



ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
CENTRE FOR FOOD SECURITY STUDIES

Assessment of Awash River Flood and Its Impact on Pastoralist's Food Security in
Amibara Woreda, Zone 03, Afar Region, Ethiopia

By

Zekarias Aragaw

ID No. GSE/3881/11

DECEMBER, 2021
ADDIS ABABA, ETHIOPIA



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COLLEGE OF DEVELOPMENT STUDIES
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DECLARATION

This thesis entitled “Assessment of Awash River Flood and Its Impact on Pastoralist’s Food Security in Amibara Woreda, Zone 03, Afar Region, Ethiopia” is my original work and has not been presented for MSc degree in any other University and that all the sources and materials used for the thesis have been properly acknowledged.

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As supervisors /co-advisers of the thesis, we certify that we have read and evaluated the thesis prepared by Zekarias Aragaw thesis Entitled “Assessment of Awash River Flood and its Impact on Pastoralist’s Food Security in Amibara Woreda, Zone 03, Afar Region, Ethiopia” recommend that it is acceptable as a thesis required for the degree of Master of Science Degree in Food Security and Development Studies.

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Final approval and acceptance of this thesis are contingent upon the candidate's submission of the final copy of the thesis, incorporating all the comments by Examining Board, to the Council of Graduate Studies (CGS) through the Centre Academic Committee (CAC) of the Centre.

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ABSTRACT

Sub-Sahara continent countries as well as African country area measure severely food insecure rely upon rain-fed agriculture for economic system and food security. Global climate change extraordinarily affects farmers' crop and livestock production, significantly within the arid semi-arid areas. Flood has the end result of global climate change it's exposures to several individuals internal displacement, disease, destroyed infrastructure, food security issue, and psychological impact everywhere the world in Ethiopia country in line with the state disaster risk management report September 2020 G.C 1,017,854 individuals area people affected 292,863 individuals area people displaced across the country. The methodology of this study used a mixed approach descriptive and explanatory analysis style through victimization acceptable activity tools. Complete of 333 households were designated for the study from the overall range of households or respondents, 333 questionnaires (sample size) area household distributed to the beneficiary however 310 questionnaires were collected or came back to the researchers and therefore the remaining was uncollectable in different reasons. The data was collected using questionnaires and interviews as well as secondary data. The data was collected using questionnaires and interviews as well as secondary data. This study assessed the inundated watercourse flood and its impact on pastoralist food security in Amibara woreda, Zone 03, Afar Region, Ethiopia. Ethiopian pastoralist's area component mainly poor and lack financial gain the most reason there's no various financial gain solely depends on livestock living inside food insecurity out of the population. Ethiopian pastoralists estimate 14-18 % (12 million to fifteen million) indicates current literature. The studies reveal the intensity and impact of flood hazard within the study area and therefore the influence of pastoralist's household food security standing high 85 % of the participated result have food insecure the remaining 15 % household food secure, food consumption score outcomes 29% there have been poor consumption, 50.50% were borderline consumption whereas the remaining who has 20.50% was acceptable consumption severally the study area unit has low food consumption score this outcome illustrates the pastoralist has lower financial gain exposed to food insecurity they can't win WFP goal, coping strategy represents very sever 5.1%, less severe 27.3%, sever 56.3% and 11.3% of the household have Quite sever most of the respondents household severely affected by food shortage they can't simply recover from natural hazard, and downfall knowledge analysis fall and stream flow rate trend occur summer season (June, July, and August) higher as compared to a different season. The outcomes of the analysis area unit the stakeholders as well as government and non-governmental organizations would like careful work collaboratively to boost pastoralist food security and minimize experiences of the flood.

Key words: food security, flood, pastoralists, coping strategy, and food consumption score.

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ACRONYMS AND ABBREVIATION

BDA	Basin Development Authority
CSA	Central Statistics Agency
CSI	Coping Strategy Index
EMA	Ethiopian Mapping Agency
ERCS	Ethiopian Red Cross Society
ERDAS	Earth Resource Data Analysis System
FAO	Food and Agricultural Organization
FCS	Food Consumption Score
FGD	Focus Group Discussion
GIS	Geographic Information System
GIS	Geographical Information System
HFIAS	Household Food Insecurity Access Scale
KII	Key Informant Interview
MOARD	Ministry of Agriculture and Rural Development
NDRMC	National Disaster Risk and Management Commission
NMA	National Meteorological Agency
SPSS	Statistical Package for Social Science
SSA	Sub-Sahara Africa
SUDS	Sustainable Drainage System
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy for Disaster Reduction
WHO	World Health Organization
WMO	World Meteorological Agency

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CHAPTER ONE

INTRODUCTION

1.1 Background and Justification

Food security may be a state of affairs wherever within the entire population has physical, social, and economic access to adequate, secure, and nutrient food that fulfills their biological process needs and food for a vigorous and healthy life over a protracted amount of your time (FAO, 2005). This definition, consistent with Jones et al. (2013), pertains to the inequitable distribution of food at intervals state and households. Additionally, food security is that the power to accumulate socially and culturally acceptable food. It's the way to acquire food and its macro-micro composition.

On the opposite hand, food insecurity may be a state once individuals don't have adequate physical, social, or economic access to food (FAO, 2002). Natural hazards have impacts on direct or indirect food security worldwide, significantly the developing countries square measure vulnerable in 2003 and 2013 developing countries suffered a complete USD 80 production loss thanks to one hundred forty large-scale disasters eighty three percent of this impact was caused by major floods (FAO, 2015). This disaster triggered loss occurred in countries wherever agriculture is one among the foremost economic drivers, usually tributary up to thirty - forty percent of employment.

Developing countries square measure progressively realizing the requirement for social protection measures to alleviate the immediate deprivation of poor individuals, and to stop others from severe economic condition (FAO, 2015).

Globally, flood hazards square measure realized to own the foremost devastating effects on economic development, livelihoods, agriculture, and health, social and occurred to be sudden, an accidental event that causes several deaths and injuries. However, not all hazards square measure caused by natural forces. Natural hazards will impact economic and food security, particularly in African countries on the poorest households like pastoralists (Dolcemascolo, 2004).

Flood water has up as flow into the stream inflated and streams cut the road property to several villages in and round the study space. will increase the amount of natural hazard events at intervals the globe, the scale of affected populations, and so the extent of economic A.K.Sons (2006), loads of victims have suffered condition, disaster-induced ill-health human and placental mammal, severe economic crises, and losses of infrastructure in precipitation dependent agricultural economies, erratic precipitation inflicting sudden floods will produce devastating and impacts on the food security.

Food insecurity continues to be a giant downside to beat in Ethiopia. Chronic and acute food insecurity is current, particularly among rural populations and pastoralists farmers. In Ethiopia, 2.7 million individuals

needed emergency food help in 2014 and 238,761 kids needed treatment for severe acute deficiency disease (Endalew, Muche, and Tadesse 2015).

Climate change has intense the natural hazards the foremost recent facts from the country's national disaster risk management commission (NDRMC) indicate that on the point of 1,017,854 individuals square measure affected 292,863 individuals square measure displaced across the country.

Floods in Ethiopia significantly, on valley space inundated stream don't seem to be a brand new development, and whenever serious floods hit the higher, middle, and lower inundated of the severely affected regions to its geographical location regarding the topography of the inundated stream the study website have geographically in middle inundated.

Amibara woreda is geographically liable to most of the woredas community livelihood agriculture like pastoralists and agro pastoralist. Supported woredas data huge irrigations farmland occupied by investors the world has ready the foremost productions of sugarcane, cotton, vegetables, etc. This pattern of quality has been discontinuous by the large-scale development of irrigation agriculture on the stream since 1960 (Ali, 1997; Hassen, 2008, Rettberg, 2009).

Flood at intervals the state has affected 240,000 people, razed one hundred and five schools, two hundred rural roads, 6 bridges, and killed over twenty one, livestock broken around sixty, hectares of crops and farmland (flood list in Africa 2020).

The livestock farm population in Afar Region at intervals the center inundated basin has shown an increasing trend starting from 1998. This was principally due to many water points developed at intervals the region that once was a vital issue at intervals the region. The pastoralist manner has direct betting on their livestock financial gain supply or social life so there life below food insecurity the flood has exacerbate there food availability and access decline below sever condition the study reveal the way to improve pastoralist social household food security.

Recent floods impact each people, communities and have social, economic, and environmental consequences. The influence of floods variable resident displacement, food security issue increase, livestock and human illness, destruct irrigated land and infrastructure like road, clinic faculty, etc.

In this thesis to assess the impact of the inundated stream flood on pastoralist social unit food security within the study area the analysis to fill gaps the way to native header strategy of study in Amibara woreda.

1.2 Statement of the Problem

Climate change has intensification of the natural hazards because of that passed impact on the socio-profitable and socio-political conditions that persisted before the disaster, immortalizing a cycle of impoverishment and vulnerability (World Bank, 2014).

Natural hazards do all over their impacts square measure additional pronounce in developing countries because of their position of impoverishment (Eleni, 2011). Adding temperatures and changes in downfall patterns have an effect on rural yields of each pastoral and irrigated crop. Temperature change affects countries' farming and food security through a range of networks notably pastoralist vulnerability is high. UNDP, (2004) international report, African countries square measure appertained to as having the loftiest vulnerability to flooding and colorful different shocks. As natural hazards square measure nearly connected to processes of mortal learning, the event decisions created by individualities, communities, and nations do conjointly induce new hazards and that they can't recover quickly.

Flood vulnerability may be a dimensional approach encompassing an out sized range of pointers. Vulnerability depends on the profitable smart, attentiveness of the individuals living throughout a society, preparation, and recovery conditions of the community. The poorest square measure disproportionately vulnerable and they've less capability to acclimatize (Narayan, 2013). The study space vulnerability has terribly high as a result of the financial gain supply solely relied on livestock so that they have low financial gain supply and food insecure.

In Africa, rush quantities square measure doubtless to drop for utmost passageway of geographic region (SSA) whereas downfall variability is anticipated to extend (IPCC, 2014). Speranza, (2010) and IBRD, (2010) argued that Africa is anticipated to witness well negative temperature change impacts, in terms of a rise within the at one time high temperatures and a call the mostly erratic downfall in its surroundings of wide impoverishment and low development. Africa, because of its low reconciling capability and high perceptiveness of socio-profitable systems, is one in all the foremost vulnerable regions mostly affected and to be littered with the impacts of temperature change (IPCC, 2014).

Utmost Ethiopia countries square measure exposed to natural hazards convinced disasters that irritate the vulnerability of the poorer section of the population. The state disaster officers, report the overflow of Kesem, tendaho, and Koka dams on the inundated watercourse were the reason for the death and relegation of individuals. The government of Ethiopia reports 2020 G.C that associate degree unknown deluge caused by the overflow of the inundated watercourse has displaced persons within the Afar region. Flood has faced serious issues to the tract and deluge hazard destruct varied rural merchandise exposed to the population food deficit. Food instability has become an epidemic greatly touching developing countries as well as the study area (adewuyi and olfan, 2014).

pastoralist livelihoods in Afar indigenous state well pastoralism historically has been the most important profitable elbow grease for thus society, homes specializing solely within the beast at this have lower inflows than those that exercise farming or mix beast and crop ranch (Tsegaye et al, 2013).

In the study area pastoralist's food availability, access, and application dragged food-deficit as a result of their life depended solely on the beast and lack of development throughout deluge lack of preparation and

fortune telling utmost of the beast swamped and exposed to die, complaint, and loss of property. The present study is a trial to assess of inundated watercourse deluge and its impact on pastoralist food security in amibara woreda.

1.3. Objectives

1.3.1 General Objective

The overall objective of this study is to assess Awash River flood and its influence on pastoralist food security in Amibara Woreda, Afar Regional State, Ethiopia.

1.3.2 Specific Objectives

This study has the following specific objectives:

1. Describe the flood frequency in the study area,
2. Determine pastoralist household food security status in the study area,
3. Identify the influence of flood on household food consumption,
4. Explore households flood induced food coping strategy.

1.4 Research Question

This research intended to answer the following basic questions which are derivatives of the above mentioned research objectives:

1. How much are the influence of flood in the case site?
2. What are the pastoralist household food security statuses?
3. What is pastoralist household food coping strategy?
4. How to affect flood on household food consumption?

1.5 Significance of the Study

Study on Assessment of Awash River flood and its impact on household food security particularly to the pastoralist of amibara wereda at large applaud. In order to minimize and avoid the problem, there should be a research that can identify and understand the causes and consequences of flood additionally the household food security status of in the study area.

In general, this study provides basic information for different concerned bodies including local communities, governmental, non-governmental organizations and researcher etc.

Ethiopia is highly vulnerable to natural hazards in particular to hydro metrological hazards. The National reports from the Ethiopian disaster prevention and preparedness agency indicate that the frequency and intensity of hydro metrological hazards are increasing at an alarming rate and flood is one of the prominent hazards.

The problem is visible in developing countries especially the study area vulnerability is high. The effect of such kinds of hazards becomes harsh and increases household food insecurity in the study area.

