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Abridged of PhD Dissertation: Household Food Insecurity in the Sidama Zone of Southern Ethiopia: Factors, Coping and Adaptation Strategies

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Abstract The aim of this thesis is to identify the determining factors of food insecurity in two contrasting farming systems in the Sidama zone of southern Ethiopia. Using a mix-method case study research design, it is therefore filtering variables through which climate impacts affect food security. These transcend social, economic, and ecological factors. Beyond showing the degree of farmers vulnerability to climate change, the study discuses the multiple strategies used by food insecure farmers in responding the decreased access to food. However, the deployed strategies are not only differs between the study contexts and household characteristics but also they are less effective to deal with the climate change and other non-climatic factors. The thesis conclude that various forms of interventions that comprehend the local contexts and household characteristics and social protection are required to improve the farmers' adaptive capacity to deal with climate change and thus to achieve long-term food security.

Keywords: *climate change, socio-politico-economic factors, food insecurity, coping and adaptation strategies, boricha, wensho, Southern Ethiopia*

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1. Introduction

The dissertation is departing from the point that small-scale farmers in Ethiopia depend on a mixed rain-fed agriculture. The sector is highly vulnerable to the effects of climate change and climate variability and other natural and societal adversities. Although large body of studies on agriculture and food security were conducted in Ethiopia following the 1984, most of these studies give little emphasis to how what happened in a particular place can be linked to national and global climate change. Literature shows that climate change is one of many challenges that negatively affect climate-dependent livelihoods [1-6]. The effects of climate change events are multifaceted (from drought to flood) and multileveled (from local to global) and have short, medium and long-term outcomes [7]. A Reference [8] indicates that drought, desertification, flooding and environmental degradation are all influenced by the effects of climate change. The increasing frequency of environmental risks affects poor farmers and affects disproportionately women and children. Although, women in Ethiopia play a seminal role in household food security, they experience hunger more than men. The study discusses the gender dimensions of agriculture and food insecurity and women perceptions on how they adjust the risks of food shortages.

The thesis comprises introductory chapter that provides a justification for and an introduction to the research topic, the changing climate of Ethiopia and its food insecurity situation, arguing that the climate changing for the worse and poor farmers are becoming more food insecure. However, some of the farmers are facing chronic and acute food insecurity while others have shorter periods of hunger only. The introduction chapter establishes the objective of the thesis, which is, *"to explore the determining factors of food insecurity and how these factors are linked to global climate change among farmers in maize-based and in coffee-based farming systems in the Sidama administrative zone of southern Ethiopia."* Eight research questions have been identified.

A) Identify food insecure small–scale farming households in the study areas.

- What are the typical characteristics of food insecure small–scale farmers?
- What is the intensity of food insecurity among these farming households?
- Do the different intensities of food insecurity correlate with household characteristics?

B) Explain the existence of food insecurity among the studied farming households.

- What are the structural factors of household food insecurity at higher geographical levels?
- What are the local processes affecting the food security of the studied households?

- What is the studied households' perception of the more or less important causes of their food insecurity?

C) Discuss the coping strategies of the studied households regarding selected adverse events.

- What do the households do to adapt the impacts of adverse events to their food security?
- What is the perception of the studied households when it comes to improving their food security?

The chapter then elaborate the changing theories to food security from a modernist perspective which focuses on the "macro, uniform and growth-oriented" approach to the post-modernist understandings of the "complex, diverse realities and development at micro level" [9] and critics on each approaches, followed by justification for the use of the resilience theoretical framework for data organization. Regardless to the social critiques of resilience such as the omission of social, political, ecological and cultural dynamics in social sciences resilience literatures [10,11,12], the thesis argue that the framework is appropriate in order to obtain comprehensive understanding of the factors influencing vulnerability and resilience to food security at the household level. It helps for in-depth understanding of the complexity, dynamics and inter-linkages of different factors that hinders farmers' livelihood assets and strategies, and the functioning of formal and informal institutions [13]. The findings focusing on the determining factors that influence farmers' food insecurity (Table 2) and their responses to the changing contexts (Table 5), respond to these social critiques of resilience.

