



WOLDIA UNIVERSITY

FACULTY OF SOCIAL SCIENCE AND HUMANITY:

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES.

Assesing the livilehood vulnerablity of smallholder farmers to the changing climate and adaptation strategies in wadla woreda ,northwollo zone.

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A research paper submitted to the College of Social Sciences and Humanities Department of Geography and Environmental Studies Masters in Food Security and Development Program for the partial fulfillment of the Master of Science in Food Security and Development program.

NOVEMBER, 2024

WOLDIA, ETHIOPIA

WOLDIA UNIVERSITY
COLLEGE OF SOCIAL SCIENCES AND HUMANITIES
FOOD SECURITY AND DEVELOPMENT PROGRAM

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As thesis research advisors, we hereby certify that we have read and evaluated this thesis prepared under our guidance by Selamyihun Shumiye, entitled ‘an assessment on climate change impacts on food security, Evidence from Wadila Woreda, North Wollo, Ethiopia’. I certify that the thesis is accepted for fulfilling the requirements for the award of the degree of Master of Sciences (M.Sc.) in “Food Security and Development Program”.

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DECLARATION

I Selamyihun Shumiye Senbetu hereby declare that the thesis entitled “an assessment on climate change impacts on food security, Evidence from Wadila Woreda, North Wollo, Ethiopia submitted to the Department of Geography and Environmental Studies at Woldia University, in partial fulfillment of the requirements for the award of the Degree of Food Security and Development, is a record of original research work done by me during 2024-2025, under the supervision and guidance of Getnet Zeleke (PhD), and it has not formed the basis for the award of any degree, diploma fellowship, or other similar title of any candidate of any university.

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ACKNOWLEDGEMENT

First and foremost, I would like to thank the almighty God for helping me with all my duties. I am glad to reach out and express my sincere appreciation to those who helped me achieve this success.

I would like to express my special thanks to my advisor, Getnet Zeleke (PhD), for his unreserved supervision, guidance, and assistance in successfully completing the thesis. He is not tired; he is appositive thinker; he supports new ideas and comments on every movement for strength in my paper. He had been very helpful throughout the work, starting from the beginning up to the successful completion of the thesis. My thanks also go to the Wadila Administrative and Agriculture Office for giving me the chance for a postgraduate scholarship and financial support.



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ACRONYMS

CRGE	Climate Resilience Green Economy
CSA	Climate Smart Agriculture
GTP	Growth and Transformation Plan
IPCC	Inter Governmental Panel on Climate Change
NAPA	National Adaptation of Action
UNCCD	United Nations Convention to Combat Desertification
WCDP	World Conference on Disaster Prevention

ABSTRACT

Adverse effects of climate change are determined not only by the changing climate but also by sensitivity of human and natural systems to these changes (Roncoli, et al., 2001). Vulnerability and adaptive capacity varies both in space and time. Many factors contribute to vulnerability and adaptive capacities, including: physical, political, institutional, financial, market forces, available information and technologies (Smit & Pilifosova,2003).

This study aim to assess livelihood vulnerability of smallholder farmers to climate change and their adaptation strategies in Wadla Woreda, North Wollo, Ethiopia.. the section of society most vulnerable to climate change impacts on food security status and reason behind it to know constraints that aggravate vulnerability to climate change in the woreda, and to identified local and institutional adaptation /coping/strategies. Data were collected from 130 respondents through House hold surveys, key informant interviews, and focus group discussions. Analysis by descriptive and inferential analysis. Using descriptive statistics, multiple regression models for the purpose of socio-economic, extreme weather events (climate related hazards), and institutional factors significantly influence the food security status of the respondents in the study area.

The findings indicate respondents food security status in the study area were adversely impacted by extreme weather events such as rain fall variability, temperature variability, snow, extreme cold, pests and disease, water scarcity, lack of knowledge to predict climate and weather patterns and extreme flooding . Factors such as family size, working personnel in the household, number of dependency in the house hold, land ownership status, grazing land ownership, distance to all weather road, were crucial in influencing the food security status and adaptation of climate change impacts of the house hold in the study area. The study demonstrates that adaptation practices, including crop rotation, organic and in organic fertilizers, focus on animal only, diversifying crop and soil and water conservation, use of improved seed ,change the culture of production were practiced.

The coup up mechanisms were remittance, productive safety net program, selling asset, minimize size of meal, migration, borrow money from private and governmental institutions e.t.c were practiced in the study area. This study concluded that Wadla woreda were a woreda characterized by large number of land but land were cultivated by traditional agricultural practice and highly influenced by climate change related hazards and the impacts become severe. Subsistence crop and animal husbandry farming is not enough to feed the entire household sufficiently throughout the year. Therefore, policies should promote initiatives that invest more in rural off-farm activities to generate employment to enable households increase their income and thus be able to improve their food security status and minimize climate change impacts. This study recommends strict environmental literacy and adopt the climate smart agricultural practice is the only option to combat climate change impacts on the food security status of the society.

Keywords: climate-smart agriculture; food security; adaptation, climate change impacts; Livelihood vulnerability; econometric models, multiple regression model, wadila woreda.

CHAPTER ONE

1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Global climate change and associated weather extremes continued posing considerable challenges on the contemporary world. A number of models have projected implications of climate change for the world with variance by locations, and by all means Sub Saharan Africa has been found the most vulnerable to impacts perceived (CARE, 2009). Climate induced food shortages and chronic diseases affected billions of people in developing countries (IPCC, 2007b).

Adverse effects of climate change are determined not only by the changing climate but also by sensitivity of human and natural systems to these changes (Roncoli, et al., 2001). Vulnerability and adaptive capacity varies both in space and time. Many factors contribute to vulnerability and adaptive capacities, including: physical, political, institutional, financial, market forces, available information and technologies (Smit & Pilifosova,2003).

In these cases, rising temperatures, increasingly erratic rainfall, and more frequent and severe floods and frequent droughts have significant consequences especially to those who depend highly on use of natural resources such as agriculture for their livelihoods. It is consensus that changes in temperature and precipitation will result in changes in land and water regimes that will subsequently affect agricultural productivity (World Bank, 2003;CARE, 2009).

Ethiopia is one of the most vulnerable countries in the world to climate change including variability. The country's economy is principally dependent on rain fed agriculture. The sector contributes 85% of employment opportunities; generates more than 45% of GDP and 90%

foreign exchange earnings, and up to 95% of crop production has been produced by small holders who are subsistent farmers with less adaptive capacity to climate change (Aragie, 2013).

Many believe agriculture is the most susceptible sector to climate change. This is attributed to the fact that climate change affects the two most important direct agricultural production inputs, precipitation and temperature (Deschenes & Greenstone 2006). Climate change also indirectly affects agriculture by influencing emergence and distribution of crop pests and livestock diseases, exacerbating the frequency and distribution of adverse weather conditions, reducing water supplies and irrigation; and enhancing severity of soil erosion (Watson et al. 1998; IPCC 2001).

This study aims to answer questions: what is the trend of climate change, what is the impact on livelihood, who is vulnerable to the impact and why, what are other constraints that exacerbate societal vulnerability, and what are the existing opportunities rather than vulnerability in addition to local and institutional coping mechanisms and how they can be viewed from sustainability and aid free society building point of view. The empirical material of this study will be based on current climate impact data that will generate from local stakeholders from Wadla Woreda North Wollo zone, Ethiopia. By examination of directional change in the current climate impacts and responses, and predicting future adaptive capacity and constraints of the communities, this study distinguishes the community's ability to cope with the future likely climate change impacts (Smit & Pilifosova 2003).

The ambition of the study is to remediate both knowledge about climate change and socio-economic condition in the Wadla woreda. Although the study focuses on the Wadla woreda, it is held that the result generated from this study is relevant to many areas of the county as well as other countries with a similar climate and socio-economic structures.

1.2. Statement of the Problem

The Ethiopian government has recognized climate change as a threat to its national development. The country has signed most of the international environment conventions including those specifically focused on climate change: it ratified the UNFCCC in May 1994, UNCCD United

Nations Convention to Combat Desertification in June 1997, and the Kyoto Protocol in February 2005 (Senbeta, may,2009).

The country prepared a National Adaptation Programme of Action (NAPA) to fight the impacts of climate change and desertification (Amsalu and Gebremichael 2009). The program clearly states the urgency of taking practical adaptation and mitigation actions in many social and economic sectors to enhance food security in the community (NMA 2006; Epsilon International 2011).

CRGE (Climate Resilient Green Economy) strategy recommends the use of low carbon solutions to leapfrog other economic sectors while realizing the ambitions set out in the country's GTP. CRGE Present an overarching framework to marshal a coherent response to climate change, to generate both innovative thinking and a course of actions to meet the challenges associated with the transfer of climate-friendly technologies and finance for the construction of a climate resilient green economy in Ethiopia (NMA 2006; Epsilon International 2011).

GTP (Growth and Transformation Plan) recognized Climate change as a huge threat. It stipulates the country's ambitions to build a CRGE by 2030. The country has formulated a number of policies, strategies and action plans aimed at promoting Environmental protection, sustainable development and poverty reduction improving the food security status of the community. However, lack of local specific focused policies and legislation were a serious impediment to deal with the adverse impacts of climate changes on food security status of the community (Sintayehun 2008).

Kassahun (2008) also stated, it is important and high time to take climate change issues into the country's policies, program and guidelines. However, the current policies, strategy and laws related to climate change and sustainable agriculture for the enhancement of food security status are adequate. But still they are not well implemented for the sake of upgrading the food security status of local level in the study area wadla woreda in particular. Therefore, creating awareness about

In Ethiopia, Deressa et al., (2008) have conducted an integrated quantitative vulnerability assessment for seven Regional States of the total eleven regions by using biophysical and social vulnerability indices. The study will found that decline in precipitation and increase in temperature are both damaging to Ethiopian agriculture and endanger the livelihood and food security issues in the study area wadla woreda just like that of the other vulnerable woredas in amhara region.. Many researcher acknowledged as their study was highly generalized and further study is needed at local levels, particularly at district and villages, one of a gap this study is aimed at wadla woreda north wollo zone will filling the generalized climate change impacts on food security status of the country and the region led disaggregated to woreda wise and area specific as well as climate change induced opportunities will be assessed in detail.

1.3 General Objective

The general objective of the study is to assess livelihood vulnerability of smallholder farmers to climate change and their adaptation strategies in Wadla Woreda, North Wollo, Ethiopia.

1.4 Specific objectives

To analyze the degree of climate variability in the study area.

To examine livelihood vulnerability at household level.

To assess major climate change adaptation practices and factors affecting choices of farming households on adaptation methods

1.5 Research Questions

What looks like the trends of climate variability in the study area?

what is the degree of livelihood vulnerability at household level

What are the actual smallholder farmers local climate change adaptation strategies in the study area?

Which factor will affect climate change adaptation practice in the study area

1.6 hypothesis of the study

Hypothesis (Ho). There are significant impacts of climate change on the livelihood vulnerability dimensions and coupling mechanisms of communities in different natural-disaster-threatened areas of the woreda.

Hypothesis(HA). There are no significant impacts of climate change on the livelihood vulnerability dimensions and coupling mechanisms of communities in different natural-disaster-threatened areas of the woreda.

CHAPTER TWO

REVIEWED LITIRATURE

2.1.Climate Change in the Context of Ethiopia

Ethiopia is highly affected by climate change due to three main reasons; (i) about 80% of the population is largely depend on rain fed agriculture (ii) low income country (iii) varied geographical locations with different magnitude of climate impacts. Climate change induced El-Nino increase the average temperature and affect rainfall pattern in time and space leading to a recurrent drought which results in food insecurity particularly in dry and semi dry areas of the country. The country has experienced 16 major national droughts since the 1980s, along with dozens of local droughts. In Ethiopia climate change is already taking place now, thus past and present changes helps to indicate possible future changes. Over the last decades, the temperature in Ethiopia increased at about 0.2–0.37 °C per decade (Kassahun 2008).

The increase in minimum temperatures is more pronounced with roughly 0.4 °C per decade (Mengistu 2008; Kassahun 2008). The temperature will very likely continue to increase for the next few decades with the rate of change as observed (Kassahun 2008; Mengistu 2008; Mengistu and Mekuriaw 2014; IPCC 2014a).

The average annual volume of rainfall over the past 50 years (from 1951–2000) remained more or less constant for the whole country (NMSA 2001). Many authors agreed that mean annual rainfall showed a slight decreasing trend and higher year to year variation was observed in 1950–2010. However, rainfall distribution across the country shows a marked difference. There is a tendency for less rain to fall in the northern part of the country where there is already massive environmental degradation. The same trend can be observed in the south east and north east of the country which is both often affected by drought. However, in central Ethiopia where most of the population and the country's livestock are located, and where the soil is severely depleted

and degraded, more rain is falling. The western and north-west parts of the country have also received more rain (Mengistu 2008; 400 T. Alemu and A. Mengistu McSweeney et al. 2010).

Farmers and pastoralists are experiencing that the rain is becoming more unpredictable or is failing to appear at all. In some places the rain falls more heavily and the degraded soil is unable to absorb this rain which falls over a shorter period. According to Kassahun (2008), the farmers in the central part of the country have lost up to 150 tons of soil per hectare. The rise in temperature and fluctuations in rainfall create many problems for the pastoralists who live in the already drought stricken areas which are receiving less and less rain. They have already switched from cattle to goats and camels, as they are more able to endure the long periods of drought. In the central part of the country more rain will mean further erosion of the soil and lower crop yields for small holder farmers and lead to flooding in the more low lying areas. Climate change is affecting how long the farmers have to grow their crops. In addition, warmer weather provides better growing conditions for pests and other diseases that attack crops and destroy the farmers' harvests (Mengistu 2008; Kassahun 2008; Deressa et al. 2008).

Therefore, it is possible to conclude that not only the rainfall distribution that has changed but it has also become warmer in the last 60 years. Hence, there is already a great demand for improved seed which is more drought and pest resistant, and for seeds which mature faster as the rains have become more unpredictable and shorter in some places. Today the forest cover is very low (less than 10%), so the soil has become more vulnerable to erosion. People cut down the forest to create more farmland and to harvest firewood for cooking. Population growth will put pressure on the already degraded soil, and marginal plots will be brought into use which worsens the situation (Mengistu 2008; Deressa et al. 2008; Mengistu and Mekuriaw 2014).

2.2. Implications of Climate Change in Food Security

A large body of literature demonstrates negative impacts of climate change on the agricultural sector in East Africa. Climate change affects agriculture and food production in complex ways. It affects food production directly through changes in agro-ecological conditions (e.g. changes in rainfall leading to drought or flooding, or warmer or cooler temperatures leading to changes in

the length of growing season), and indirectly by affecting growth and distribution of incomes, and thus demand for agricultural products (Gregory et al. 2008).

Climate change is likely intensified high temperature and low precipitation in semi dry and dry areas, it is the most dramatic effects that will be felt by small holder and subsistence farmers (Mendelson and Dinar 2009). According to IPCC 5th report Climate change impacts in East Africa will increase risk of food insecurity and the breakdown of food systems, increase risks of loss of rural livelihoods and income due to insufficient access to drinking and irrigation water and reduced agricultural productivity, particularly for farmers and pastoralists with minimal capital in semi-arid regions. Risks due to extreme weather events leading to Impacts of Climate Change on Food Security breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services are also linked to these areas of concern (IPCC 2013).

The overall effect of climate change on yields of major cereal crops in the African region is very likely to be negative, with strong regional variation (Niang et al. 2014).

At even relatively low levels of warming of 1–2 °C, many unique natural systems are threatened and food productivity, human health and water resources could be negatively impacted in some regions. “Worst-case” projections (5th percentile) indicate losses of 27–32% for maize, sorghum, millet and groundnut for a warming of about 2 °C above pre-industrial levels by mid-century (Schlenker and Lobell 2010).

The IPCC concludes that large-scale warming, of around 4 °C or above, will increase the likelihood of severe, pervasive and irreversible impacts to which it will be difficult to adapt. Achieving food security and reducing poverty in the Ethiopia has been a major challenge for both governments and development agencies due to the result of many factors, some of which are: (1) land degradation or poor in nutrients; (2) the rapid population growth (3) the low and inappropriate use of technologies such as improved varieties, fertilizers, mechanization and irrigation that have stimulated agricultural development elsewhere in the world (Mekuriaw et al. 2008; Kassahun 2008).

The agricultural sector employs between 85% of the active population and contributes close to 40 % of the Gross Domestic Product (GDP) Alemu and A. Mengistu 88% of the export earnings; and supplies around 73% of the raw material requirement of agro-based domestic industries (Gebreegziabher et al. 2011). Agriculture is a major source of food and plays a key role in generating surplus capital to speed up the country's socio-economic development and hence the prime contributing sector to food security. Yet, agriculture in degraded and semi-arid regions is a highly risky enterprise due to unreliable and variable rainfall. According to Zenebe et al. (2011) as the effects of climate change on agriculture become negative, incomes drop off considerably. At the end of 2050, because of climate change, average incomes will be reduced. In the no-total factor productivity -growth scenario model showed that, climate change leads to a loss of some 30% of income, compared with the no-climate-change baseline (Gebreegziabher et al. 2011). According to World Bank (2006), droughts and floods are very common phenomena in Ethiopia with significant events occurring every three to five years. Climate change is expected to exacerbate the problem of rainfall variability and associated drought and flood disasters in Ethiopia (Mesfin 1984; NMA 2006; World Bank 2006; Amsalu and Adem 2009; UN-ISDR 2010).

2.3 National Response Towards Climate Change: Adaptation and Mitigation Policies and Strategies

Ethiopian's anthropogenic GHG emissions contribution is marginal (only 0.3% of global total) (USAID 2015). Ethiopian's GHG profile showed that the agriculture sector contribute the highest (61%) followed by land use change (18%), energy (17%); (waste 3%) and only 1% from industrial processes and product use (USAID 2015)

The reduction includes 130 MtCO₂e from forestry, 90 MtCO₂e from agriculture, 20, 10 and 5 MtCO₂e from industry, transport and buildings, respectively(USAID 2015). Ethiopia has a potential to mitigate an estimated 2.76 billion tons of carbon through protection and sustainable management of forest resources (Moges et al. 2010). To facilitate the country's response to climate change a comprehensive adaptation and mitigation mechanisms have been developed such as: CRGE strategy, GTP II, Sectoral GHGs Reduction Mechanism (SRM), National

Disaster Risk Management and Strategy, National Adaptation Programme of Action (NAPA, now NAP), Sectoral/regional adaptation plans etc. Since 1992 many MEAs are signed and/or ratified. Ethiopia leads least developing countries group in the international climate negotiation agenda.

2.4 Current Policies on Environment and Climate Change

The Ethiopian government has recognized climate change as a threat to its national development. The country has signed most of the international environment conventions including those specifically focused on climate change: it ratified the UNFCCC in May 1994, UNCCD United Nations Convention to Combat Desertification in June 1997, and the Kyoto Protocol in February 2005. The country prepared a National Adaptation Programme of Action (NAPA) to fight the impacts of climate change and desertification (Amsalu and Gebremichael 2009). The program clearly states the urgency of taking practical adaptation and mitigation actions in many social and economic sectors (NMA 2006; Epsilon International 2011). CRGE (Climate Resilient Green Economy) strategy recommends the use of low carbon solutions to leapfrog other economic sectors while realizing the ambitions set out in the country's GTP. CRGE Present an overarching framework to marshal a coherent response to climate change, to generate both innovative thinking and a course of actions to meet the challenges associated with the transfer of climate-friendly technologies and finance for the construction of a climate resilient green economy in Ethiopia (NMA 2006; Epsilon International 2011). GTP (Growth and Transformation Plan) recognized Climate change as a huge threat. It stipulates the country's ambitions to build a CRGE by 2030. The country has formulated a number of policies, strategies and action plans aimed at promoting Environmental protection, sustainable development and poverty reduction. However, lack of local specific focused policies and legislation were a serious impediment to deal with the adverse impacts of changes and variability in climate (Sintayehun 2008). Kassahun (2008) also stated, it is important and high time to take climate change issues into the country's policies, program and guidelines. However, the current policies, strategy and laws related to climate change and sustainable agriculture are adequate. But still they are not adequately incorporated into extension guidelines and manuals in a way that local farmers understand and participate in the implementation processes. Therefore, creating awareness about

and A. Mengistu policies, strategies and implementation guidelines at all levels including agricultural extension workers and implementation of CSA (climate smart agriculture) is a key. Despite the relatively high knowledge of the subject among policy-makers, and the prominent role being played by Ethiopia in international climate change negotiations, Ethiopia was still formulating its response in 2009 (Ayalew 2009). Ethiopia, on behalf of African continent plays a great role in climate change negotiations (COPs) which indicates that Africa as a whole and Ethiopians in particular are aware of the climate change impacts on global, regional and national scale. The efforts given to poverty alleviation and socio-economic development will be challenged by the impacts of a changing climate unless such issues are well integrated with adaptation plans (NMSA 2001). According to Deressa et al. (2008), since vulnerability to climate change in Ethiopia is highly related to poverty through loss of coping or adaptive capacity. Integrated rural development schemes can play a great role in reducing poverty and increasing adaptive capacity for dealing with climate change. Yesuf et al. (2008) also suggested that farmers need timely information on predicted changes in climate in a readily accessible form to empower them to take appropriate steps to adjust their farming practices, such as adopting yield-enhancing adaptation strategies. The early warning system in the country is based on crop forecasts and assessments of food stocks, and deals mainly with preparedness for food emergency relief. In addition, efforts should also be made to reduce the risks of disasters, and extend access to credit markets and extension services in order to facilitate adaptation (Amsalu and Gebremichael 2009). However, the Government's response has been challenged by shortage of funds and lack of institutional capacity. Hence, the role of non-state actors and their contribution in enhancing local adaptive capacities is very crucial need to be encouraging (Amsalu and Adem 2009; Amsalu and Gebremichael 2009) and included in the plan.

2.5 Ethiopia's Program of Adaptation to Climate Change (EPACC)

EPACC (Ethiopian Program of Adaptation to Climate Change) strategy adequately understood climate change as a growing threat in Ethiopia and clearly elaborate the need to mainstream climate change in all spheres of development policy making and planning at all phases and stages of the planning and implementation process. As a Party to the UNFCCC, Ethiopia is obliged by several articles of the convention to address climate change through the preparation of

a national adaptation document and the integration of climate change into its sectoral development plans, policies and strategies. The NAPA, prepared in 2007, represented the first step in coordinating adaptation activities across government sectors, but was not intended to be a long-term strategy in itself. Ethiopia's NAPA projects are currently "on hold" whilst international adaptation funding mechanisms are under negotiation (Adem and Bewket 2011).

2.6.Impacts of Climate Change on Food Security

The former Federal Environmental Protection Authority and the present Ministry of Forest Environment and Climate Change (MFECC) of Ethiopia developed a separate work program for action on adaptation to climate change. The document interlinks climate change adaptation strongly with the economic development and physical survival of the country. The main objective of EPACC and CRGE is to create the foundation for a carbon-neutral and climate-resilient path towards sustainable development in the country. According to this programme, climate change will be implemented by inhabitants and farmers at local and district levels (NMA 2006 and Adem and Bewket 2011). The climate risks identified by EPACC are broadly in the areas of human, animal and crop diseases, land degradation, loss of biodiversity, decline in agricultural production, dwindling water supply, social inequality, urban waste accumulation, and displacement due to environmental stress and insecurity. The programme also identifies adaptation strategies and options in the various socioeconomic sectors including cloud seeding, crop and livestock insurance mechanisms, grain storage, societal reorganization, renewable energy, gender equality, factoring disability, climate change adaptation education, capacity building, research and development, and enhancing institutional capacity and the political momentum (NMA 2006). The program clearly explains the need to mainstream climate change in all spheres of development policy making and planning at all phases and stages of the planning and implementation process and the urgency of taking practical adaptation and mitigation actions in the various social and economic sectors.

2.7 Climate Resilient Green Economy (CRGE) of Ethiopia

Although international climate negotiations have made little progress, Ethiopia has started the race towards low-carbon development (LCD). LCD Plans have been developed and lay foundations for overall sustainable development planning of the country. In fact aggregate climate change mitigation commitments are still far apart from a level of ambition that effectively creates a realistic chance of limiting global warming to a maximum of 2 °C or possibly even lower. Many developing countries including Ethiopia seem to have already begun this process. In this regard, Ethiopia can be an example and tried to implement a new national strategic framework for a smooth transition to a climate resilient green economy by 2030. A climate resilient green economy is a long-term ambition of Ethiopia. The mission statement developed to facilitate the development of the Ethiopian CRGE strategy sets out a five step roadmap for moving towards a climate resilient low carbon economy. The roadmap identified the need for more work on Ethiopia's climate change institutions, monitoring and finance systems and sectorial and regional action plans. When combined, the work is expected to enable the EPA to draft a CRGE Strategy which will identify a clear path to the goal of a climate resilient green economy by 2030 (Adem and Bewket 2011). Building resilient means reducing the risk of becoming food insecure and increasing the adaptive capacity to cope with risks and respond to climate change (Gitz and Meybeck 2012). 406 T. Alemu and A. Mengistu Priority challenges and constraints for Addressing climate change impacts Ethiopia faces a number of cross-cutting challenges and constraints in regard to climate change vulnerability assessment and adaptation and implementation. As noted in NAPA, these challenges include:

- Weak policy implementation and limited awareness
- Lack of research and development capacity to assess the impacts and consequences of climate change
- Lack of individuals with specialization in vulnerability and adaptation assessment in agriculture, water resources and health

- Limited skill capacity, facility, and technologies to provide accurate and timely weather and climate forecasts
- Weak institutional framework for dealing with climate change
- lack of coordination between research institutions and policy makers.

Addressing these capacity, institutional and coordination and needs will contribute to Ethiopians ability to continue to move forward effectively on implementation of adaptation that support long term climate-resilient green development.

2.8. Improving Smallholder Livelihood and Resilience Through Climate-Smart Agriculture (CSA)

Climate-smart Agriculture (CSA) is an approach that helps to guide actions needed to transform reorient agricultural system to effectively support development and ensure food security in the changing climate. CSA aims to tackle three main objectives: (1) increase agricultural production and income sustainability, (2) adapting and building resilience to climate change and (3) reduce and/or remove greenhouse gas emissions, where possible (IPCC 2013). CSA practices aimed at promoting efficient use of land, water and soil and other environmental resources. CSA promotes coordinated actions by farmers, researchers, private sectors, civil society and policy makers towards climate-resilient pathways through four main action areas: (1) Building evidence (2) increasing local institutional capacity and effectiveness (3) fostering coherence between climate and agricultural policies and (4) linking climate and agricultural financing (Fig. 2). CSA differs from ‘business-as-usual’ approaches by emphasizing the capacity to implement flexible, context-specific solution, supported by innovative policy and financing actions (Leslie et al. 2015; FAO 2016).

CSA encourage integrated approach e.g;-

- landscape approaches
- improved grassland and forestry management

- practices such as reduced tillage and use of adverse varieties and breeds
- integrating trees into agricultural systems
- restoring degraded lands

All these integrated activities enhance soil quality and can generate high production. It also Enhances adaptation and mitigation benefits by regulating carbon oxygen and plant nutrient cycles leading to enhanced resilient to drought and flooding and to carbon sequestration (Leslie et al. 2015). Transformative change in agriculture can involve shifts in agricultural production (for example from crop to livestock) or source of livelihoods (increase resilient on non-farm income) (Leslie et al. 2015). Transforming the current agricultural practice into CSA approach urgent actions from policy makers, public, private and civil society stakeholders at all levels is required in four areas: (i) building research based evidence and assessment tools; (ii) strengthening national, regional and local institutions (iii) developing coordinated and evidence-based policies and (iv) increasing finance institutional capacity and its effectiveness. The current evidence based research findings are inadequate, inaccessible to decision makers support effective decision making at the national, regional and local levels. Therefore the current research addressing climate change impacts on agriculture are not sufficient for national and local level planning. Research institutions should be coordinated to develop tools needed for evaluating multiple stressors including Climate Change Agriculture Opportunity space Possible future Fig. 2 Climate-resilient transformation pathways for agriculture. Adapted from ref. 4, © IPCC 408 T. Alemu and A. Mengistu the impact of climate change (both extreme events), adaptation and mitigation potential of different policies and technologies.

2.9 Challenges and opportunities for effective implementation of CSA in Ethiopia

The key challenges to implement CSA in Ethiopia are: weak implementing capacity on climate change adaptation and mitigation, lack of integration or coordination between federal and regional levels, public sector and civil society organizations, private sectors, and impacts of conventional agricultural practices such as open grazing and frequent ploughing. In spite of the above challenges the country has untapped opportunities to support the scale up of CSA in

Ethiopia. These includes; Climate Resilient green economy (CRGE) strategy of Ethiopia, promotion of avoiding open and uncontrolled grazing by regional states, promotion of integrated watershed management to improve agricultural productivity, existence of extension and development agents to create climate related awareness and provide capacity building training at the local level. All these opportunities, in addition to NGOs, at the grass root level can promote climate smart agriculture activities in the country.

Improving smallholder livelihood and resilience, in the context of climate change, through climate-smart agriculture (CSA) includes improving farm level food security and productivity through the development of profitable and sustainable farming systems. This can be achieved through integrated and sustainable land and forest management program, integrated soil fertility management, small scale irrigation schemes, integrating tree-food-crop livestock system, poultry, bee farming and animal fattening, soil and water conservation measures, rain and ground water harvesting practices. The existence of development agents and extension workers can start CSA practices if appropriate strategy, action plans and manuals are set in place.