This research has significance, in exploring the contemporary knowledge gap. The research also examined the existing problems of flood hazards and identifying the usual causes of food security decrease in the study area. Based on the findings the research provides a way forwards to bring adaptive and coping strategies in the study area.

Furthermore, the research will be having its own contribution to the concerned government bodies and another stakeholder by taking the study area as a case for other areas which has similar scenarios.

1.6 Scope and Limitation of the Study

1.6.1 Scope of the Study

The studies were conducts on assess Awash River flood and its impact on pastoralist household food security. The flood hazard occupies most kebeles from Amibara woreda according to woreda agriculture and livestock improvement office report in this thesis highest exposure, due time and resource limitation included the most topographical vulnerable Amibara woredas kebele named as werer, serkamo and badahamo kebele. The further most woreda's in Afar Regional state has exposed to Awash River flood in this study encompassed the most vulnerable Amibara woreda. The study included three kebeles named as werere, serkamo and badahamo for data gathered.

The studies concern the level of household food security status and the influence of flood on their food security pastoralist household level and the flood hazard destruct infrastructure, and property and unmoved pastoral family and livestock.

Socio demographic and socio economic including in variable and food consumption score, household food security status and pastoralist food coping strategies were in variables consider in this study.

The study focused based on scientific survey recommended the consistent solution and household's resilience and coping strategies potential kebeles three representative kebeles households.

1.6.2 Limitation of the Study

These studies were limits to identify factors that determine the vulnerability of assess Awash River flood and its impacts on pastoralist food security in Amibara woreda, Afar Region.

Still, it was not possible to successfully study in Awash River flood and its impact on pastoralist household food security the only thesis study on this title in this study area. The flood analysis organized by flood spatial analysis, and during collect data spatial analysis has incomplete data the stakeholder government authority especially national basin development.

Methodologically, this study used as survey questioner, key informant interview, field observation and focus group discussion collected from sample flood affected households as well as the variables includes were focused on socioeconomic, and demographic related factors.

The current world pandemic disease coronavirus (COVID-19) risks to done on time and the big obstacle to collect necessary data, budget issue, national security issue and pastoralist life style a big challenged to collect data.

1.7 Ethical Consideration

In the case of data collection, ethical considerations must be seriously taken into account to ensure the protection, integrity, anonymity, consent, and other human elements of the informants. As argued by Kitchin and Tate (2000) research ethics are considered with the extent to which the researcher is ethically and morally responsible to participants, the research sponsors, and other concerned bodies that have a contribution in research. Taking this idea into consideration, before starting to conduct the study, ethical consideration has been seriously taken into account by the researcher. First of all, initial contacts have made with those higher government officials and sample populations to introduce myself and explain the purpose of the research. Then, the discussants and respondents were met and asked their willingness to conduct FGD and interview. The questionnaire survey was undertaken by a trained data collector.

The data collectors were selected with the collaboration of the woreda office director, and then I gave half-day training on all the necessary research processes including research ethics. In addition, obviously, the voluntary respondents are the target groups of this research.

Both researcher and the enumerators inform the respondents that their responses were being kept at utmost confidential level. Beyond the ethics on human subjects, research ethics also considers acknowledgment of data generated by others and appropriate citations of scholarly research outputs, books, websites, and any other related documents to assure the intellectual and scientific integrity of the researcher.

1.8 Organization of the Thesis

This research has five chapters. Chapter one presents the introduction, background study; Scientific works flow about flooding and food security as well as statement of the problem, Scope and limitation of the study area, objective and research question, the significance of the study, and organization of the thesis.

Chapter two Literature review theoretical and conceptual framework for the studies, chapter three deals with the research method and material depicts study area description, research design, sampling method, and method of data analysis studies. The forth chapter also devoted to result, discussion and analysis based on the processed primary and secondary data of the study. And finally the fifth chapter is dedicated to conclusion and recommendation based on the findings of the study and lastly References.

CHAPTER TWO

LITERATURE REVIEW

2.1. Concept of Pastoralism, Flood and Food Security

2.1.1 Concepts of Pastoralism and Flood Hazard Vulnerability

Pastoralism is a form of animal husbandry where tamed creatures known as beasts are released onto large vegetated out-of-door lands (ranges) for grazing, historically by nomadic people that moved around with their herds. The species involved include cattle, camels, goats, yaks, llamas, reindeer, nags, and lamb (Rainer, 2018).

Pastoralism is planted in numerous variations throughout the world, generally where environmental characteristics similar as dehumidification, poor soils, cold or hot temperature, and lack of water make crop-growing delicate or insolvable. Operating in these further extreme surroundings with further borderline lands, mean that pastoral communities are veritably vulnerable to global warming (Benton, 2019).

The conception and description of the pastoralism vulnerability that has been employed by different studies revolve around the explaining of vulnerability as lack of adaptive capacity in both social and natural systems perceptivity and exposure to hazard (Adger and Kelly, 1999; Deressa, 2010; Acheampong et al., 2014). Pastoral communities are susceptible to unforeseen or gradational changes in social or ecological shocks and stresses. Ethiopian pastoralists are together doable and susceptible. The present global climate change, food instability, and internal conflict extremity are affecting pastoralist's livelihood within the country.

To define vulnerability, we would wish to define threat first. Dercon (2001), the peril defines the threat-taking events which will damage mortal and beast good well- being certainty pertains to the circumstance, timing, and magnitude of the negative event. Supported threat description vulnerability denotes failure of adaptability to the circumstances of those uncertain events, including long-term and seasonal trends. The climatic shock of the failure is one among numerous sources of vulnerability for Ethiopian pastoralists. Poverty is one of the foremost experimental challenges in Africa, also as Ethiopia. Despite wide attention being given to poverty relief, confusion still exists over the veritably complex poverty dynamics in pastoral areas. Because pastoralists are frequently poor as a result of low standard pointers such as cash expenditures, education, and request access (Devereux, 2007). Global climate change, failure, food instability, conflict, and unsafe security issues are crucial challenges and long-term structural problems for pastoralists in Ethiopia.

According to (Peter, 2008) reliance on quantitative measures are largely questionable within the environment of pastoralism, and an evident reluctance to fully value pastoral product and consumption leads to misperceptions about the character and extent of poverty among pastoral populations.

Grounded on threat description vulnerability denotes a lack of adaptability to the circumstances of these uncertain events, including long-term and seasonal trends.

The climatic shock of the drought and flood is one of many sources of vulnerability for Ethiopian pastoralists. The shortage livestock terms of trade for cereals and other staple commodities have collapsed, while pasture and water resource conflicts have increased. Loss of access to water, pasture, and effective, community-based animal health care, all these vulnerabilities led to increases in malnutrition, morbidity, and malnutrition (Leutze et al., 2011).

2.1.2 Concepts of Flood

The definition of flood is “an accumulation of water inside a water body and the overflow of excess water on to adjacent flood plains, or it's associate degree overflow of interior or recurrent event waters, uncommon and speedy accumulation of runoff or surface waters from any source” Meyer, (2004).

In addition to this, flooding is associate degree overflowing or irruption of a wonderful body of water over the land surface that quickly inundates an area. what is more, Manandhar (2010), conjointly outlined flooding as ‘flooding could also be a general and temporary condition of partial or complete inundation of commonly land areas from the quality and speedy runoff of surface waters which might result from rain, rivers, ice soften then on’.

Sinafikish (2013), the flood is utilized throughout a broader sense to cover many stream activities that cause harm that is the inundation of floodplains and adjacent terraces, bank cutting, stream channel shifting, and rubbish torrents throughout commonly high discharge.

There square measure differing types of flooding like stream flooding, coastal flooding, flash flooding, and concrete flooding. Among these types of flooding, a flash flood can be outlined as speedy flooding of low-lying areas, rivers, and streams that square measure caused by the acute rain associated with a electrical storm which conjointly occur once a manmade structure, like a dam, collapses.

Flash flooding happens once rock bottom beneath a storm becomes saturated with water thus quickly that it cannot be absorbed. The runoff collects in low-lying areas and flows speedily downhill.

Grabs (2011), and Bariweniet. al (2012), cited in Sinafikish (2013), finalized the idea of flooding throughout this way that” flood happens once ponds, lakes, and riverbeds have no capability to hold further water because of deposit or different connected factors, and conjointly it happens once soil and vegetation cannot absorb or infiltrate all the water could return from rain or different sources”.

Most of the study space district community life depends on agriculture (pastoral and agro-pastoral farm) throughout happened of a float stream flood impact on support either direct or indirect.

2.1.3 Concepts of Food Security

Food security concept at an individual and household level the problem of hunger distributed to becomes the realization of availability food shortage rather than the lack of accessing food.

Food security is very flexible and has different explanations at different times, however; food security is explained by four major dimensions; Availability, accessibility, utilization, and sustainability of food at all times and places, however, is used to emphasize access to food rather than the simple availability of food. It also incorporates the need for healthy food (FAO, 2003).

The issue of food security really involves the fore within the 1970s and at the 1974 world food conference in Rome, the primary explicit acknowledgment was made that this issue concerned the whole of mankind. Since the 1974 Rome conference, the entire concept has evolved, developed, multiplied, and diversified. There are a lot of definitions of food security, almost two hundred definitions. However, the definition that has acquired the broadest acceptance is that the world food summit in 1996. 'Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food which meets their dietary needs and food preferences for active and healthy life (FAO, 1996). Food security is a difficult concept to measure since it deals in very broad terms with the production, distribution, and consumption perspective. From the given definition, there are four basic pillars or dimensions of food security, those pillars are food availability, accessibility, utilization, and stability (FAO, 1996).

Food availability: is the first pillar of food security, which is defined as the presence of food that is at a country or household level through all forms of domestic production, food aid, and commercialization import and purchase (WFP, 2012). At the micro-level (household), food availability is the extent to which food is within reach of households through production and market (Pieter et al., 2013).

Food access: is defined as the household's ability to acquire an adequate amount of food, through its own production, purchase, gift, and others the household level food access is expressed in terms of the access of food regarding both sufficient quality and quantity to ensure a safe and nutritious diet (FAO, 2006; WFP, 2012).

Hence, it is affected by logistic, economical, or sociocultural reasons. The household which has a greater resource has a greater success to food, either directly or indirectly through food production and income generation respectively (Pieter et al., 2013).

Food utilization: refers to the ability of members of a household to make use of the food to which they have access. Particularly to the deity diversity intake and to the individual's ability to absorb nutrients contained in the food that is eaten (WFP, 2012). The household income enhanced by the technologies permits the purchase of diversified food items.

Food stability: it takes into consideration the change of household food security conditions over time. Stability describes the three basic dimensions of food security (availability, access, and utilization). Periodic inadequate access to food because of adverse weather conditions, political instability, or economic factor exposed the household to food insecurity. Such risk of the household severely damages the food security status of the households.

The household can ease the welfare impact and reduce their vulnerability to food insecurity by adopting and coping strategies (Pieter et al. 2013). Food Insecurity: Sen (1999), states that food insecurity, famine, malnutrition, and undernourishment are different concepts though interchangeably used in different literature. As indicated hereinbefore, food insecurity is a complex concept mainly referring to lack of access to enough food for all people at all times for an active and healthy life. The Food and Agricultural Organization, FAO, (2002) defines food insecurity as a situation where there is limited availability of safe and nutritious food needed to live an active and healthy life. This condition also involves being worried about not having sufficient food to eat or not having money to buy food when it runs out, Burns, (2004:6). People found to be food insecure generally cannot consume or grow enough food due to limited resources (Boussard et al., 2006). Other instances of food insecurity are found amongst those who have been victims of wars, the urban poor, and low-income households, especially in underdeveloped countries. Moreover, women residing in low-income households are most vulnerable to food insecurity. This is because women usually spend a large share of their income on children's needs. They are also responsible for producing or preparing the food they purchase (FAO, 2011; European Commission, 2009), note that theory differentiates two types of food insecurity, chronic and transitory food insecurity:

Chronic food insecurity: chronic food insecurity occurs when the shortage of food lasts for long periods of time and it is usually caused by a lack of productivity and financial resources due to poverty. It persistently affects individuals that are not able to meet necessary requirements to purchase or produce enough food (European Commission, 2006). Chronic food insecurity breeds favorable conditions for vulnerability which is defined as continual susceptibility to food insecurity, (Devereux, 2006:3). Chronic food insecurity is regarded as mild or moderate food insecurity and it usually dominates when there is a consistent market or structural failure within a nation (Misselhorn et al., 2010). Chronic food insecurity has an effect on almost one billion people each year (Staatz et al., 2009:159). Cathie (2006:100) argued that the minimum daily food intake and nutritional policy measures are essential policy recommendations to alleviate the challenges related to chronic food insecurity. Transitory food insecurity: Transitory food insecurity is a temporal shortfall of food and lasts for short periods of time. It is rooted in several factors such as short-term shocks and lack of food availability due to fluctuations in food prices (FAO, 2008:9). The condition of transitory food insecurity happens when there is an unexpected change in the ability to purchase or produce sufficient food to maintain a healthy lifestyle.

