP) and the New Partnership for Africa's Development (NEPAD) have strategic directions that aim at addressing food security challenges of the African continent. More specifically, CAADP is an Agenda 2063 continent wide initiative that aim to help African states eradicate hunger and reduce poverty. It targeted to allocate 10% national budget to agriculture and achieve 6% of growth in agricultural GDP (African Union, 2021). In this respect, Ethiopia is vowed to achieve CAADP targets which may be considered as a stride in the right direction. Nevertheless, as presented by African Union Development Agency (2022), 32% of the population are undernourished and prevalence of underweight among children under 5 years amounts 32% revealing the need for more resource allocation in nutrition interventions and to take measures that allow to meet target of the Malabo declaration in boosting agricultural productivity.

KII 2 appreciated the presence of a robust mobilization of financial resources to underpin the realization of food security projects and programs in Ethiopia. Echoing this perspective, KII 6 argued that the Ethiopian government is committed to earmark its share of resources for financing food security projects and programs. An illustrative example is the government's contribution to the PSNP, which has increased from 14% to 25% in recent years. Additionally, KII 4 accentuates the potential to harnessing resources from diverse stakeholders through heightened awareness campaigns and sensitization efforts. However, the informant astutely notes to address the country's food security challenges in a sustainable manner through alternative financing mechanisms by encouraging private sector engagement in the agriculture sector.

With respect to non-financial resources, human capital is a critical resource, which KII 4 contends that a discernible proficiency gap exists among personnel responsible for executing food security programs across the country. This deficiency is further exacerbated by the relatively low salaries and compensation provided to civil servants engaged in the implementation of food security programs. It is evident that such inadequate remuneration poses a substantial impediment to the effective execution of these interventions. Further buttressing

this narrative, KII 5 articulates similar sentiments by highlighting that the technical limitations of personnel, particularly in monitoring and implementation capacities.

In general, findings underscore the Ethiopian government's demonstrated commitment in terms of financial and technical resource allocation for the advancement of food security objectives. Notwithstanding this commitment, there is notable deficiency in technical capacity for leadership and coordination within the sector is evident. Addressing this dearth of expertise is, therefore, essential to fortify the trajectory toward achieving sustainable food security for the country.

5.5 Conclusion and Recommendations

The government of Ethiopia has put efforts to address the problem of food security. But the findings of this analysis highlighted that food security governance is generally weak which is manifested in the limitations observed in the seven dimensions of food security governance. Although, the government of Ethiopia have policies and legal frameworks to guide the governance of the country's food security, , their operationalization was found to be difficult and witnessing problems of coherence. In the same manner, the government capacity to lead the food security interventions is weak and with absence of putting in place clear accountability system and enforcement mechanisms. The level of participation in the design and implementation of food security policies, strategies and programs is minimum in which participation of different stakeholders responsible to address food security is nominal without playing active roles. Weak coordination among actors responsible to address food security is a norm than order.

The analytical framework adapted to evaluate food security governance of the nation allowed to clearly observe areas of weakness and strengths of the country's food security governance. Based on the findings the following recommendation is suggested to Ethiopian policymakers.

Given the fact that food security is a critical problem affecting multi-millions of the population of the nation, an independent organization with clear mandates and responsibilities, with the power and authorities to make decisions along with the needed resources and with clear accountability mechanisms should be instituted in the country. Experiences so far in Ethiopia show that food security is organized under the Ministry of Agriculture and/or under the Ministry of Health. Food security is a multi-dimensional phenomenon that requires coordination of

several actors, which transcends beyond food production issue (as in the case of Ministry of Agriculture) or nutrition and health issue (as in the case of Ministry of Health). Therefore, an independent organization mandated to address all cross-cutting and multi-dimensional facets of food security shall be instituted by the Ethiopian government.

Chapter Six: Synthesis and Policy Implications

6.1 Introduction

This chapter provides overview of the study context, key research questions, methodological approach, major findings and recommendations. In the first section, the chapter provides summary of major findings answering key research questions of the study followed by a section that attempts to link findings with major theoretical presentations and paradigms and with a final section that elucidate practical and policy implications forwarded to different actors.

6.2 Overall summary of the study

Food security has been a development challenge for decades notwithstanding the attempts to address it through the development of international declarations, models and frameworks and implementation of various interventions. In Ethiopia, addressing food insecurity is an important development agenda since the country has been experiencing a multitude of challenges including drought, conflict, and displacement, which exacerbate transitory and chronic food insecurity and malnutrition. Though concerted efforts were undertaken by the government in collaboration with development partners, the challenges of food insecurity have been lingering.