Research sites selection processes (Figure 1: the *Wensho* district in the coffee-based farming system and the *Boricha* district in the maize-based farming system to identify a Peasant Association (PA) in each district as the study sites) and farmers' economic activities and income sources are amply justified, followed by the research methodology which employed a mix-method case study research design.

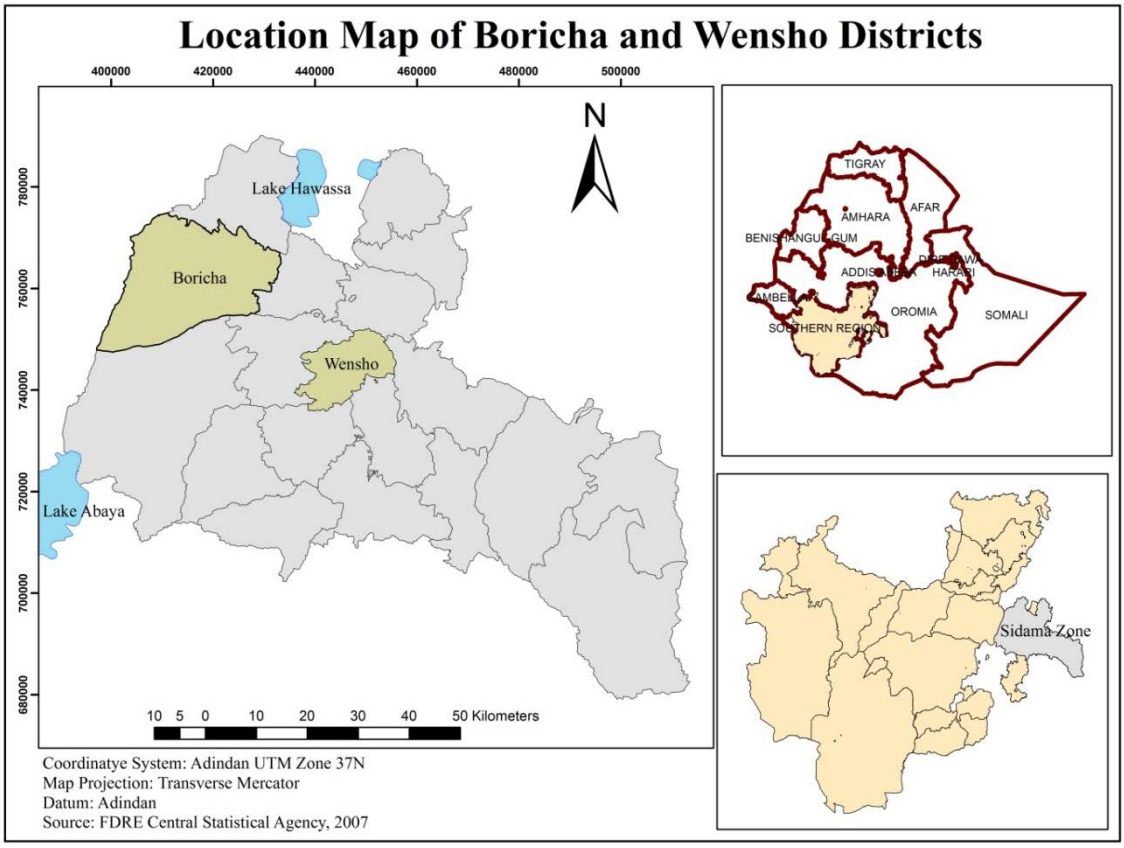

Figure 1. The administrative division of Ethiopian territory and study sites

Table 1. METHODS AND DATA OVERVIEW.

Research tools	Number of participants in two fieldworks	
	***Fero-two* PA**	***Hanja-Chafa* PA**
Questionnaires	176	200
In-depth interviews	43	37
Key informants	14	18
Group interviews with farmers	3(n=4)	5(n=5)
Discussion with officials	1(n=3)	3(n=4)
Household visits	Researcher	Researcher
Field notes	Researcher	Researcher
Photographs	Researcher	Researcher
Informal dialogue		

Note: n = refers to the total number of participants involved in the research process.