Transitory food insecurity: is regarded as the most serious manifestation of household food insecurity because it causes hunger and famine, even though the condition occurs in the short term (Staatz et al., 2009). Inappropriate government policy may lead to transitory food insecurity due to the destabilization of food consumption trends (Cathie, 2006:100). The major sources of transitory food insecurity are; year-to-year variations in international food prices, foreign exchange earnings, domestic food production and household incomes, temporary sharp reductions in a populations ability to produce or purchase food and other essential undermine long term development and cause loss of human capital from which it takes years to recover.

2.2 Flood and Food Security

Climate change affects countries' economies and food security through an expansion of channels. Rising temperatures and changes in downfall patterns have an effect on agricultural yields of each spots of rain feed and irrigated crops.

Supported A.K. Sen's "entitlement approach," Devereux 2007 applies a framework to the recent food crises in Malawi and concludes that policy responses will catch informed the failures of production-based, labor-based, trade-based, and transfer based mostly entitlements.

A better frequency of droughts could impair hydropower production and an increase in floods will considerably raise public investment needs for physical infrastructure (Stern 2006; International Bank for Reconstruction and Development 2007; Garnaut 2008; Yu, Thurlow, et al. 2010; Yu, Zhu, et al. 2010).

Impacts can have knock-on effects on alternative sectors and so influence the economic processes, food security, and ménage incomes.

Reviewing twenty African countries Theron (2007) ended that floods had many socioeconomic and political implications and a couple of these enclosed the displacement of people and food security problems. Sinclair and Pengram (2003) have declared that floods cannot be prevented however their devastating affects are usually reduced if advanced warnings are obtainable. Rashid (2000) concludes that women and kids are the foremost vulnerable throughout the incidence of floods.

Ninno, et al (2003) studied the floods in People's Republic of Bangladesh and ended that the floods have affected the food security of the many households.

Mitiku et al. (2012) have computed the food security index mistreatment the FGT model and unconcealed that concerning thirty six % of the Shashemene districts in Federal Democratic Republic of Ethiopia are food insecure. Throughout an identical study inside the North Wello region of Federal Democratic Republic of Ethiopia Ramakrishna et al., (2002) found that thirty seven % of households are food insecure.

Floods undermine farm yields and so the national harvest, reducing ménage and national food accessibility, and so the agricultural financial gain derived from crop and farm animal sales. Poor harvests threaten food security and livelihoods from ménage to national level, to varied degrees according to the extent that the family or nation depends on agriculture for its food and financial gain.

Households and economies that are additional diversified are less prone to these direct impacts of floods, as long as their various financial gain sources are neither related with downfall nor directly or indirectly hooked into agriculture.

According to Rabalao (2010) in his analysis paper entitled ‘the social, psychological and economic impact of flooding in gamotla and gamoeka communities of moretele district within the northwest province, South Africa’ explained that effects of flooding may be divided into primary, secondary, and tertiary or semi-permanent effects.

The primary effects may be within the style of physical injury to any kind of structure like buildings, bridges, roads, cars, and sewer systems. The opposite kind is of casualties wherever folks and farm animal die as a result of drowning.

Secondary effects are water provides which will be contaminated, waterborne diseases, crops, and food provides shortage and alternative species of trees that are non-tolerant will die from suffocation.

Tertiary or semi-permanent effects are of an economic nature there may be a decline in business, reconstruction prices, food shortage that usually results in worth will increase, etc.

In Federal Democratic Republic of Ethiopia, the food security standing of the households is totally different from region to region conjointly it varies inside the region as a result of the majority of the economy of Ethiopians in the main depends on agriculture that is prone to different shocks, seasonality, and trends (Sani, 2017). Moreover, as FAO, (2012) concerning fifty two of the agricultural population and 12 months of the urban population consume underneath the minimum suggested daily intake of 2100 kcal/person/day.

According to an early 2010 report, 5.2 million folks in Federal Democratic Republic of Ethiopia face a risky food security state of affairs. The worsening food security state of affairs is attributed primarily to poor downfall last year throughout the February–May, and June–October seasons. A series of serial droughts had already weakened Ethiopia's food state of affairs, with "poor and erratic downfall over the last 2 years." international conditions like the high food and fuel costs that have persisted within the country since 2008 and the international monetary crisis have also contributed to Ethiopia's failing food security. Federal Democratic Republic of Ethiopia is taken into account the smallest amount developed country hierarchic 171 out of 182 countries within the UNDP Human Development Index (2009).

2.2.1. Flood Hazard and Elements at Risk

Flood hazard has all harmful effects on individuals, health, and properties thanks to public and private like infrastructure, ecological systems, cultural heritage, agricultural yield, and economic activities (Messner & Meyer, 2006).

In 2007, the planet Economic Forum outlined the 5 core areas of worldwide risk as economic, environmental, politics, societal, and technological. Inside these, global climate change is seen united of the process challenges for the 21st century, because it may be a world risk with impacts so much on the far side the surroundings (World Economic Forum, 2007).

For many individuals, the benefits of flood risk reduction at the coast are that the direct flood injury on property and economic activity is avoided as results of schemes to cut back either the frequency or impact of flooding (Penning Rowsell et al., 2013).

However, the results of flooding for individuals are additional complicated and following Smith and Ward (1998), we'll classify flood losses into direct and indirect losses. Further, we'll distinguish between immediate or semi-permanent consequences and tangible or intangible consequences. Such consequences depend upon the land uses found inside the Champaign.

Immediate impacts of flooding will embody loss of human life, injury to property and infrastructure, and destruction of crops and farm animal (biodiversity). Samples of semi-permanent impacts embody the interruption to communication networks and vital infrastructure (such as power plants, roads, hospitals, etc.) which might have vital impacts on social and economic activities.

Unbreakable to assess the intangible impacts; for example, the psychological effects of loss of life, displacement, and property injury to be able to assess the potential losses and degree of injury of components in danger, it's vital to analysis the type of negative effects that the event may have on the weather in danger exposed to it, and thus the characteristics of the weather in danger.

The negative effects of venturous events on components in danger are usually classified throughout many teams, looking forward to the type of hazard (Hollenstein, 2005).

As associate example, a building might even be wedged by a mass, and thus the damaging effects would be determined by the number of the mass, speed of impact, and thus the medium of impact, like rocks, soil, debris, snow, water, and air.

In every of these things, explicit building characteristics are vital for evaluating the damaging effects, like structural kind, construction materials, application of code, age, maintenance, roof type, height, floor area, volume, shape, proximity to different buildings, proximity to hazard supply, proximity to vegetation, and openings (FEMA, 2004; Jones, et al., 2005; Grünthal et al, 2006; Douglas, 2007).

Damage to buildings from flooding is caused by a range of things, like type, velocity, height, duration, sediment, and pollution. Therefore, it's elementary to grasp flood hazards throughout flood emergencies, conjointly as before an incident truly takes place, to mitigate, prepare, injury reduction activities.

2.2.2. Flood Hazard Impact on Food Security

Floods are the natural hazard with the absolute best frequency and thus the widest geographical distribution worldwide. Although most floods are small events, monster floods aren't infrequent, and global climate change is that the main driver of citizenry and nature UNISDR, (2017).

The increase of temperature is that the results of global climate change the most cause has ice melting, afforestation, and expanded industry wastage affect the ecosystem balance exposes the world to unpredictable rainfall is that the most exposure to flood hazards everywhere on the earth.

Agriculture in Africa is significant to provide food for people to eat and it provides the primary source of livelihood for two-thirds of the working population in Sub-Saharan Africa. If agricultural production within the low-income developing countries of Asia and Africa is adversely affected by global climate change, the livelihoods of giant numbers of the agricultural poor are getting to be put in peril and their vulnerability to food insecurity enlarged (IPCC, 2001).

In Africa country, the vulnerability is high because the foremost country is poor and prone to food insecurity. Mozambique features an extended record of being affected by water-related disasters (Venton et al., 2013) and is ranked the foremost flood-prone country in southern Africa (Karlsson and Arnberg, 2011). The explanations behind the varied flood disasters are the region's exposure and vulnerability to tropical cyclone activity, intensive local rainfall, and poor management of upstream reservoirs.

Table 2.1: Flood displaced people in Ethiopia from June to September 2020 G.C

Region	Flood Affected	Flood Displaced
Afar	162,921	128,242
Amhara	144,490	6,010
Gambella	31,865	18,819
Oromia	447,565	46,028
Somali	140,892	37,650
SNNP	90,121	56,114
Dire Dawa	0	0
Addis Ababa	0	0
Total	1,017,854	292,863

Source: NDRMC

Food security is extremely sensitive to climate risks in Ethiopia historical and newer climate-related events just like the 2008/2009 and 2011 food security crises within the Horn of Africa have highlighted the impact of floods on food production, access to markets, and income from agricultural activities. However, assessing the ways during which livelihoods and specific vulnerabilities are linked to climate could also be a difficult task given the complex relationships between other environmental and socioeconomic factors in determining food security outcomes.

According to the state national disaster risk management (NDRMC) report, in September 2020 Ethiopia has 1, 017,854 people suffering from the flood, and 292,863 people displaced by flood.

Dagnachew and Wubet (2009), cited by Sinafikish (2013), in their study on flood hazard and risk assessment in Fogera Woreda investigated that, the foremost flooding causative factors, particularly in Fogera Woreda, are slope condition of the planet , soil type, elevation, land use type, drainage density, and rainfall.

Yonas and Girma, (2010), on flood triggering factors and thus the efforts to mitigate flood disaster in Dire Dawa, Ethiopia, revealed that the primary explanation for flooding within the chat River is unusually high rainfall and other man-induced causes, like land degradation, deforestation, increased population density along riverbanks, poor land-use planning and zoning and a progressive loss of flood risk perception because of the periodic occurrence of flash floods, play an enormous role.

2.3. Flood Risk Management and Coping Strategy

2.3.1 Flood Resilience System

The term defines resilience as ‘bouncing back from a terrible event’ or ‘having the strength to cope’ or ‘being determined to establish things through the tip ‘From these definitions, we are going to understand that folk being mentally sturdy, sufficiently sturdy to require care of some way of upbeat while facing challenges (Mowbray, 2011).

In this thesis, flood risk management is outlined as all activities that aim at maintaining or raising the potential of a district that is full of flooding and food security problems.

Andjelkovic, (2001 cited in Dewi, 2007,) ‘Floods cannot be prevented however designing the emergency measures through flood management will usually scale back their black consequences. Management cycles, as well as an applicable balance of bar, mitigation, preparation, response, recovery, and disaster-related development, area unit usually effective.

Flood risk management implies 2 main types of measures that area unit distinguished by their aim: structural and nonfunctional measures (Karin, 2005). Floods cause additional harm worldwide to human life and property than the alternative reasonably natural disaster. This trend shows no sign of reduction several of the efforts to have an effect on flooding up to now area unit targeted on recovery. Though, to

cut back flood losses and facilitate communities in each developed and developing countries improve flood resilience, is extraordinarily crucial that it ought to be additionally targeted on mitigating risks and steel oneself against floods, rather than merely handling the results once a flood happens (Zurich Insurance cluster, 2014).

Hence, wishing on ancient management measures is recognized as inadequate, since the harm is usually harmful if flood controls fail. The thought of flood resilience is that the one which is able to face up to or adapt to a flood event while not being injured in its practicality (Restemeyer, et al., 2015).

Resilience ways area unit usually characterized usually as ways that permit floods however aim at minimizing flood impacts, increasing recovery rates, for all attainable flooding varieties. They aim at increasing the potential of a system to urge over flood impacts.

The measures utilized throughout a resilience strategy might amendment the flood chances or the impacts for specific locations at intervals the system. They comprise each structural and nonfunctional measure. The flood chance is usually modified by, as an example, decreasing the protection of natural areas, or increasing that of cities, whereas flood impacts may even be reduced by e.g. raising flood risk awareness and ever-changing land use.

Both types of measures might increase the resilience of the system as a complete since expected damages area unit down, recovery is increased and thus the reaction to flooding waves might become additional gradual (Karin, 2005).

2.3.2 Pastoralist Food Coping Strategies

In relationship hazard, coping is defined as the manner in which people and organizations act, using existing resources within a range of expectations of the situation to achieve various ends (Blaike, et al. 1994 cited in Dewi, 2007).

The assumptions on which individuals make their decisions, therefore, rest within the knowledge that, sooner or later, a specific risk will occur of which individuals have some experience of how to cope (Blaikie, et al, 1994 cited in Dewi, 2007). He also emphasized that all coping strategies for adverse events which are perceived to have precedent consist of actions before, during, and after the event.

According to Twigg, (2004, cited in Dewi, 2007) coping mechanisms pertain in about hazards is divided into four categories: Economic/material; (economic diversification, such as having more than one source of income, even having a large family can be seen as part of the economic coping strategy because it gives household additional labor; saving and credit schemes are often an important component of economic coping strategies).

In most arid and semi-arid regional state found that agro-pastoral community in that area use alternative coping mechanisms such as: moving from one place to other in dry season, sale of more livestock than usual, borrowing of food, reduce number of meal, reduce size of meal, sale firewood and charcoal,

seasonal migration, seeking alternative or additional job, rely on less preferred and less expensive food, seeking relief assistance, becoming temporary trade, household splitting, consume wild food, remittance, participating in cash basis project work (Abdulahi , 2017).