2.10. Vulnerability

Definitions and Issues The Intergovernmental Panel on Climate Change (IPCC) and world conference on disaster prevention (WCDP), defines vulnerability as “the extent to which climate shocks such as drought may damage or harm a system.” It adds that vulnerability “depends not only on a system’s sensitivity, but also on its ability to adapt to new drought conditions” (Santiago, 2001). The IPCC (2007b) defines the concept of vulnerability as the degree to which a system is susceptible to, or unable to cope with, adverse effects of drought. Vulnerability is a function of the character and magnitude, of drought to which a system is exposed, its sensitivity, and its adaptive capacity (WCDP, 2004; IPCC, 2007b cited in Mirjam, 2008).

This definition implies that in order to assess future vulnerability of a system to drought not only the exposure of a system to a potential future biophysical hazard level at a global, regional or local scale needs to be considered, but also the sensitivity of vulnerable groups and the ecosystems they live in to drought impacts and their adaptive capacity. The WCDP report, The

Regional Impacts of drought: An Assessment of Vulnerability (Watson et al., 1998), argues that the vulnerability of a region depends to a great extent on its wealth, and that poverty limits adaptive capabilities. According to the Second Assessment Report, vulnerability depends on the level of economic development and institutions. The report argues that socio-economic systems “typically are more vulnerable in developing countries where economic and institutional circumstances are less favorable” (Watson et al., 1996: 24). A common theme in the drought impacts and vulnerability literature is the idea that countries, regions, economic sectors and social groups differ in their degree of vulnerability to drought (Bohle et al., 1994). This is due partly to the fact that changes in temperature and precipitation will occur unevenly and the fact that resources and wealth are distributed unevenly. Though vulnerability differs substantially across regions, it is also recognized that “even within regions... impacts, adaptive capacity and vulnerability will vary” (WCDP, 2004:2; IPCC 2001: 15).

2.10.1. Approaches of vulnerability

Vulnerability can be conceptualized in many different ways along a continuum from outcome to contextual vulnerability. Outcome vulnerability is characterized by the degree, to which a system is susceptible to, or unable to cope with, adverse effects of drought, while contextual vulnerability assesses ‘the susceptibility of a system to disturbances determined by exposure to perturbations, sensitivity to perturbations, and the capacity to adapt (Pearson and Langridge, 2008). Furthermore, vulnerability is influenced by both physical and socioeconomic characteristics which are themselves not static implying that vulnerability is context specific, and specific to place, time and the perspective of those assessing it (Adger, 26 1996; Aandahi, and O’Brien., 2001). The context specific nature of vulnerability means that there can be no single, unified or general purpose approach to conceptualizing it (Pearson and Langridge, 2008 cited in Ignatus, 2006).

There are however three major conceptual approaches to analyzing vulnerability to drought: the socio-economic, the biophysical (impact assessment), and the integrated assessment approaches. Although each has its strong points and weaknesses, the integrated approach has much to offer in terms of policy decisions (Deressa et al., 2008). Now, let’s briefly see each approach one by one.

2.10.1.1. Socio-economic Approach

The socio-economic vulnerability assessment approach mainly focuses on the socioeconomic and political status of individuals or social groups (Adger, 1999; Füssel, 2007). Individuals in a community often vary in terms education, gender, wealth, health status, access to credit, access to information and technology, formal and informal (social) capital, political power, and so on. These variations are responsible for the variations in vulnerability levels. In this case, vulnerability is considered to be a starting point or a state (i.e., a variable describing the internal state of a system) that exists within a system before it encounters a hazard event (Allen, 2003; Kelly and Adger, 2000). Thus, vulnerability is considered to be constructed by society as a result of institutional and economic changes (Adger and Kelly, 1999). In general, the socioeconomic approach focuses on identifying the adaptive capacity of individuals or communities based on their internal characteristics. A study by Adger and Kelly (1999) is an example of this approach. In that study, the environmental factor in a district to coastal lowlands of Vietnam was taken as given, and vulnerability was analyzed based only on variations in socio-economic attributes of individuals and social groups.

2.10.1.2. Bio-physical Approach

The biophysical approach assesses the level of damage that a given environmental stress causes on both social and biological systems. For instance, the monetary impact of drought on agriculture can be measured by modeling the relationships between extent of drought and farm income (Mendelsohn, et al., 1994; Polsky and Esterling, 2001; Sanghi, et al., 1998).

Similarly, the yield impacts of drought can be analyzed by modelling the relationships between crop yields and drought extent (Adams, 1989; Kaiser et al., 1993; Olsen,et al., 2000). Other related impact assessment studies include the impact of drought on human mortality and health terms (Martens et al., 1999), on food and water availability (DuToit et al.,2001;FAO, 2005; Xiao et al. ,2002), and on ecosystem damage (Forner, 2006; VillersRuiz and Trejo-Vázquez,1997). The damage is most often estimated by taking forecasts or estimates from drought prediction models (Kurukulasuriya and Mendelsohn ,2006; Martens et al., 1999) or by creating indicators of

sensitivity by identifying potential or actual hazards and their frequency (Cutter et al., 2000). Füssel (2007) identified this approach as a risk-hazard approach and denoted the vulnerability relationship as a hazard-loss relationship in natural hazard research, a dose-response or exposure-effect relationship in epidemiology, and a damage function in macroeconomics. Kelly and Adger (2000) referred to the biophysical approach as an end-point analysis responding to research questions such as, “What is the extent of the drought problem?”

2.10.1.3. The Integrated Assessment Approach

The integrated assessment approach combines both socioeconomic and biophysical approaches to determine vulnerability. The hazard-of-place model (Cutter et al., 2000) is a good example of this approach, in which both biophysical and socioeconomic factors are systematically combined to determine vulnerability. The vulnerability mapping approach (O’Brien et al., 2004) is the other related example, in which both socio-economic and biophysical factors are combined to indicate the level of vulnerability through mapping. Füssel (2007) and Füssel and Klein (2006) argued that the IPCC (2001) definition—which conceptualizes vulnerability to drought as a function of adaptive capacity, sensitivity, and exposure—accommodates the integrated approach to vulnerability analysis. According to Füssel and Klein (2006), the risk-hazard framework (biophysical approach) corresponds most closely to sensitivity in the IPCC terminology. Adaptive capacity (broader social development) is largely consistent with the socio-economic approach (Füssel, 2007). In the IPCC framework, exposure has an external dimension, whereas both sensitivity and adaptive capacity have internal dimension, which is implicitly assumed in the integrated vulnerability assessment framework (Füssel, 2007).

2.11. Adaptation and Sustainable Development

Ability to adapt clearly depends on the state of development (Berke, 1995; Munasinghe, 1998). As Ribot et al. (1996) illustrate, underdevelopment fundamentally constrains adaptive capacity, especially because of a lack of resources to hedge against extreme but expected events. The events are not surprises: “It is not that the risk is unknown, not that the methods for coping do not exist...rather inability to cope is due to lack of or systematic alienation from resources

needed to guard against these events” (Ribot et al., 1996). The process of enhancing adaptive capacity is not simple; it involves “spurts of growth interdispersed with periods of consolidation, refocusing and redirection” (Holmes, 1996).

Enhancement of adaptive capacity involves similar requirements as promotion of sustainable development, including: Improved access to resources, Reduction of poverty, lowering of inequities in resources and wealth among groups, Improved education and information, Respect for accumulated local experience, Active participation by concerned parties, especially to ensure that actions match local needs and resources, Improved institutional capacity and efficiency and etc (Burton et al. 2006)

Because actions taken without reference to climate shocks such as have the potential to affect vulnerability to it, enhancement of adaptive capacity to drought can be regarded as one component of broader sustainable development initiatives (Ahmad and Ahmed, 2000; Munasinghe, 2000; Robinson and Herbert, 2000). Hazards associated with drought have the potential to undermine progress with sustainable development (Berke, 1995; Wang’ati, 1996).

Therefore, it is important for sustainable development initiatives to explicitly consider hazards and risks associated with drought (Apuuli et al., 2000). Clearly, adaptive capacity to deal with climate risks such as drought, flood is closely related to sustainable development and equity. Enhancement of adaptive capacity is fundamental to sustainable development. For example, in the drought-stricken region of northeastern Brazil, an assessment of past successes and failures has indicated that a comprehensive sustainable development strategy is needed to increase regional and societal capacity to face present and future probability of drought (Magalhães, 1996). By assessing differences in vulnerability among regions and groups and by working to improve the adaptive capacity of those regions and groups, planned adaptation can contribute to equity considerations of sustainable development. In the context of African agriculture, Downing et al. (1997) conclude that enhancement of present resource management activities is necessary to prepare for potential impacts of drought. Many communities and regions that are vulnerable to drought are also under pressure from forces such as population growth, resource depletion, and poverty. Policies that lessen pressures on resources, improve management of environmental

risks, and increase the welfare of the poorest members of society can simultaneously advance sustainable development and equity, enhance adaptive capacity, and reduce vulnerability to drought and other stresses. Inclusion of climatic risks in the design and implementation of national and international development initiatives can promote equity and development that is more sustainable and that reduces vulnerability to drought (WCDP, 2004; IPCC, 2001).

CHAPTER THREE

3. RESEARCH DESIGN AND METHODS

3.1 Description of the Study Area

3.1.1 Location of the study area

The Wadila district is located in northeast Ethiopia's Amhara region, specifically in the North Wollo zone. The district has borders with the following areas: the north Meket woreda and Gashena city administration; the East Meket and Dawunt; the west Gazo and Delanta woreda; and the south Daunt and delanta Worda. Its coordinates are located between latitude 11°50'N and longitude 38°50'E. Wadila Woreda's capital city, Kone Town, is located 252 kilometers from the regional center of Bahir Dar and 644 kilometers from Addis Ababa.

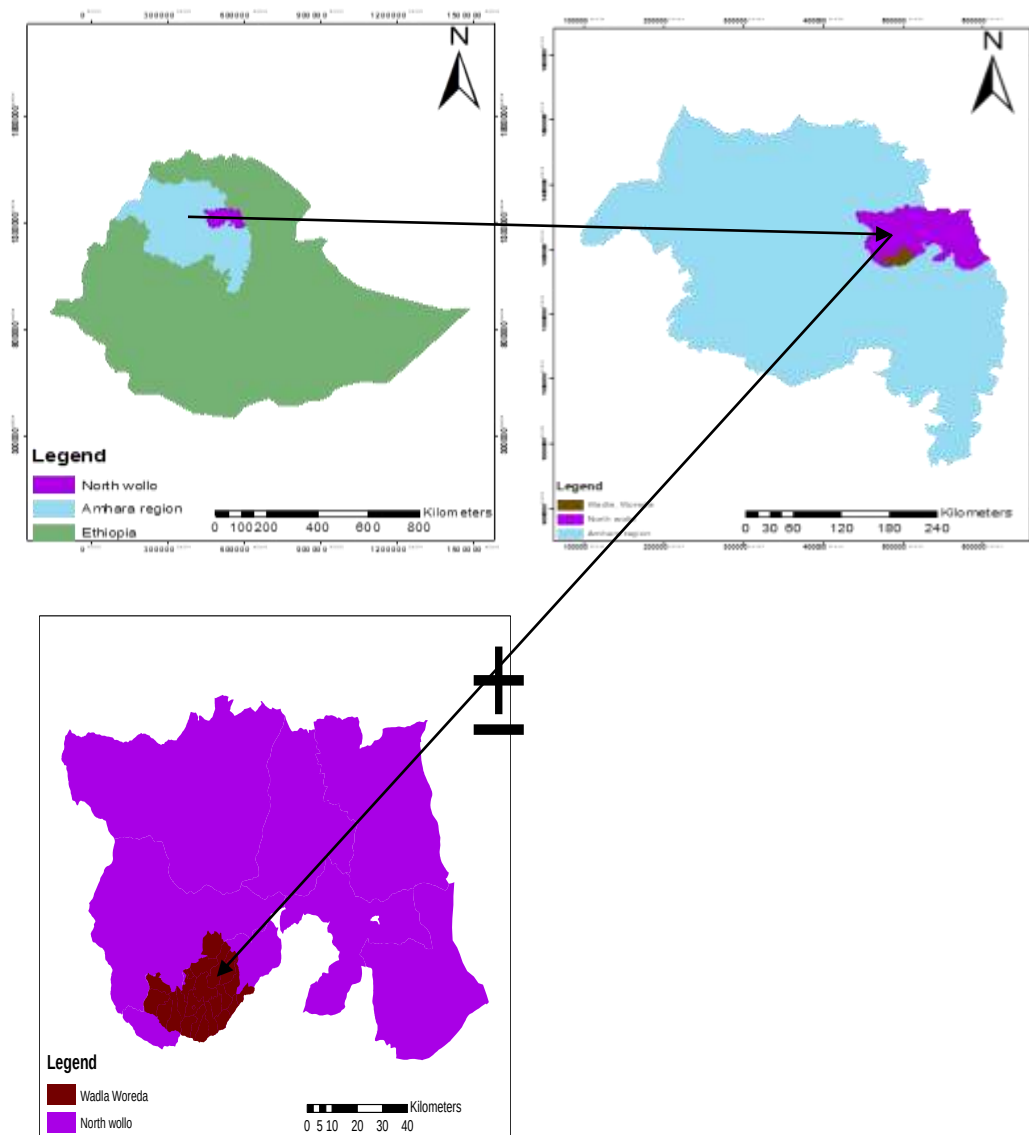


Figure 1: Map of wadila woreda

Source Biyazen Alemu PSNP Expert (2024)

3.2 Research Design

Since the emphasis of this research was undergo an intensive examination of impacts of climate change, vulnerability and coping strategies in association with societies with in specific location, a case study research strategy is used (Bryman 2008 p550). In case study research, an exploratory questions, ‘what’ and ‘how’, and inductive research are

most appropriate and helps to harness detailed and valuable insights and understanding of the topic which could not be achieved by a survey (A. Rialp & J. Rialp 2006; Yin 2003). The case study strategy is both “qualitative and quantitative” (Yin 2003). Methodological triangulation; obtaining data from different sources, such as observations, documentations and interviews, helps to harnesses diverse ideas about the same issue and assist in cross-checking the results, and consequently helps to increase the validity, reliability of the findings and eases data analysis (Bryman 2008; A. Rialp & J. Rialp 2006). This study obtains data from primary sources (field observation, household, government officials and local administrative interview) and secondary data. This study used data from primary sources (field observation, interviews with households’ government officials and local administrative) and secondary data sources (government documents, meteorological data, crop production data and livestock data).

Besides, the researcher is interested in the specific Woreda as he is very familiar with the local unit’s problems that might have some implications for climate change impacts on livelihood.

3.2.1 Types and sources of data

Primary, the researcher were collect directly from the respondent’s collect and capture for the first time for a specific reason, and it’s gathering from the original sources of the respondents, which are selected from each selected sample by way of the questioner's key informant interview, focus group discussion, and field observation.

Secondary data, the researcher was review existing sources that wear intensive desk reviews of unpublished reports of the governmental offices and departments for the study.

3.3 Study Population ,sample size and sampling technique

Purposive and random sampling techniques were employed to select the sample households used to generate the required primary data. At the first stage, Wadila woreda selected purposefully from the food security and early warning office of the North Wollo zone Amhara

region. The reason for the selection was that Wadila woreda was one of the drought-prone districts in the North Wollo Zone of the Amhara region, faces a number of human-induced and environmental problems (small and fragmented farmlands, soil degradation, high population pressure, crop and animal production problems, cultural barriers, recurrent droughts, and frequent erratic rainfall). To minimize this problem, some potential climate-change adaptation agricultural activities were implemented in the area.

In the second stage, the research uses purposive sampling techniques; that the three target study kebeles from the total of twenty-five kebeles in the woreda are selected based on their representation to agro-ecological zones that related with agricultural and livestock production which have direct impact on livelihood vulnerability of smallholder farmers and to show the climate change variability and actual smallholder farmers local climate change adaptation strategies in the study area.

The researcher is interested in the fact that the selected kebele represents the average activity of the woreda total kebele, i.e., kone rural, timtimat, and Hamusit, based on the woreda agricultural, food security and early warning office's climate change variability and actual smallholder farmers local climate change adaptation activities classification. In the third stage, the selected three kebele researchers will select the sample respondents by asking for the total population list for the determination of a simple random sample size from the total amount of the target population. The size of the sample households from each kebele were selected using a proportional sampling method. Using Kothari's method of sample size determination, the total number of households (n) to be surveyed was (Kothari, 2004):

$$\frac{Z^2 P Q N}{e^2 (N-1) + Z^2 P Q}$$

Where n was the sample size. N: was the number of population/households. Then, the total number of households from three villages was (2500) P: population reliability=0.1 (10%). q= 1- p=0.9. e: margin of error considered:5% for this study, Z is 1.96 at 95% confidence level. Hence, the total sample size was determined as: $n = \frac{1.96^2 \times 0.1 \times 0.9 \times 2500}{0.05^2 (2500-1) + 1.96^2 \times 0.1 \times 0.9} \approx 132$.

Eventually, 132 households will be selected for the questionnaire in the study kebeles by employing a lottery sampling method. Size of sample for selected kebeles list below:

Table 1. Target Kebeles Population and Sample Size

No	Name of kebeles	Total population			Sample Size
		Male	Female	Total	
1	Kone geter	888	93	981	52
2	Hamusit	700	125	825	43
3	Timtimat	610	84	694	37
Total		2198	302	2500	132

3.4 Data Collection and Instrumentation

For the fulfillment of this study the researcher were substantially relied on the primary sources of data. The main sources of the data were the sampled households which were contacted through field survey, government officials found at the different administrative level and key informants (who are believed to have climate related and food security knowledge). To obtain the required information, structured, semi structured, and unstructured interviews was conducted to obtain the climate change opinion of the relevant bodies. Besides, the researcher was obtained a substantial amount of information from observation. Appropriate data were collected both from primary and secondary sources through employing different instruments of data collection. Primary data will be collected from different original sources/unpublished sources.

3.5 Data Collection

The following procedures were strictly followed by the researcher to collect the data required for the study. The questionnaires will be tested to check clarity. The amended questionnaire was delivered by hand to the community at their working place on their

working hours and collected through the researcher. Interview sessions were conducted with respondents in their work and the information obtained was compiled accordingly.

3.5.1 Key Informant Interviews

Key informants was interviewed at Woreda and Kebeles where the fieldwork undertaken. Key informant interviews were used because of the researcher's interest in understanding the perceptions of different stakeholders who were directly or indirectly affect the food security (livelihood) or affected by climate change impacts. In order to collect this primary data, employed semi structured questions because it allows the researcher to go beyond systematically prepared questions. Moreover, the way respondents act and answer may lead the researcher to ask in different ways, so these types of questions will be more appropriate. Therefore, individuals who are expected to have background with climate change impacts on food security and climate conscious on community were contacted and interviewed.

The questionnaire was also translated into their local language Amharic, for simplicity of communication with respondents. A random selection procedure was used to obtain samples of individual households from the total HHs. This helps to get a more representative respondent from HHs with equal probability and thus improve efficiency. Formal interviews with the households are conducted with the close supervision of the researcher and/or trained enumerators and also the potential respondents that are members of food security and climate change technical members and Task Forces at Woreda level.

3.5.2 Questionnaires

Moreover, questionnaires which have semi-structured (closed and open ended) questions were prepared and administered to collect a wide range of data from a large number of household heads. The questionnaires were designed and administered by the researcher and supported by enumerators through trained them. The questions were translated in to local language and administered by trained enumerators under direct supervision of the

researcher. The administration of the instruments were seriously supervised and more than half of it is undertaken by the researcher in order to minimize errors.

3.6 Data Analysis Methods

Both qualitative and quantitative data analysis methods were employed in this study. Temperature and rainfall variability was analyzed using mean, standard deviation and coefficient of variation (CV). Coefficient of variation will be calculated as the ratio of the standard deviation to the long-term mean rainfall and temperature data sets.

The multiple regressions model was employed to analyze climate change affecting food security(livelihood status) decision to implement various adaptation strategies. The MNL model is given as follows; $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + e_i$. (4) Where Y= food security status of the society and X_i , where $i = 1, 2, \dots, 11$, are explanatory variables(family size, working personnel in the household, number of dependency in the house hold, land ownership status, grazing land ownership, distance to all weather road, distance to the market). It assumes that each household faces a set of discrete, mutually exclusive choices of adaptation measures (that means a person chooses exactly one of the options, not more and not less) and these measures are assumed to depend on factors of X. Therefore, X represents several climate attributes, environmental, socioeconomic characteristics of households and other factors.

On the other hand, the analytical method was used in order to look beyond the facts and figures which were collected through different instruments and to critically evaluate it. On this basis, the data gathered through the interviews were analyzed by narrating and describing the meanings and implications. In other words, data which were qualitative in nature was described, classified and concepts are connected with one another. The quantitative data were analyzed through simple but appropriate statistical methods. Simple statistical methods like percentages, pie, graph and tabulations were employed to facilitate meaningful analysis and interpretations of the research.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This chapter presents the analysis and discussions of the main findings of the study in relation to the research questions. The first section describes the demographic and socio-economic characteristics of HH heads in the study area. This sub-section has been presented and discussed using descriptive statistics. The climate change impacts on food security status of the house hold in the study area are covered in section two. Section three deals with the adaptation and coping climate change impacts in the study area were detail elaborated. Descriptive and inferential statistics are used to discuss the research findings.

4.1. Demographic Characteristics of Household Heads

The demographic and socio-economic characteristics of HH heads including sex, family size, education level, martial status, working person and dependency were analyzed as shown in the next tables. male headed household 115 (88.5%), 15(11.5%) femal headed household are predominant respondents based on this logic we can concluded that male were dominant in that area this treand have negative effect on climate change practice, food security and decision making. Family size of the respondant has shown 69(53.1) ,48(36.9),13(10) above 3 members,1-3 members and no members at all respectively due to that majority of house hold members fleeing to urban area of the country which has an effect on working ablity and vulnerablity of household for their food security. The working ablity and dependebility 79(60.8), 36(27.7), and 15(11.5) were having working labor of above 3 labour , 1-3 labour and no labor availability in the house hold. And 15(11.5%),35(26.9%),80(61.5%) 3-5 dependent,1-3 dependent and no dependent respectively based on the logic that we reveal house holds which have labor and less dependent in the house holds were food secured than that of non labor households in the study area as it is managed and used the potential carfully.

4.2. Socioeconomic condition of Household Heads

As we have seen in the figure 4, respondents which accounts 13(10%),35(26.9%),82(63.1%) were spent above 1 hours, 31-1 hours and 0-30 minutes respectively to arrive in all-weather road in the study area. Therefore we reveal that respondents in the study area were live surrounding to the nearest all weather roads which enables them to supply their commodities to the market by using all weather roads and accssesed to information related to climate change. As shown in the above figure 6 households which accounts 16(12.3%), 29(22.3%),85(65.4%) were no secured, somewhat secured and secured in their land ownership status respectively. Therefore we can concluded that substantial numbers of respondents in the study area were confidential on their land ownership status and enable the house holds to any CSA practice and become food secured sustainably. As we reveal in the graph 8 respondents which accounts 20(15.4%), 109(83.8%),1(0.8%) non-ownership,0-0.5 hectare and above 0.51 hectare of land used to harvesting twice a year respectively in the study area. Therefore we can summarized that majority of households in the study area used its plot twice a year for cultivation of their land but the impact of weather varablity induce rain fall distribution and onset that affects their production.

The health status in graph 11, shows us respondents which account 7(5.4%),4(19.2%),7(5.4%)3(5.3%),109(83.8%) responded that chronic illness affect households activity by reducing labor availability, decreased productivity of agricultural inputs, by increasing health care expenses, loss of knowledge or expertise when key house hold members are affected and all problem were happen in respectively. Therefore chronic illnesses were a serious problem in household vulnerability to any hazard, aggravating the climate change impacts and a direct influence on the food security status of the study area.

Their agricultural engagment in figure 16 shows respondents accounts 9(6.9%),58(44.6%),56(43.1%) ,7(5.4%) were engaged on agriculture for the successive 0-10 ,10-25, 26-50, and above 51 years . therefore from this facts and figure we can summarize that the community livelihood were practiced over several years without any significant improvements in their life,econmy and environment. In general the economic status of the study

area summarized in figure 22, 11(8.5%),24(18.5%),95(73.1%) were rich, medium, poor households based on community classification and status in respectively. Therefore we can say that majority of respondents in the study area were poor and highly impacted by climate change impacts and their food security were highly vulnerable to climate related hazards and changes .

4.3 Climate change and livelihood vulnerability

In the study the graph 27 , illustrate respondents which accounts 103(79.2%),were responded yes and the remaining 27(20.8) responded no. there fore we can concluded that in the study area traditional knowledge uses for predicting climate change impacts and prepared adaptation and mitigation measure based on their traditional perspective and views and 74(56.9%),56(43.1) mentioned that their traditional methods of predicting weather or climate patterns of their surroundings were common methods that watching the movement or appearance of clouds and observing wind direction and intensity in respectively. Therefore we can summarized that majority of respondents in the study area reveals that their trends of predicting weather or climate patterns were watching the movement and appearance of clouds. But the predictability of weather using their traditional method has shown in figure 30 , households which accounts 44(33.8%),42(32.3%),44(33.8%) responded that increase unpredictability of climate/weather/,loss of community elders with knowledge, less reliance on traditional practice in modern times were the reasons of less reliable of climate prediction respectively .Therefore we can summarized that majority of respondents in the study area reveals that their trends of predicting climate related information were highly influenced this three things. They tried to reduce the impact by using different masures that show in figure 29, the community practices 44(33.8%),42(32.3%),44(33.8) mentioned mixed cropping (inter cropping),using indigenous seeds or drought resistant varieties, practicing crop rotation .Therefore we can summarized that majority of respondents in the study area reveals that their trends of adapting climate variability were by using mixed cropping,drought resistant seed and crop rotation as based on their capacity and resource availability.

In these study the climate relat events affect negatively on the livelihood and food security of the the household in graph 32, shows 115(88.5%),15(11.5) responds yes, and no respectively.

Therefore the extreme weather events such as flood, snow, storm, drought, high rainfall, low rain fall, extreme heat and extreme cold were frequently happen in the study area over the decades and impacted the life of households , drought lead to crop failures, excess rain fall causing flooding or water logging, late or early onset of rainfall, pests and disease, reduced water for livestock were the existed impacts of climate related hazards which jeopardize the living standard of the households in the study area. Due to the prevalence of the above factors majority of the respondents were proportionally depends on productive safety net program, sell household asset or livestock, take loans from credit institution and small number of households are take measure of reduce the number or size of the meals.

All most all the trends of crop choice for planting in the past and now a day were paradigm changed. Know a day the majority of the respondents were changed the culture of planting crops towards cropping animal fodder such as oat and that oat provides better economic gain by feeding animals and generating better money for exchanging crops in the market than growing traditionally planted barley and wheat. In the past two years the respondent planted 109(83.8%),16(12.3%),5(3.8%) plants cereals, pulses and vegetables respectively. Therefore we can conclude that majority of the community planted cereals but did not get the expected amount of productivity in comparative with the total hectare of land planted due to climate related hazards such as, snow, stormy rainfall, pests, winds, flood and extreme cold frequently prevails in the area.(figure 38)

The incident , frequency of excess rain fall , onset of rainfall and snow vary and increased illustrated below figures(40,42,43) accounts 56(43.1%),18(13.8%)56(43.1%) responded incident increased, not change observed, and incident decreased. Onset of rainfall 66(50.8%),43(33.1%)21(16.2%) evaluated incident increased, incident decreased, no change at all respective to frequency of rain fall happen before and after the normal date of rainy season in the locality .the incident of snows 93(71.5),37(28.5) responded the incidents and frequency of snow were increased and decreased respectively.so rainfall and priceptation of the area changed in the past ten years of their expreance.

In the past ten year the condition of daily(maximum) temperature results shown in the graph 44 respondents which account 91(70%),evaluated the trends of daily maximum temperature were increased whereas the remaining 39(30%) were decreased. Therefore we can generalized that the majority of the respondents described that daily maximum temperature were increased due to the global level climate change impacts and endanger the food security status of the respondents in the study area.

Table 2, sex of the respondent

		Frequency	Percent
Valid	Male	115	88.5
	Female	15	11.5
	Total	130	100.0

As shown in Table 2, male headed household 115 (88.5%), 15(11.5%) femal headed household are predominant respondents in this study. As we have seen in the above table majority of the respondent in the study area were male. based on this logic we can concluded that male were dominant in that area this treand have negative effect on climate change practice, food security and decision making.

Table 3, family size of the respondent

		Frequency	Percent	Valid Percent
Valid	above 3 members	13	10.0	10.0
	1-3	48	36.9	36.9
	no members at all	69	53.1	53.1
	Total	130	100.0	100.0

source survey result of the woreda

As we have seen in the above table there were 69(53.1) ,48(36.9),13(10) house holds which had no family members ,1-3 family members, above 3 members respectively with in the house hold. there fore we can concluded that majority of the respondents in the study area were the only spouses and 48 percent were having 1-3 members in the house hold due to that majority of house hold members fleeing to urban area of the country which has an effect on working ablity and vulnerablity of household for their food security.

Table 4, educational level of the respondent

		Frequency	Percent	Valid Percent
Valid	Secondary education	15	11.5	11.5
	Primary education	44	33.8	33.8
	illiterate	71	54.6	54.6
	Total	130	100.0	100.0

As we have shown in the above table 4 majority of the respondents in the study area were 71(54.6),44(33.8),15(11.5) were illiterate, primary education and secondary education respectively. there fore we can summarized that majority of the respondents were illiterate.