This study (1) measured the status of household's food security using multi- dimensional food security indicator and assessed diet diversity situation of households across regions in Ethiopia; (2) identified the key drivers of household's food security in the country; (3) evaluated food security policies, and strategies in designing programs that target to address the different dimensions of food security; and (4) investigated the food security governance mechanisms in Ethiopia. This study focused on analyzing food security by taking into account the multidimensional nature of the concept and attempted to reveal the situation across different administrative regions of the country. In Ethiopia, studies on household food security were conducted in limited geographical areas using uni- dimensional methods of measuring the magnitude of food insecurity. This study is used survey data at household level covering all administrative regions of the country that provided geographically disaggregated evidence compared to earlier studies. Furthermore, the study added to the existing knowledge base using a food security indicator constructed based on the four dimensions of food security in all the

administrative geographic regions in the country that provided the chance to have clearer picture about the status of household's food security across regions in the country. Therefore, the study shed light on the food security status and diet diversity situation of households and provided a comprehensive insight across regions in Ethiopia. By evaluating policies, strategies and programs as to whether they have considered the four dimensions of food security, this study w sheds light on what shall be done in designing policies and interventions in the future. Beyond analyzing policies from a multi-dimensional perspective, this study has also evaluated the food security governance system of the nation with a policy contribution of what should be addressed in the future to address food security in a comprehensive manner. This study, however, did not looked into the causal relationship between enabling environments such as policies, strategies and programs as well as food security governance system and household's food security status in the country.

The results of this study highlighted that household's food security status based on an indicator of multi-dimensional food security indicator and using an indicator measuring the diet diversity of households across administrative regions in Ethiopia are alarmingly high and the magnitude varies across administrative regions. Dietary diversity is very low where consumption of essential nutritional diets is missing the food table of households. Often, the food table is dominated by consumption of starchy staples and locally grown few fruits and vegetables with limited consumption of protein sources from animal products. The finding further revealed different food security drives that fall under demographic and socio-economic characteristics of households which significantly affected both household's food security status from a multi-dimensional point of view and household's dietary diversity in the country.

The evaluation of policies, strategies and program designed and put into effect so far in the country revealed that policy and intervention design so far in Ethiopia mainly considered the availability and access dimensions of food security, with little focus on the utilization and stability dimensions of food security. Furthermore, the food security governance in Ethiopia is not effectively functioning due to capacity limitation, failure to institute effective coordination and accountability mechanisms, and passive participation of food security actors.

6.3 Overall Conclusions

Food security is a complex concept that requires to have an in depth understanding of the subject. The conceptualization of food security has evolved over the past few decades in terms of properly measuring the multi-dimensional feature of the concept, identifying the key drivers of the problem, and putting in place policy options, governance mechanisms as well as interventions that will address food security problem.

Literature indicates that the concept of food security evolved from a mere consideration of food availability as a key indicator to the inclusion of other dimensions, namely, access, utilization and stability. In the same manner, the measurement mechanism of food security has evolved from mere use of unidimensional indicator to the application of comprehensive indicator that capture all the dimensions of food security. Furthermore, the literature recognized that the issue of food security and addressing it transcends beyond a mere technical approach, but rather political, socio-economic and environmental aspect too. More specifically, addressing food security is recognized to consider enabling environments such as policy environment and governance mechanisms which were often sidelined in previous food security discourses. That said, this study attempted to study the concept based on the latest understanding of the issue where it has considered the broader conceptual aspect of food security making it comprehensive in investigating the status and household level divers, as well as policy and governance aspects of food security which are broadly understood as drivers at national level. The findings of this study, therefore, challenged previous estimates of the magnitude of food security that used uni-dimensional measurement indicators on top of painting an interesting picture regarding variations in household's food security status from a multi-dimensional perspective and dietary diversity status of households across regions in Ethiopia. Furthermore, the analysis of enabling environments highlighted the focus being to address the availability and access dimensions of food security highlighting the need to re-consider utilization and stability dimensions of food security in future design of food security policies, strategies, and interventions. The regional variation of household's food security brought interesting picture by challenging the commonly held belief that what were commonly recognized as 'major' regions such as Amhara, Oromia, and Tigray in terms of level of development are those that have very despairing performance with respect to status of food security compared to what were largely classified as emerging' regions such as Benshanguel Gumuz and Gambella regional states. This calls for a shift in

rhetoric in the design of interventions in the future. Evaluation of food security governance highlighted important gaps in some dimensions of governance. It signaled there are a multitude of challenges which need to be addressed.

6.4 Recommendations to practices and policy

6.4.1 Recommendations to improve development practice.

The regional variation in dietary diversity and food security from multi-dimensional perspective imply the need to consider geographical differences while implementing interventions addressing specific food security and diet diversity challenges. Given the variability in context and specific needs across regions in Ethiopia, interventions that are implemented to address the food security and diet diversity challenges should be tailored to meet the specific needs and unique circumstances and challenges faced by rural households across administrative regions in the country. Accordingly, it is recommended that proper geographic targeting and considerations of context-specific interventions should be implemented by those concerned during design and implementation of interventions related to food security and dietary diversity.