2.4 Empirical Literature and the Gap

The country pastoral and agro-pastoral areas are more vulnerable to drought, flood, weather related shocks, livestock and human diseases than other parts of the country because of this; they move from one place to others specially in dry seasons in order to find water and pasture for their livestock's which leads the same times to come into conflict with other border community and flood has exacerbate the food availability, access, and utilization problem.

Therefore, coping mechanisms employed by the people can be applied in different phases of hazard management: Mitigation, response, and recovery. Based on the hazard management phases (Wisner, et al., 2003, cited in Eleni, 2011). There are two types of coping mechanisms: “preventative” and “impact minimizing” strategies.

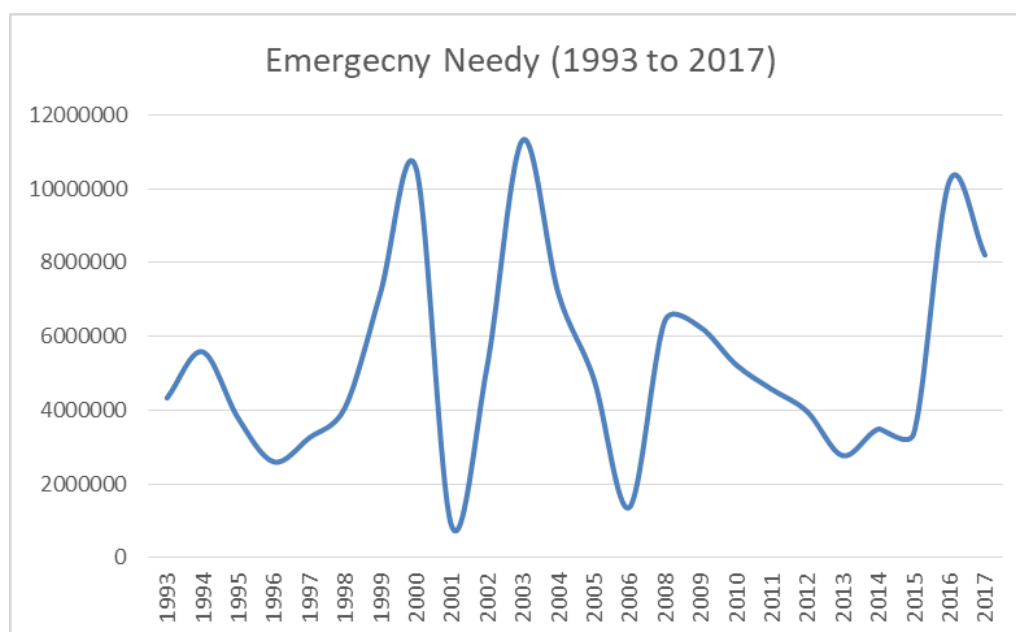


Figure 2.1: Emergency needy population (Source: DRMC)

Preventative strategies can be employed at the individual and community level, which implies that people making choices so that they will not be affected by an event, such as avoiding dangerous places at certain times or choosing safe residential locations and informed early warning information.

A pastoralist in Afar has become largely losses of collaborative grazing areas along the Awash River, due to heads for hydroelectric power, and large-scale irrigated cotton and sugar schemes (Kloss, 1982; Rettberg, 2010). How to ameliorate pastoralist food security by supporting and produce mindfulness irrigation cropland make in the study area?

2.5. Conceptual Framework

The study is principally involved with the pastoralist household has lack of information, knowledge, development, and infrastructure herein pastoralist's households are simply exposed to flood-prone and exacerbate their food insecurity.

Flood hazard has historically been a difficulty of concern in farming areas, in recent years, pastoralist areas have conjointly been laid low with floods indicating the ever-changing hazard setting in Ethiopia WDRP/DRMFSS, (2012). Within the study area, food security incorporates a huge drawback like food handiness, access and utilization can become severe tendency throughout the prevalence of flood.

The flood affects the subsequent variable socio-demographic and socio-economic (age, sex, marital status, monthly financial gain, education standing, and house size).

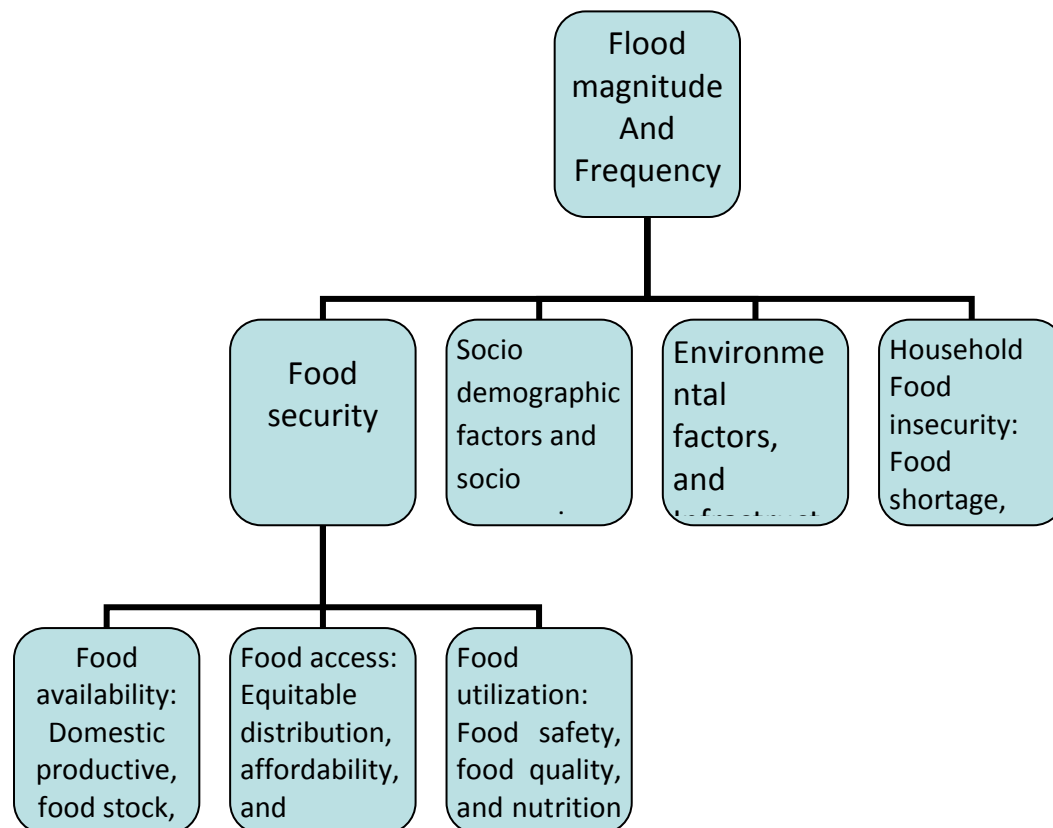


Figure: 2.2 Sources developed by author and researcher 2015.

The variable enclosed basic infrastructure such as health center, market, veterinary services, school, facility, and psychological impact of the flood-affected household.

Furthermore, describe flood frequency to point out the consistent solutions to the neutral. Development and provision of flood hazard and flood risk maps have a significant role as per prevailing hazards and risks (Prinos, 2008).

Globally, the scientist has enforced completely different strategies to live household food security standing exploitation numerous indicators. This thesis was being employed indicator food consumption score/dietary diversity score, household food insecurity access scale, and precipitation information for analysis all are casual variables. The score position of households on the food security scale is based on the overall pattern of response to the whole set of indicators by the households (Bickel et al., 2000). Many studies have established the vulnerability of people or communities to flooding as a perform of things like exposure of infrastructure and population, geographical location, institutional and political structures, cope and adaptive capability yet as cultural and socio-economic conditions that differentiate the impact on folks and human system (Wisner et al., 2004; Cardona et al., 2012; Munyai, 2015).

CHAPTER THREE

DESCRIPTION OF STUDY AREA, RESEARCH DESIGN AND METHODOLOGY

3.1 Description of Study Area

The Afar National Regional State is positioned in the North-Eastern part of Ethiopia. It's geographically located between 39° 34' and 42° 28' East Longitude, and 8° 49' and 14° 30' North Latitude. The region is framed to the north-west by the Tigray region, to the south-west by the Amhara region, to the south by Oromia, and to the south-east by the Somali region, and to the northeast by Djibouti and Eritrea. The 2008 casing and tale report of the Federal Democratic Republic of Ethiopia Census Commission reveals that the estimated total population of the region is and with a population growth rate of 2.2 percent (FDRECC, 2008). The Region covers are administratively divided into five zones, 32 woredas; and 358 peasant associations, and 28 municipalities (ANRS, 2005).

The zonal population distribution of the region is (29.89 percent) in zone I (Awsi rasu, (24.90 percent) in zone II (Kilbet Rasu), (14.08 percent) in zone III (Gabi Rasu), 255, 542 (18.11 percent) in zone IV (Fantena Rasu) and 183, 701 (13.02 percent) in zone V (Hari Rasu) (FDRECC, 2008).

In terms of land use patterns, 14.8 of the total land area of the region is covered by Champaign, 31.5 shrub lands, 1.7 forestlands, and 0.11 timber lands. Whereas water bodies and wet 27 lands together regard for 1.37 of the total land, the vast area of the region, 49.6, is exposed soil, beach, or gemstone. 7 of the region's land are also estimated to be cultivable. As far as the livelihood system of the region is concerned, pastoralism and agro-pastoralism are the two dominant modes of livelihood systems. Roughly, 90 percent of the people depend on the subsistence pastoral product system while the remaining 10 percent pursue agro-pastoralism (CARE, 2007).

3.1.1 Description of Amibara woreda

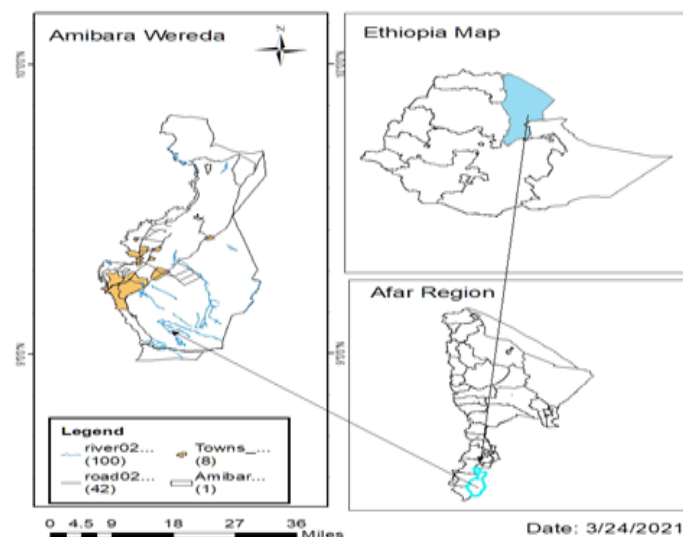
The studies are located conducted in the Afar region, Zone 03 (Gabe Rasu), in the Amibara woreda (see figure 3.1). Grounded on the 2007 report conducted by the central statistical agency of Ethiopia (CSA), this woreda features a total population were 63, 378 of whom men 35,374 and women 28,004 with an area of 2,007.05 square kilometers, Amibara has a population density of 31.58.

While 28,137 or 44.40 percent are civic occupants, a farther 6,555 or 10.34 percent are pastoralists. Totally 13,729 households were counted in this woreda An aggregate of homes were counted in this woreda, which results in an average of 4.6 persons to a household, and 14,773 housing units. 68.86 of the population said they were Muslim, 21.2 were Orthodox Christians, and 9.18 were Protestants CSA, (2007).

The Geographical position is 09 ° 13 ' - 09 ° 30 ' N latitude and 40 ° 05 ' - 40 ° 25 ' E longitude. Amibara is one of among the woredas within the Afar Region of Ethiopia. Part of the administrative Zone 3, Amibara woreda is framed on the south by Awash Fentale, on the west by the Awash River which separates it from Dulecha, on the northwest by the super intendant Zone 5, on the north by Gewane, on the east by the Somali Region, and on the southeast by Oromia Region. Town in Amibara includes Awash arba, awash sheleko, and melka sedi and melka werere.

Agro-ecologically the rainfall condition of the woreda is generally semi-arid with a temperature position that falls between 25°C and 35°C, with an average temperature of 30°C. The altitude of the wereda ranges between 720 and 1100 masl. Seasonal variations reveal that the temperature is moderate in the months between September and January whiles the loftiest in the months of February and May. Temperature is generally low in the months of July and August. The woreda receives an average periodic downfall of 360 mm. The livelihood of occupants in Amibara woreda is generally pastoralism; although agro-pastoralism is also studied. Likewise, watercolor product, petty trade, and employment in original government and NGOs also constitute the means of living substantially for civic resides. In general, the main sources of food in the woreda are own animal product, and some crop product, and also purchase of cereals from the request.