Data were collected using wide-range of methods (Table 1) in two fieldworks over a period of eight months. The author used asset-based methods coupled with location specific criteria to identify food insecure households for in-depth interviews and a random sampling method for household questionnaire interviews. The adoption of some tried and tested method for measuring the level of households' food security that includes the frequency-occurrence questions of the Household Hunger Scale (HHS) and the Coping Strategy Index (CSI) which has been used only in a few cases in Ethiopia produced valid and comparable results across settings and socio-economic groups.

The method section provides description of how the data were analysed. Qualitative data were analyzed following Reference [14] identified steps: read and annotate transcripts, identifying the common themes, data categorization, and interpreted the themes by giving explanations and bring the whole analysis together. Survey data analysis was made using SPSS software.

2. Findings

2.1. Factors of Food Insecurity

Using a blend of qualitative and quantitative methods, the findings of the thesis assess the effects of climate change in two contrasting production systems on determinants of food in/security. It is therefore about the filtering variables through the impacts of climate change affect food security. The findings show not only the complexity and inter-linkages of different factors but also the more and less important structural and local factors influencing farmers' food insecurity and their responses to these factors in two sites: the *Fero-two* Peasant Association (coffee-based farming system) in the *Wensho* district and the *Hanja-Chafa* Peasant Association (maize-based farming system) in the *Boricha* district.

Table 2. DETERMING FACTORS TO FOOD INSECURITY

Factors	Local	National	Global

Physical and environmental	• Climate change and climate variability:
	  • Unpredictable, more erratic and insufficient rainfall
	  • Drought, prolonged dry season and strong heat
	  • Unexpected heavy rainfall, floods and snow events
	• Low soil fertility partly due to limited compost
	• Natural resources degradation
	• Lack of grazing and fodder
	• Lack of irrigation: Undulating hills hinders irrigation
	• Weather-driven weeds, pests and diseases
	• Year-to-year fluctuation of coffee production
		• Climate change:
		  • Frequent droughts and high temperature
		  • More intense and erratic rainfall
		  • Successive rain-failure
		  • Frost
		  • Floods and land slides
		  • Crop pests and diseases
		  • Poor agricultural performance
			• Climate change:
			  • Global temperature rises
			  • Changes in precipitation pattern and season
			  • Changes in temperature and rainfall
			  • Increase the frequency, duration and intensity of extreme weather events

Social and institutional	• Limited education and trainings
	• Land shortage, fragmentation and degradation
	• High population pressure and chronic poverty
	• Organizational weaknesses
	• Lack of water for drinking and livestock
	• Poor social services such as health services
	• Limited use of improved sanitation
	• Gender inequality in accessing to resources
		• Poor social services
		• Population growth
		• Environmental degradation:
		  - Deforestation
		  - Soil erosion
		  - Overgrazing
		• Lower use of farm inputs
			• The growing food demand due to population growth, income increases and urbanization are driving increased foreign investors land demand to produce food crops for export over that for domestic markets. This changing food and feed demand.

Economic	• Limited assets: land, livestock and *enset* plants • Lack of saving and credits • Lack of storage facilities • Unequal collateral arrangements • Social payments • Low wage rate • Low levels of income opportunities • Costs of fertilizers and quality seeds as well as late arrivals • Seasonal staple crops price rise: diminished purchasing power • Low producer prices • Diesel prices: affect local transportation and food prices	• Reduction of coffee prices • Limited competitive market and crop insurance • Export crop price fluctuation and inflation • Food price volatility: influenced by domestic policies • Lack of well-functioning markets • Chronic poverty • Limited income-generating activities • Diesel price rise due to subsidy removal and the country's vulnerability to price change in the world market as well as large-scale investments • Limited resource available to combat poverty and the effect of climate change	• Coffee price fluctuation • Prices rise on imported food items • Sanitary requirement: hampering to access the world market for the commodities exported from developing countries such as Ethiopia. • Trade restrictions and protectionism
Political	• Lack of *active* participation in decision-making • Corruption and favoritism • Power-relation between the poor and better-off • Lack of weather and market price information • Small-scale agriculture incorporation into the world market: deteriorate farmers food and livelihood security	• Policy shift to large-scale exportable crops including food crops: creating new demand for food in the domestic market • Lack of agricultural subsidies and imported food commodities	• Global trends and food prices: "the triple F crisis – food, fuel and finance" are drivers of commercialization of small-scale agriculture

Source: Field data, [15].