Table 5, marital status of the respondent

		Frequency	Percent	Valid Percent
Valid	widowed	13	10.0	10.0
	Divorced	32	24.6	24.6
	married	85	65.4	65.4
	Total	130	100.0	100.0

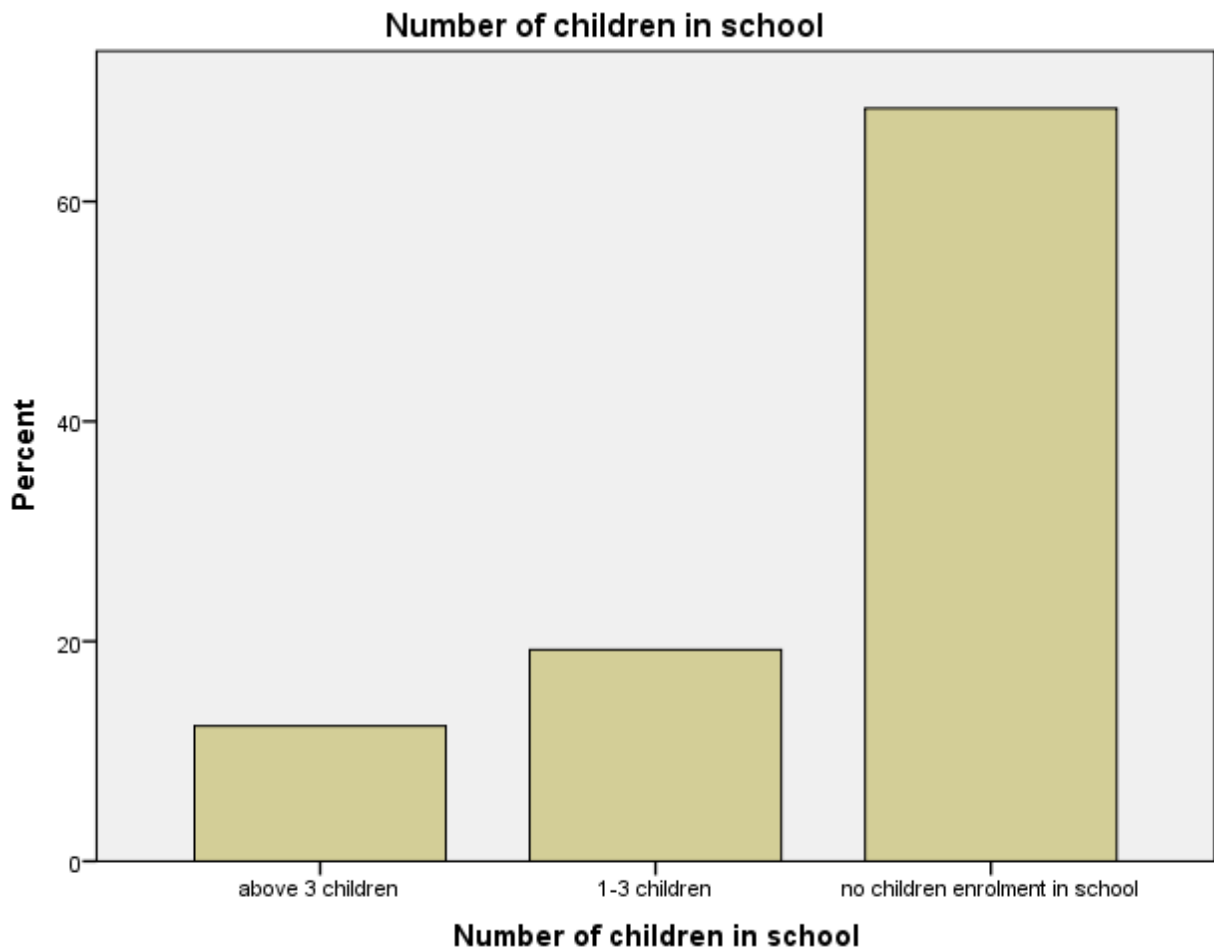
As shown in the above table 4 majority of the respondents in the study area were married house hold which accounted 85(65.4) and the remaining 32(24.6),and 13(10) were divorced and widowed house holds.there fore we can summarized that majority of the respondents were married lead stable livelihood than that of widowed and divorced households.

Table 6, respondents working person in the house hold

		Frequency	Percent	Valid Percent
Valid	no labour	15	11.5	11.5
	1-3	36	27.7	27.7
	above3	79	60.8	60.8
	Total	130	100.0	100.0

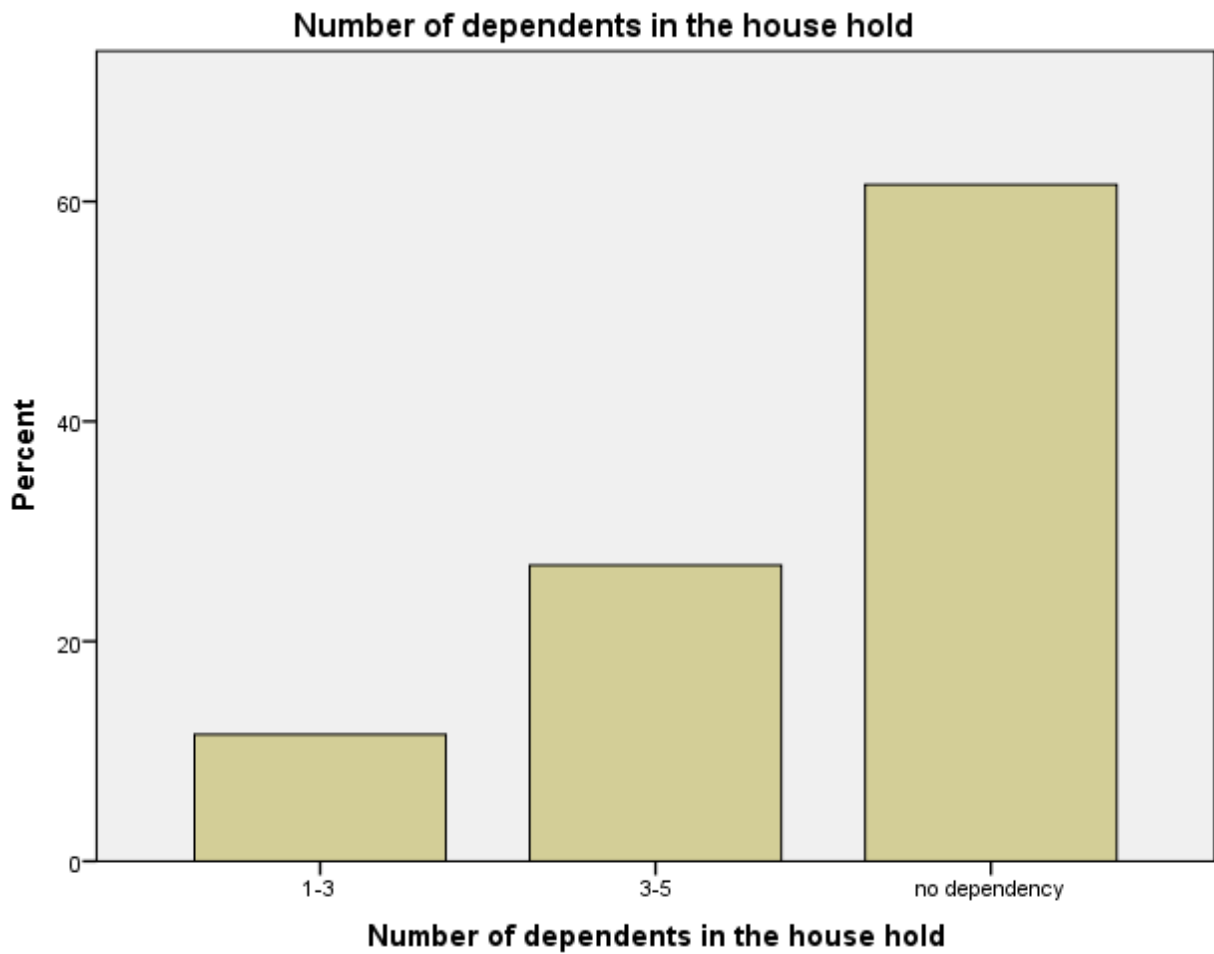
As we have seen in the above table 6, respondents which accounts 79(60.8),36(27.7),and 15(11.5) were having working labor of above 3 labour , 1-3 labour and no labor availability in the house hold. based the logic that we reveal house holds which have labor in the house holds were food secured than that of non labor households in the study area.

Figure 1 number of children in the school



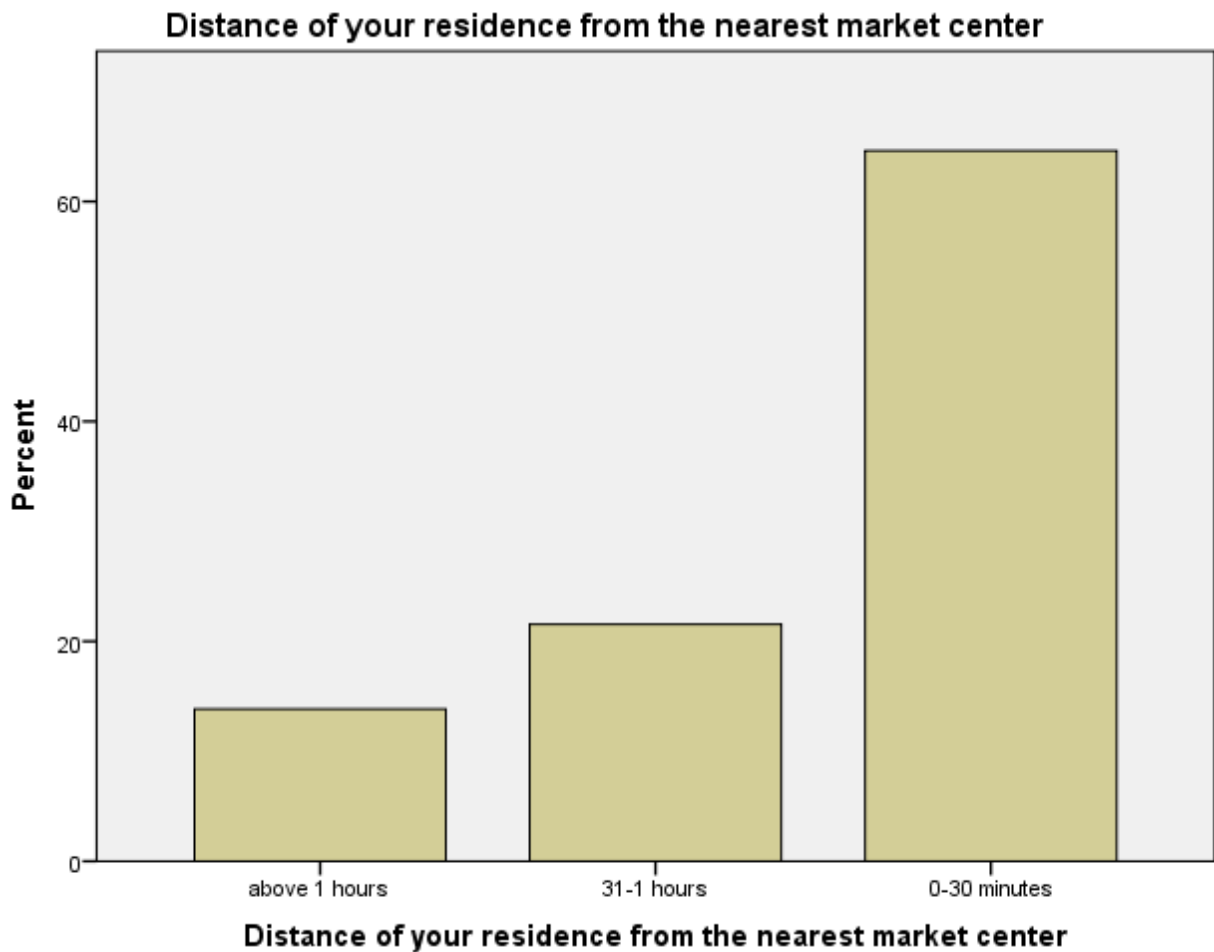
As we have seen in the above figure 1 respondents which accounted 16(12.3%),25(19.2%),89(68.5%) were no children enrollment in the school,1-3 children enrolment in the school, and above 3 children enrollment in the school in respectively .therefore we concluded that majority of the respondents in the study area were no children enrollment in the school and that enables the house hold to minimize cost related with education and contribute for safe livelihood food security status of the house hold.

Figure 2 number of dependent in the house hold



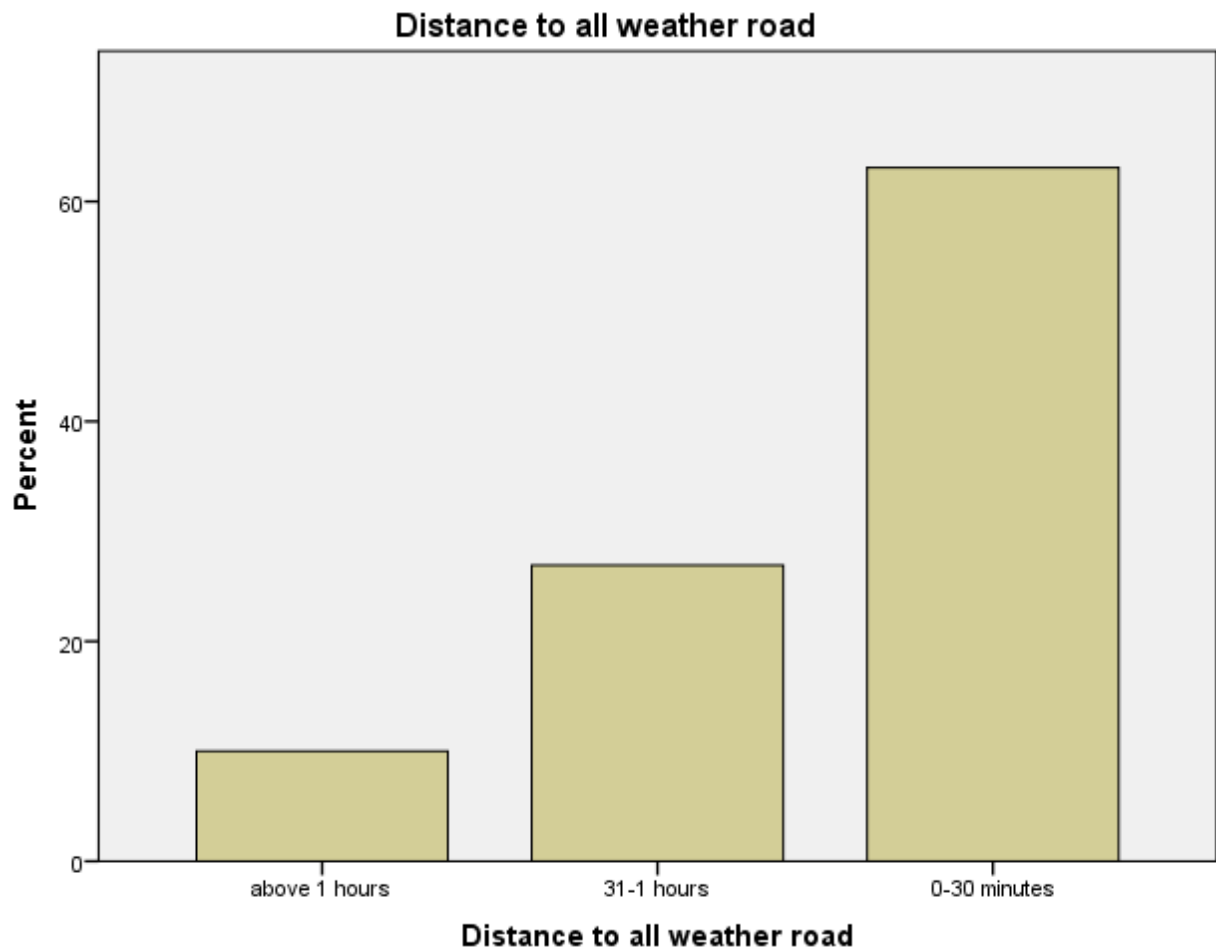
As shown in the above figure 2 respondents which accounts 15(11.5%),35(26.9%),80(61.5%) were no dependent ,3-5 dependent,1-3 dependent respectively in the respondents in the study area and having better food security status rather than having dependent with in the house hold.

Figure 3 respondents distance from the nearest market center



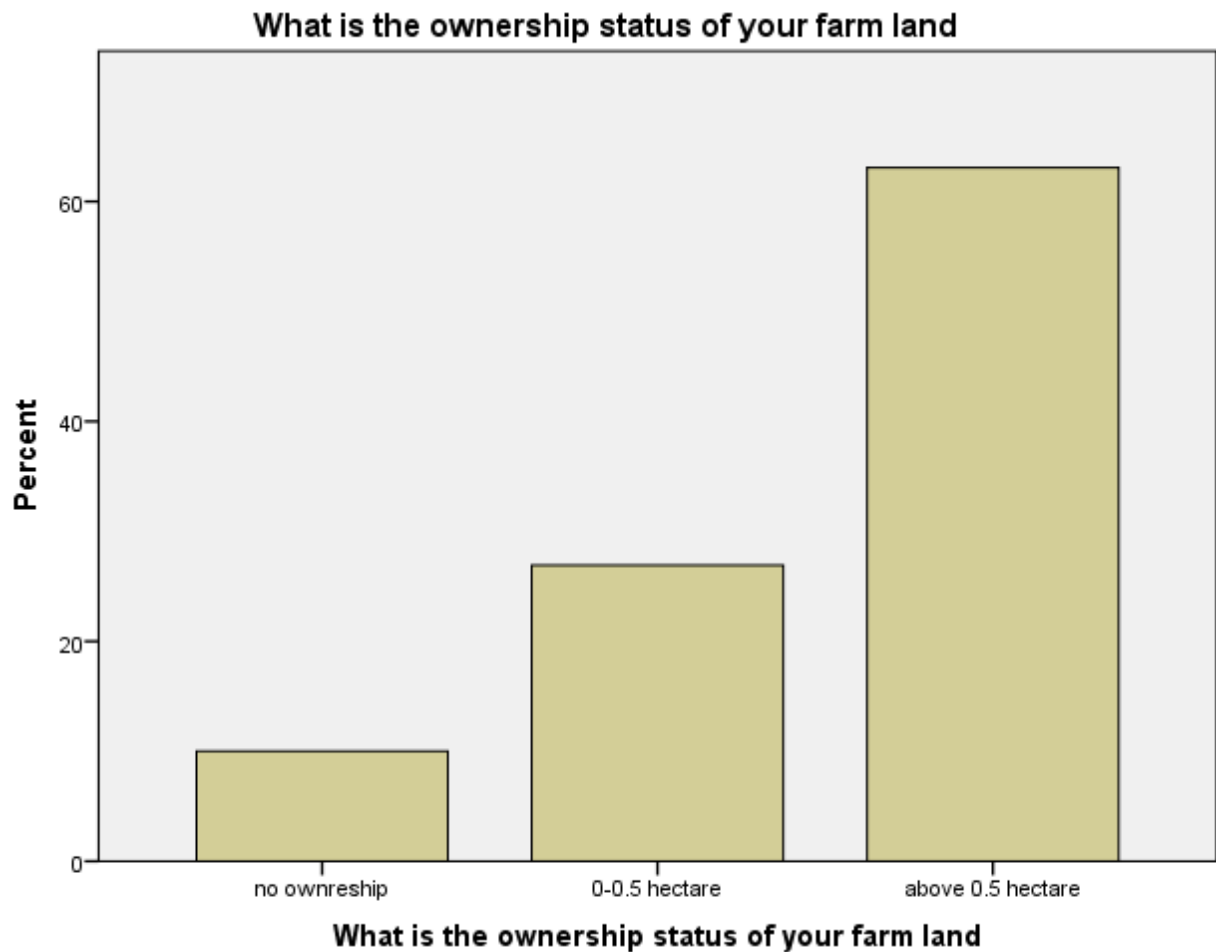
As shown in the above figure 3 respondents which accounts 18(13.8),28(21.5),84(64.6) were spend 0-30,31-1 hours, over 1 hours to arrive in their local markets respectively .therefore we can conclude that majority of the respondents spent 0-30 minutes to arrive in their proximity of market center.

Figure 4 respondents distance to all weather road



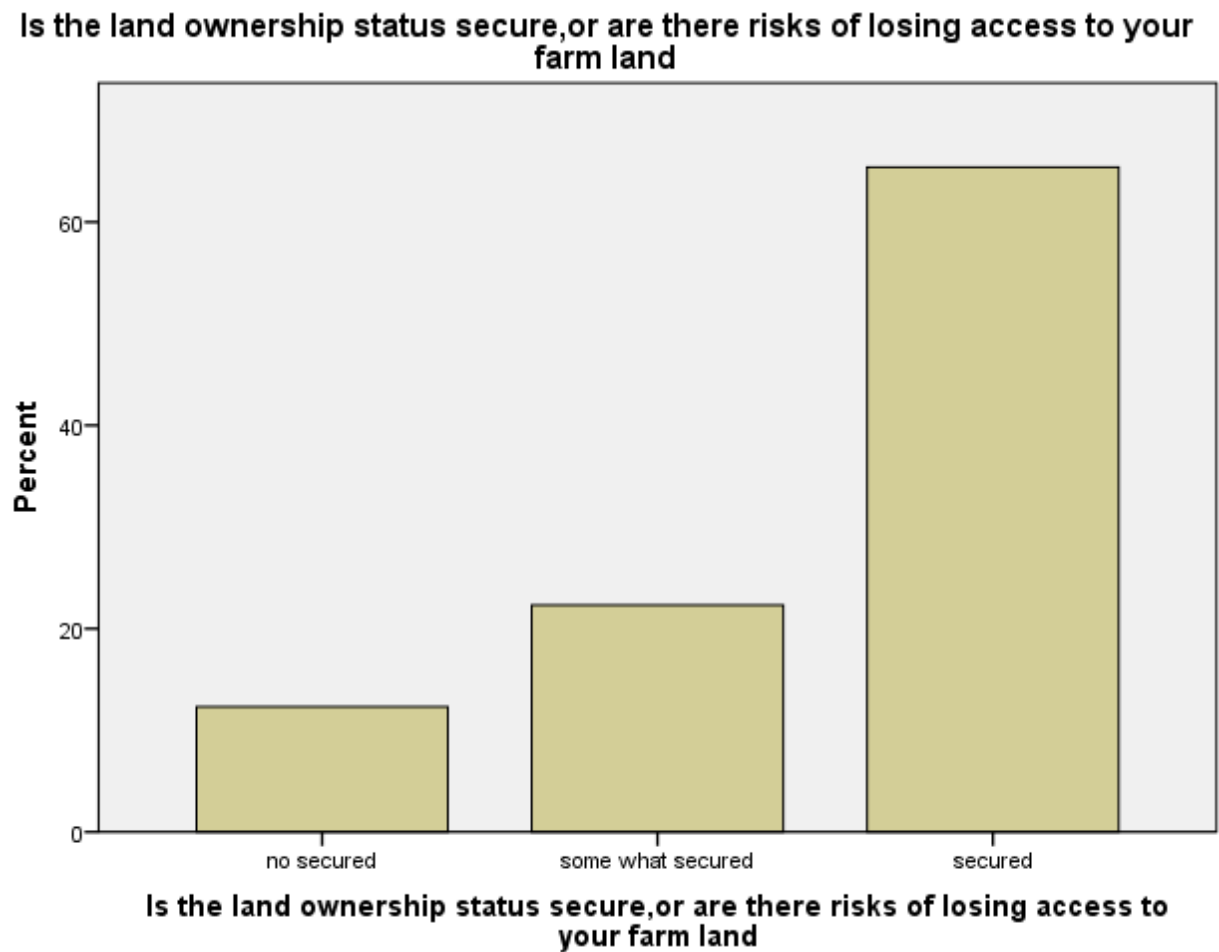
As we have seen in the above figure 4 respondents which accounts 13(10%),35(26.9%),82(63.1%) were spent above 1 hours, 31-1 hours and 0-30 minutes respectively to arrive in all-weather road in the study area. Therefore we reveal that respondents in the study area were live surrounding to the nearest all weather roads which enables them to supply their commodities to the market by using all weather roads.

Figure 5 respondents farm land ownership status



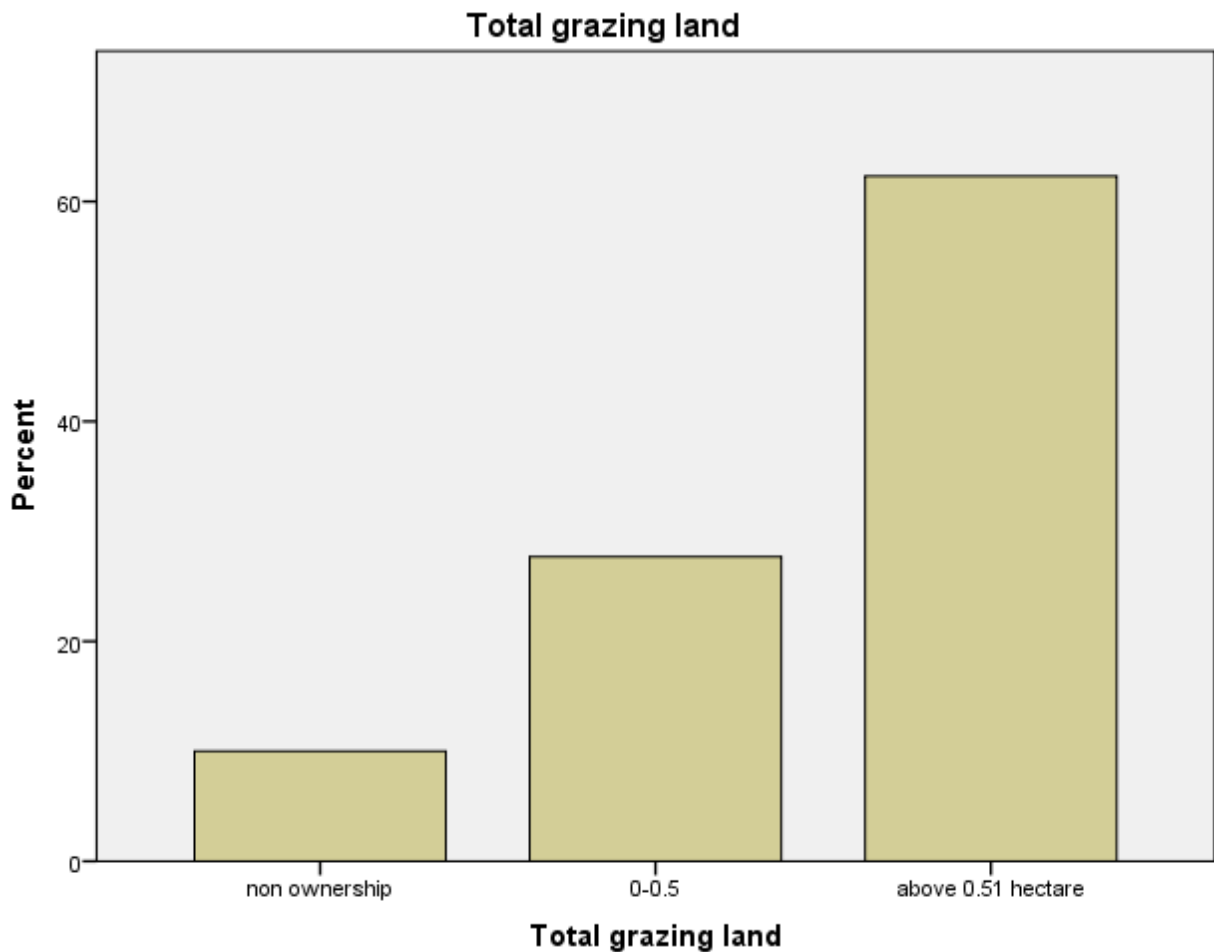
As we have seen in the above graph 5 respondents which accounts 14(12.36%),37(27%),79(68.5%) were have no land, 0-0.05 hectare and above 0.5 hectare land ownership at all respectively. we revels that in the study area majority of the respondents were having above 0.5 hectare of farm land and house holds with land ownership leads better livelihoods and food secured than those haven't farm land.