Geomorphology of the study area understands below figure 3.1 the study area vulnerability is high due to their geomorphology and the study area located table land part of the country it included by grate rift valley so the populations near the Awash River plant Amibara Woreda experience deluge hazard this honored repliers through questionnaires, KII, and Field Observation. For numerous times the original community lost numerous parcels, mortal and beast life, structure, and threat of contagious complaint, profitable collapse, and exposure to severe food deficit



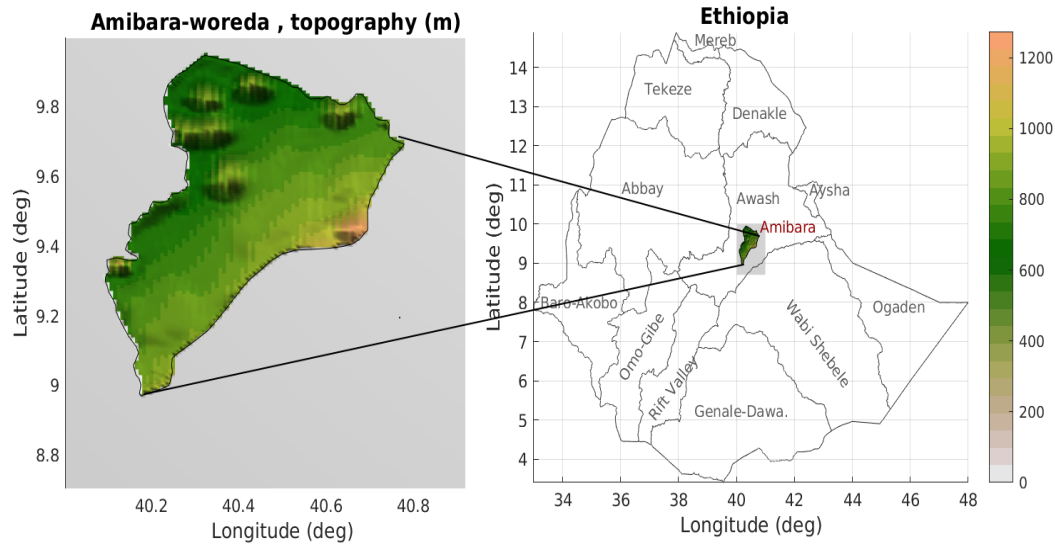


Figure: 3.1 Amibara woreda spatial maps (source of data: NMA, 2021)

3.2 Research Design

The current study used both descriptive and explanatory research design to uncover the impact of flood hazard on household food security. Descriptive research design enable to the researchers to accurately describe of the flood hazard phenomena's and overview of household food security. Whereas explanatory research design used to best explain the frequency and magnitude of flood and its impact on household food security. Accordingly data were drawn from multiple sources using various tools. Triangulation of data sources from various sources broaden the researcher's insight into the different issues underlying the phenomena being studied (Bekhet AK, 2017).

3.3. Research Methods

3.3.1 Sampling Techniques

Based on the Amibara Woreda administration report in 2020G.C summer season flood damage over 11, 000 hectares sugarcane, cotton and horticulture and displace many pastoralists in Amibara woreda, Afar regional state. According to the state national disaster risk management (NDRMC) report September, 2020 Amibara woreda has 37,670 peoples affected by flood, and 37,670 peoples displaced due to flood.

In this study different probability and none probability sampling methods were applied. For instance, purposive sampling methods were applied to select the sites due to their high exposure to flood risks. Key informants and Focus Group Discussion (FGD) participants were selected purposely due to their awareness on the impact of flood on the HH food security. Accordingly, Simple random sampling methods were employed to select sample households to capture the respondents representing the various

socio-economic, demographic, and quantitative survey questioners according to the specific objectives representatives.

3.3.2 Sample Size

According to the woreda administration, most of the kebele pastoralist vulnerable to food shortage and flood is intensify food crises. Key informant claim is supported by the official report Ministry of Water, Irrigation and Energy over 7,000 households have been displaced from their villages due to the overflowing of Awash River in Amibara woreda (ERCS, 2020).

Most woreda's in Afar Regional state has exposures to Awash River flood in this study encompassed the most vulnerable Amibara woreda. The study included three kebeles named as werere, serkamo and badahamo for data gathered each kebele including 111 sample households. Out of these, the Kebele administration based on their secondary data helped the researcher to purposively select the gote that are frequently affected by the flood, and food shortage.

The total households considered affected is around 2000 populations the researcher used from the total sample number of affected household 333 population as a representative for the house to the house questionnaire survey out of these, 310 (93%) valid responses were obtained and analyzed, of which 133 (39.8 %) were men and only 200 (60.2 %) women.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = 2000 / 1 + 2000(0.05)^2 = 333$$

Yamane (1967) provides a simplified formula to calculate sample sizes. A 95% confidence level and P = .5. Where n is the sample size, N is the population size, and e is the level of precision.

Also, the researcher used simple random sampling to select the residential housings during the house to house survey after the districts were select. Random sampling is one such procedure that selects a sample of units from a population by chance, typically to facilitate generalization from the sample to population (Shadish, Cook, & Campbell, 2002).

3.3.2 Data Sources and Data Collection Tools

Primary and secondary data were used in this study. Secondary data were obtained from relevant literature both published and unpublished, government. Primary data was be gathered from different stakeholders such as households affected by floods or subjected to flood, service providers such as kebele, wereda administration, and national basin development authority. Primary data were gathered through interview question guides (FGD and KII), questionnaires, observations respectively. To gather adequate and reliable data, the study used three basic instruments. These are field observation, questionnaires, and interview guide questions.

Field Observation: These methods were applied to observe the existing situation of the area under studies such as the physical infrastructure of the neighborhood (street pavement, soft landscape condition, the topographic feature of the case site. Thus information on those pictures was taken during observation time was also incorporated in the paper to show the current status of the flood-prone neighborhood.

Survey Questionnaire: These were specifically prepared for sample Households affected by flood in selected three Kebeles residents. The questionnaire questions are as clear as possible for both the interviewer and the interviewees. Thus to achieve this there was one pilot survey to identify the gap between conveniently and translated into the Amharic language. Finally, the questionnaire was deployed at the household level differently.

Key Informant Interview and Focus Group Discussion:

The interview was employed to gather different information about flood occurrence in Amibara woreda, projects that are designed to defeat the flood, interview guides were systematically prepared for FGD and KII, to obtain relevant information from the community and relevant government officials, Administrations, and woredas expert interview to get reliable data as they are close enough to work with the residents on their day to day lives.

Focus group discussions were conducted with the local communities of the affected area. As mentioned in the Sample size subtopic above Kebele flood-affected gores were selected by snowball sampling technique. Each flood-affected community leaders were part of the focus group understanding of the location of flood and food-prone areas (by using community mapping), local coping strategy knowledge, and the driving cause of resilience to such hazard.

The interviews were used as data collection to get full information on the personal thoughts, experiences, and attitudes of the case site residents. Hence, ten years with the help of the district's leaders. Out of the five respondents, two were women and the rest were men total participated in KII and FGD 20 people. The KII participated women respondents have a great role in identifying the causes and consequences of the flood and understanding household food security status.

3.3.3 Data Analysis

The research was used mixed approaches namely quantitative and qualitative analysis. The demographic background information of the respondents and environment status were being analyzed and presented using descriptive statistics in form of frequency and percentage. This unit of analysis is detailed explains a quantitative and qualitative discussion.

Influence of flood on household food security: The mean or average is a measure of central tendency that offers a general picture of the data without unnecessarily covering each of the observations in the data set. The mean of respondents in each dimension of Awash River flood impact on pastoralist household food security that the average amount that each dimension has the positive or negative

response of respondents. In this case, the mean of each item together with their respective dimension overall average mean was calculated in order to conclude the overall reliability of the extent and influence of flood in amibara wereda. The mean statistical values of the items were based on the 5 points Likert scale and were being illustrated through the following assumptions: if the mean (M) score is below 2.5 it implies that the respondents“ disagree with the statement if the mean score is equal to 2.5 it indicates that the respondents“ prefer to stay Neutral, and finally if the mean score is above 2.5 it implies that the respondents“ agree with the statement. For measuring variables in Table 4.3 above both ordinal and Likert scales are employed using ordinal measurement the result for the extent and influence of flood in the case area respondent is above average Bowling, A. (1997).

Rainfall analysis method: sample analysis method “analysis of rainfall data was involved characterized long term mean values, and calculations of indices of variability and trend at monthly, seasonal and annual time steps. Standard anomaly shall be calculated to assess rainfall and temperature variability.

$$SRA = P_t - P_m / \sigma$$

Where: P_t is annual (rainfall or temperature) in year, P_m is long term mean annual (rainfall or temperature) over the period of observation, and σ is the standard deviation of rainfall. Mann Kendall test, as described by Sneyers (1990), were used to detect trends. The significance levels of the slope were estimated used Son’s method Temperature and rainfall trend analysis method, and runoff and stream flow analysis method. Trend Analysis Statistically trend is a significant change over time which is detectable by parametric and non-parametric procedures while trend analysis of a time series consists of the magnitude of trend and its statistical significance. In this study statistical significance trend analysis was done by using Man- Kendall test while for the magnitude of trend was determined by non-parametric A.K. Son’s estimator method.

Household food insecurity access scale (HFIAS) technique: Sample analysis method of food insecurity questionnaires sometimes employs a series of nine to fifteen queries that find the amount of concern and also the lack of access to, variety, and/or amount of food. The queries retrospectively confer with a amount between four weeks. The form format for the HFIAS form consists of 9 incidence queries that represent a usually increasing level of severity of food insecurity (access), and 9 “frequency-of-occurrence” queries that area unit asked as a follow-up to every incidence question to work out however usually the condition occurred. The frequency-of-occurrence question is skipped if the respondent reports that the condition delineated within the corresponding incidence question wasn't intimate within the previous four weeks (30 days) (Jennifer et. al, 2007). All of the incidence queries rise whether or not the respondent or alternative social unit members either felt an explicit means or performed a selected behavior over the previous four weeks.

The subject interviewed is 1st asked regarding the incidence of food insecurity, in alternative words, if the condition mirrored within the question befell within the last four weeks (yes or no). If the topic answers affirmatively to the present kind of question, another question is asked regarding the frequency to work out if the condition has occurred some times (once or twice), typically (between 3 - 10 times) or oftentimes (more than 10 times) within the last four weeks.

Food Consumption Score; The FCS could be a composite score supported dietary diversity, food frequency, and relative nutritionally importance of various food teams. Food things area unit sorted into eight commonplace food teams with a most price of seven days/week. To calculate FCS cluster food things within the nominal food cluster, add all the consumption frequencies of food things inside a similar cluster, multiply the worth of every food by its weight then add the weighted food cluster scores to get FCS finally verify the household's food consumption standing supported the subsequent World Food Program (2008).

Above this tool, the food consumption score was assessed dietary diversity, food frequency, and relative nutritionally importance of various food teams by employing a food consumption score could be a composite score supported food things. Food things area unit sorted into eight commonplace food teams with a most price of seven days/week food teams and weights (Gemma et. al, 2015).

Coping strategic index: questionnaires indicate the respondent social unit level of recovery from flood hazards within the last seven days. The result was divided into the four categories consistent with field technique manual cope strategic index terribly severe, less severe, severe, and quite severe from the overall sample size social unit the questionnaires frequency times their weight Daniel Maxwell. (2008). Results showed that households displayed a range of food-related cope methods. Food-related cope methods were categorized into less most popular and fewer costly foods, borrow food, purchase food on credit, gather wild food, hunt, eat food elsewhere, get food by mendicancy, get restricted portion size of food, food for a tiny low kid to eat, and cut back the amount of meals ingested in an exceedingly day. Every cope strategy showed a special level of perceived severity, that is, terribly severe, less severe, severe, and quite severe. lastly, the qualitative knowledge give valuable info for understanding the experiences of food insecurity which will be used as a basis to develop direct indicators which will capture the core behaviors and their level of severity to live social unit food insecurity. It's essential to make sure that the values for each the frequency and also the severity influence the CSI score within the same means Daniel Maxwell. (2008). that's the upper the frequency, the upper the score; and also the bigger the severity the upper the severity coefficient. The food cope strategic index questionnaires indicate the respondent social unit level of recovery from flood hazards within the last seven days.

The info of this study was being analyzed by pc through package software system SPSS version twenty five (Statistical Package for Social Sciences), MS Excel, and GIS software system and demonstrates used maps, diagrams, and graphs. During this study knowledge analysis used the subsequent basic descriptive statistics formula proportion, mean, and variance

Appropriateness of the Data: According to Field (2009), before conducting any applied math analysis, 2 main problems regarding the appropriateness of the collected information are central and should be checked victimizations appropriate techniques. These 2 problems are missing information and statistical distribution of information. the chance of missing information was lessened during this analysis preventing survey submission if any question remained unrequited, as annex indicate that there was no missing worth and therefore the appropriateness of the collected information in terms of its statistical distribution through using a feature victimization the IBM SPSS applied math package version twenty five are conferred as follows. The lead of the imbalance is each negative and positive. The negative worth implies that the distribution of the information is slightly skew to the left or negatively skew. It's skew to the left as a result of the computed worth is negative, and is slight as a result of the worth is about to zero. On the opposite hand, the positive worth implies that the distribution of the info is slightly skew to the correct or absolutely skew. It's skew to the correct as a result of the computed worth is positive, and is slight as a result of the worth is about to zero. Once the distribution is about to zero then it's most likely about too traditional. For the kurtosis, it's potential to own any form of peak any once the kurtosis is negative (or positive). Kurtosis measures the tail (potential outlier) character of the distribution. With negative excess kurtosis, the outlier character of the distribution is a smaller amount extreme than that of a traditional distribution (Field, 2009).