Table 2 presents the factors that explain food insecurity which are definitely linked to global climate change [1]. The factors causing farmers food insecurity are economic, some are social and others are physical and political ranging from local to national and international levels. These interrelated factors weaken the farmers' adaptive capacity to deal with climate change impacts. Some of the factors that cause farmers food insecurity are similar while some differ between the study sites. The findings show that the *intensity* and *severity* of food insecurity vary between communities and socio-economic groups within a community. The increasing frequency of environmental risks affects poor farmers and affects disproportionately women and children.

2.1.1. Climate Change

The findings (Table 3) show that more prolonged droughts and successive seasonal rain failures, erratic and insufficient precipitation coupled with higher temperature have been the country's major environmental challenges for decades. These have affected several aspects of farming resulting in low food outputs or poor prices for cash crops. The result describing the experiences of people on climate change: changes in temperature, precipitation, weather variability and extreme events. Such environmental changes and other complex socio-politico-economic factors (Table 2), however, affect production pattern and yield, timing of land preparation and planting, plants' growth and the length of maturating periods and traditional work arrangements and farm inputs application (Table 4).

2.2. Climate Change Impacts on Food Security

The findings in Table 3 show that drought, unpredictable and more erratic and insufficient rainfall and flooding negatively affect production. Weather-related changes affect not only the quantity but also the quality of production through increasing pests and other diseases (Table 4). The effect of climate change risks on production has adverse implications for producer prices through its effect on production quantity and quality. Therefore, the climate change impact affects not only the farmers' ability to buy farm inputs to improve productivity but also their demand for fertilizers. The impact of climate change, such as food price spikes is a challenge to the farmers. Droughts affect food prices by reducing the yield and thus the food availability at the household level and at the local markets. Data indicate that the rate of food price inflation in Ethiopia is often higher than the general consumer price inflation [15]. The findings further indicate that the seasonal food supply variation in the local markets has an implication for price changes. Moreover, food prices in the local markets are instable because of the production instability. The result shows that the food price shows significant variation between the time of harvesting and lean season.

Table 3. CHANGES IN CLIMATE EXPIRENCED BY FARMERS IN THE STUDY SITES

Climate change	Experienced changes
Changes in temperature	• Local temperature rise • Deplete soil moisture • Reduce water availability for drinking and livestock
Changes in precipitation	• Changes in seasonality: timing, intensity and duration of rainfall • Increase the risks of flooding: damaged cropland • Reduce forages: the leaf of the *enset* plant • Reduced the growing of food eaten during annual food shortages
Extreme events	• Droughts and rainfailure • Occurrence of heavy rains and winds, floods, and snow events

Weather variability	• Changes in seasonal precipitation pattern:
	  • Prolonged dry periods
	  • Erratic and insufficient rainfall
	  • Too early and too late rains
	  • Rainfall duration extended beyond the normal season

Source: Field data, [15].

Table 4. CLIMATE CHANGE AND FOOD SECURITY

Food security dimensions	Outcomes of climate change
Availability: (production, distribution, storage and exchange/trade)	• Agricultural production (food crops and livestock) reduced and instable • Increases crop pests and diseases • Cause for cropping and land use pattern and farming practices of change • Reduce *intra* and *inter-household* food distribution, exchange, loan and gifts • Reduce food available on local markets • Increase farmers who are seeking food assistance
Access: (allocation, affordability and preference)	• Yield instability increases crops prices • Climate change affect *off-farm*, and *non-farm* income and livelihood sources • Reduce farmers ability to access food due to yield and income instability • Production reduction changes in food preferences and food quantity • Shift to low quality foods: such as *Amicho*, *Rafo*, *Furfurame* and so on • Changes in social arrangements to manage food security risks
Utilization: (nutritional value, food value and food safety and healthcare)	• Reduce water availability: pond water and rainfall harvest • Affect sanitation • Increase the occurrence of diseases: Malaria and other water-born diseases such as diarrheal. • Reduce quality and diversity of food eaten • Exacerbates the prevalence of malnutrition
Stability: (the function of fluctuation in food availability, access, and utilization)	• Changes in food supply both at the household and local markets • Market price inflation on major food crops • These in turn affect the food utilization

Source: Field data, [15].