Figure 6 respondents land ownership security status



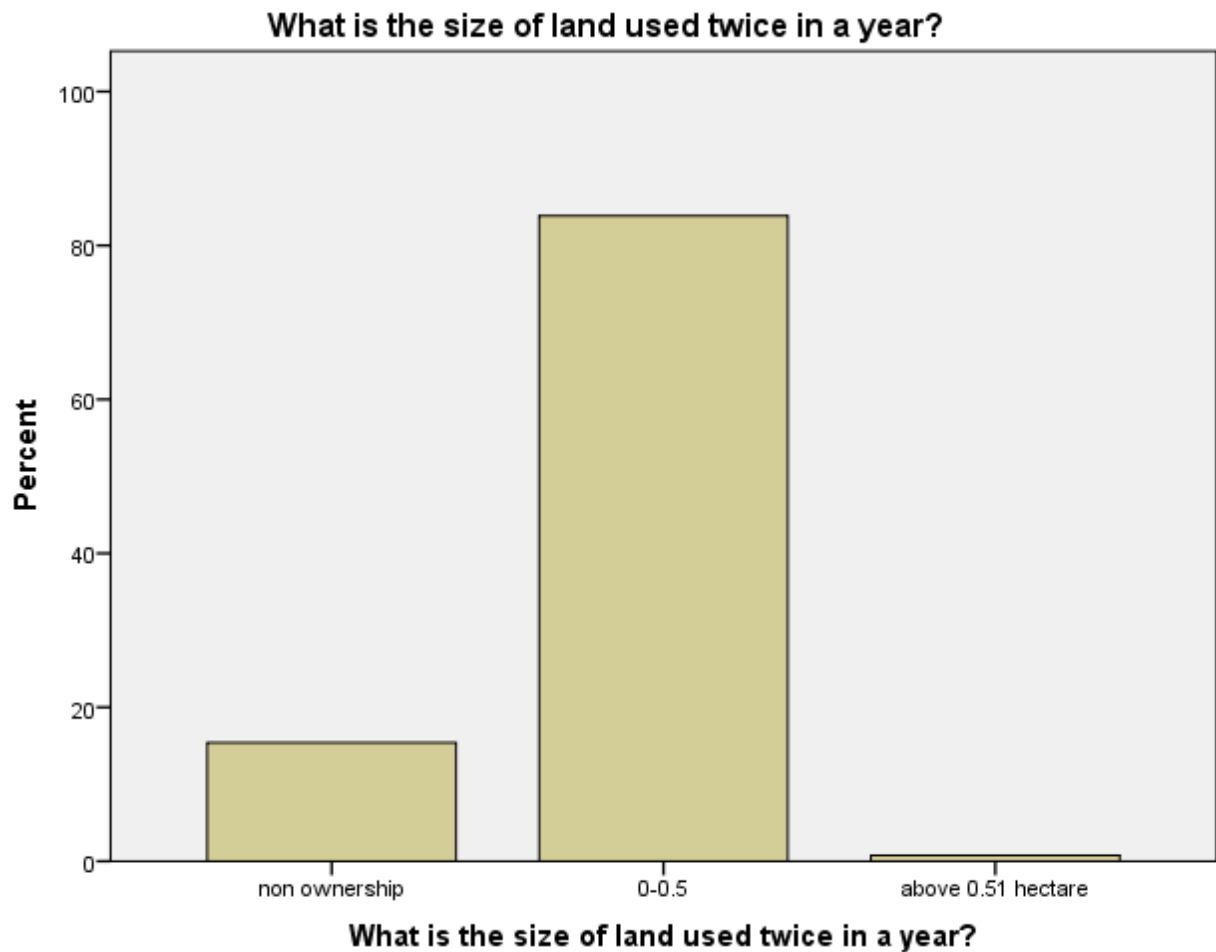
As shown in the above figure 6 households which accounts 16(12.3%),29(22.3%),85(65.4%) were no secured, somewhat secured and secured in their land ownership status respectively. Therefore we can concluded that substantial numbers of respondents in the study area were confidential on their land ownership status and enable the house holds become food secured rather than the in secured ownership status ones.

Figure 7 respondents grazing land status



As we reveals in the above graph 7, respondents which accounts 13(10%),36(27.7%),81(62.3 %) were have above non-ownership,0-0.5,and above 0.5 of grazing land respectively. Therefore we can concluded that majority of the respondents in the study area were resilient to climate change impacts on their livelihood than household lacks grazing land in the study area.

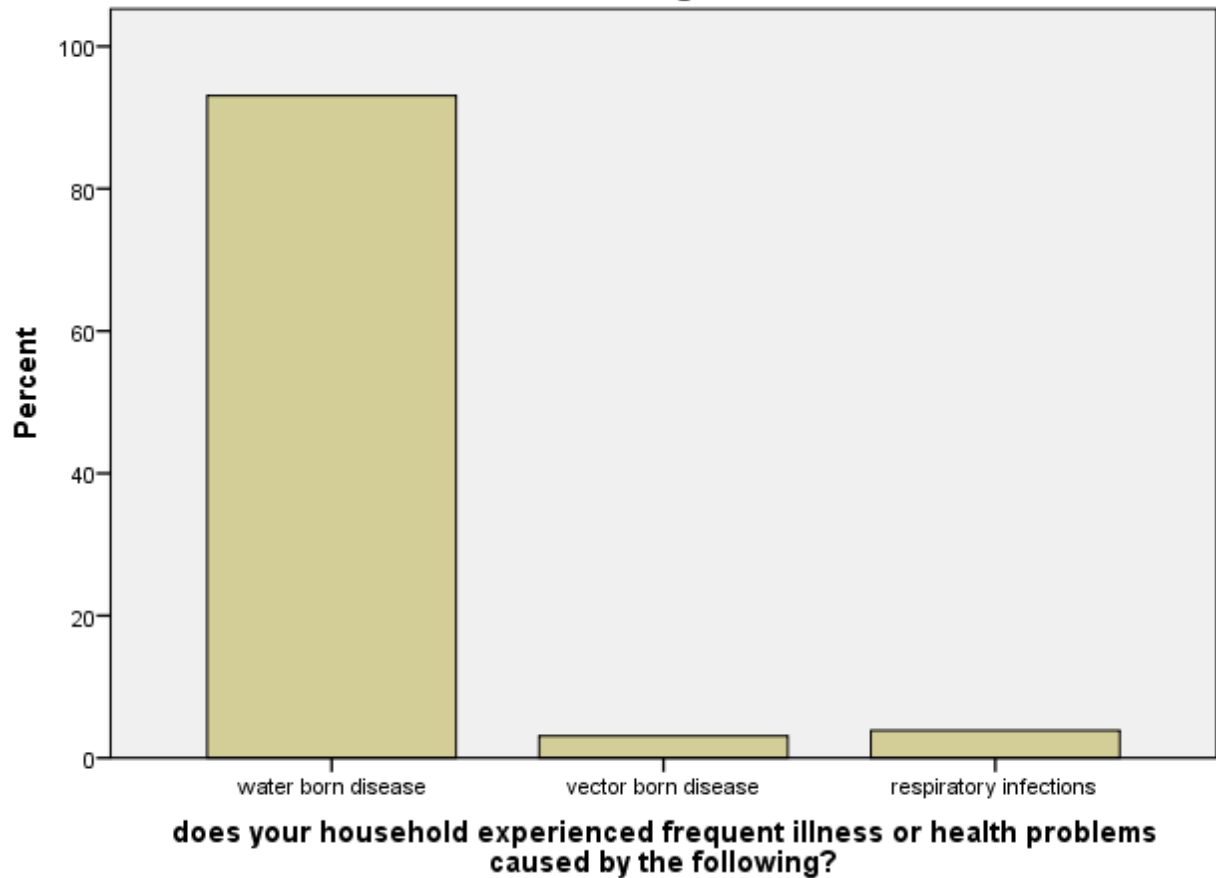
Figure 8 respondents the size of land used twice a year



As we reveal in the above graph 8 respondents which accounts 20(15.4%),109(83.8%),1(0.8%) non-ownership,0-0.5 hectare and above 0.51 hectare of land used to harvesting twice a year respectively in the study area. Therefore we can summarized that majority of households in the study area used its plot twice a year for cultivation of their land.

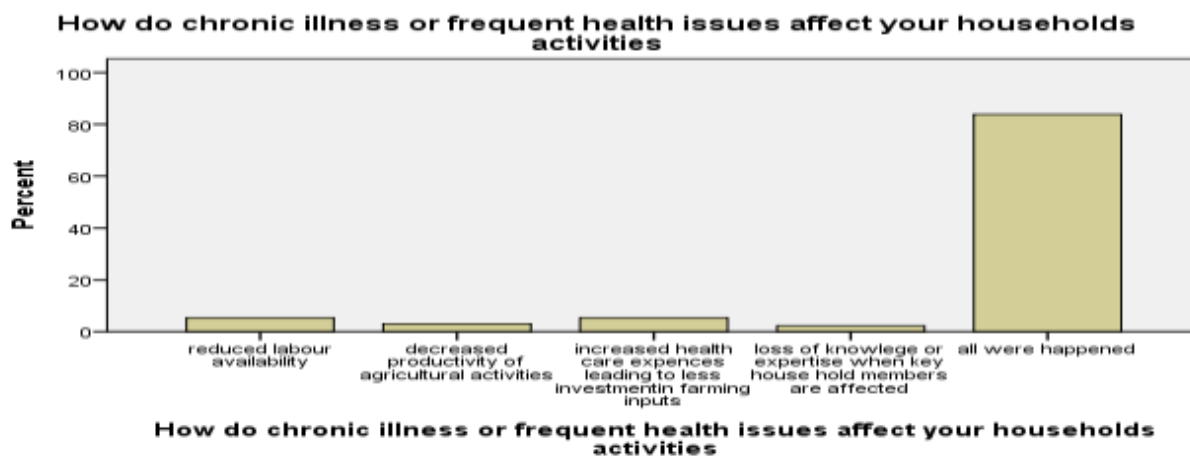
Figure 9 respondents causes of health problem

does your household experienced frequent illness or health problems caused by the following?



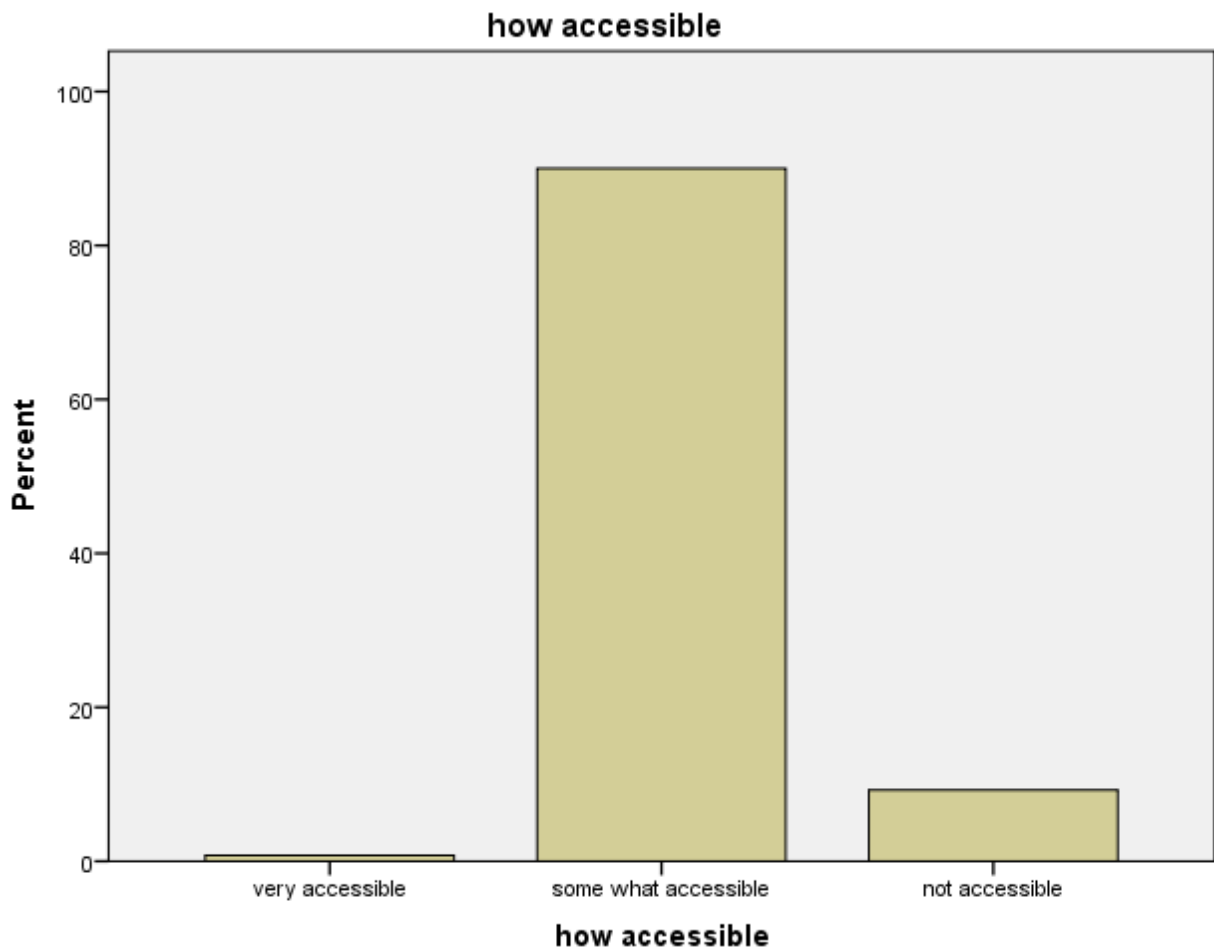
As we have seen in the above figure 9, from those encounter health related problem which accounts 121(93.1%),4(3.1%),5(3.8%) respectively were experienced with water born disease, vector born disease, respiratory infections respectively and aggravated the climate change impacts on their food security status of the households.

Figure 10, respondent's frequent health issues impact on household activities



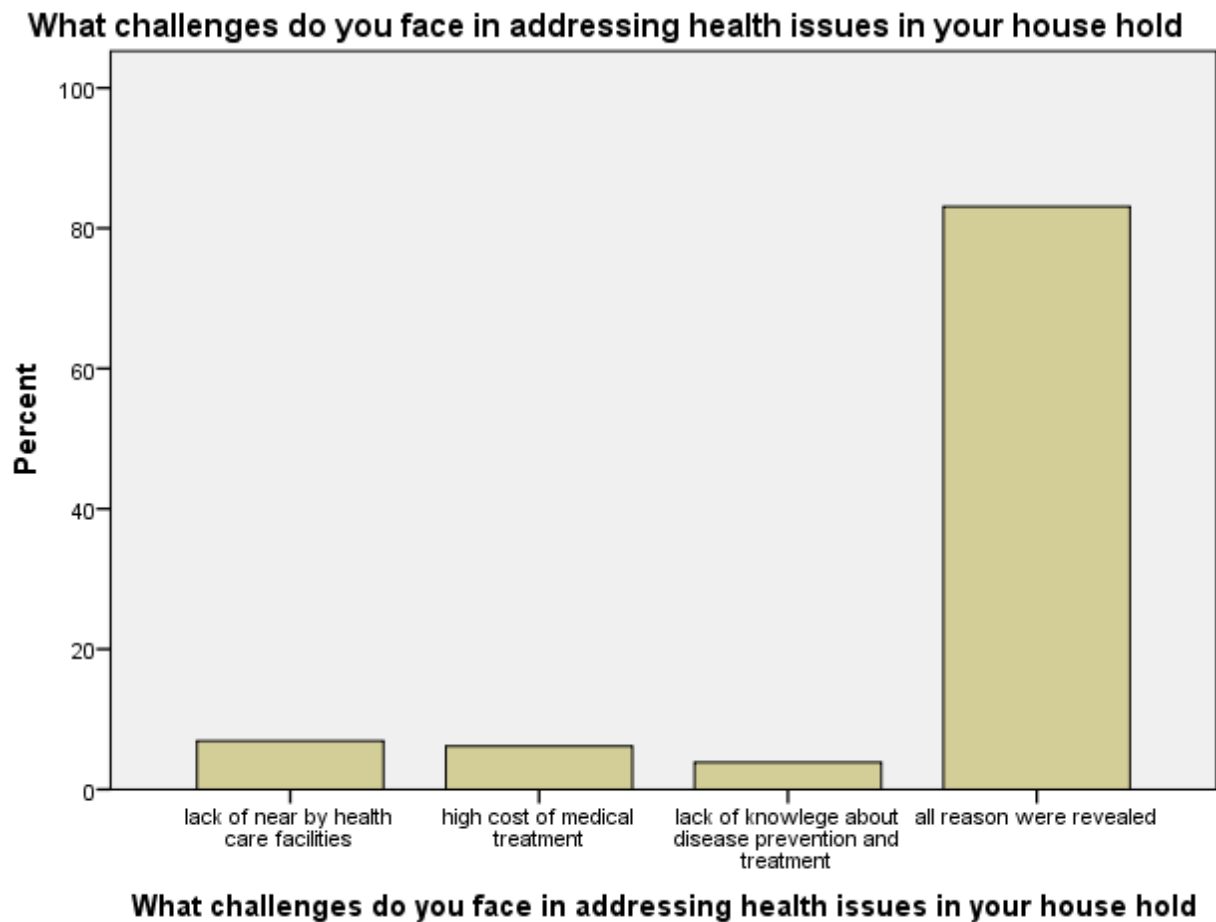
As we have seen in the above graph 10 respondents which account 7(5.4%),4(19.2%),7(5.4%)3(5.3%),109(83.8%) responded that chronic illness affect households activity by reducing labor availability, decreased productivity of agricultural inputs, by increasing health care expenses, loss of knowledge or expertise when key house hold members are affected and all problem were happen in respectively. Therefore chronic illnesses were a serious problem in aggravating the climate change impacts and a direct influence on the food security status of the house hold.

Figure 11 respondents health access



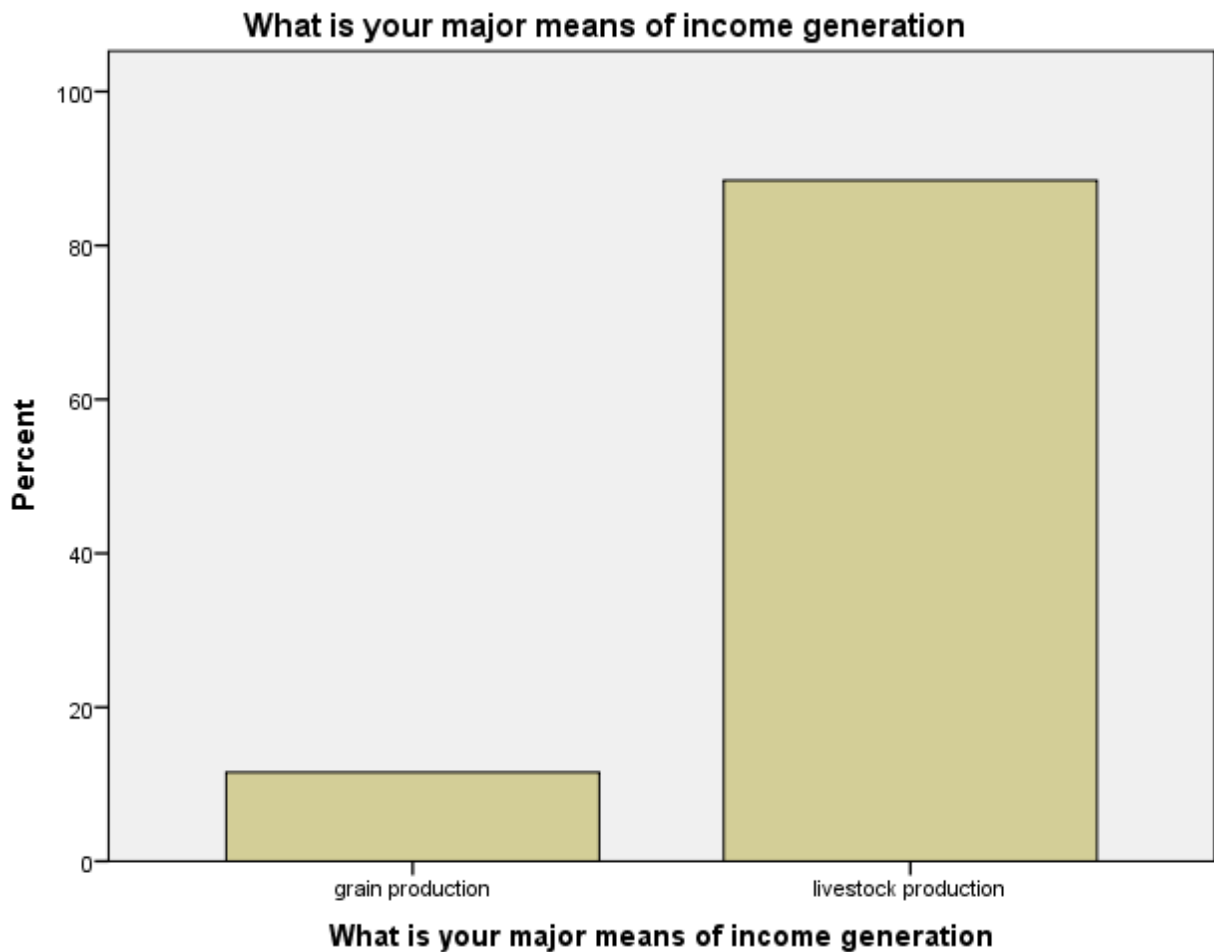
As we have seen in the above graph 11 respondents which accounts 1(0.8%),117(90%),12(9.2%) have health care service accessibility status were very accessible, somewhat accessible, not accessible respectively .therefore we can say that the available health center were not able to satisfy the demands of the community and does not optimize climate change impacts and building resilience capacity of the households in the study area.

Figure 12 respondents challenges to address health issues



As we have seen in the above figure 12 respondents which accounts 9(6.9%),8(6.2%),5(3.8%)108(83.1%) reported that lack of nearby health facility, high cost of medical treatment, lack of knowledge ,all problem happened in the area respectively .therefore disease prevention and treatment were serious challenges encountered by the community in the study area. Therefore we can say that serious health related issues were highly impacted the food security status and climate change and adaptation practice of the community in the study area.

Figure 13 respondents means of income generation



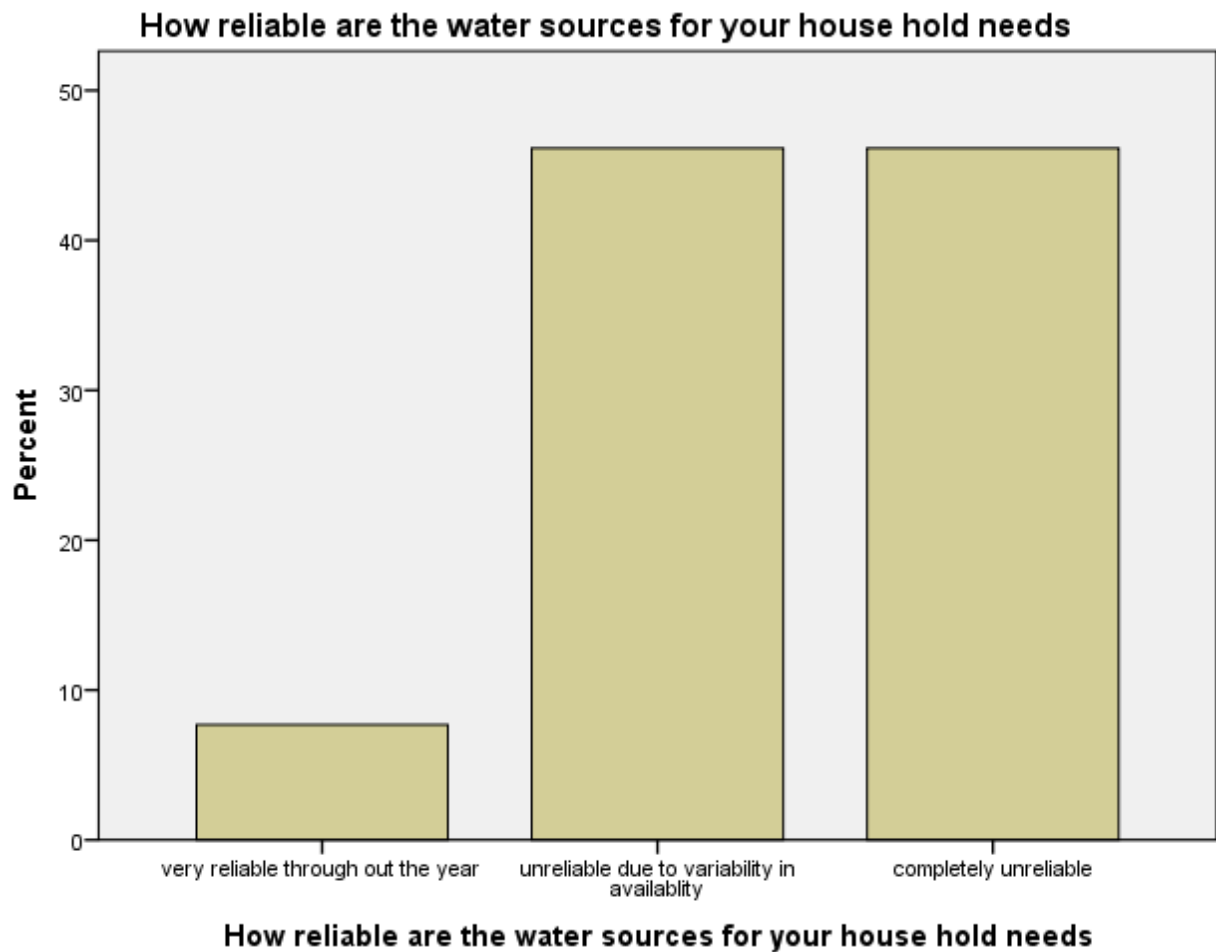
As shown in the above graph 13, respondents which accounts 15(11.5%),115(88.5%) ways of livelihood were dependent on livestock and crop production respectively. therefore from this logic we can say that majority of community livelihood means in the study area were livestock production.

Figure 14 respondents experience on engagement of agriculture



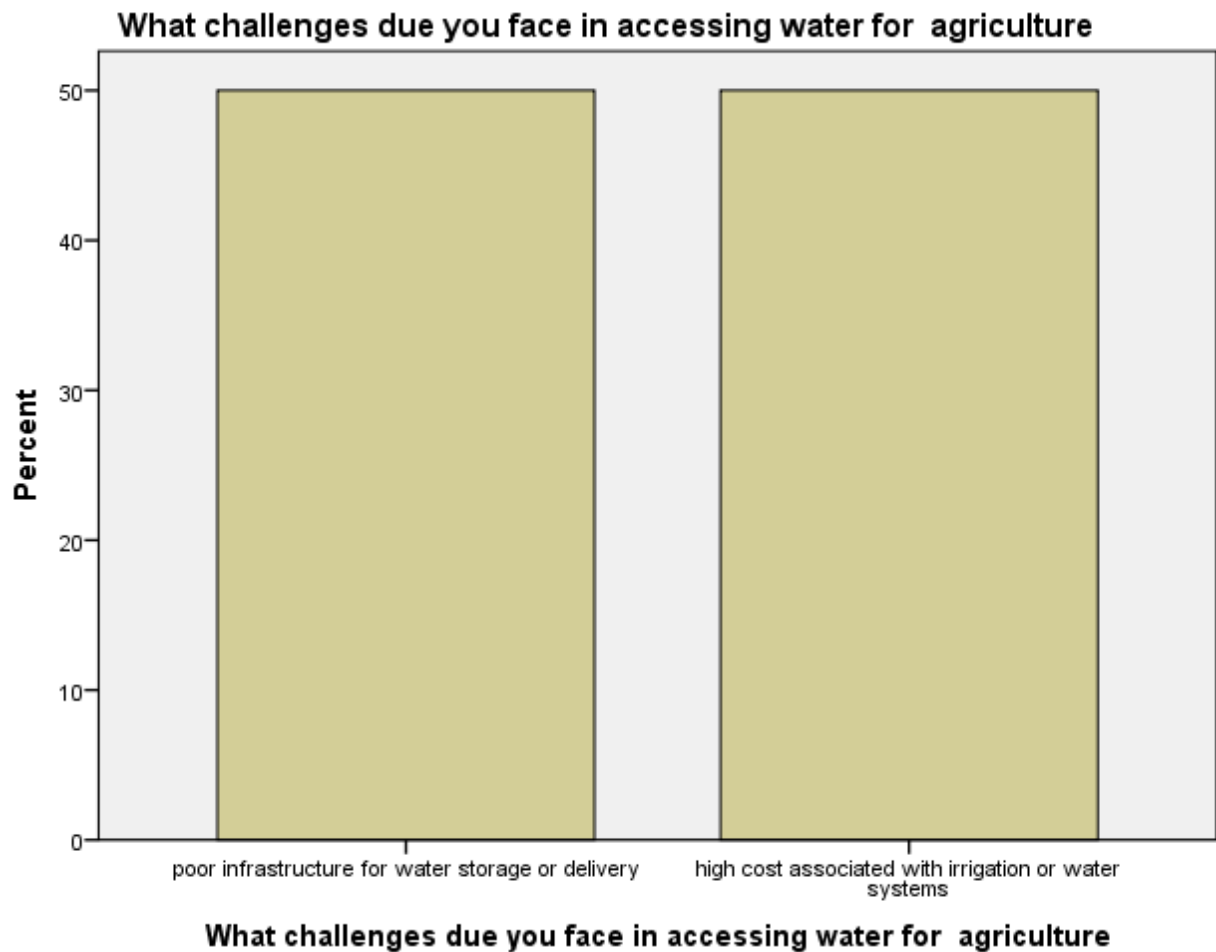
As we shown in the above figure 14, respondents accounts 9(6.9%),58(44.6%),56(43.1%),7(5.4%) were engaged on agriculture for the successive 0-10 ,10-25, 26-50, and above 51 years . therefore from this facts and figure we can summarize that the community livelihood were practiced over several years without any significant improvements in their life,econmy and environment.

Figure 15 respondents water sources reliability



As shown in the above graphs 15 the majority of respondents water sources were rain fall and rain fall reliability status were seriously endangered due to variability in availability unreliable source of information.