Having mentioned the appropriateness of the collected information in terms of each the chance of missing information and therefore the statistical distribution of the info, it's helpful to handle information quality implications before conducting the applied math analyses. Information quality could be a crucial issue in each quantitative and qualitative scientific discipline analysis, because it is one among the foremost necessary indicators for establishing the honesties and credibleness of results, maintaining the lustiness of analysis findings (Kaplan 2004). Reliability is primarily determined by Cronbach's α worth (Field, 2009) in quantitative studies.

CHAPTER FOUR

RESULTS, AND DISCUSSION

4.1. Introduction

This chapter seeks to provide some statistical procedures involved in conducting appropriate quantitative analysis, establishing the credibility of the results, and maintaining the strength of the research findings. Flood Impact on food security survey, a total of 333 randomly selected HHs was included from various HH categories. Out of these, 310 (93%) valid responses were obtained and analyzed, of which 39.8 % were men and only 60.2 % were women.

4.2. Demographic and Socio-economic Characteristics of the Respondent

Sex of the respondents: In the household including in this study 39.8 percent were male and 60.2 percent female this separation corresponds more or less to the real situation of sex distribution of poor pastoralists in the study area. According to local culture, females have the full responsibility of carrying for family food, housing, and children through field observation and group discussions. The occurrence of the accident usually affects the women and exacerbates the severity of the injury. Females were more frequently affected by various Natural and human-induced accidents like floods, conflicts, etc. Neumayer, E. & Plümper, T. (2007).

The FGD participants' observation is supported by other researchers. For instance, Rashid (2000) attested that female-headed households were more food insecurity than male-head households. Therefore in this study, it is anticipated that there is an increased likelihood that male-headed households are likely to be food secure and less vulnerable to severe food insecurity than their female counterparts.

Age distribution of the respondent: The age distribution of the respondents also corresponds between the age groups. All respondents were over 18 years old which includes the early working age of the country and the majority are between 29-45 years old which is 67.8%, the remaining age group 18-28 14.6%, and 46 - 60 years old 14.6%. In this case, the majority of the age is between 29-45 years which is categorized as under the prime working age (25- 54). Rashid (2000) concludes that ladies and youngsters are the foremost vulnerable during the occurrence of floods.

Marital status of the respondent: As table 4.1 indicates that, the marital status of the respondent is single 6.4%, married 74.3%, divorced 10.5% and widowed 8.8% in this study showed married households are more affected by the occurrence of flood and they can't easily move from flooded area to safe area the household has exposed to food insecurity.

Table 4.1 Socio demographic profile of the respondent (n=310)

Variables	Item	Frequency	Percent (%)
Sex	Male	123	39.8
	Female	187	60.2
Age	18-28 years	49	15.8
	29-45Years	211	68
	46-60Years	50	16
Marital status	Single	20	6.4
	Married	230	74.3
	Divorced	33	10.5
	Widowed	27	8.8
Household size	1-3	56	18.1
	4-7	182	58.5
	8-above	72	23.4
Educational status	Can't Read & Write	69	22.2
	Read & Write	194	62.6
	Completed primary School	47	15.2
Livelihood	Unemployment	48	15.5
	Pastoralist	199	64.3
	Civil servant	42	13.5
	Self Employed	21	6.7
Monthly Income	500-1000	69	22.2
	1001-1500	172	55.6
	1501-2000	58	18.7
	2001	11	3.5

Source: Own survey result, 2021



Figure 4.1 Female and youngsters fled due to the flood (Photo source: Amibara woredas officials 2020 G.C)

Educational background of the respondents: Table 4.1 on above of indicates that the bulk of the respondent's educational background is below grade school that 22. 2% cannot scan & write, read & write 62.6% and completed grade school 15.2% severally. This is often just because most of the respondent's actors who merely work and pastoralists for generating financial gain for themselves have low financial gain therefore the exposure to food insecurity.

Household size and monthly income of the respondents: the table, 4.1 result shows the family size of the respondents indicate that respondents square measure classified within the 1-3 members size whereas 18.1%, respondents square measure groped in class 4-7 members size 58.5%, and also the stay respondents square measure beneath 8-above cluster 23.4%.It's argued that the lower the family size, the upper the anticipation of a lot of food consumption in a very family. Within the study, it's expected that households with economically active and utilized member's square measure a lot of food secure than households with members who square measure unemployed. So counting on the result of the results, the family size can have a positive or negative impact on food attainment. This may be seen by the monthly financial gain of the household majorities of the respondents which represent 55. 6% square measure classified beneath 1001 -1500 birr financial gain cluster, 22.2% square measure 500-100 birr, 18.7% square measure 1501-2000 birr and also the remains 3.5% respondent square measure 2001-2500 the respondent pastoralist family has low financial gain as a result of their life solely relied on a livestock.

Livelihood of the respondent: Within the study, most respondents' bread and butter have 64.3 percent square measure pastoralists, 15.5 percent square measure unemployed, 13.5 percent square measure civil servants, and 6. 7 percent square measure self-employed this outcome most of the respondent square measure pastoralist during this study literature review section two.2.1 show pastoralism in the Federal Democratic Republic of Ethiopia is each viable and vulnerable however the present temperature change,

food insecurity, and internal conflict crisis square measure poignant pastoralists' bread and butter within the country. This analysis determined the vulnerability of pastoralist households has high their bread and butter depended solely on livestock they haven't another financial gain supply.

During the field observations and focused group discussion, it absolutely was determined that living with livestock, carrying for them may be a special blessing from the creator. As a result, it's liable to severe food and survival from flood hazards.

4.3. Influence of flood on household food security

Table 4.2 the extent and influence of flood (n=310)

Variables	Extent/influence of flood						
	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	SD
Magnitude of household flood risk exposure	8.8	35.7	35.1	20.4		2.67	0.90
Perceived household access to food	17.0	29.8	32.2	21		2.57	1.00
Coping strategies of pastoralist to prevent food	9.4	29.2	42.7	17.0	1.8	2.73	0.91
Flood hazard are the main causes of household food security	4.1	22.2	46.8	21.1	5.8	3.02	0.91
Flood hazards are critical problem for food security	4.7	30.4	40.4	22.2	2.3	2.87	0.89
Food security is a threat in the study area	3.5	15.8	44.4	31.6	4.7	3.17	0.87
Enough information about flood hazard	4.7	37.4	43.9	14.0		2.67	0.77
The influence of flood hazard to pastoralist food security is high	2.9	31.0	40.9	22.8	2.3	2.91	0.89
The Vulnerability of flood hazard	7.0	25.1	32.7	32.7	2.3	2.98	0.97
Feel that you are vulnerable to flood hazards	1.8	14.0	43.3	40.9		3.23	0.75
Stakeholders think they are working to alleviate the flood risk in sustainable way	3.5	20.5	35.1	33.3	7.6	3.21	0.97
Family is exposed to food shortages due to floods	1.2	34.5	40.9	22.2	1.2	2.88	0.80
Humanitarian assistance has been provided to the flood –affected family	8.2	30.4	40.8	13.5		2.67	0.81
Flood damaged infrastructure has been adequately repaired	10.5	33.9	41.5	11.7	2.3	2.61	0.90
They were forced to flee their homes due to floods	10.5	37.4	36.8	15.3		2.57	0.87

Source: Own survey result, 2021

As Table 4.2 below both ordinal and likert scale are employed using ordinal measurement the result for the extent and influence of flood in the case area respondent is above average Bowling, (1997). The average mean value score with regard to the influence of flood in the case area is (M= 2.78) which is above average and it indicate that according to section 2.2 and 2.2.1 literature review of this study floods undermine farm yields and therefore the national harvest, reducing household and national food availability, and therefore the agricultural income derived from crop and livestock sales.

As the table 4.2 the mean are 57% respondent's households headed are highly exposed to flood influence 43% respondents are low exposure flood influence to household food security in Amibara Woreda, Afar region. In this study observed most of the community exposed to flood hazard and food insecurity because the area has lack of development, low income, and lack of infrastructure. The main reason of Awash River flooded has the government of Ethiopia report the overflow hydroelectric power dams in research by field observation and questionnaire affirmed additionally the river canal not adequately repaired that are exposed for further either natural or man-made hazard.



Figure 4.2 Flood at Amibara wereda (Photo source: Awash basin development office)

A river flood causes a significant threat to a lot of individuals living in stream basins worldwide. At the household level, a flood could leave individuals while not shelter, limit prospects to urge concerned in economic activities, and will increase the load of diseases. The severity of flood impacts could more increase within the future due to global climate change. In several places, temperature change won't solely happen as a gradual change in average conditions however additionally as a change within the frequency and intensity of maximum events, like serious and unconditional downfall. Global climate change has intensification of the natural hazards influenced to that occurred impact on the socio-economic and socio-political conditions that persisted before the disaster, perpetuating economic condition and vulnerability (World Bank, 2014).

Poor harvests threaten food security and livelihoods from household to national level, to varied degrees per the extent that the family or nation depends on agriculture for its food and financial gain. Flood

hazard has all prejudicial effects on individuals, health, and properties thanks to public and private like infrastructure, ecological systems, cultural heritage, agricultural yield, and economic activities (Messner & Meyer, 2006). The households in the study area are the most vulnerable communities and are mostly subsistence farmers with the lowest crop production, expenditure per capita, and livestock ownership in their communities. Ninno, et al (2003) studied the floods in Bangladesh and concluded that the floods have affected the food security of many households.

4.4 pastoralist's household food security status

4.4.1 Household food insecurity access scale (HFIAS)

Table 4.3 Household food insecurity access scale (n=310)

Variables	Household perceived food security status					
	Food secure	Food insecure				SD
		1	2	3	Mean	
Worried to access food		52	82	37	1.91	0.71
Not able to eat the kinds of foods you preferred because of a lack of Resources		27.5	53.2	19.3	1.92	0.68
Eat a limited variety of foods due to a lack of resources		35.7	52	12.3	1.77	0.65
Eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food		36.3	48.5	15.2	1.79	0.68
Eat a smaller meal than you felt you needed because there was not enough food		44.4	41.5	14	1.70	0.70
Eat fewer meals in a day because there was not enough food		54.4	40.9	4.7	1.50	0.58
There ever no food to eat of any kind in your household because of lack of resources to get food	8.2	59.1	28.7	4.1	1.29	0.67
Go to sleep at night hungry because there was not enough food	43.3	39.2	16.4	1.2	0.75	0.76

Go a whole day and night without eating anything because there was not enough food	95.3	1.8	2.9	0.08	0.36
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*1: Rarely (1 or 2 in the past four weeks), 2: Sometimes (3-10 times in the past four weeks), 3: Often (>10 times in the past four weeks)

Source own survey 2021

Figure and table 4.3 illustrates about 15% of the respondents were food secure and 85% were food insecure. The severity of food insecurity was not uniform. For instance from the total food insecure sample households 37%, 38% and 10% were fall under mild, moderate and sever food insecure. The result show the pastoralist household in the study area has exposed to chronic food insecurity because their life depended only on livestock they have low income.

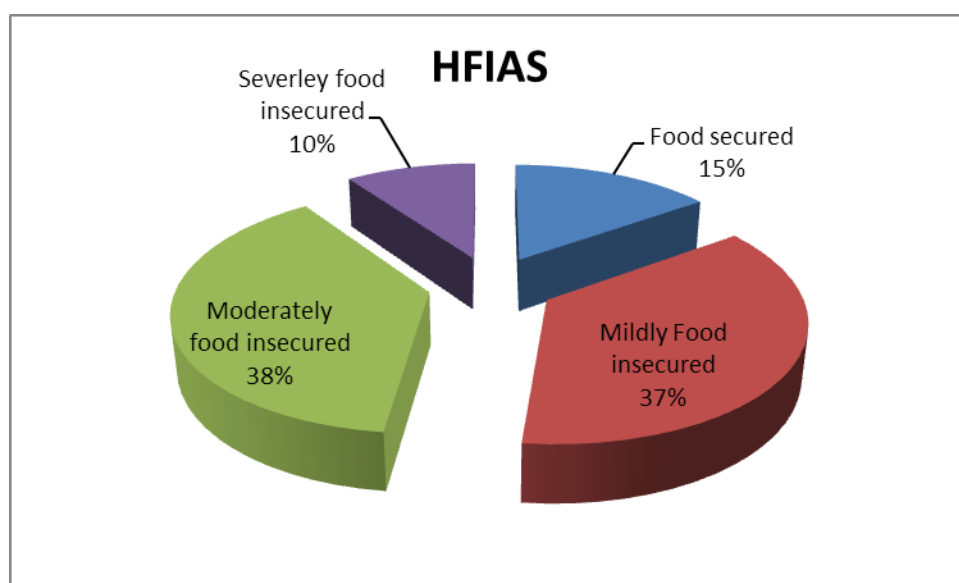


Figure: 4.3 Household food insecurity status distributions (Source: Owen survey 2021)

Households are categorized as progressively food insecure as they respond affirmatively to additional severe conditions and/or expertise those conditions more of times. A food-secure house experiences none of the food insecurity (access) conditions, or simply experiences worry, but rarely. A light food insecure (access) house worries regarding not having enough food generally or usually, and/or is unable to eat most well-liked foods, and/or chow an additional monotonous diet than desired and/or some foods thought of undesirable, however solely seldom.