The findings in Table 4 further highlights that climate change impact on production affects intra and inter-household social networks and arrangements, which are vital forms of food security practices. These includes the traditional animal sharing is affected due to a climate change impact on livestock production. The farmers' participation in social activities is affected because of climate change impacts on production and incomes and livelihoods, health and food security, gender equality. However, the findings shows that farmers' vulnerability to the changing conditions is not uniform as the non-climatic factors such as social, economic and ecological act as prisms through which climate change effects are refracted with outcomes of food security or insecurity. Table 4 provide a brief summary of the effects of climate change on the four pillars of food security: production, storage, distribution and trade (availability); affordability and preferences (access); nutrition value, food value and food safety (utilization); and stability.

2.3. Climate Change Coping and Adaptation Strategies

The thesis argues that the poor are not passive but use multiple strategies in responding to the decreased access to food. Different roles and actors within the household are involved in the processes, demonstrating a high level of dynamism. The findings (Table 5) show that farmers' in the study contexts adopt multiple forms of *ex-ante* and *ex-post* consumption-related and production-related adaptation strategies and migration to manage the effects of climate change and changes that affect their present sustenance negatively and jeopardize their future income generating capacity. Production-related adaptation strategies include altering drought resistant crop varieties, delaying the planting time, soil and water conservation practices. Building of small terraces, mulching, planting trees and small-scale rainwater harvesting and check-dams to prevent flooding are other production-related adaptation strategies.

In dealing with the strategies, the thesis also examines the farmers' adaptive capacities. However, most of the adopted strategies are short-term and vary not only between the two sites but also with the studied farmers' demographic and socio-economic groups. Data show that farmers with limited access to productive assets and livelihood strategies are more sensitive than farmers who are able to use their adaptive capacity to manage the risks of shocks or stresses. Table 5 indicates that different consumption coping strategies are undertaken by food insecure farmers. The findings further show that the gender dimensions of agriculture and food insecurity and women's difficulties with food insecurity and how they adjust to food shortages by eating less preferred food, reduce the food intake, reduce the number of meals, limit the portion size at meals in a day and going a whole day with little food to feed their children. Most of the adopted consumption coping strategies are an indication of poor alternative sources of food and income. Seasonal out-migration in search of wages and resettlement is another form of adaptation strategies to deal with climate change-driven food insecurity.

Table 5. COPING AND ADAPTATION TO CLIMATE CHANGE AND FOOD INSECURITY

Climate change adaptation strategies	Coping strategies	Out-ward strategies

Production-related strategies
• Delaying the planting time
• Reduce the application of fertilizers
• Switch the use of land from food to cash crop such as *khat* and tobacco.
• Expansion of coffee plants against *enset* plants
• Expansion of eucalyptus tree plantation
• Gradual shift from *enat* (mother) coffee to project coffee
• Grow *enat* coffee with project coffee and intercropping other crops
• Planting trees in-between the coffee plants
• Increase application of chemical fertilizers and non-local seeds
• Intercrop local seeds with improved seeds
• Apply wood ash around the coffee plant to deal with the spared of CBD
• Changes in livestock management: maintain few cattle around homestead
• Apply traditional weather forecasting methods
• Communal collective action: praying together to God (discontinued)
 	
A traditional soil and water conservation practices
• Planting elephant grass against the slope
• Mulching to retain soil moisture
• Cover the soil around the coffee roots with leaves
• Make soil and stone bunds
• Plant tree to stabilize slopes
• Small-scale rainwater harvesting
• Check-dams and build small terraces to prevent flooding and soil erosion
	Consumption-smoothing strategies
	• Eat less preferred food
	• Consume immature *enset* plants
	• Reduce food intake
	• Reduce number of meals
	• Limit portion size at meals
	• Going the whole day with little food
	• Restrict consumption by adults to feed children
	
	Other coping strategies
	• Work for better-off farmers
	• Reduce non-food expenditure
	• Sales of livestock and possessions
	• Increase petty commodity production and trade
	• Use collateral arrangements:
	  • Contract farming
	  • Access to loan with interest rate
	  • Sell the coffee during the flowering stage and bartering
	• Use livestock and eucalyptus trees as collateral to access loan
	• Reduce participation in social activities
	• Sales of eucalyptus trees
		• Seasonal migration in search of wage employment
		  • Rural-to-rural migration
		  • Rural-to-urban migration
		• Resettlement

Source: Field data, [15].