Figure 16 respondents challenge in accessing water for agriculture



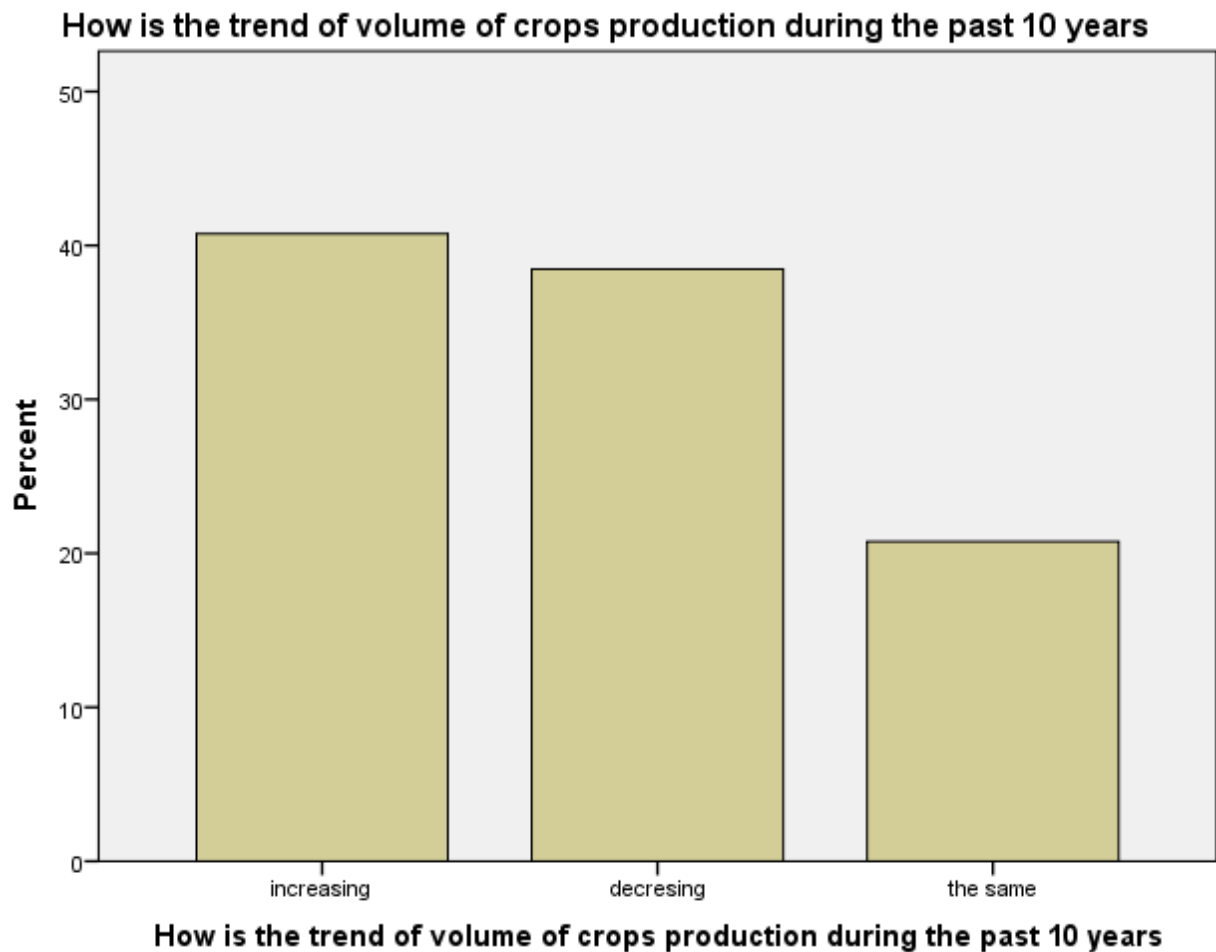
As shown in the above graphs 16, respondents which accounts 65(50%),65(50%) were challenged by poor infrastructure for water storage and delivery as well as high cost associated with irrigation or water systems in respectively. Therefore we can concluded that majority of the respondents in the study area were challenged in access of water for agriculture and their food security were adversely impacted by climate change and lacks adaptability coping mechanisms still not optimized.

Figure 17 respondent classification of their economic status



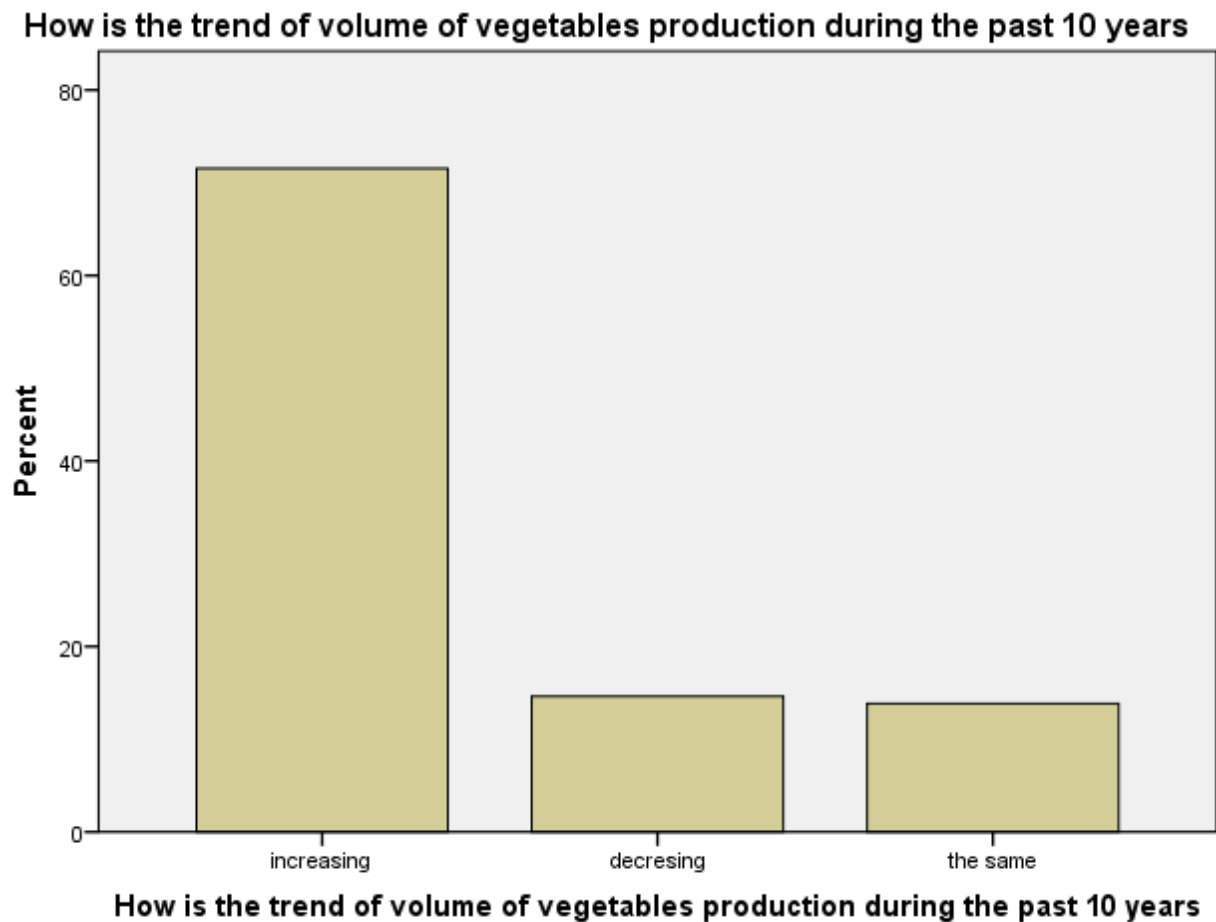
As shown in the above graphs 17, respondents which account 11(8.5%),24(18.5%),95(73.1%) were rich, medium, poor households based on community classification and status in respectively. Therefore we can say that majority of respondents in the study area were poor and highly impacted by climate change impacts and their food security were highly vulnerable to climate related hazards and changes.

Figure 18 respondents trends of crop production



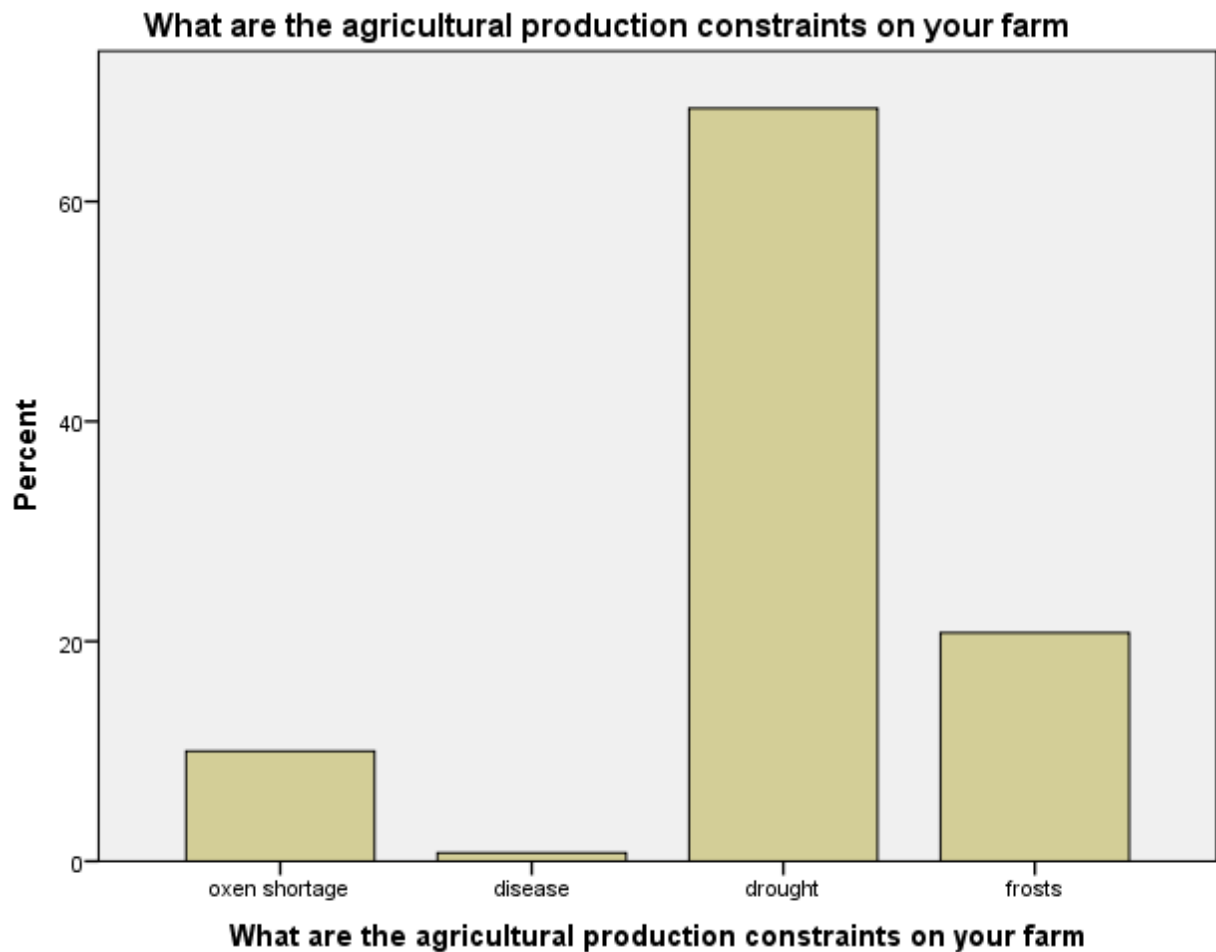
As we reveals in the above graph 18, households which accounts 53(40.8%),50(38.5%)27(20.8%) mentioned that their trends of volume of crop production over decades observed that increasing, decreasing and remain the same respectively. Therefore we can summarized that majority of respondents in the study area revels that their trends of crops production in terms of volume were progressed due to the application of adaptation practice like application of fertilizer, compost, chemical ,improved seed e.t.c.

Figure 19 respondents trend of vegetables production



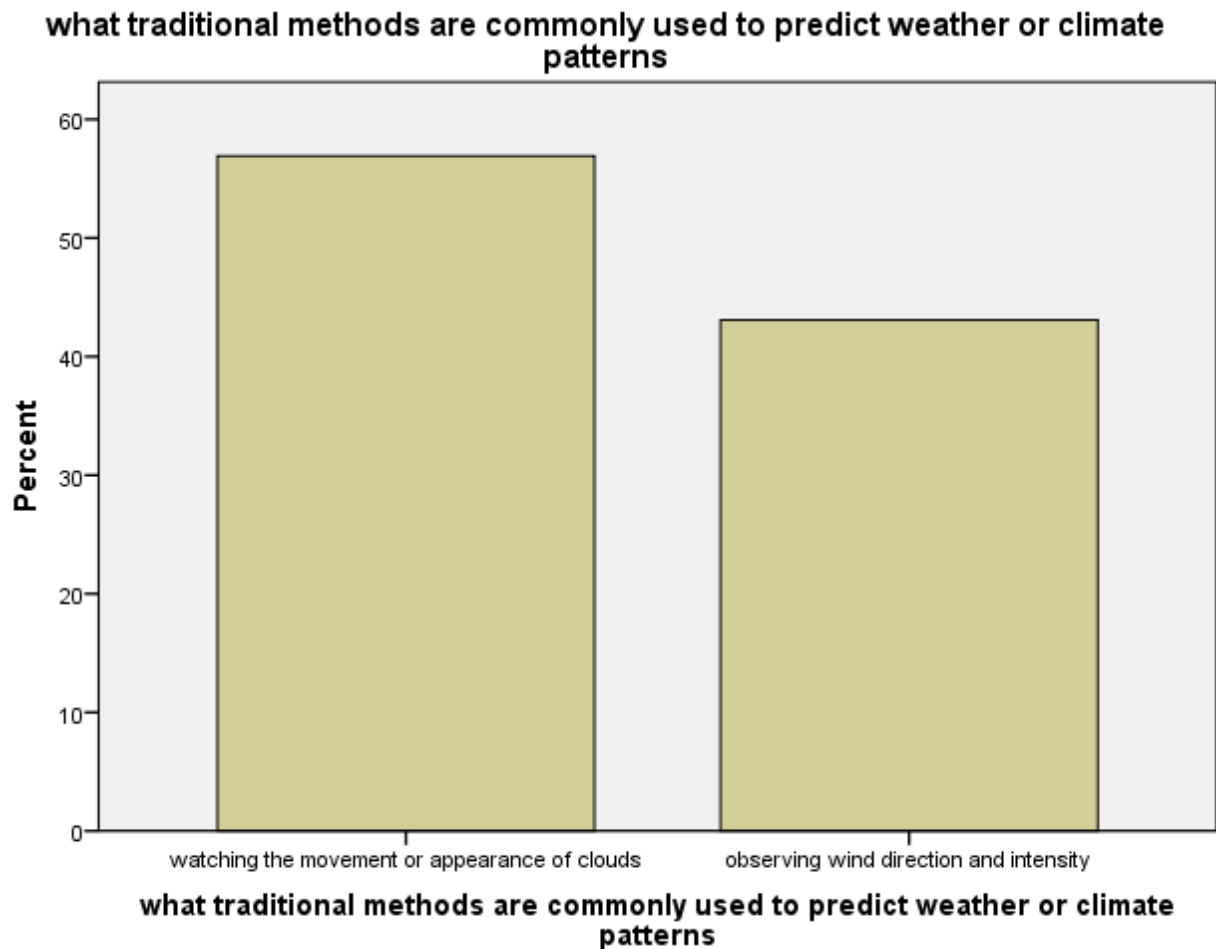
As we reveals in the above graph 19, households which accounts 93(71.5%),19(14.6%)18(13.8%) mentioned that their trends of volume of vegetable production over decades observed that increasing, decreasing and remain the same respectively. Therefore we can summarized that majority of respondents in the study area reveals that their trends of vegetable production in terms of volume were progressed due to the application of adaptation practice like application of fertilizer, compost, chemical ,improved seed e.t.c.

Figure 20 respondents agricultural production constraints



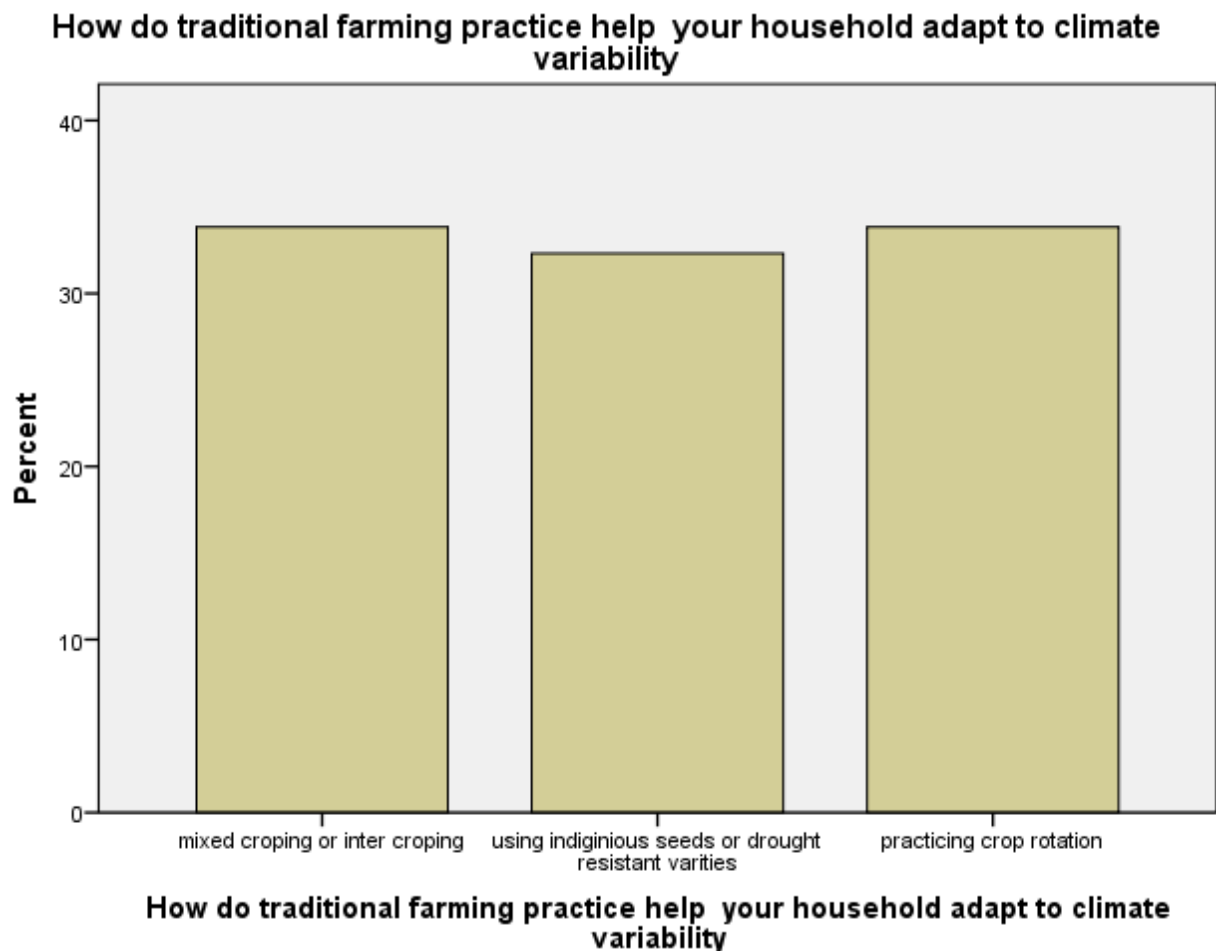
As we reveals in the above graph 20, households which accounts 13(10%),1(0.8%) 89(68.5%),27(20.8) mentioned that their agricultural production constraints were oxen shortage ,disease, drought, frost respectively. therefore we can summarized that majority of respondents in the study area revels that frequent drought and frost were the main factors that affect their livelihood and food security status for a long period of time.

Figure 21 types of traditional methods used to predict weather or climate patterns



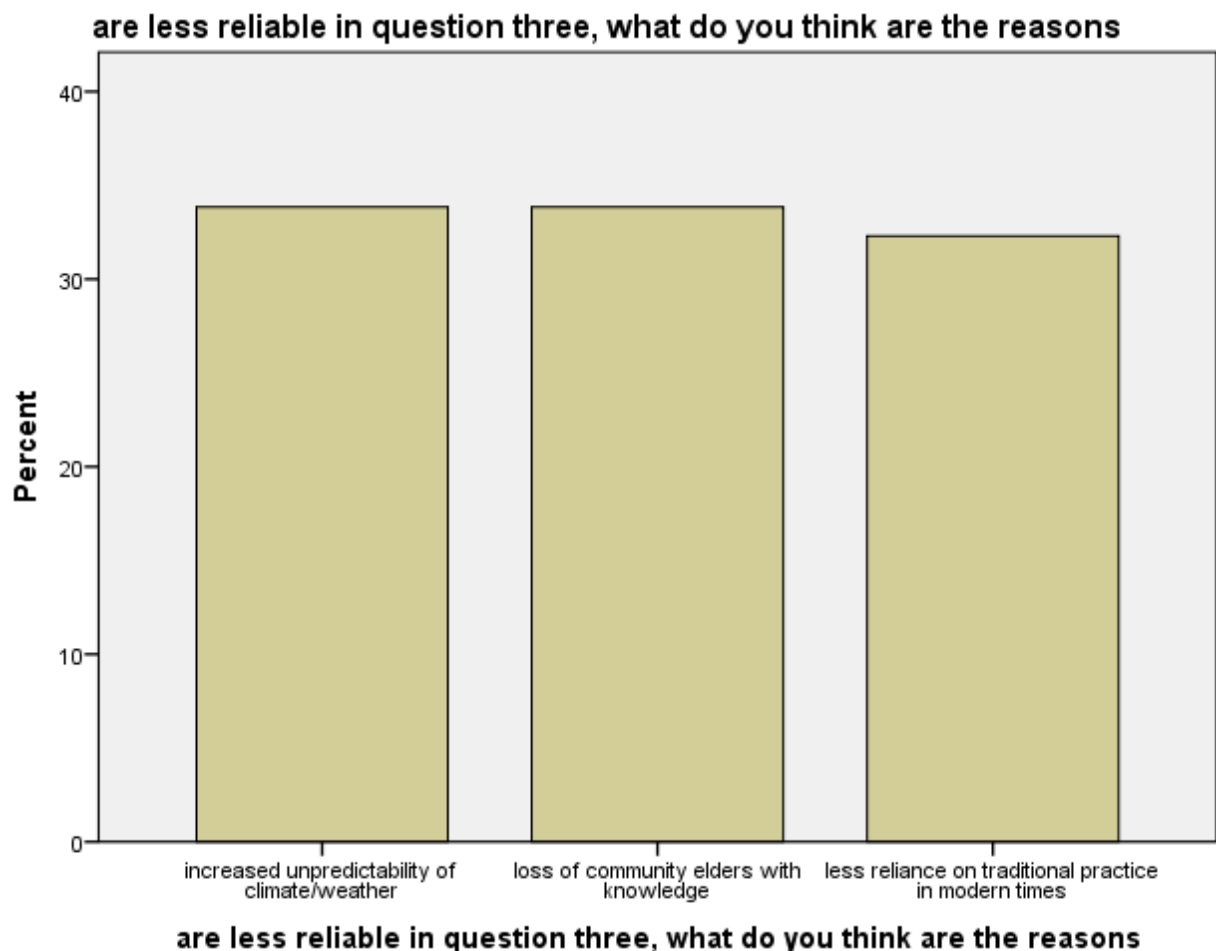
As we reveals in the above graph 21, households which accounts 74(56.9),56(43.1) mentioned that their traditional methods of predicting weather or climate patterns of their surroundings were watching the movement or appearance of clouds and observing wind direction and intensity in respectively. Therefore we can summarized that majority of respondents in the study area revels that their trends of predicting weather or climate patterns were watching the movement and appearance of clouds.

Figure 22 respondents traditional farming practice to adapt climate variability



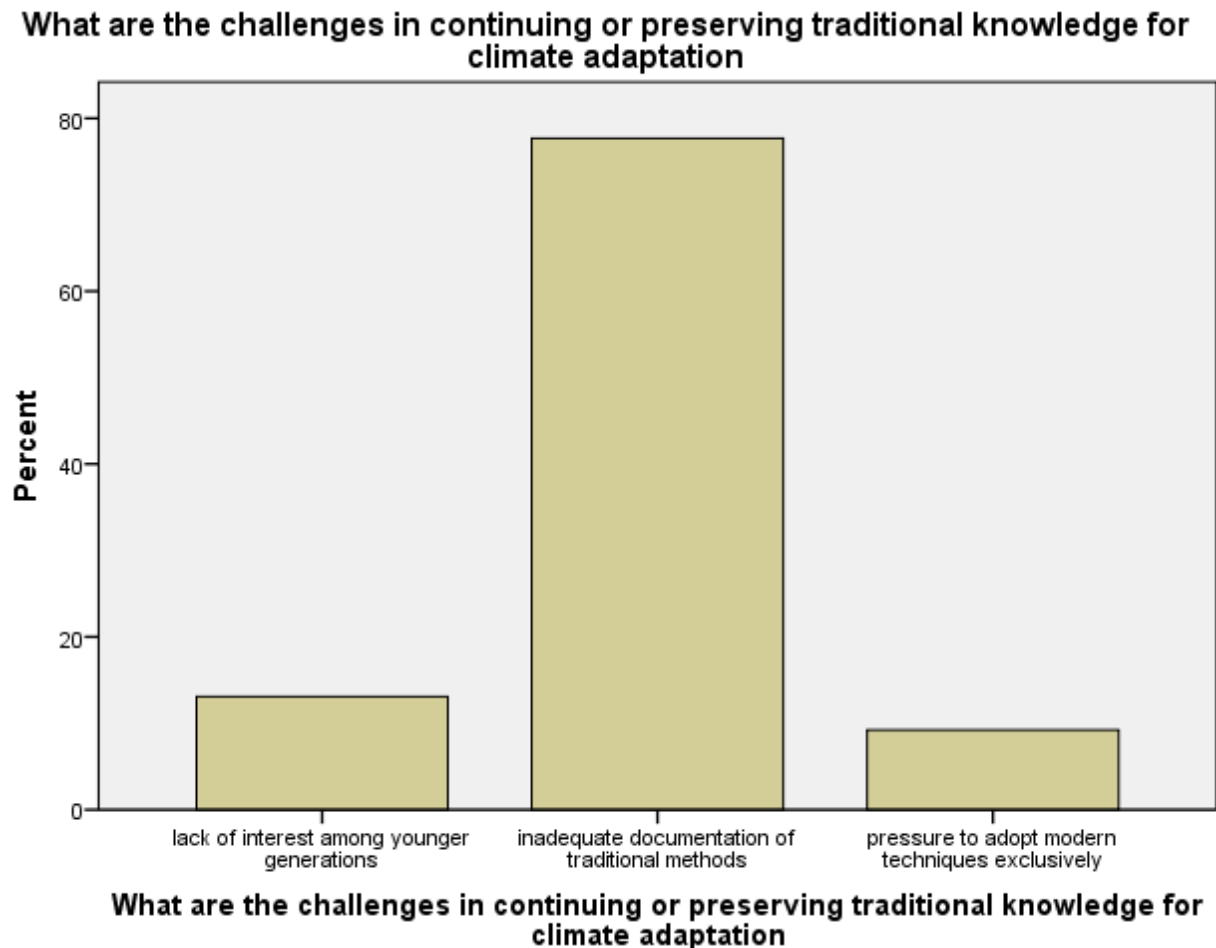
As we reveals in the above graph 22, households which accounts 44(33.8),42(32.3),44(33.8) mentioned mixed cropping (inter cropping),using indigenous seeds or drought resistant varieties, practicing crop rotation .Therefore we can summarized that majority of respondents in the study area reveals that their trends of adapting climate variability were by using mixed cropping,drought resistant seed and crop rotation as based on their capacity and resource availability.

Figure 23 respondents reason of less reliability of tradition knowledge to predict



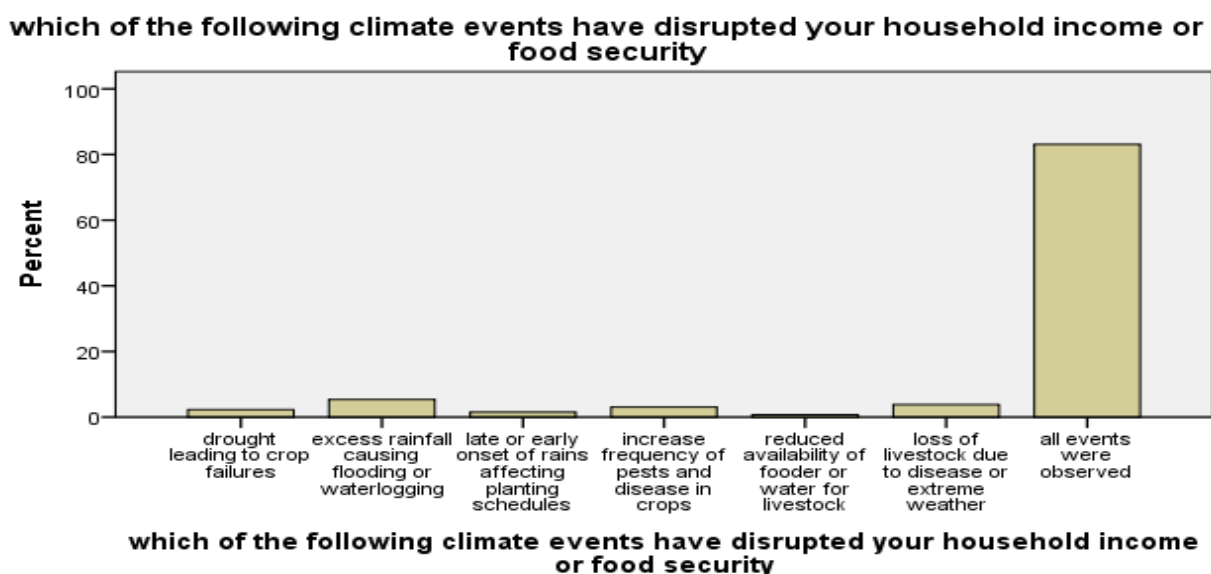
As we reveals in the above figure 23, households which accounts 44(33.8%),42(32.3%)44(33.8%) responded that increase unpredictability of climate/weather/,loss of community elders with knowledge, less reliance on traditional practice in modern times were the reasons of less reliable of climate prediction respectively .Therefore we can summarized that majority of respondents in the study area reveals that their trends of predicting climate related information were highly influenced by the afore mentioned in the above graph in combined.