Wealth status of households is a significant determinant of food security analyzed using multi-dimensional indicator and diet diversity in Ethiopia. This suggests the necessity to support rural households to increase and diversify income through creating different income generating activities. Hence, it is recommended that government and development partners to work hand in hand for the implementation of wide range of income-generating activities which improve the wealth status of rural households.

Dietary situation in Ethiopia is alarming owing to not just limited access to resources but also due to limited awareness on the benefits of consumption of diverse food stuff. In order to ameliorate this challenge, it is recommended that government and development partners design and implement nutrition education emphasizing on the benefits of consuming diverse food stuff. Furthermore, development practitioners should focus on the correlates of food security found as significant determinants in this study in their efforts to address food security from a multi-dimensional perspective.

6.4.2 Recommendations to improve policy

Food security related policies and the governance of food security, which are largely known as enabling environments, are essential to guide design and successful implementation of food security programs. The design of food security related polices, strategies and programs gave much emphasis to boost food availability and creating better access to foods with limited focus on utilization and stability dimensions of food security. This calls for the need to shift development thinking from boosting mere production and creating food access to addressing utilization and stability dimensions too. It is thus recommended that future efforts for policy document revision or development of new ones consider the multi-dimensional feature of food security to design a comprehensive document incorporating interventions that addresses all the four dimensions of food security. Food security governance is among the drivers of food security. As evident in the findings, there is capacity limitation at lower levels of the governance tier in the implementation of food security policies and programs, and weaknesses in putting in place effective coordination, accountability mechanisms. Information sharing and knowable management was also among the gaps identified in the food security governance in the country. It is, therefore, recommend that policymakers should pay attention on building the capacity of human power at lower level (i.e woreda level) and instituting a system of coordination and accountability aspect of food security governance. More importantly, it is imperative to have an independent authorized and accountable entity granted with the needed resources entrusted with the responsibilities of designing and implementing food security policies, strategies, and programs as well as coordinating diverse food security actors working on the achievement of food security in the country.

6.5 Suggestion for future research

6.5.1 Contextualizing the determinants of household food security

The current study investigated the determinants of multidimensional food security at national level. It did not identify the determinants of multidimensional food security at regional level. Since spatial variation is a significant determinant of multidimensional food security, future research should unpack the determinants of multidimensional food security at regional level**.**

6.5.2 Intra-household level analysis

The unit of analysis of this study is household. Given the household is composed of family members, it is suggested that intra-household analysis of status and determinants of food security using multi-dimensional food security indicators should be undertaken for better understanding gender disparities within the household.

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Annex 5.1 Profile of key informants

SN	Interview code	Profile of key informant
1	KII 01	KII 01has served as the Director of PSNP 1- 4. Currently, He is Senior Adviser to the Ministry of Agriculture in the area of implementation of food security programs by the Ministry. The informant has extensive experience and is familiar with the food security related issues and challenges in Ethiopia.
2	KII 02	KII 02 is a senior expert in the agriculture sector in Ethiopia and he has been member of the key technical working groups involved in the development of key policy, strategic agriculture and food security related documents in Ethiopia. KII 02 has produced a number of documents on agriculture development in Ethiopia.
3	KII 03	KII 03 worked in the government, NGOs and UN. He has extensive experience and exposure for the agriculture sector in Ethiopia and elsewhere. The informant is familiar with the food security challenges that Ethiopia is experiencing. Working in various countries, he has experience in the food security coordination mechanism of other countries. Currently, the informant is a senior advisor in the Ministry of Agriculture supporting the Ministry in development Agriculture investment cases and development of Food system approaches for Ethiopia.
4	KII 04	KII 04 is an International Policy Officer and Team Leader in FAO Ethiopia. Maya has been actively engaged and supported in the design and implementation of food and nutrition security engagements of the by the Ministry of Agriculture and Ministry of Health. The informant has been a focal person representing FAO in the development of Food and Nutrition Security Policy and Program. KII 04 is highly experienced and familiar with food and nutrition securely challenges in Ethiopia
5	KII 05	KII 05 is a researcher in agriculture and food security. The informant is families with key challenges in the food security sector in Ethiopia
6	KII 06	KII 06 has hand on experience in the implementation of food security programs in Ethiopia. The informant worked as senior office technically supporting the implementation of PSNPs. He is currently FAO livelihood officer supporting the implementation of livelihood component of PSNP 5.