The thesis comprises seven articles that have been submitted to the following peer-reviewed academic journals for publication: Agrarian South: Journal of Political Economy; Food Policy; Regional Environmental Change; Ghana Journal of Geography; Climate and Development; and Data in Brief (two articles presents the data on varying themes of the dissertation).

Article 1: *Abebe, Gezahegn. Debates on the Linkages between Large-scale Agricultural Investments and Farmers Food Security: Examples from Ethiopia. Forthcoming.*

This article is retained as a literature review article that discusses the debates on the effects of large-scale agricultural investments on small-scale agriculture and food insecurity with a focus on rural development of Ethiopia. The article has been submitted to *Agrarian South: Journal of Political Economy*. The paper is primarily concerned with the displacement of small-scale agriculture with capital intensive export cope production has opportunities in employment generation, income and national-level growth. However, despite the potential prospects, the trend of large-scale agriculture for export poses risks to a number of small-scale farmers' food security by reducing food supply, loss of access to agricultural land and exposure to market risks and changes the local production patterns as well as the farmers' multiple livelihood strategies. The transformation contributes to local climate change and environmental degradation. The paper concludes that *both* large-scale and small-scale agricultural development strategy is not a viable means to effectively reduce Ethiopia's complex poverty. It suggests other type of agriculture such as transforming small-scale farmers to *medium-sized* labour-intensive and enterprising productive farmers through combing investments in manufacturing and non-farm employment opportunities as well as building social protection to bring sustainable growth, food security and poverty reduction in Ethiopia.

Article 2: Abebe, Gezahegn. *A Productive Safety-Net Program's role on Household Resilience to Food Insecurity in the Boricha District of Southern Ethiopia.* Forthcoming.

This article has been submitted to *Food Policy*. The paper provides a multifaceted understanding of the challenges and prospects of the cash-for-work and food-for-work programs' role regarding household resilience to food insecurity. It focuses on the beneficiaries varied perceptions and priorities towards the program which is designed to building household resilience to food insecurity. Different issues such as targeting, organizational weaknesses; influence of the crop market; gender aspects and credits were discussed. The findings show that the resource transfers are ineffective in dealing with shocks and that affect only some households and that different social categories require different forms of support to be resilient. It further advocates that interventions should focus on building households abilities to address the root causes of poverty and vulnerability, thereby leading them to resilience pathways.

Article 3: Abebe, Gezahegn. *Dealing with Climate Change and Other Stressors: Small-scale Coffee Farmers in the Fero-two Peasant Association in the Wensho District, Southern Ethiopia.* Forthcoming.

This article provides evidence on the coffee farmers' multifaceted challenges, and has been submitted to *Regional Environmental Change*. The paper shows that coffee farmers face multifaceted challenges in production such as prolonged dry season, erratic and insufficient rainfall, too early and too late rains and temperature rise. Unexpected heavy rains and snow events and weather change-driven pests and diseases affect not only the coffee quality but also prices make farmers lives insecure. The paper discusses the local condition of vulnerability and the complex ways in which farmers experience and cope the socio-economic, environmental, political and other factors. Although the farmers rely on multiple forms of responses to the changing environment, most of the adopted strategies are short-term. The result shows that the cooperative, which aims to solve the problems of members, does not benefit all of them equally. The poor farmers are particularly sensitive to shocks, and that they have a low adaptive capacity. It suggests diversified interventions aiming to adapt sustainable agricultural practices and social protection are needed to improve farmers' adaptive capacity to deal climate change.

Article 4: Abebe, Gezahegn. *Household Food Insecurity in two Peasant Associations of the Rural Sidama Zone of Southern Ethiopia*. Forthcoming.