Figure 24 respondents challenge of continuing or preserving traditional knowledge for climate adaptation



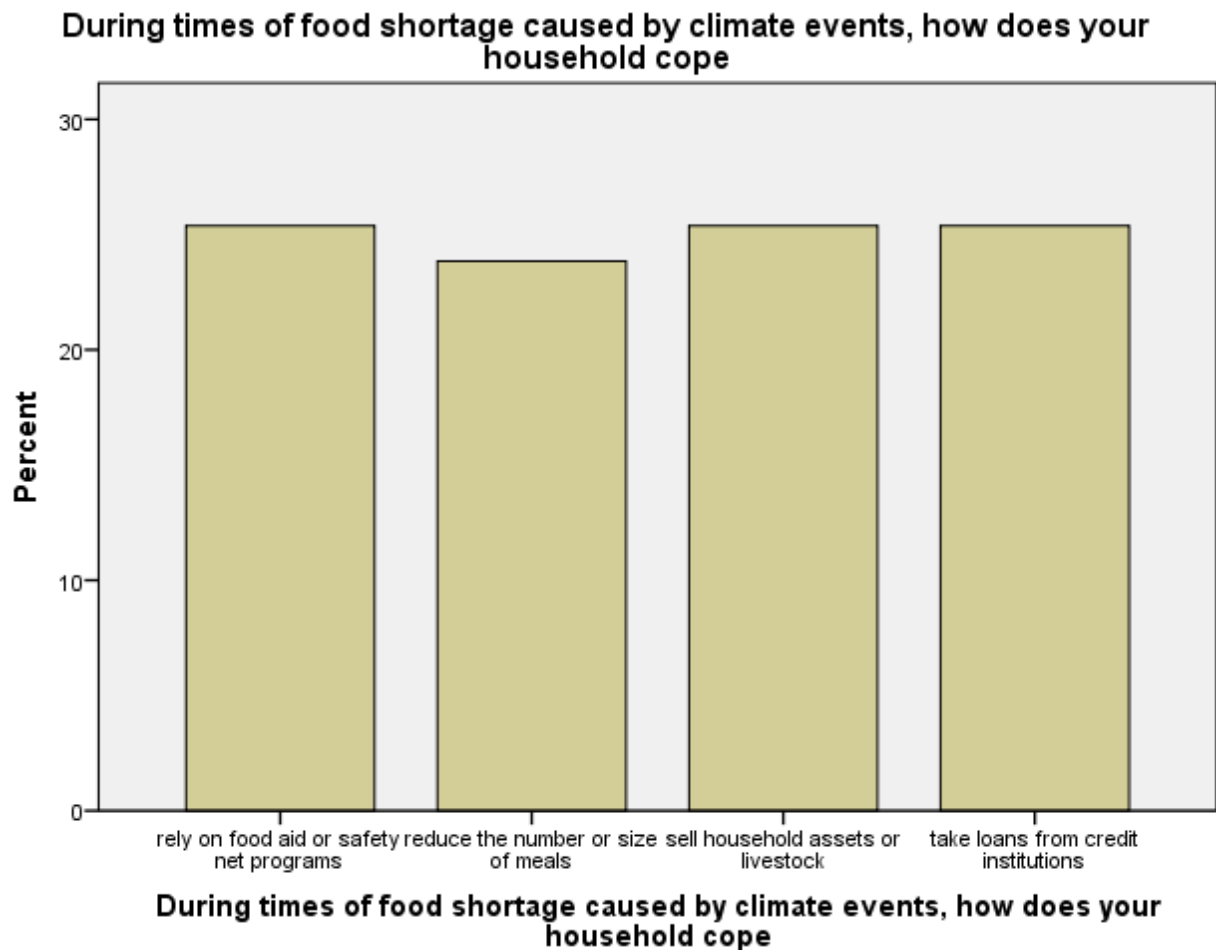
As we reveals in the above graph 24, households which accounts 17(13.1%),101(77.7%)12(9.2%) reveals that increase unpredictability of climate/weather/,loss of community elders with knowledge, less reliance on traditional practice in modern times were the reasons of less reliable of climate prediction respectively .Therefore we can summarized that majority of respondents in the study area reveals that their trends of predicting climate related information were highly influenced by the afore mentioned in the above graph in combined.

Figure 25 respondents food security and income disturbance climate related events



As we reveals in the above graph 25, households which accounts major proportion say that extreme weather events such as flood, snow, storm, drought, high rainfall, low rain fall, extreme heat and extreme cold were frequently happen in the study area over the decades and impacted the life of households in the study area in combined.

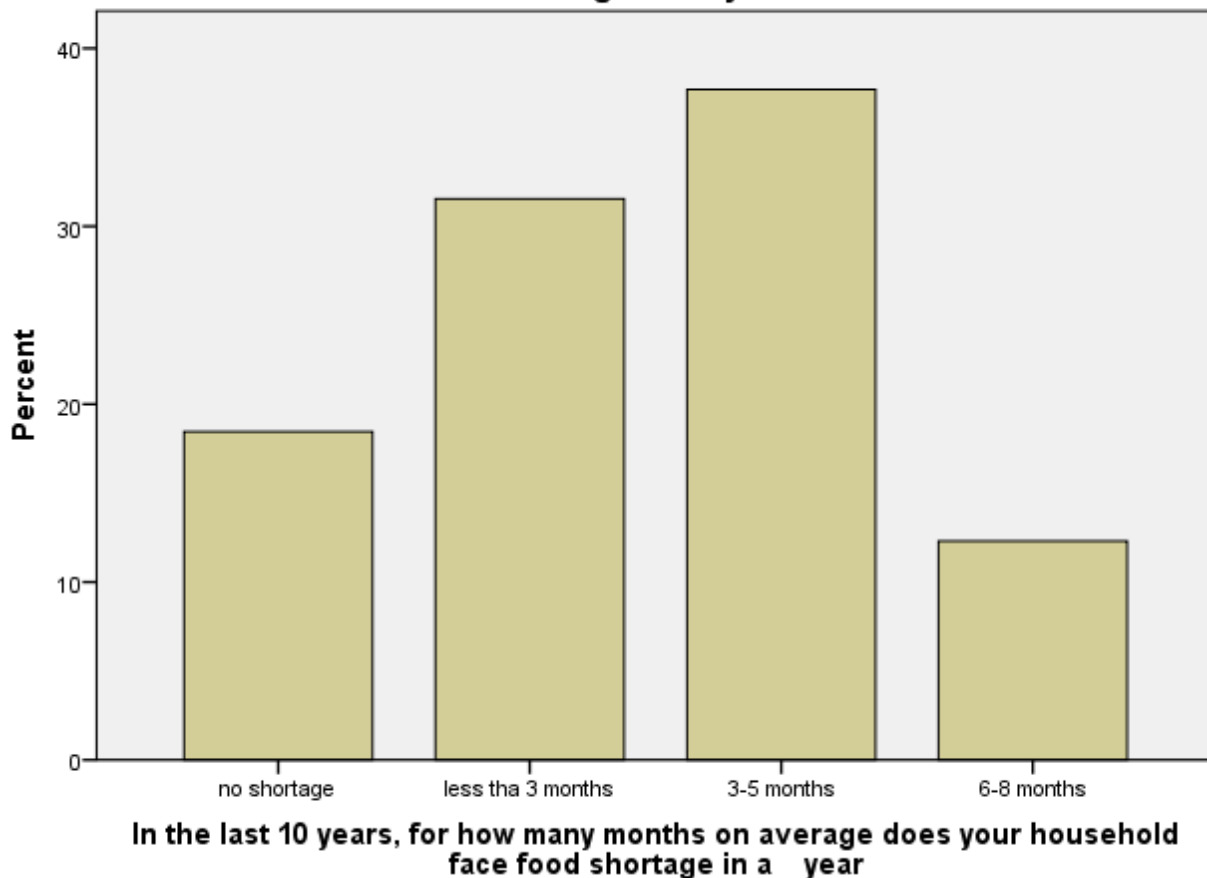
Figure 26 respondents cope up mechanisms food shortage caused by climate events



As we reveals in the above graph 26, substantial number of households reported that drought lead to crop failures, excess rain fall causing flooding or water logging, late or early onset of rainfall, pests and disease, reduced water for livestock were the existed impacts of climate related hazards which jeopardize the living standard of the households in the study area. Due to the prevalence of the above factors majority of the respondents in the study area were proportionally depends on productive safety net program, sell household asset or livestock, take loans from credit institution and small number of households are take measure of reduce the number or size of the meals.

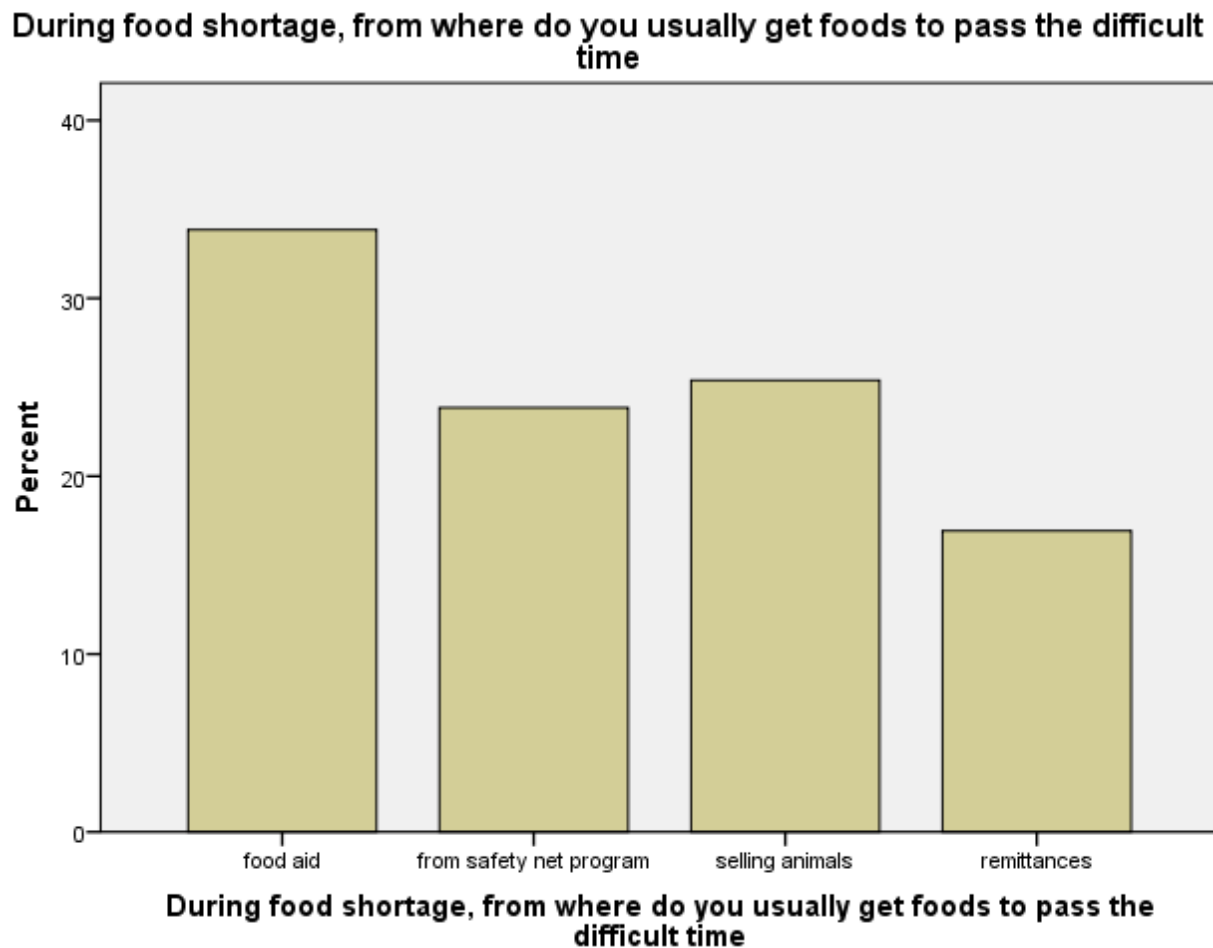
Figure 27 respondents trends of food shortage over a year

In the last 10 years, for how many months on average does your household face food shortage in a year



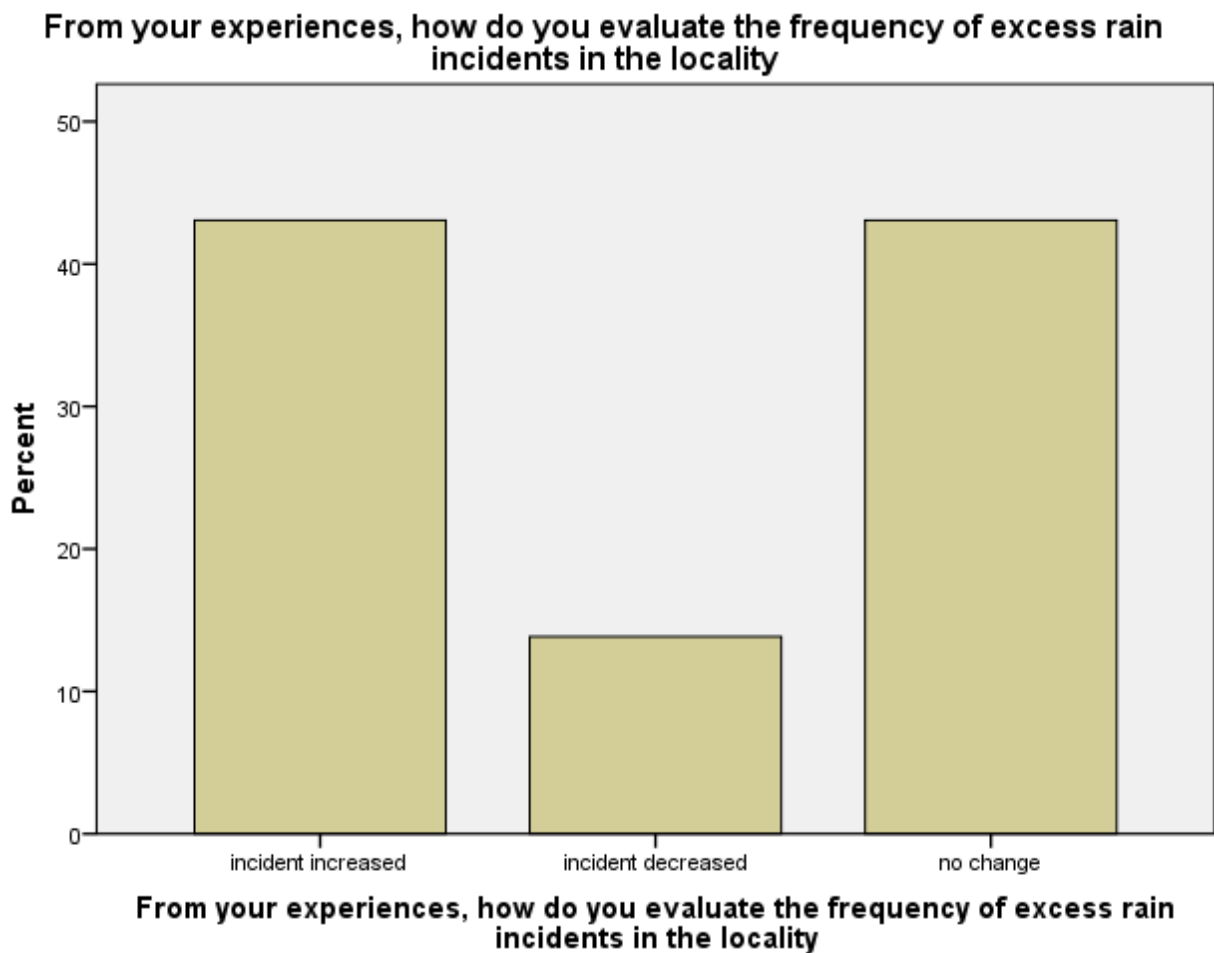
As shown in the above graph 27, respondents which accounts 24(18.5%), 41(31.5%), 49(37.7 %) 16(12.3%), no food shortages face food shortage for less than 3 months, 3-5 months, and 6-8 months respectively. Therefore we can summarize that majority of the respondents in the study area were faced a short period of food shortage or shocks.

Figure 28 respondents source of food during food shortage



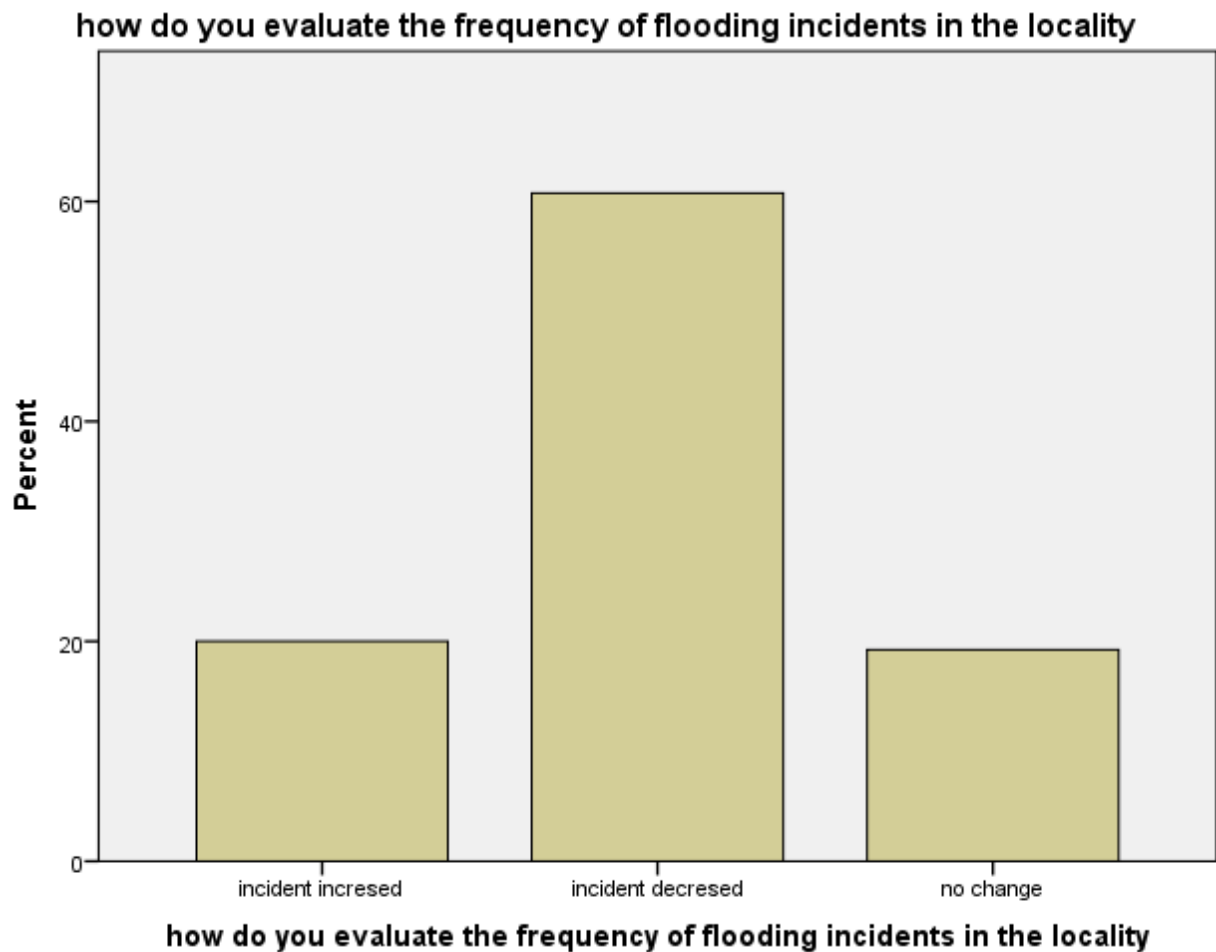
As shown in the above graph 28, respondents which accounts 44(33.8%),31(23.8%)33(25.4%) 22(16.9) get food from food aid, from selling animals, from safety net program, from remittance, in respectively in times of food shortage and difficulty. Therefore we can concluded that majority of the respondents in the study area gets from food aid from shock responsive governmental and non-governmental organization as well as from animal selling and safetynet program as well as remittances.

Figure 29 respondents response on frequency and incidents in the locality



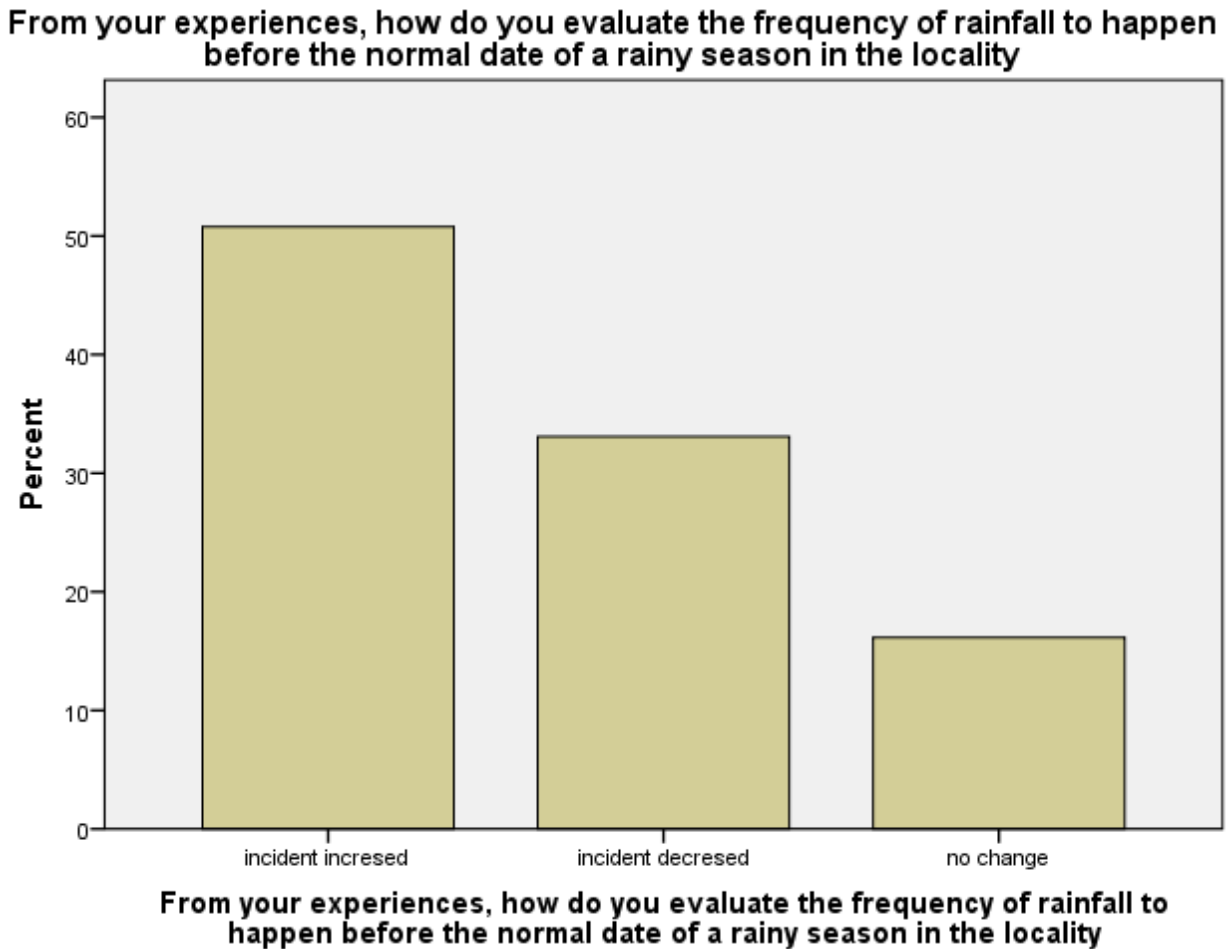
As shown in the above figure 29, respondents which accounts 56(43.1%),18(13.8%)56(43.1%) responded incident increased, not change observed, and incident decreased. there fore we can say that majority of the respondents in the study area observed that the incident and frequency of excess rain fall were increased.

Figure 30 response of flooding incidence and frequency



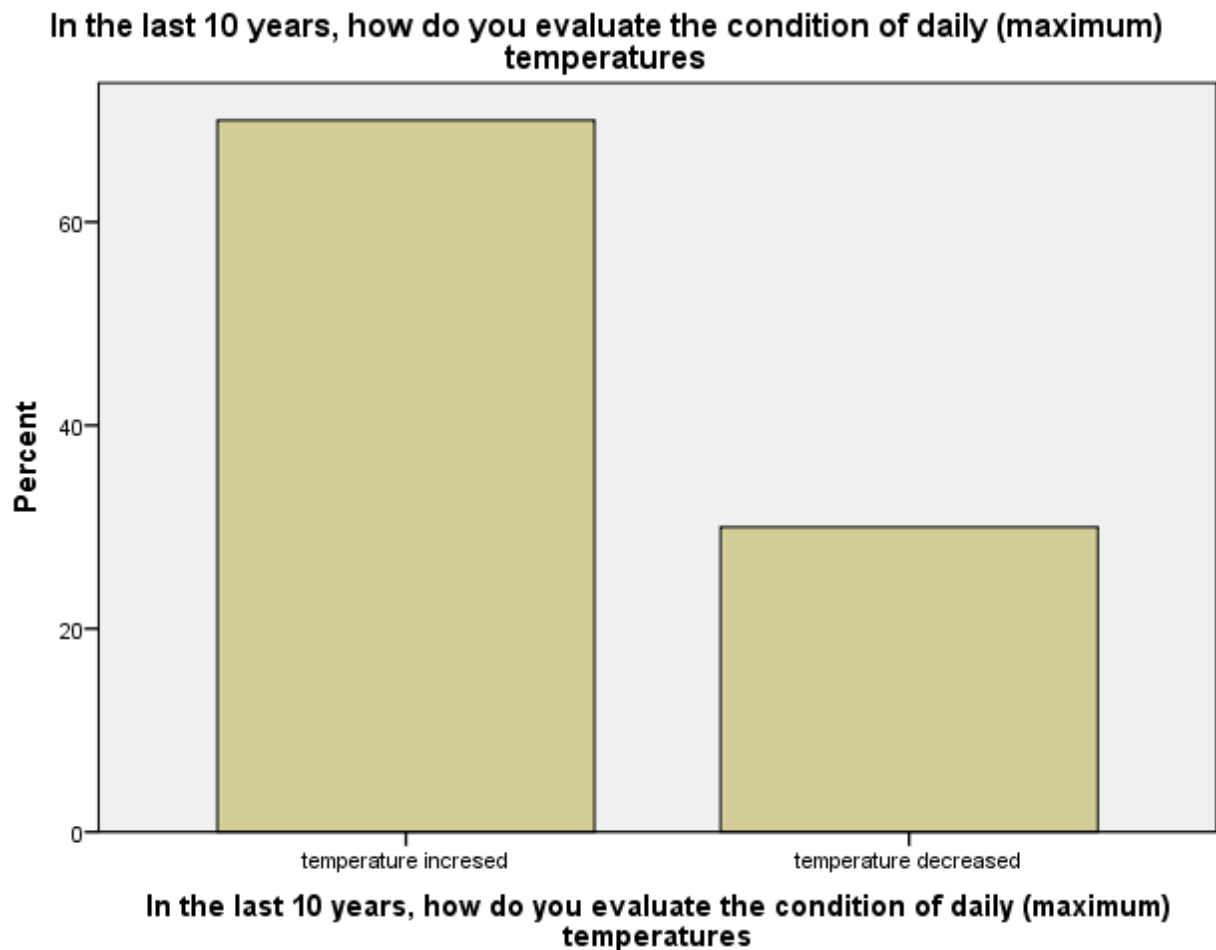
As shown in the above graph 30, respondents which accounts 26(20%),79(60.8%)25(19.2%) evaluated incident decreased, incident increased, no change at all respective to frequency of flooding incidents in the locality. Therefore we can generalized that the majority of the respondents described that flooding incidents in their locality were declined due to the integrated watershed rehabilitation work and productive safety net program implementation work on the by assessing flood affecting area and early warning and early preparation work in combined.