Annex 5.2 Summary documents reviewed for the study

SN	Document	Source
1	The Constitution of FDRE	FDRE (1995)
2	Food Security Strategy/Program	MoARD (2002)
3	Productive Safety Net Program 5	MoA (2020-2025)
4	Food and Nutrition Security Policy	FDRE (2018)
5	Agricultural Investment Directive	MoARD (2010)
6	Ethiopia's agricultural sector policy and investment framework (PIF)	Ministry of Agriculture (2010)
7	The New Partnership for Africa's Development (NEPAD)	AU (2001)
8	RED&FS Coordination Mechanism	ATA et al (2018)
8	CAADP	African Union Development Agency (2022)

Annex 5.3: Summary key finding from document review

Key Pillars of Food Security Governance	Food Security Program (FSP)	Food and Nutrition Security Policy (FNSP)	PSNP (2020-2025)	PIF/RED&FS
Policy and legal frameworks	The FSP (2010-2014) highlighted key policies and frameworks that support food security strategies and policies in Ethiopia. The document acknowledged the importance of policies and frameworks to ensure successful implementation of food security programs. The FSP further emphasized promoting sustainable agricultural practices, improving market access for smallholder farmers, and expanding social safety nets.	The FNSP highlighted the need to have legal framework and serve as an organizing schema to provide the necessary legal and institutional framework for national nutrition planning, implementation, monitoring and evaluation, and coordination in the country.	The PSNP document appreciated the existence of policies, laws, and regulations that support food security strategies and policies. PSNP5 is mentioned as a document designed in alignment with these policies and frameworks to ensure effective implementation and achievement of program objectives.	The PIF is meant to streamline the government priority areas for the government investment areas (2010-2022)
Institutional capacity	The FSP highlighted the importance of institutional capacity for successful implementation of food security programs. It mentioned that institutional capacity plays critical roles in designing, implementing, and monitoring food security policies and programs.	The FNSP gave due attention to capacity building efforts of institutions, human resources, individuals, and communities in order to effectively implement the Food and Nutrition Policy at all levels and transform the system to the next higher level.	The document didn't mention anything about institutional capacity	The document didn't mention anything about institutional capacity
	The Food Security Program (FSP) put in place some		The system emphasized the importance of government	Reviewing sector level implementation status and

Accountability	accountability mechanism. It has indicated that bottom-up accountability and program performance mechanism to be in place taking various measures including improving communication, introducing client cards to track program implementation, providing more specific guidelines for appeal committees, empowering kebele and woreda councils, and implementing performance incentives. To ensure clarity and understanding of roles and responsibilities, a comprehensive Memorandum of Understanding has been developed. This document outlines the responsibilities of each party involved in the program and sets expectations for their performance.	The document didn't mention clearly how accountability is to be ensured.	accountability with clear roles and responsibilities defined for all agencies and staff engaged in the program. This includes putting measures to ensure success for the lead agency which is accountable for monitoring program's effectiveness.	other ongoing efforts by the government and other development partners is one of key areas of the RED & FS platform
Participation	The document doesn't clearly mention how to promote participation	The document highlighted participation of non-governmental bodies and recognized the roles of private sector. The private sector engaged from farm to table along the food value chain are recognized to play roles to develop a system that prevent food losses and	The document indicated that the design process of PSNP5 was participatory and government-led, involving stakeholders from both government and civil society.	RED & FS is a platform promoting the participation of the government and development partners.

		to ensure food safety and quality. Attention is also given for the role of communities. The need to have comprehensive participation and ownership of the communities is recognized to ensure food and nutrition security		
Coordination	The document outlines a hierarchical structure as a coordination mechanism for the implementation of food security programs in Ethiopia. The Ministry of Agriculture and Rural Development, as well as its regional and woreda counterparts, are responsible for managing the program and its components. The Ministry of Finance and Economic Development manage the program finances.	The document mentions the need to establish Food and Nutrition Council at national level to facilitate and coordinate the implementation of the Food and Nutrition Policy. The document proposed the Council to have an independent institution with its own organizational structure. The government, other relevant non-governmental organizations, private sectors, and civic society organizations shall be responsible for coordinating and supporting all food and nutrition communication	The document recognized the importance of effective coordination and collaboration among various actors, including government agencies, civil society, and private sector organizations. The document encouraged the use of informal governance structures to complement the work of the formal system.	The document acknowledged to coordinate and harmonize efforts of various development partners.

		activities. The document noted the importance of strengthening capacity of the regulatory agencies at national, regional and local levels and ports.		
Information and knowledge	Not clearly indicated	The responsibility for the information sharing is indicated in the document.	The importance of monitoring, evaluation, and Learning (MEL) in the PSNP5 is emphasized. Introduction of Management Information System (MIS) to improve data accessibility, management, and transparency is also documented.	Sharing information on government policies, strategies, and programs based on national sector objectives and targets are mentioned as key issues in the document.
Resource	Not clearly indicated	The document stated the need to mobilize the general public to actively participate and make contributions to support the implementation of the Food and Nutrition Policy.	Not clearly indicated	The RED&FS platform included funding partners and created an opportunity for improved resource harmonization and mobilization