This article identifies the determining factors of food insecurity and how these factors are linked to global climate change. The paper has been submitted to *Ghana Journal of Geography*. The findings shed light on the challenges of communities due to a combination of economic, social, physical, and political factors that ranges from local to national and international level. The result show high prevalence of *moderate* and *severe* food insecurity. However, the *intensity* and *duration* of food insecuirty vary with the household type of production and with their characteristics, access to resources, income sources and the presence and absence of outside interventions to improve food security. Interventions to food security are short-term and thus do not support the farmers to exit from their chronic poverty. The paper suggests that policies should focus on accessibility of food for poor farmers than food availability at the higher geographical levels. It concluded that various forms of interventions that comprehend the household characteristics and gender sensitive social protection are required to improve the farmers' adaptive capacity to deal with climate change and thus to achieve food security.

Article 5: Abebe, Gezahegn. *Farmers' Coping and Adaptation Strategies to Climate Change-Driven Food Insecurity in the Rural Sidama Zone of Southern Ethiopia.* Forthcoming.

The article deals with farmers coping and adaptation strategies to climate change-driven food insecurity. The paper has been submitted to *Climate and Development*. It highlights the multiple adaptive strategies used in maize-based and coffee-based farming systems, and shows that the farmers use multiple short-term strategies to deal with the effects of climate change and food insecurity. The paper shows that the farmer strategies differ depending on gender, household assets, climatic conditions and livelihood and income sources. The adopted strategies are categorized into production related, consumption related

and migration. A call for long-term resilient adaptation strategies is made.

Article 6: Abebe, Gezahegn. *A Survey Data Description on Food Insecurity Factors, Farmers' Coping and Adaptation Strategies in the Sidama Zone of Southern Ethiopia*. Forthcoming.

In this article the dataset on climate change risks and the prevalence of households' food insecurity among small–scale farmers in two Peasant Associations (PA) are presented. The paper has been submitted to *Data in Brief*. The article contains analyzed survey data on farmers' livelihood and income sources, long-term rainfall and temperature data, the level of food insecurity, determining factors, and consumption coping and adaptation strategies as well as insightful pictures taken from the fields. The data used in this article contribute not only to develop theoretical and policy-relevant knowledge but also useful by providing a way for researchers and experts to easily share data and facilitate reproducibility.

Article 7: Abebe, Gezahegn. Long-term Climate Data Description in Ethiopia. *Data in Brief*, 14, 371-392. 2017.

This article has been published in *Data in Brief*. It presents long-term analyzed rainfall and temperature data obtained from the National Metrological Agency (NMA) of Ethiopia. Data show that the declining average annual rainfall and the high inter-annual fluctuations for 18 weather stations. The stations are located in different agro-climatic zones of the country. Based on data obtain from the Central Statistical Agency (CSA) of Ethiopia, the paper shows that the trends of major cereals production, use of fertilizers and types of fertilizers for cereals production area cultivated under improved seeds, and local seeds. Trends in oil seeds, cereal crops and pulses production and the consumer price index were also presented. The data used in the article is helpful to identify vulnerable communities and social groups to the impacts of climate change on production and prices to deign appropriate policy interventions.

3. Conclusions for Policy Implication

The findings in the articles indicate that farmers have experienced food insecurity due to complex factors. Farmers have different opinions and priorities regarding the changing environmental risks and other inter-related factors responsible to their food insecurity. They in response have developed *ex-ante* and *ex-post* coping and adaptation strategies. Most of these strategies are less effective and short-term. The heterogeneity of the informants' opinions shows that a single and short-term food security intervention is not adequate to improve the farmers' adaptive capacity. In recognizing changing nature of causes, there is a need to expand investments in manufacturing and food production, diversified income sources through combining farmers' access credit and health services, weather index crop and market insurance. The thesis contends these interventions need better comprehend the farmers' livelihood strategies, the agro-ecology, rainfall pattern and farming systems to adapt sustainable agricultural practices and social protection to build households resilience to adapt climate change and other interrelated socio-politico-economic factors. However, a Reference [16] evidences that since "resilient household does not necessary result in resilient communities"… interventions should also stretch emphasis on "building resilience across sectors (political, social, human, physical, natural and financial) and levels include household, community and national."

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Declaration

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