Figure 31 respondents response on frequency of rain fall happen before and after normal date



As shown in the above figure 31, respondents which accounts 66(50.8%),43(33.1%)21(16.2%) evaluated incident increased, incident decreased, no change at all respective to frequency of rain fall happen before and after the normal date of rainy season in the locality. Therefore we can generalized that the majority of the respondents described that frequency of rainfall happen before and after the normal date of rainy season were increased due to the climate change impacts and endanger the food security status of the respondents in the study area.

Figure 32 respondents response on daily temperature trend



As shown in the above graph 32, respondents which account 91(70%),evaluated the trends of daily maximum temperature were increased whereas the remaining 39(30%) were decreased. Therefore we can generalized that the majority of the respondents described that daily maximum temperature were increased due to the global level climate change impacts and endanger the food security status of the respondents in the study area as well as the third world country. On the contrary in the study area temperature sees as opportunities for grown the emerging new variety and shift the culture of previously cultivated crop towards adoption of temperate crops as well as enables the previous culture of production towards short cycle of production.

Figure 33 respondents response on frequency and incidence of animal disease



As shown in the above graph 33, respondents which accounts 12(16.9%),103(79.2%),5(3.2%)evaluated incident decreased, incident increased, no change at all respective to frequency of incidents of animal disease in the locality. Therefore we can generalized that the majority of the respondents described that frequency and incidents of animal disease were decreased due to involvement of agricultural extension and medication service provided by agricultural and stakeholder coordination in the study area.

4. 4 Correlation analysis of variabels

		sex of the respondent	family size of the respondent	educational level of the respondent	marital status of the respondent	respondents working person in the house hold	Number of children in school	Number of dependents in the house hold	Distance of your residence from the nearest market center	Distance to all weather road	Distance to all weather road	Is the land ownership status secure, or are there risks of losing access to your farm land	Total cropped land	Total grazing land	Total irrigable area	What is the size of land used twice in a year?	Do you have any health problem	does any one in your household have a chronic illness or long term health conditions	food security status
sex of the respondent	Pearson Correlation	1	-.017	-.051	-.011	-.013	-.049	-.017	.013	-.035	-.026	.001	-.035	-.066	.013	-.052	-.070	.020	-.057
	Sig. (2-tailed)		.851	.564	.900	.880	.581	.845	.885	.696	.771	.988	.696	.454	.882	.557	.427	.819	.520
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
family size of the respondent	Pearson Correlation	-.017	1	.733**	.862**	.805**	.798**	.815**	.803**	.882**	.848**	.840**	.882**	.803**	.811**	.591**	.645**	-.089	.802**
	Sig. (2-tailed)	.851		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.315	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
educational level of the respondent	Pearson Correlation	-.051	.733**	1	.800**	.731**	.756**	.708**	.715**	.770**	.771**	.765**	.770**	.777**	.737**	.482**	.624**	-.226**	.744**
	Sig. (2-tailed)	.564	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.010	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
marital status of the respondent	Pearson Correlation	-.011	.862**	.800**	1	.889**	.911**	.896**	.895**	.958**	.960**	.945**	.958**	.898**	.889**	.661**	.740**	-.083	.911**
	Sig. (2-tailed)	.900	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.347	.000

	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
respondents working person in the house hold	Pearson Correlation	-.013	.805**	.731**	.889**	1	.839**	.912**	.864**	.878**	.895**	.868**	.878**	.853**	.796**	.574**	.688**	-.118	.857**
	Sig. (2-tailed)	.880	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.183	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Number of children in school	Pearson Correlation	-.049	.798**	.756**	.911**	.839**	1	.814**	.860**	.871**	.874**	.876**	.871**	.815**	.808**	.634**	.745**	-.117	.985**
	Sig. (2-tailed)	.581	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.183	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Number of dependents in the house hold	Pearson Correlation	-.017	.815**	.708**	.896**	.912**	.814**	1	.841**	.886**	.887**	.891**	.886**	.827**	.803**	.607**	.699**	-.052	.832**
	Sig. (2-tailed)	.845	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.556	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Distance of your residence from the nearest market center	Pearson Correlation	.013	.803**	.715**	.895**	.864**	.860**	.841**	1	.901**	.839**	.918**	.901**	.798**	.805**	.613**	.689**	-.054	.877**
	Sig. (2-tailed)	.885	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.545	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Distance to all weather road	Pearson Correlation	-.035	.882**	.770**	.958**	.878**	.871**	.886**	.901**	1	.916**	.936**	1.000**	.872**	.863**	.677**	.746**	-.070	.888**
	Sig. (2-tailed)	.696	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.426	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Distance to all weather road	Pearson Correlation	-.026	.848**	.771**	.960**	.895**	.874**	.887**	.839**	.916**	1	.905**	.916**	.891**	.832**	.596**	.710**	-.096	.859**
	Sig. (2-tailed)	.771	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.275	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130

Is the land ownership status secure, or are there risks of losing access to your farm land	Pearson Correlation	.001	.840**	.765**	.945**	.868**	.876**	.891**	.918**	.936**	.905*	1	.936**	.846**	.853**	.645**	.714**	-.067	.893**
	Sig. (2-tailed)	.988	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.448	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Total crop land	Pearson Correlation	-.035	.882**	.770**	.958**	.878**	.871**	.886**	.901**	1.000*	.916*	.936**	1	.872**	.863**	.677**	.746**	-.070	.888**
	Sig. (2-tailed)	.696	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.426	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Total grazing land	Pearson Correlation	-.066	.803**	.777**	.898**	.853**	.815**	.827**	.798**	.872**	.891*	.846**	.872**	1	.839**	.550**	.706**	-.174*	.832**
	Sig. (2-tailed)	.454	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.048	.000
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
food security status	Pearson Correlation	-.057	.802**	.744**	.911**	.857**	.985**	.832**	.877**	.888**	.859*	.893**	.888**	.832**	.825**	.644**	.755**	-.091	1
	Sig. (2-tailed)	.520	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.302	
	N	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130

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

* . Correlation is significant at the 0.05 level (2-tailed).

There were a strong positive correlation which was statistically significant($r_s = 0.802, p = 0.00$) between family size of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.74, p = 0.00$) between educational level of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.91, p = 0.00$) between marital status of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.857, p = 0.00$) between working person in the house holds respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.832, p = 0.00$) between number of dependents of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.877, p = 0.00$) between distance of residence from market of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.859, p = 0.00$) between distance from all weather road of the respondents and food security status of respondents.

There were a strong positive correlation which was statistically significant($r_s = 0.832, p = 0.00$) between total grazing land of the respondents and food security status of respondents.

Table 7: Factors Affecting the Adoption of climate change Practice

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.025	.041		.608	.544
	family size of the respondent	-.054	.026	-.051	-2.043	.043
	educational level of the respondent	-.052	.019	-.051	-2.676	.009
	marital status of the respondent	-.020	.072	-.019	-.280	.780
	respondents working person in the house hold	.127	.034	.126	3.738	.000
	Number of children in school	.903	.028	.905	32.198	.000
	Number of dependents in the house hold	-.133	.043	-.132	-3.134	.002

Distance of your residence from the nearest market center	-.042	.031	-.043	-1.347	.181
What is the ownership status of your farm land	.374	.071	.358	5.250	.000
Distance to all weather road	-.381	.051	-.372	-7.519	.000
Is the land ownership status secure, or are there risks of losing access to your farm land	.102	.040	.103	2.530	.013
Total crop land	.075	.049	.071	1.533	.128
Total grazing land	.087	.029	.083	2.984	.003
Total irrigable area	.017	.025	.017	.682	.497
What is the size of land used twice in a year?	-.015	.029	-.008	-.525	.601

4. 5 regrassional analysis of variabels

Education level of house hold head: Education has shown negative effect on food security status of the house hold with significance level at 5%. On average, if the house hold gets educated, the status of food security of the households decrease by 0.02 percent. The result implies that, there is difference between literate and illiterate peoples to engaged themselves on market commodities and also education has improved the producing household ability to acquire new idea in relation to market information and improved production by using appropriate inputs and technology which in turn enhanced productivity and thereby increased marketable supply but in the study area the reverse were happen due to that educated households were lacks land ownership and less rely on agriculture rather on another activities. This result is happening in many research conducted climate change impacts on food security in our country.

Family size of the respondent: family size has shown negative and significant effect on food security status of the house hold with significance level at 5%. On average, if household's family size increase, the food security status of the household will be decreased by 0.54 percent. The result implies that, there is difference between house hold having family size of and haven't family members and family member which has no labor contribution decreased the food security status and aggravate climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

Working personnel in house hold head: working personnel has shown positive and significant effect on food security status of the house hold with significance level at 5%. On average, if households working personnel increase, the food security status of the household will raised by 0.127 percent. The result implies that, there is difference between house hold having working labor and haven't working personnel and also working personnel has improved the producing household ability to acquire new idea in relation to market information and improved production by using appropriate inputs and technology which in turn enhanced productivity and thereby

increased the food security status and minimize climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

Number of dependency in the house hold: number of dependency personnel has shown negative and significant effect on food security status of the house hold with significance level at 5%. On average, if households number of dependency increase, the food security status of the household was decreased by -0.133 percent. The result implies that, there is difference between house hold having dependent household member and haven't dependent member and also dependent personnel has decreased the producing household ability to production by expenses related with the dependent and much time and attention were grabbed by the dependent. Using appropriate inputs and technology which in turn enhanced productivity and thereby increased the food security status and minimize climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

Land ownership status of the household: land ownership has shown positive and significant effect on food security status of the house hold with significance level at 5%. On average, if households having land increase, the food security status of the household was raised by 0.374 percent. The result implies that, there is difference between house hold having land and haven't land and also land ownership has improved the producing household ability of autonomous and decision making freedom and acquire new idea in relation to climate smart adaptation and mitigation information and improved production by using appropriate inputs and technology which in turn enhanced productivity and thereby increased the food security status and minimize climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

Grazing land ownership status of the household: grazing land ownership has shown positive and significant effect on food security status of the house hold with significance level at 5%. On average, if households having grazing land increase, the food security status of the household was boost by 0.087 percent. The result implies that, there is difference between house hold having grazing land and haven't grazing land because the house hold who own grazing land has dramatic livelihood improvement. The basic reason is that livestock is the predominant

livelihood in the study area and livestock has a great gear of the economy by selling and converting to cereals and pulses and uplift the house holds food security status by minimizing climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

Distance to all weather roads: land ownership has shown positive and significant effect on food security status of the house hold with significance level at 5%. On average, if household's proximity to all weather roads increases, the food security status of the household will be raised by 0.381 percent. The result implies that, there is difference between house hold proximity to all weather roads and not proximity to all weather roads and also proximity to all weather road has improved the producing household ability of supply agricultural commodities to market, market information and improved production by using appropriate inputs and technology which in turn enhanced productivity as well as increased the food security status and minimize climate change impacts. This result is happening in many research conducted on climate change impacts on food security in our country.

The remaining total crop land, irrigable area, age, marital status, distance to the market center and the like were insignificant variable which did not affect food security status of households on climate change impacts in the study area.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5. Conclusion

Food insecurity is the most crucial and persistent problem facing rural households in Ethiopia. Even though the country has considerably reduced the problem of poverty in general, many of its rural households are still unable to feed themselves throughout the year. Food availability in the country is largely determined by domestic staple food production through subsistence agriculture (FAO, 2024). The purpose of this study was to provide an assessment of the climate change impacts on vulnerability of smallholder farmers of food security status and factors influencing the choice of climate change coping mechanisms in Wadla woreda. The following objectives were addressed:

- I. To identify the section of society most vulnerable to climate change impacts on food security status and reason behind it
- II. to know constraints that aggravate vulnerability to climate change in the woreda,
- III. to identify local (indigenous) and institutional adaptation /coping mechanisms

To forward policy and action areas to be enhanced in order to increase the understanding of the concerned body and local community in the woreda for future most likely climate change impacts on vulnerability of food security in smallholder farmers. A survey of a sample covering 130 households from responsive woreda administrators were chosen through a systematic sampling procedure was conducted. The data collected were analyzed using Statistical program for Social Sciences (SPSS). Descriptive statistics were generated to describe the social-economic and demographic characteristics of the households and also address all objective on climate change impacts, constraints that aggravate climate change and coping mechanisms adopted by households in Wadla woreda.

Wadla woreda were a woreda characterized by large number of land but land were cultivated by traditional agricultural practice and highly influenced by climate change related hazards and

the impacts become severe. Subsistence crop and animal husbandry farming is not enough to feed the entire household sufficiently throughout the year. Therefore, policies should promote initiatives that invest more in rural off-farm activities to generate employment to enable households increase their income and thus be able to improve their food security status and minimize climate change impacts.

The results of this study revealed that the households that own livestock are more likely to have a high food consumption score (food secure) due to its important role in terms of income generation and provision of food. Thus, efforts should be made to improve the production and productivity of livestock in the study area. The results of the study also show that family health play a vital role in improving food and nutrition security for their members in rural areas in the sense that healthy active farmers were productive than unhealthy households and members and able to combat climate change impacts on food security status and vulnerability.

Exposure was assessed through climate variability, early warning system, and training for coping with climate change. The households which did not receive any warning regarding the disasters' is considered as one of the important indicators because it reflects the level of preparedness of the households during a climate-related emergency, especially in the absence of a proper disaster management system. Similarly, training to cope with climate change can help households to be better prepared for future changes. Thus, it is important to consider households which do not receive any training to cope with climate change to determine the overall vulnerability of the district to climate change. In order to get more accurate results, it is also important to take into consideration the households which experienced loss of livestock as a result of the most severe natural disasters in the past years. This might also require significant financial resources in case of permanent injuries or to buy new livestock.

Households with member(s) having a chronic illness suggests frequent loss of wages due to illness, and thus, an increased level of livelihood vulnerability. The households which do not having access to local government veterinary services is an important indicator and determines how frequently the households suffer a loss of food or livelihood due to illness among their

livestock. Households which are solely dependent on family farms for food tend to be more vulnerable to climate change.

The communities which are self-sufficient in terms of food rely on their indigenous knowledge of food preservation. The higher the indigenous knowledge of food preservation such as making kolo, Besso, quanta qita, dried vegetables. among the households, the lower will be the vulnerability as they can store such items for future use or earn additional income through selling the extra produce in the market. While considering the availability of food, it is crucial to look at the trends in food production, the impact of manures and fertilizers on the level of production, and the loss of agricultural land (due to any disaster) over the past decade.

The use of fertilizer and manure results in higher yield, whereas, any loss of agricultural land due to a natural disaster would set back the households with decreased food production, adversely affecting the food availability in the area. The accessibility of water can be evaluated through indicators like average time to fetch water and the percentage of households reporting difficulties in accessing water for a variety of purposes. Shorter travel time to water sources is indicative of better accessibility and the time saved during the day can be used for other productive purposes including livelihood activities. Therefore, the average time to water sources as an indicator would have a significant impact on the households' livelihood vulnerability.

The dependency of households solely on natural water sources makes them more prone to diseases and thus increases livelihood vulnerability. Therefore, the indicators showing the current status of water sources being utilized, like the percentage of households that utilize a natural water source, and the percentage of households reporting depleting groundwater, have also been included to assess the sensitivity. Besides fulfilling the basic needs of households, water is also essential for the purpose of irrigation. Households having problems accessing irrigation water adds to their vulnerability. So, an indicator portraying the current situation of water availability for irrigation has also been included to determine livelihood vulnerability at household level. There are a number of indicators which define the ecosystem services surrounding

The households and evaluating these indicators may provide a better view of livelihood vulnerability to climate change at household level. A significant proportion of households are dependent on the community land for a variety of resources. The percentage of households deriving benefits from the community land/forest⁴ and households reporting a reduction in the volume or quality of natural resources in community land/forest were chosen for analysing household dependency on community land⁴. The dependency on community land, coupled with a reduction in the quality or quantity of natural resources, can have an impairing impact on the livelihoods of the households. The percentage of households reporting a decrease in the availability of fodder from community land for livestock in the last 10 years⁴, is indicative of forest area degradation, making the households more vulnerable as many of them are dependent on forests for their livelihood. Adaption capacity component included five sub-components (socio-demographic profile, livelihood strategies, social network, finance and government schemes).

The socio-demographic indicators were selected to provide an overview of the characteristics of these households, which directly or indirectly have a significant impact on their livelihood vulnerability to climate change. The dependency ratio, provides insights about the composition of households, and the degree of vulnerability linked with a higher ratio. Among the working-age population, the households with more number of working members will tend to have better income stability and lower vulnerability. This indicator will have high relevance in situations where one of the working members gets sick or has to take up some other responsibilities or when his/ her/their source of livelihood gets affected due to some external factors. The households being headed by a woman can be linked to the migration process. A higher percentage of female-headed households is generally a result of men moving out of the district for work. This practice increases the chance of household structural instability, as women not only have to look after the children but also find work from among the limited livelihood opportunities made available to them.

The indicator where the head of the household has not attended school is indicative of the household's level of awareness regarding different livelihood options. The indicators under the livelihood strategies⁴ sub-component have been selected to understand the households⁴

dependency on agriculture, as well as their engagement in other livelihood activities. Household family members working outside/different community is considered good as it is promoting diversification.

Number of households which are completely dependent on agriculture‘ has been included as an indicator in the assessment, as the changes in precipitation, floods, drought, etc. will adversely affect their only source of livelihood. Average livelihood diversification index‘ also gives an idea about the number of livelihood activities taken up by the households and the vulnerability decreases with an increase in the number of livelihood activities.

Another indicator which might affected the food security status of the house hold the number of livelihood activities carried out by households is the availability of land to carry out agriculture. The available land can be used for various aliend activities such as horticulture, livestock rearing, forestry, fishery, or setting up a small-scale industry and enables the house hold in the area to be a food secured and combat climate change impact

Demographic characteristics, types of CSA practices in the study, interdependencies among practices, and factors influencing adoption. Key findings reveal a predominant presence of male household heads, high illiteracy rates, and large above 0.5 hectare land ownership, proximity of all-weather roads, proximity of the market center, no dependency in the household and no children enrollment in the school were dominant in the study area. The households that experienced food insecurity problem, which in some cases is repeated over years, had to adopt some mechanisms to cope with food insecurity.

The third objective of the study aimed to find out and characterize the factors that influence the choice of food insecurity coping mechanisms in the study area. Thus, to respond to this objective, a Multiple regration was used and the results revealed that out of the 14 variables included in the model, 6 were found to be insignificant and 9 were found to be significant at different levels, which are 5 percent levels. The choice of casual labour-based coping mechanisms was found to be positively influenced by educational level of the respondent,working personel in the household,number of children in the school,number of dependent in the house hold,land ownership,distance to all weather road,ownership security

status ,and total grazing land of the respondent. When we saw the agricultural experience of the respondents were shown significant improvements that takes over a decade .

5.1 Recommendation and policy implications

Expand access to credit facilities tailored to CSA initiatives to alleviate financial constraints associated with adoption. Technology Access Improve the availability and affordability of improved crop varieties and irrigation technologies to encourage broader adoption and enhancement of livelihood.

Encourage farmers to adopt integrated farming practices rather than singular interventions, emphasizing the benefits of combining practices like soil water conservation with crop rotation or organic fertilizers. Develop targeted interventions that address gender disparities in climate change adoption activities, ensuring equitable access to resources such as credit, extension services, and agricultural inputs. Similarly, tailor interventions based on age demographics to enhance food security and build resilient capacity of the house hold.

Policies should target vulnerable groups and provide support tailored to their needs, such as financial assistance for initial investment in climate smart technologies that reduce vulnerblities of smallholder farmers in their fragmented plots. Implementing subsidies or tax incentives for adopting practices could encourage more farmers, especially smaller ones, to adopt these techniques despite initial costs. Introduce financial incentives and subsidies to encourage smallholder farmers to invest in climate smart technologies, promoting sustainable agricultural practices.

The government and other stack holders should enact policies incorporated financial literacy, life skill, basic agriculture training campaign for changing the paradigm of farmers.

Government, stack holders and community Should rehearse about climate smart agricultural practice for the farmers and build the culture of climate smart agriculture practice in the study area

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Annex 1: Questionnaire for household survey

መጠይቅ ቁጥር _____

የቃለ መጠይቅ ጥያቄዎች፡-

ውድ ምላሽ ሰጪዎች፣ በወልድያ ዩኒቨርሲቲ በምግብ ዋስትና እና ልማት ሳይንስ ማስተርስ ዲግሪ ለማግኘት የሚያስፈልጉትን መስፈርቶች ለማሟላት “በሰሜን ወሎ ዞን ዋድላ ወረዳ የአነስተኛ አርሶ አደሮች የኑሮ ተጋላጭነት እና የአየር ንብረት ለውጥ ተጋላጭነታቸውን በመገምገም እየሰራሁ ነው። ያቀረቡት መረጃ እና የእርስዎ አስተዋፅዖ ለዚህ ጥናት ውጤት ወሳኝ ናቸው ብዬ አምናለሁ። ለዚህ የጥናት ፕሮጀክት ስኬት፣ ጊዜዎን ስለሰጡኝ አመሰግናለሁ። የሰጡኝ ማንኛውም መረጃ በምስጢር እንደሚቀመጥ እና ለአካዳሚክ ዓላማዎች ብቻ እንደሚውል አረጋግጣለሁ።

ለትብብርዎ አመሰግናለሁ

ሰላምይሁን ሹምየ

ሀ. የቤተሰብ አጠቃላይ መረጃ

1. ወረዳ: _____ ቀበሌ: _____ መንደር: _____
2. ዕድሜ: [] ዓመታት
3. ጾታ (✓): ሀ. [] ወንድ ለ. [] ሴት
4. የትምህርት ደረጃ (✓): ሀ. [] መደበኛ ትምህርት አልተማረም ለ. [] ከ 6 ክፍል በታች ሐ. [] 7-12 ክፍል
መ. [] ሰርተፍኬት ሠ. [] ዲፕሎማ ረ. [] ዲግሪና ከዛ በላይ
5. የጋብቻ ሁኔታ (✓): ሀ. [] ያገባ ለ. [] ያላገባ ሐ. [] በሞት የተለየ
6. የቤተሰብ መጠን: [] ወንድ [] ሴት [] ጠቅላላ
7. በትምህርት ላይ ያሉ ልጆች ቁጥር: [] ወንድ [] ሴት [] ጠቅላላ
8. የጉልበት ሰራተኞች ብዛት (14-64 ዕድሜ): [] ወንድ [] ሴት [] ጠቅላላ
9. መስራት የማይችሉ ብዛት (< 14 እና > 64 ዕድሜ): [] ወንድ [] ሴት [] ጠቅላላ
10. የመኖሪያ ርቀት በአቅራቢያው ካለው የገበያ ማእከል: [] የሰዓት የእግር ጉዞ ይርቃል?
11. 16. የመኖሪያ ርቀት በአቅራቢያው ወደ ሚንኝ የእድገት ተቋማት: [] የሰዓት የእግር ጉዞ ይርቃል?
12. 17. ለሁሉም ምቹ ሁኔታዎች ያለው የመንገድ ርቀት [] ኪ/ሜ ወይም [] የሰዓት የእግር ጉዞ ይርቃል?
13. የሚታረስ መሬት ባለቤት ነዎት? (✓) ሀ. [] አዎ ለ. [] አይ
14. የእርሻ መሬትዎ የባለቤትነት ሁኔታ ምን አይነት ነው?

ሀ. በባለቤትነት የተያዘ

ለ. በክራይ

ሐ. የጋራ

መ. ሌላ (እባክዎ ይግለጹ) -----

15. የመሬት ባለቤትነት ሁኔታ ደህንነቱ የተጠበቀ ነው ወይንስ የእርሻ መሬትዎን የማጣት አደጋዎች አሉ?

ሀ. ደህንነቱ የተጠበቀ

ለ. አደጋ ላይ

ሐ. እርግጠኛ አይደለሁም

16. ጠቅላላ የሰብል መሬት: _____ ጥማድ _____ ሄ/ር (ማስታወሻ: 1 ሄ/ር = 8 ጥማድ ወይም 1 ጥማድ = 0.125 ሄ/ር)

17. ጠቅላላ የግጦሽ መሬት: _____ ጥማድ _____ ሄ/ር

18. ጠቅላላ የመስኖ መሬት: _____ ጥማድ _____ ሄ/ር

19. በዓመት ሁለት ጊዜ ጥቅም ላይ የሚውለው የመሬት መጠን ምን ያህል ነው? _____ ጥማድ _____ ሄ/ር

20. 34 የጤና ችግር አለብዎ ? ሀ. አዎ ለ. አይ

21. ከቤተሰብዎ ውስጥ ሥር የሰደደ ሕመም ወይም የረጅም ጊዜ የጤና ችግር ያለበት አለ ? ሀ. [] አዎ ለ. [] አይ

22. ቤተሰብዎ በሚከተሉት ምክንያቶች በተደጋጋሚ ህመም ወይም የጤና ችግሮች አጋጥሞታል ?

ሀ. በውሃ የተወለዱ በሽታዎች (ለምሳሌ ተቅማጥ፣ ኮሌራ)

ለ. በተዋስያን የተወለዱ በሽታዎች (ለምሳሌ ወባ፣ ዴንጊ)

ሐ. የመተንፈሻ አካላት ኢንፌክሽኖች (ለምሳሌ ፣ የሳንባ ምች)

መ. የቆዳ በሽታ ሌሎች (እባክዎ ይግለጹ) -----

23. ሥር የሰደደ ሕመም ወይም ተደጋጋሚ የጤና ችግሮች በቤተሰብዎ እንቅስቃሴዎች ላይ ምን ተጽዕኖ ያሳድራሉ? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. ለእርሻ ስራ የሚሆን የሰው ኃይል አቅርቦት ቀንሷል

ለ. የግብርና ሥራዎች ምርታማነት ቀንሷል

ሐ. በእርሻ ግብዓቶች ላይ ተጽእኖ የሚያሳድር የጤና እንክብካቤ ወጪዎች መጨመር

መ. ቁልፍ የሆኑ የቤተሰብ አባላት ሲታመሙ እዉቀትና ልምድ ያለዉ ሰራተኛ ማጣት

ሠ. ሌሎች (ይግለጹ) -----

24. የእርስዎ ቤተሰብ የጤና እንክብካቤ አገልግሎት ማግኘት ይችላል? (✓) አዎ ☐ አይ ☐

25. ከሆነ የጤና አገልግሎቶች ምን ያህል ተደራሽ ናቸው?

ሀ. በጣም ተደራሽ (በቅርብ እና በተመጣጣኝ ዋጋ)

ለ. መጠነኛ ተደራሽ (መጠነኛ ርቀት ወይም ወጪ)

ሐ. ተደራሽ አይደለም (ሩቅ ርቀት ወይም ተመጣጣኝ ያልሆነ)

26. በቤትዎ ውስጥ ያሉ የጤና ችግሮችን ለመፍታት ምን ችግሮች ያጋጥሙዎታል? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. በአቅራቢያው ያሉ የጤና እንክብካቤ ተቋማት እጥረት

ለ. ከፍተኛ የሕክምና ወጪ

ሐ. ስለ በሽታ መከላከል እና ህክምና እውቀት ማነስ

መ. የሚገኙ የጤና አጠባበቅ አገልግሎቶች ዝቅተኛ ጥራት

ሠ. ሌላ (እባክዎ ይግለጹ) -----

27. ከጤና ጋር የተያያዙ ጉዳዮች በቤተሰብዎ የምግብ ዋስትና ወይም ገቢ ላይ የረዥም ጊዜ ተጽእኖ አላቸው? ሀ. አዎ ለ. አይ

አዎ ከሆነ፣እባክዎ እንዴት እንደሆነ ያብራሩ -----

28. በግብርና ስራዎ ላይ የጤና ጉዳዮችን ተፅእኖ ለመቆጣጠር ማንኛውን ስልቶች ተግባራዊ አድርገዋል?

ሀ. አዎ ለ. አይ

አዎ ከሆነ የትኞቹን ስልቶች ተግባራዊ አድርገዋል? -----

29 . የእርስዎ ዋና የገቢ ማስገኛ መንገዶች ምንድን ናቸው? (እንደ አስፈላጊነቱ በደረጃ ያስቀምጡ)

ሀ. [] የአትክልት ምርት

ለ. [] የፍራፍሬ ምርት

ሐ. [] የእህል ምርት

መ. [] የጥራጥሬ ምርት

ሠ. [] የእንስሳት ምርት

ረ. [] ከግብርና ዉጭ

ሰ. [] ሌሎች ካሉ ይግለጹ -----

30. በግብርና ስራ ላይ ምን ያህል ጊዜ ቆይተዋል ? ----- በዓመታት ይግለጹ

31. የህብረት ሥራ ማህበር አባል ነዎት ? (✓) ሀ. [] አዎ ለ. [] አይ

32. ለጥያቄ 31 የሰጡት መልስ አዎ ከሆነ፣ የህብረት ሥራ ማህበሩ ስም ማን ይባላል ? -----

33. ለቤትዎ እና ለእርሻ ስራዎ ዋና የውሃ ምንጮች ምንድን ናቸው?

ሀ. የዝናብ ውሃ

ለ. ወንዝ ወይም ጅረቶች

ሐ. ኩሬዎች ወይም ሀይቆች

መ. የከርሰ ምድር ውሃ (ለምሳሌ, ጉድጓዶች)

ሰ. የመስኖ ዉሃ

ረ. ሌሎች (እባክዎ ይግለጹ) -----

34 . ለቤትዎ ፍጆታ የውሃ ምንጮች ምን ያህል አስተማማኝ ናቸው?