But it doesn't prune on amount or expertise any of the 3 most severe conditions (running out of food, reaching to bed hungry or going a full day and night while not eating). A moderate food-insecure house sacrifices quality additional overtimes, by intake an uneventful diet or undesirable foods generally or usually, and/or has begun to prune on amount by reducing the scale of meals or variety of meals, seldom or generally. However it doesn't expertise any of the 3 most severe conditions. A severe food-insecure

house has graduated to restricting on meal size or the amount of meals usually, and/or experiences any of the 3 most severe conditions (running out of food, reaching to bed hungry, or going a full day and night while not eating), when sometimes as seldom. In different words, any house that experiences one in every of these 3 conditions even once within the last four weeks (30 days) is taken into account severely food insecure (Jennifer et. al, 2007). Chronic food insecurity is thought to be delicate or moderate food insecurity and it always dominates once there's the same market or structural failure at intervals a nation Misselhorn et al., (2010).

4.4.2 Food consumption score

Table 4.4 Food consumption score (n=310)

Variables: How many days, in the last 7 days eaten food Items?	1	2	3	Mean	SD
Staple food Items	9.4	56.1	34.4	4.03	1.16
Pulses food Items	23.9	68.4	7.6	2.2	1.03
Vegetables food Items	81	17.5	1.2	1.90	0.83
Fruit food Items	75.5	20.5	4.1	2.12	1.50
Meat and fish food Items	33.9	56.2	9.9	1.92	1.01
Milk food Items	45.6	35.6	18.7	3.02	1.43
Sugar food Items	85.4	12.3	2.3	1.91	0.86
Oil food Items	29.8	66.6	3.5	1.89	0.93
Condiments food Items	43.9	53.8	1.2	1.65	0.82

*1: (1- 2 times in the past one week), 2: (3-4 times in the past one week), 3: (5-7 times in the past one week)

Source: Owen survey 2021

As Table 4.4 and Figure 4.4 29 % were poor consumption, the most that have the most 50.50% were borderline consumption while the remaining who has 20.50% was acceptable consumption respectively. The study area household has low food consumption score this outcome illustrate the pastoralist has lower income exposed to food insecurity they can't achieve WFP goal.

As FAO report (2012) concerning 52% of the Ethiopian agricultural population and three hundred and sixty five days of the urban population consume below the minimum counseled daily intake of 2100 kcal/person/day.

WFP's goal is to possess a typical food consumption information assortment instrument and analysis approach that's versatile enough for various desires and contexts, whereas commonplace enough to possess equally applicable analysis techniques and equally explicable results, and additionally one which will be enforced within the field during an affordable information assortment and analysis timeframe. There square measure many alternative routes to gather and analyze food consumption info victimization indicators that square measure a proxy for actual caloric intake and diet quality. The frequency weighted diet diversity score or "Food consumption score" could be a score calculated victimization the frequency of consumption of various food teams consumed by a home throughout the seven days before the survey (Gemma et. al, 2015). Food security could be a troublesome idea to live since it deals in terribly broad terms with the assembly, distribution, and consumption perspective. From the WFP given definition, there square measure four basic pillars or dimensions of food security, those pillars square measure food convenience, accessibility, utilization, and stability within the study contemplate this perception.

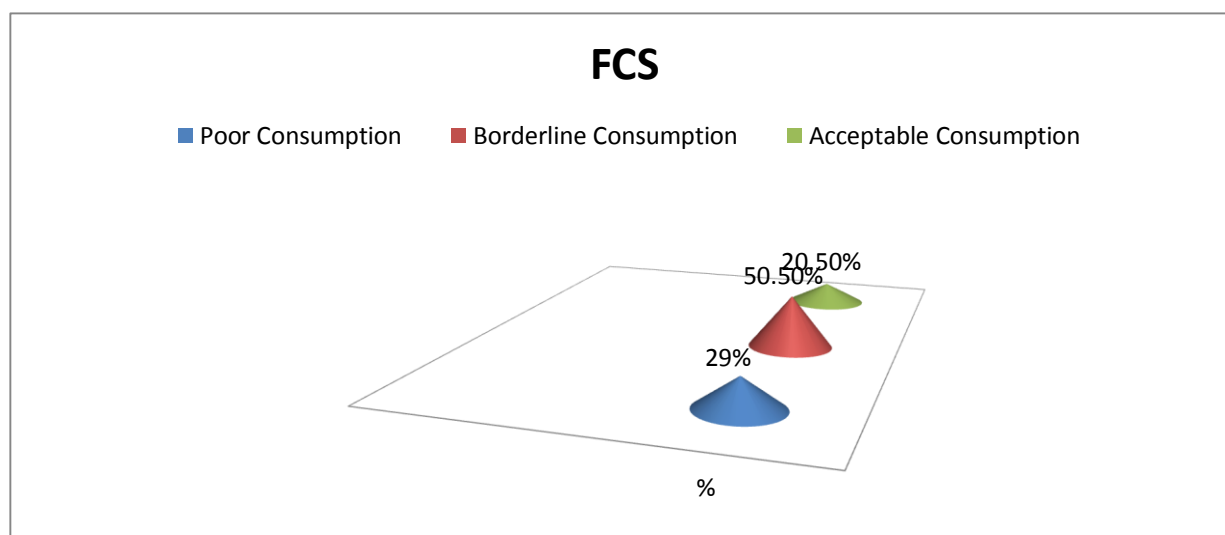


Figure: 4.4 Household Food consumption score distribution (Source: Owen Survey 2021)

The scores methodology is employed to judge food consumption and discuss the strategy from the attitude of food pattern assessment. The scores methodology projected by Fornés et al. is ready to judge food patterns and allows associations to be established between socioeconomic variables and therefore the parts of the study diet/food grouping to that the individual was exposed.

As table 4.4 above Indicates most of staples, pulses, sugar, condiments and oil are eaten by the household as compared to vegetables, milk, meat and fish but to know the household food consumption score. Once

the food consumption score is calculated according to their weight and frequency of each question then the sum of all gives the total consumption score of the household, the thresholds for the FCS should be determined based on the frequency of the scores and the knowledge of the consumption behavior in Ethiopia. The household food consumption score /FCS/ Profiles 0-21 poor, 21.5-35 borderline and 35 acceptable in the study area food consumption score by percent and frequency World Food Program (2008).

4.4.3 Food Coping Strategy Index (CSI)

Table 4.5 Food Coping Strategy Index (n=310)

Variables: In the past 7 days how many days has your household	1	2	3	4	Mean	SD
Rely on less preferred and less expensive foods		67.2	32.7		3.30	1.39
Borrowing, friends or relatives food support		52.6	47.4		27.4	1.20
Purchase food on credit		38.1	62		24.2	0.98
Gather wild food, hunt, or harvest immature crops	5.3	20.5	74.3		1.86	0.91
Consume seed stock held for next season	14.6	13.5	72		1.53	0.92
Send household members to eat elsewhere	2.3	37.4	60.3		2.30	1.10
Send household members to beg	39.2	12.9	47.9		1.18	1.17
Limit portion size at mealtimes		41.5	58.5		2.37	1.03
Restrict consumption by adults in order for small children to eat		18.1	81.9		2.06	0.66
Feed working members of HH at the expense of non-working members		25.8	74.2		2.08	0.70
Reduce number of meals eaten in a day		35.6	64.4		2.25	0.79

* 1. *Very Sever (every day)*, 2.*less sever (3-6 days)*, 3.*sever (1-2 days)*, and 4.*Never (Quite sever)*

Source: Own Survey 2021

Table 4.5 and figure 4.5 show very severe 5.1% from the respondents household this indicates the household in consecutive seven days (week) highest exposure to food insecurity, less severe 27.3% intermediate exposure to households food insecurity 3-6 days per week, 56.3% household low exposure to food insecurity are from the sample size sever that indicate 1-2 days per week and 11.3% of the household have Quite severed from the sample household they have very low exposure to food insecurity.

Twigg, (2004, cited in Dewi, 2007) coping mechanisms pertain in about hazards is basic Economic/material; (economic diversification, such as having more than one source of income, even having a large family can be seen as part of the economic coping strategy because it gives household additional labor; saving and credit schemes are often an important component of economic coping strategies) in the study area ther is no any busiuness institute. Understanding the experiences of flood influence household food coping is essential for better measurement and assessment of its nutritional, physical, and psychological consequences. This qualitative study explored food coping strategies and their perceived severity in relation to household food insecurity. Women (n=187; 29-45 years old) from Amibara woreda, Afar regional State participated in this study. Women were chosen since they were primarily responsible for food acquisition and preparation for all household members Daniel Maxwell (2008). As result, the study area household food coping strategy trend has low because pastoralist livelihood has low income and there have geographically exposures to flood and food insecurity.

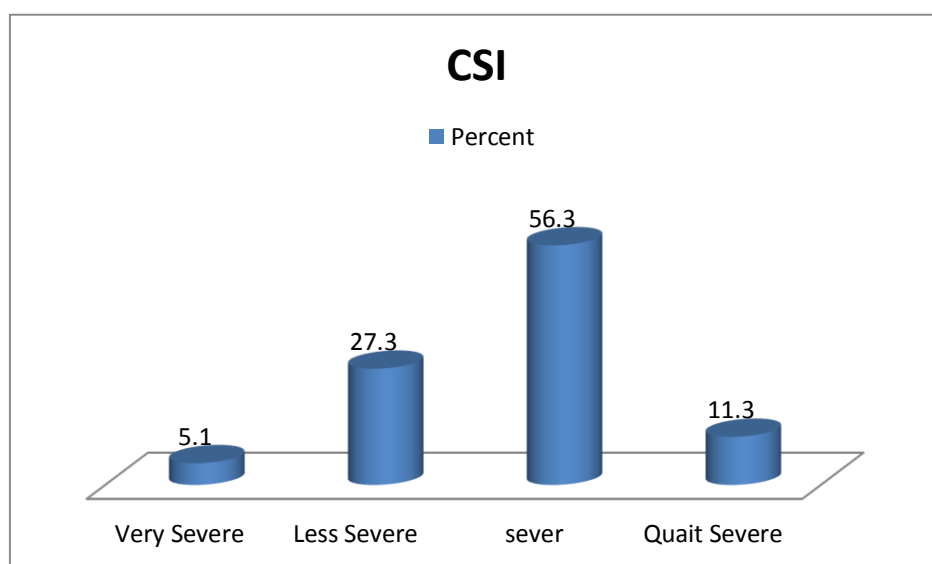


Figure: 4.5 Household food coping strategies distribution (Source: own survey 2021)

In this study observed several alternative coping strategy showed most arid and semi-arid regional state found that agro-pastoral community in that area use alternative coping mechanisms such as moving from one place to another in the dry season, sale of more livestock than usual, borrowing of food, reduce the number of the meal, reduce the size of the meal, sale firewood, and charcoal, seasonal migration, seeking alternative or additional job, rely on less preferred and less expensive food, seeking relief assistance, becoming temporary trade, household splitting, consume wild food, remittance, participating in cash basis project work Abdulahi,(2017). This study verified through observation, FGD, and KII the pastoralist survival to their food security difficult because their life only depended on livestock and vulnerable on their livelihood.

Food security is extremely sensitive to climate risks in Ethiopia historical and newer climate-related events just like the 2008/2009 and 2011 food security crises within the Horn of Africa have highlighted the impact of floods on food production, access to markets, and income from agricultural activities. However, assessing the ways during which livelihoods and specific vulnerabilities are linked to climate could also be a difficult task given the complex relationships between other environmental and socioeconomic factors in determining food security outcomes.

4.5 Climate Variability and Stream Flow and Runoff

4.5.1 Amibara Woreda rainfall and Temperature trend and variability

According to the figure on 4.5.1, FGD and KII Amibara woreda rainfall trend occur summer season (June, July, and August), Autumn season (September, October, and November) the half of September month has occasionally rainfall protracted from the august month, winter season has typically arid in the study area (December, January, and February), and Spring season nearly the summer season have rainfall (March, April, and May). The annual temperature trend of Amibara woreda realizes the under figure 4.5.1 the annual average temperature of the study area has high temperature between minimum and maximum temperature fall 25°C and 35°C, with an average temperature of 30°C.

The climate change has a significant impact on the food security of the local pastoralist's community for food and fodder this exposed to migrate to need their pasture during dry season all are established during field observation and interview by researcher.