ሀ. ዓመቱን ሙሉ በጣም አስተማማኝ

ለ. በተወሰኑ ወቅቶች ብቻ አስተማማኝ

ሐ. በተገኝነት ተለዋዋጭነት ምክንያት የማይታመን መ. ሙሉ በሙሉ የማይታመን

35. ለእርሻ የሚሆን ውሃ ለማግኘት ምን ችግሮች ያጋጥሟቸዋል?(ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. ወደ ውሃ ምንጭ ረጅም ርቀት

ለ. በድርቅ ወይም ከመጠን በላይ ጥቅም ላይ በመዋሉ ምክንያት ተገኝነት ቀንሷል

ሐ. በውሃ ሀብቶች ላይ ግጭት ወይም ያለአግባብ መጠቀም

መ. የውሃ ማጠራቀሚያ ወይም አቅርቦት ደካማ መሠረተ ልማት

ሰ. ከመስኖ ወይም ከውሃ ስርዓቶች ጋር የተያያዙ ከፍተኛ ወጪዎች

ረ. ሌሎች (እባክዎ ይግለጹ) -----

36. ለቤተሰብዎ ወይም ለእርሻዎ የውሃ አቅርቦትን ለማሻሻል ማንኛውን እርምጃ ተግባረዋል?

ሀ.አዎ ለ. አይ

አዎ ከሆነ፣ ምን እርምጃዎችን ተግባራዊ አድርገዋል? -----

37. እንስሳት እርባታ ያረባሉ? (✓) ሀ. [] አዎ ለ. [] አይ

38. ለጥያቄ 37 መልስዎ አዎ ከሆነ የከብት ቁጥር፡- በሬ []፣ ላሞች/ጊደሮች []፣ ጥጆች []፣ ፍየሎች []፣ በጎች []፣ አህዮች []፣ ፈረሶች []፣ ግመሎች []፣ በቅሎ []፣ ዶሮዎች []፣ የንብ ቀፎ [] ሌሎችም []

39. በማህበረሰብ ምደባ ላይ በመመስረት፣ የእርስዎን ኢኮኖሚያዊ ደረጃ እንዴት ይገመግማሉ?

ሀ. ሀብታም

ለ. መካከለኛ

ሐ. ድሀ

40. ባለፉት 10 ዓመታት የሰብል ምርት መጠን አዝማሚያ እንዴት ነው? (✓)

የሰብል አይነት	እየጨመረ ነው	እየቀነሰ ነው	ተመሳሳይ ነው
አትክልቶች			
ጥራጥሬዎች			
ሌሎች (ይጥቀሱ)			

41. ምርቱ ከጨምረ ምክንያቶች ምንድን ናቸው? _____

42. ምርቱ ከቀነሰ ምክንያቶች ምንድን ናቸው? _____

43. የግብርና ምርትን ማስፋፋት ይፈልጋሉ? (✓) ሀ. [] አዎ ለ. [] አይ

44. ለ ጥያቄ .43 መልስዎ አዎ ከሆነ ለምን? _____

45. ለ ጥያቄ .43 መልስዎ አይ ከሆነ ለምን? _____

46. በእርሻ ስራዎ ላይ የግብርና ምርት እጥረቶች ምንድን ናቸው? በአግድም ደረጃ (1= በጣም ከባድ፣ 2= ከባድ)

ሰብል በአይነት	የእርሻ በሬ	የሰብል	የሰብል በሽታ	ድርቅ	አረም	ጎርፍ	ዉርጭ	ፈጥነዉ የሚደርሱ ዘሮች	ማዳበሪያ እጥረት	ተባይ መከላከያ	ሌሎች
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		ተባይ									

ለ. የአየር ንብረት ለውጥ እና የኑሮ ተጋላጭነት የመረጃ / የእውቀት ፍሰት / መጠይቆች

1. እርስዎ ወይም ማህበረሰብዎ የአየር ንብረት ለውጥን ለመተንበይ ወይም ለመላመድ ባህላዊ እውቀትን ይጠቀማሉ? (✓) ሀ. ☐ አዎ ለ. ☐ አይ

አዎ ከሆነ መልስዎ፣ የአየር ሁኔታን ወይም የአየር ሁኔታን ለመተንበይ ምን አይነት ባህላዊ ዘዴዎች በብዛት ጥቅም ላይ ይውላሉ (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. የእንስሳትን ባህሪ መመልከት (ለምሳሌ፡ ስደት፣ የጎጆ ጥለት)

ለ. በእጽዋት እድገት ወይም አበባ ላይ ለውጦችን መከታተል

ሐ. የደመና እንቅስቃሴን ወይም ገጽታን መመልከት

መ. የንፋስ አቅጣጫን እና ጥንካሬን መመልከት

ሠ. የተላለፉ ባህላዊ ምሳሌዎችን ወይም ታሪኮችን ማዳመጥ

ረ. ሌሎች (እባክዎ ይግለጹ) -----

2. ባህላዊ የግብርና ልምምድ ቤተሰብዎ ከአየር ንብረት መለዋወጥ ጋር እንዲላመዱ የሚረዳው እንዴት ነው? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. ድብልቅ ወይም ስብጥር እርሻ በመጠቀም

ለ. አገር በቀል ዘሮችን ወይም ድርቅን የሚቋቋሙ ዝርያዎችን መጠቀም

ሐ. የሰብል ፈረቃ

መ. ባህላዊ የውሃ ጥበቃ መዋቅሮችን መገንባት (ለምሳሌ ኩሬዎች፣ እርከኖች)

ሠ. ለወደፊት ጥቅም ላይ የሚውሉ ምግቦችን ወይም ዘሮችን ማከማቸት

ረ. ጉልበትን እና ሃብትን ከጎረቤቶች ወይም ከማህበረሰብ አባላት ጋር መጋራት

ሰ. ሌሎች እባኮችን ይግለጹ -----

3. የአየር ሁኔታን በመተንበይ በባህላዊ እውቀት እውነታ ላይ ምን አይነት ለውጥ አስተውለዋል?

ሀ. አዎን፣ ባህላዊ ዘዴዎች አስተማማኝ እየሆኑ መጥተዋል

ለ. አይ ፣ ባህላዊ ዘዴዎች ብዙም አስተማማኝ አይደሉም

ሐ. እርግጠኛ አይደለሁም

በጥያቄ ፤3 ውስጥ የሰጡት መልስ ብዙም አስተማማኝ ካልሆነ ምክንያቶቹ ምንድን ናቸው ብለው ያስባሉ?

ሀ. የአየር ንብረት/የአየር ሁኔታ ያልተጠበቀ ሁኔታ መጨመር

ለ. ባህላዊ እውቀት ያላቸው የማህበረሰብ ሽማግሌዎችን ማጣት

ሐ. በዘመናዊነት እሳቤ በባህላዊ ልምምድ ላይ ያነሰ ግንዛቤ መኖር

መ. ሌሎች እባኮችን ይግለጹ -----

4. የአየር ንብረት ለውጥን ተፅእኖ ለመቅረፍ የታለሙ ማህበረሰብን መሰረት ያደረጉ ልምዶች ወይም የአምልኮ ሥርዓቶች አሉ? (✓) ሀ. ☐ አዎ ለ. ☐ አይ

መልስዎ አዎ ከሆነ፣ እባክዎን ልምምዱን ይግለጹ -----

5. የአየር ንብረት ለመላመድ ባህላዊ ዕውቀትን ከዘመናዊ አሠራር ጋር አዋህደዋል? (✓)

ሀ. ☐ አዎ ለ. ☐ አይ

መልስዎ አዎ ከሆነ፣ ለቤተሰብዎ ወይም ለማህበረሰብዎ የሰሩ ጥምር ልምዶች ምንድናቸው? -----

6. የአየር ንብረት ለመላመድ ባህላዊ እውቀትን ለማስቀጠል ወይም ለመጠበቅ ምን ተግዳሮቶች አሉ? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. በወጣት ትውልዶች መካከል ፍላጎት ማጣት

ለ. የባህላዊ ዘዴዎች በበቂ ሁኔታ ሰንዶ አለመያዝ

ሐ. ዘመናዊ ቴክኒኮችን በብቸኝነት ለመጠቀም ፍላጎት መኖር

መ. ሌሎች እባኮችን ይግለጹ -----

7. ትውፊታዊ እውቀትን በመጠበቅ እና የአየር ንብረት መላመጃ ስትራቴጂዎች ጋር ለማዋሃድ ምን ሊደረግ ይችላል ብለው ያስባሉ? -----

የአየር ንብረት ክስተቶች የቤተሰብ ገቢን ወይም የምግብ ዋስትናን እንዴት እንደሚጎዳ የሚያሳዩ ምሳሌዎችን ይጠቁሙ -----

8. ከአየር ንብረት ጋር የተያያዙ ክስተቶች ባለፉት 10 ዓመታት ውስጥ የቤትዎ ገቢ ወይም የምግብ ዋስትና ላይ አሉታዊ ተጽዕኖ አሳድሯል? (✓) ሀ. [] አዎ ለ. [] አይ

መልስዎ አዎ ከሆነ፣ ከሚከተሉት የአየር ንብረት ሁኔታዎች ውስጥ የትኛው የቤተሰብዎን ገቢ ወይም የምግብ ዋስትናዎን አወኩ? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. የሰብል ውድመት የሚያደርስ ድርቅ

ለ. ከፍተኛ የጎርፍ ወይም የዉሃ መጥለቅለቅ መከሰት

ሐ. ዝናብ ዘግይቶ ወይም ቀደም ብሎ መጀመር በምርት መርሃ ግብሮች ላይ ተጽዕኖ አሳድሯል

መ. በሰብል ምርት የተባዮች እና በሽታዎች ድግግሞሽ መጨመር

ሠ. በፍተኛ ሙቀት የሰብል ምርት መቀነስ

ረ. ለከብቶች መኖ ወይም ውሃ አቅርቦት ቀንሷል

ሰ. በበሽታ ወይም በአስከፊ የአየር ሁኔታ ምክንያት የእንስሳት መጥፋት

ሸ. ሌላ (እባክዎ ይግለጹ) -----

9. ድርቅ በተለይ በቤተሰብዎ ላይ ምን ተጽዕኖ አሳድሯል? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. የሰብል ምርትን ማጣት

ለ. በመኖ ወይም በውሃ እጦት ከእንስሳት የሚገኘው ገቢ ቀንሷል

ሐ. ወደ ሌላ ቦታ ሥራ ለመፈለግ ስደት

መ. በምግብ እርዳታ ወይም በሴፍቲኔት ፕሮግራሞች ላይ ጥገኝነት መጨመር

ሠ. ምግብ ለመግዛት ንብረቶችን መሸጥ (ለምሳሌ የቤት እንስሳት፣ መሳሪያዎች)

ረ. ሌላ (እባክዎ ይግለጹ):-----

10. ከባድ ዝናብ ወይም የጎርፍ አደጋ በቤተሰብዎ ላይ ምን ተጽዕኖ አሳድሯል? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. ሰብሎች ወይም የእርሻ መሬቶች መጥፋት

ለ. ባልተሰበሰቡ ሰብሎች ወይም ዘሮች ላይ የሚደርስ ጉዳት

ሐ. በመስጠም ወይም በበሽታ ምክንያት የእንስሳት መጥፋት

መ. በቤቶች ወይም በግብርና መሠረተ ልማት ላይ የሚደርስ ጉዳት (ለምሳሌ መስኖ አዉታር ፣ ማከማቻ)

ሠ. በጎርፍ በተጥለቀለቁ መንገዶች የገበያ መዳረሻ ወይም የትራንስፖርት አገልግሎት ቀንሷል

ረ. ሌላ (እባክዎ ይግለጹ):-----

11. በሰብል እና በከብት እርባታ ላይ የሚከሰቱ ተባዮች ወይም በሽታዎች የቤተሰብዎን ገቢ ወይም የምግብ ዋስትናዎን እንደሚጎዳ እንዴት ለክተውታል።

ሀ. ከእህል ወይም ከእንስሳት ሽያጭ የሚገኘው ገቢ ቀንሷል

ለ. ተባዮችን ለመቆጣጠር ወይም ለማከም ወጪዎች መጨመር

ሐ. የሰብል ወይም የእንስሳት ምርታማነት አጠቃላይ መጥፋት

መ. ሌላ (እባክዎ ይግለጹ)፡-----

12. በአየር ንብረት ሁኔታዎች ምክንያት የምግብ እጥረት በሚፈጠርበት ጊዜ ቤተሰብዎ እንዴት ይቋቋማል?
(ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. በምግብ እርዳታ ወይም በሴፍቲኔት ፕሮግራሞች ላይ መታመን

ለ. የምግብ ብዛት ወይም መጠንን በመቀነስ

ሐ. ከጎረቤት ወይም ከዘመዶች ምግብ ወይም ገንዘብ በመበደር

መ. የቤት ውስጥ ንብረቶችን ወይም ከብቶችን በመሸጥ

ሠ. ከብድር ተቋማት ብድር በመውሰድ

ረ. ጊዜያዊ ሥራ ለማግኘት በመሰደድ

ሰ. ሌላ (እባክዎ ይግለጹ)፡-----

13. ካላችሁበት ተደጋጋሚ የአየር ንብረት ሁኔታዎች አንጻር በቤተሰብዎ የምግብ ዋስትና ላይ የረዥም ጊዜ ለውጦች ተመልክተዋል?

ሀ. አዎ፣ የምግብ ዋስትና ችግር ተባብሷል

ለ. አይ፣ የምግብ ዋስትና አሁንም የተረጋጋ ነው

ሐ. በማላመድ እርምጃዎች ምክንያት የምግብ ዋስትና ተሻሽሏል

14. የምግብ ዋስትናው ከተባባሰ ዋና ዋናዎቹ ምክንያቶች ምንድን ናቸው? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. በአፈር ጥራት መጓደል ምክንያት የእርሻ መሬት ምርታማነት ቀንሷል

ለ. ከአየር ንብረት ጋር በተያያዙ በሽታዎች ምክንያት የእንስሳት መጥፋት

ሐ. የግብርና ግብዓቶች ዋጋ መጨመር

መ. አስተማማኝ የውኃ ምንጮች አቅርቦት ቀንሷል

ሠ. ሌላ (እባክዎ ይግለጹ):-----

15. ቤተሰብዎ በገቢ እና በምግብ ዋስትና ላይ ከደረሰው የአየር ንብረት ተጽዕኖ እንዲያገግሙ የሚረዳዎ ምን ዓይነት ልዩ ድጋፍ ወይም ጣልቃ ገብነት ነው?-----

16. ባለፉት 10-20 ዓመታት ውስጥ ከሚከተሉት ችግሮች አንዱን አጋጥሞዎት ከሆነ ያክብቡ

ሀ. የዝናብ እጥረት

ለ. በረዶ

ሐ. ከመጠን ያለፈ ዝናብ

መ. የጎርፍ መጥለቅለቅ

ሠ. የሰራተኛ እጥረት

ረ. የመሬት እጥረት

ሰ. ለም ያልሆነ መሬት

ሸ. የእውቀት / የክህሎት ክፍተት

ቀ. የበሬዎች እና ቁሳቁሶች እጥረት

በ. ተባዮች

ተ. የጤና ችግር

ቸ. የመስኖ መርሃ ግብሮች ተደራሽ

አለመሆን

አ. ዝቅተኛ የገበያ ዋጋ

ነ. የግብርና ግብዓቶችን ለመግዛት የገንዘብ እጥረት

ኘ. ሌሎች -----

17. የእርስዎ ቤተሰብ በምግብ እርዳታ ላይ ጥገኛ ነው? 1) አዎ 0) አይደለም

18. ባለፉት 10 ዓመታት፣ ቤተሰብዎ በአመት ውስጥ በአማካይ ለስንት ወራት የምግብ እጥረት ያጋጥመዎታል?

ሀ. እጥረት የለም

ለ. ከ3 ወር በታች

ሐ. ከ3 እስከ 5 ወራት

መ. ከ6 እስከ 8 ወራት

ሠ. ከ8 ወራት በላይ

19. በምግብ እጥረት ወቅት አስቸጋሪውን ጊዜ ለማለፍ ብዙ ጊዜ ምግቦችን ከየት ያገኛሉ?

ሀ. የምግብ እርዳታ

ለ. ከሴፍቲኔት ፕሮግራም

ሐ. እንስሳትን በመሸጥ

መ. መሰደድ

ሠ. የጉልበት ስራ

ረ. የገንዘብ ልውውጦች

ሰ. ሌላ-----

20. የእርሻ መሬታችሁ ማዳበሪያ ሳይጠቀም ምርት መስጠት ይችላል? 1) አዎ 0) አይደለም

21. ባለፉት 5-10 ዓመታት ውስጥ የእርስዎ ቤተሰብ የዘሩአቸው የሰብል ዓይነቶች ምን ምን ናቸው? -----

22. በዚህ ሁለት ዓመታት ውስጥ የእርስዎ ቤተሰብ ምን ዓይነት ሰብል ዘርቷል? -----

23. ከዚህ በፊት እና አሁን በዘሩአቸው የሰብል ዓይነቶች ላይ ለውጥ አይተዋል? 1) አዎ 0) አይ

24. **ለ ጥያቄ 23 መልስዎ አዎ ከሆነ፣** ምን ዓይነት ለውጥ ታዝበዋል?-----

25. ባለፉት 10 ዓመታት ውስጥ በአካባቢዎ ድርቅ አጋጥሞዎት ያውቃሉ? 1) አዎ 0) አይ

26. ከተሞክሮዎ በመነሳት በአካባቢው ያለውን የድርቅ ክስተት ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

27. ባለፉት 10 ዓመታት ውስጥ በአካባቢዎ ከመጠን በላይ ዝናብ አጋጥሞዎት ያውቃሉ? 1) አዎ 0) አይ

28. ከተሞክሮቻቸው በመነሳት፣ በአካባቢው የሚፈጠረውን የዝናብ መጠን ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

29. ባለፉት 10 ዓመታት ውስጥ በአካባቢዎ የጎርፍ መጥለቅለቅ አጋጥሞዎት ያውቃሉ? 1) አዎ 0) አይ

30. ከተሞክሮቻቸው በመነሳት በአካባቢው የጎርፍ አደጋዎችን ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

31. ባለፉት 10 ዓመታት ውስጥ፣ በአካባቢዎ ከመደበኛው የዝናብ ወቅት በፊት የሚደርስ ዝናብ አጋጥሞዎት ያውቃሉ? 1) አዎ 0) አይደለም

32. ከተሞክሮቻቸው በመነሳት፣ በአካባቢው የዝናብ ወቅት ከመደበኛው ቀን በፊት የሚፈጠረውን የዝናብ ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

33. ባለፉት 10 ዓመታት ውስጥ፣ ከመደበኛው ቀን ዘግይቶ የሚጀምር ዝናብ አጋጥሞዎት ያውቃል በአካባቢዎ ዝናባማ ወቅት? 1) አዎ 0) አይ

34. ከተሞክሮቻቸው በመነሳት በአካባቢው ዘግይቶ የሚጀምር የዝናብ ስርጭትን እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል ምንም

ሐ. ለውጥ የለም

35. ባለፉት 10 ዓመታት ውስጥ፣ በአካባቢያችሁ አውዳሚ በረዶዎች ገጥሟችሁ ታውቃላችሁ? 1) አዎ 0) አይ

36. ከተሞክሮዎ በአካባቢው የበረዶ ክስተቶችን ድግግሞሽ እንዴት ይገምግሙ?

ሀ. ክስተት ጨምሯል።

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

37. ባለፉት 10 ዓመታት ውስጥ የየቀኑን (ከፍተኛ) የሙቀት ሁኔታን እንዴት ይገመግማሉ?

ሀ. የሙቀት መጠኑ ጨምሯል

ለ. የሙቀት መጠኑ ቀንሷል

ሐ. ምንም ለውጥ የለም

38. ባለፉት 10 ዓመታት የሰብል በሽታዎች አጋጥመውዎት ያውቃሉ? 1) አዎ 0) አይ

39. ከተሞክሮዎ በአካባቢው የሰብል በሽታዎችን ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

40. በአካባቢዎ በሚከሰት የሰብል በሽታ ምክንያት ምርት አጥተው ያውቃሉ? 1) አዎ 0) አይ

41. ባለፉት 10 ዓመታት የእንስሳት በሽታ አጋጥሞህ ያውቃል? 1) አዎ 0) አይ

42. ከተሞክሮዎ በአካባቢው ያሉ የእንስሳትን በሽታዎች ድግግሞሽ እንዴት ይገመግማሉ?

ሀ. ክስተት ጨምሯል

ለ. ክስተት ቀንሷል

ሐ. ምንም ለውጥ የለም

43. በአካባቢዎ በሚከሰት የእንስሳት በሽታ ምክንያት እንስሳትን አጥተዋል? 1) አዎ 0) አይ

44. ስለቅድመ ማስጠንቀቂያ እንቅስቃሴዎች በአካባቢዎ ካሉ ከማንኛውም ተቋም ሰምተው ያውቃሉ?

አዎ 0) አይ

45. ከእርስዎ ልምድ በመነሳት በክረምት ወቅት አጠቃላይ የዝናብ አዝማሚያን እንዴት ይገመግማሉ?

ሀ. የክረምት ዝናብ እየጨመረ ነው

ለ. የክረምት ዝናብ እየቀነሰ ነው

ሐ. ምንም ለውጥ የለም

46. ከእርስዎ ልምድ፣ አጠቃላይ የክረምት ዝናብ አዝማሚያ በአመራረት ስርዓትዎ ላይ ያለውን ተጽእኖ እንዴት ይገመግማሉ?

ሀ. አሉታዊ ተጽእኖ አለው

ለ. አዎንታዊ ተጽእኖ አለው

ሐ. ምንም ለውጥ የለም

47. ከእርስዎ ልምድ በመነሳት በበልግ ወቅት ያለውን አጠቃላይ የዝናብ አዝማሚያ እንዴት ይገመግማሉ?

ሀ. የበልግ ዝናብ ጨምሯል

ለ. የበልግ ዝናብ ቀንሷል

ሐ. ምንም ለውጥ የለም

48. ከእርስዎ ልምድ በመነሳት አጠቃላይ የበልግ ዝናብ አዝማሚያ በምርት ስርዓትዎ ላይ ያለውን ተጽእኖ እንዴት ይገመግማሉ?

ሀ. አሉታዊ ተጽእኖ አለው

ለ. አዎንታዊ ተጽእኖ ይኖረዋል

ሐ. ምንም ለውጥ የለም

ሐ. የመላመድ ስልቶች መረጃ አዘል መጠይቆች

1. የአየር ንብረት ለውጥ በተከሰተበት ጊዜ ወይም የዝናብ መጠን ከሰብል ምርት ሂደትዎ ጋር በተገናኘ በተለያዩ ባህሪያቱ ላይ እምነት በማይሰጥበት ጊዜ ተለዋዋጭነትን ጨምሮ የአየር ንብረት ለውጥን ተፅዕኖ ለመከላከል ከሚከተሉት መንገዶች ውስጥ የትኛውን ይተገበራሉ? (ምልክት ያድርጉ)

የመላመድ ልምዶች	አዎ	አይ	አስተያየት
የተለያዩ ሰብሎች ዝርያዎችን			
ሰብሎችን መቀየር			
የመትከያ ቀናትን መለወጥ			
የአፈር እና የውሃ ጥበቃ			
የሚታረስ መሬት መጠንን ማስተዳደር			
ዛፎችን መትከል			
የመስኖ አጠቃቀምን መጨመር			

በሰብል ምርት ላይ ብቻ ማተኮር			
በእንስሳት ምርት ላይ ብቻ ማተኮር			
የእንስሳትን ብዛት መገደብ			
ከእርሻ ውጭ ገቢን ማስፋት			
የማዳበሪያ አጠቃቀም			
የተሻሻሉ ዘሮችን መጠቀም			
(ሌሎች ካሉ እባክዎን ይዘርዝሩ)			

መ. አዳዲስ አሰራሮችን ከመከተል (ለምሳሌ ወጪ፣ የእውቀት ማነስ) ጋር የተያያዙ ተግዳሮቶችን ያካትቱ ተዛማጅ መጠይቆች

- አዳዲስ የግብርና ወይም የአየር ንብረት መላመድ ልምዶችን ለመጠቀም ሲሞክሩ ችግሮች አጋጥሞዎታል?
 ሀ. ☐ አዎ ለ. ☐ አይ
- አዎ ከሆነ፣ የሚያጋጥምዎት ዋና ዋና ችግሮች ምንድን ናቸው? (ከአንድ በላይ መምረጥ ይችላሉ)
 ሀ. የግብአት ከፍተኛ ዋጋ (ለምሳሌ ዘር፣ ማዳበሪያ)
 ለ. ስለ አዳዲስ ልምዶች እውቀት ወይም ስልጠና እጥረት
 ሐ. የተገደበ የሀብቶች ተደራሽነት (ለምሳሌ ውሃ፣ መሳሪያዎች)
 መ. የተሻሻሉ ዘሮች ወይም ማዳበሪያዎች አለመገኘት
 ሠ. ብድር ወይም ብድር የማግኘት እጦት

ረ. አስተማማኝ የአየር ንብረት መረጃን የማግኘት ችግር

ሰ. ከማህበረሰብ ወይም ከቤተሰብ አባላት ተቃውሞ

ሸ. በማይታወቁ ዘዴዎች አደጋዎችን የመውሰድ ፍርሃት

ቀ. ደካማ የመንግስት ወይም ተቋማዊ ድጋፍ

በ. ሌላ (እባክዎ ይግለጹ):-

3. የገንዘብ ተቋማት ችግሮች አዳዲስ አሰራሮችን የመከተል ችሎታዎ ላይ ምን ተጽዕኖ ያሳድራሉ?

ሀ. የመጀመሪያ ኢንሹራንሶችን መግዛት አይቻልም (ለምሳሌ፣ ለመሳሪያዎች ወይም ግብዓቶች)

ለ. በብድር ላይ ከፍተኛ የወለድ ተመኖች

ሐ. ኢንሹራንሶችን ለማረጋገጥ በቂ ያልሆነ የገበያ ዋጋዎች

መ. ሌላ (እባክዎ ይግለጹ):-

4. የመረጃ እና የሥልጠና ተደራሽነት አዳዲስ ልምዶችን በመቀበል ላይ ምን ተጽዕኖ ያሳድራል?

ሀ. በአካባቢው የሥልጠና ፕሮግራሞች እጥረት

ለ. ቴክኒካዊ ቃላትን ወይም ዘዴዎችን ለመረዳት አስቸጋሪነት

ሐ. ከኤክስቴንሽን ሰራተኞች ወይም አማካሪዎች በቂ ያልሆነ መመሪያ

መ. ሌላ (እባክዎ ይግለጹ):-

5. ባህላዊ የግብርና አሰራሮች ከአዳዲስ ዘዴዎች የበለጠ አስተማማኝ ናቸው ብለው ያምናሉ?

ሀ. አዎ

ለ. አይ

ሐ. እርግጠኛ አይደለሁም

6. አዎ ከሆነ ባህላዊ ዘዴዎች የበለጠ አስተማማኝ ናቸው ብለህ በምን ታምናለህ ? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. ስለ ባህላዊ ዘዴዎች የተሻለ እውቀት

ለ. ከባህላዊ እርሻ ጋር የተያያዙ ዝቅተኛ ወጪዎች

ሐ. ከአዳዲስ ልምዶች ጋር የመውደቅ አደጋ

መ. ባህላዊ ልምዶችን ማህበራዊ ተቀባይነት

ሠ. ሌላ (እባክዎ ይግለጹ):-----

7. በአካባቢዎ ያለው መሠረተ ልማት አዳዲስ አሰራሮችን የመከተል ችሎታዎ ላይ ምን ተጽዕኖ ያሳድራል?

ሀ. ደካማ የመጓጓዣ መገልገያዎች

ለ. የተገደበ የገበያ መዳረሻ

ሐ. በቂ ያልሆነ የማከማቻ ቦታ

መ. ሌላ (እባክዎ ይግለጹ):-----

8. አዳዲስ ልምዶችን ለመቀበል ድጋፍ (ገንዘብ፣ ቴክኒካል ወይም ቁሳቁስ) አግኝተዋል?

ሀ. አዎ ለ. አይ

አዎ ከሆነ፣ ምን አይነት ድጋፍ አግኝተዋል? -----

አይደለም ከሆነ፣ አዳዲስ አሰራሮችን ለመቀበል ምን አይነት ድጋፍ ያስፈልግዎታል? -----

9. አዳዲስ የግብርና ወይም የመላመድ ልምዶችን ለመውሰድ ሲያስቡ ምን ተጨማሪ ችግሮች

ያጋጥሙዎታል? -----

10. እነዚህን ተግዳሮቶች ለመፍታት ምን መደረግ አለበት ብለው ያስባሉ?-----

11. በአየር ንብረት መላመድ ዙሪያ ከመንግስታዊ ወይም መንግስታዊ ካልሆኑ ተቋማት ስልጠና ወይም አውደ ጥናቶች ተሳትፈዋል?-----

12. እንደ የጋራ መስኖ ፕሮጀክቶች ወይም የዘር ባንኮች፣ የህብረት ሥራ ማህበራት ያሉ ማህበረሰብን መሰረት ያደረጉ የማላመድ ስልቶች አሉ? እነሱን እና ኢኮኖሚያዊ፣ ማህበራዊ ጥቅሞቻቸውን ለምግብ ዋስትናዎ ይዘርዝሩ -----

<< ስለ ትብብርዎ እናመሰግናለን >>