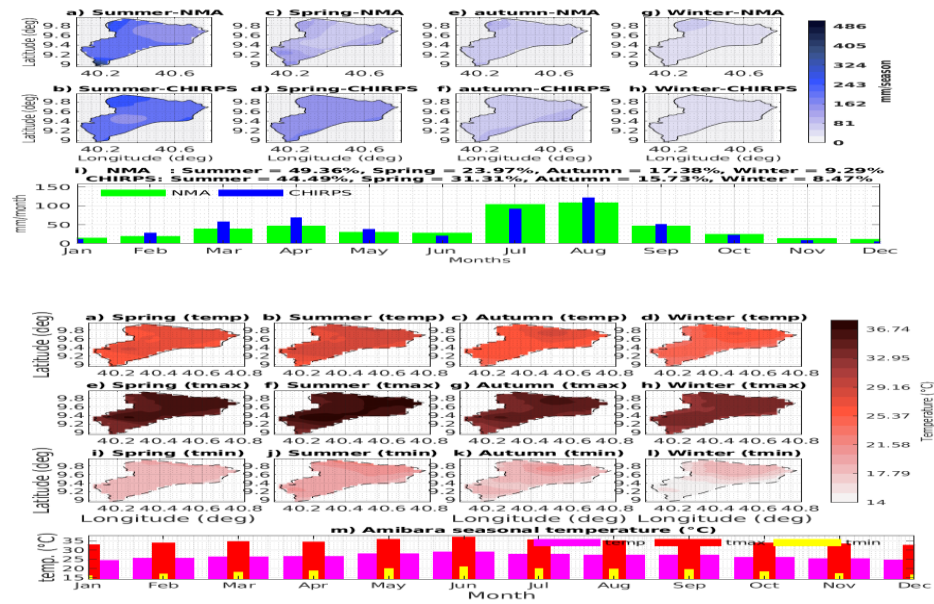


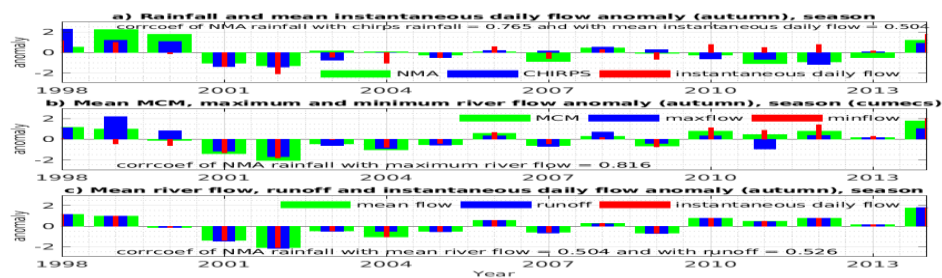
Figure 4.5.1 Amibara woreda rainfall and Temperature trend and variability (source of data: NMA)

4.5.2 Awash river rainfall and river flow in amibara wereda

In the study area Afar regional state, zone 03/Gabi rasu/ Amibara woreda Awash River have two sites: Awash melka werer and Awash melka sedi. The study concerns these two sights and daily, seasonal, and mean rainfall and river flow rate, runoff.

Figure 4.5.2a Awash melka sedi sites in the year of 1998, 2001,2004, 2007, 2010, and 2013 autumn season demonstration chirps rainfall 0.765 and mean instantaneous daily flow 0.504 in the same years and season realizes under figure 4.5.2b maximum river flow is 0.816, and in the similar season and year NMA rainfall with mean river flow 0.504 and runoff 0.526.

Figure 4.5.2a awash melka werer sites in the year of 1993, 1996,1999, 2002, 2005, and 2008 autumn season show chirps rainfall 0.723 and mean instantaneous daily flow in the similar years and season label under figure 4.5.2b maximum river flow, and in figure 4.5.2c the same season and year NMA rainfall with mean river flow and runoff.



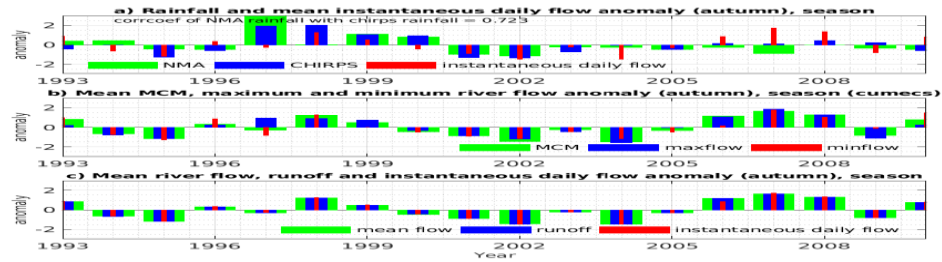


Fig: 4.5.2 Evaluation of Awash river autumn season rainfall, river flow, runoff, and mean instantaneous daily flow (source: NMA and BDA)

According to Figure 4.5.3a awash river the summer season Awash melka sedi sites in the year 1998, 2001, 2004, 2007, 2010, and 2013 show chirps rainfall 0.716 and mean instantaneous daily flow 0.613 in the equivalent years and season realizes below figure 4.7.3b maximum river flow is 0.589, and in the similar season and year NMA rainfall with mean river flow 0.613 and runoff 0.611.

Figure 4.5.3a awash melka werer sites in the year of 1993, 1996, 1999, 2002, 2005, and 2008 summer season show chirps rainfall and mean instantaneous daily flow in the same years and season tells under Figure 4.5.3b maximum river flow, and in the same season and year NMA rainfall with mean river flow and runoff .

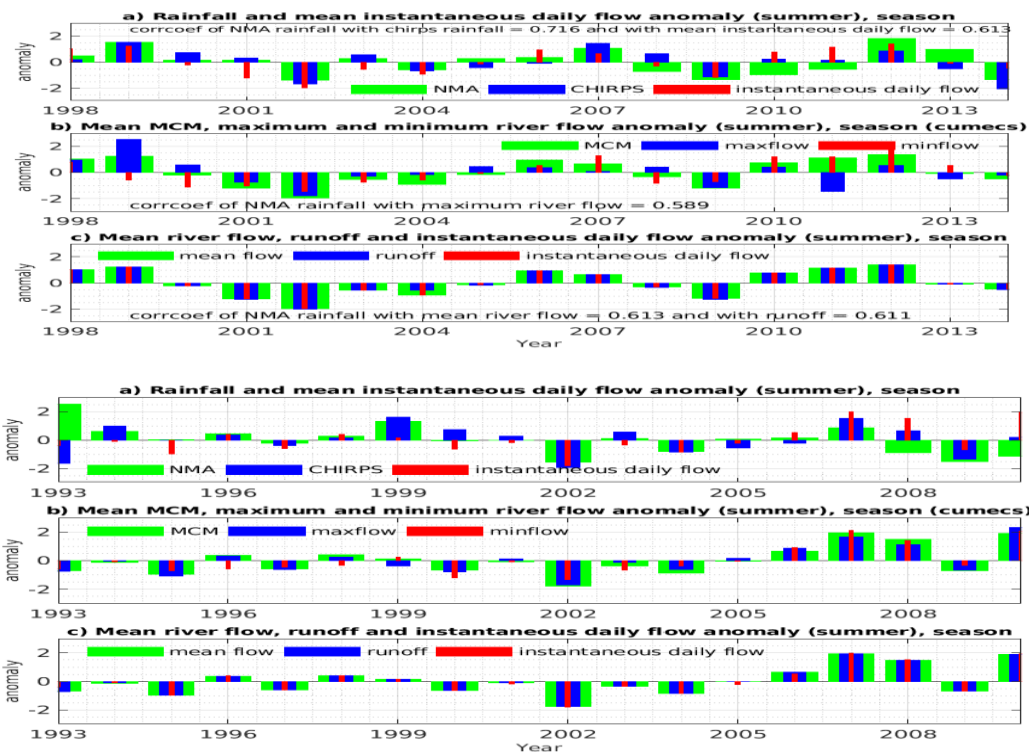


Fig: 4.5.3 Evaluation of Awash river summer season rainfall, river flow, runoff, and mean instantaneous daily flow (source: NMA and BDA)

According to Fig 4.5.4a awash river the spring season awash melka sedi sites in the year of 1998, 2001, 2004, 2007, 2010, and 2013 show chirps rainfall 0.797 and mean instantaneous daily flow has low exposure in the equivalent years and season realizes below Fig 4.5.4b maximum river flow is, and in the same season and year NMA rainfall with mean river flow rate and runoff are low exposure.

Figure 4.5.4a awash melka werer sites in the year of 1993, 1996, 1999, 2002, 2005, and 2008 Spring season show chirps rainfall 0.765 and mean instantaneous daily flow 0.504 in the similar years and season realizes below fig 4.5.4b maximum river flow is 0.816, and in the same season and year NMA rainfall with mean river flow 0.504 and runoff 0.526.

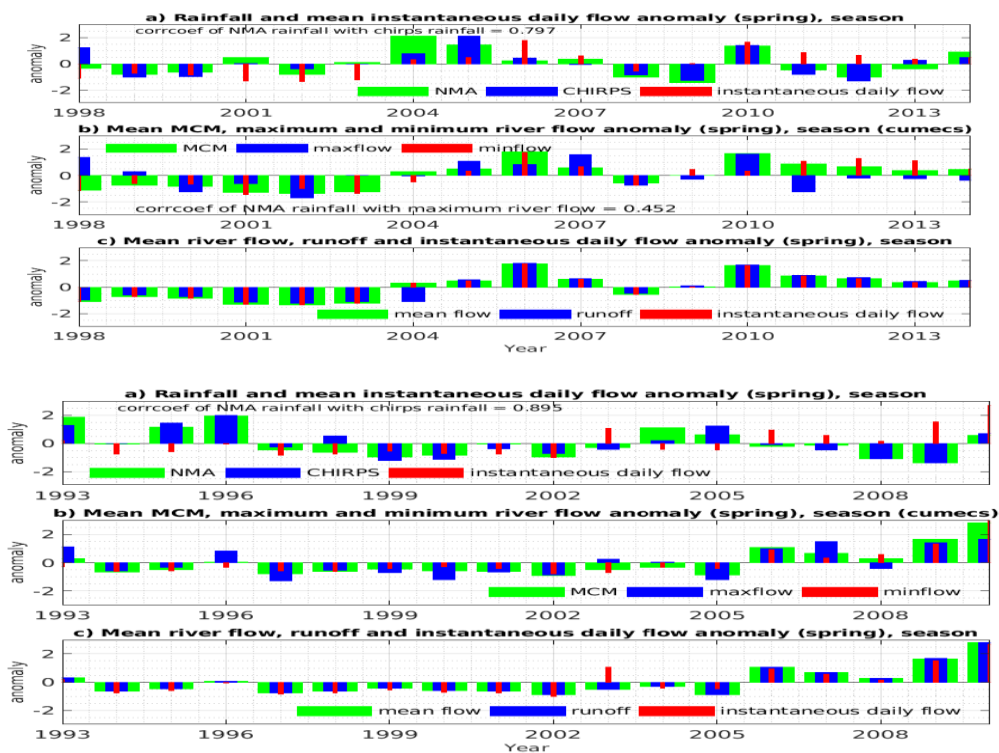


Fig: 4.5.4 Evaluation of Awash river spring season rainfall, river flow, runoff, and mean instantaneous daily flow (source: NMA and BDA)

4.5.3 Comparison of the seasonal spatial and temporal variation of mean:

Figure 4.5.2a, 4.5.3a, and 4.5.4a are examples of this The melka sedi site on the Awash River in 1998, 2001, 2004, 2007, 2010, and 2013 and the werer site in 1993, 1996, 1999, 2002, 2005, and 2008; autumn, summer, and spring seasons indicate chirps rainfall, respectively. Summer has much more rainfall than any other season, the spring season, has low rainfall; the autumn season was relatively good rainfall.

The above-listed figure represents the mean instantaneous daily flow in the equivalent years and season, with the autumn season having decent daily river flow, the summer season displaying higher river flows, and the spring season having the lowest experience daily river flow in the listed years and season understood above figure.

Figure 4.5.2b, 4.5.3b, and 5.5.4b Awash River in the year of 1998, 2001, 2004, 2007, 2010, 2013 melka sedi site and the werer site in the year of 1993, 1996, 1999, 2002, 2005, and 2008 Maximum river flow in the autumn season have high, the summer season has well, and spring season has low.

In figure 4.5.2c, 4.5.3c, and 4.5.4c Awash River in the year of 1998, 2001, 2004, 2007, 2010, 2013 melka sedi site and the werer site in the year of 1993, 1996, 1999, 2002, 2005, and 2008 NMA rainfall with mean river flow autumn season and runoff has a decent season relatively, the summer season means river flow and runoff has higher runoff as compared to another season, and in spring season mean river flow rate and runoff is low exposure comparatively another season. Risk-taking events that can damage human and livestock well-being certainty pertains to the occurrence, timing, and magnitude of the negative event. Based on risk definition vulnerability denotes a lack of resilience to the occurrences of these uncertain events, including long-term and seasonal trends. The climatic shock of the flood is one of many sources of vulnerability for Ethiopian pastoralists. The shortage livestock terms of trade for cereals and other staple commodities have collapsed, while pasture and water resource conflicts have increased. Loss of access to water, pasture, and effective, community-based animal health care, all these vulnerabilities led to increases in malnutrition, morbidity, and malnutrition (Leutze et al., 2011). The community as a whole has been worsened by the floods, which have exacerbated food insecurity by destroying crops, livestock, and infrastructure, etc. of the study area.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of major findings

The final chapter concludes this research by revisiting the research objectives proposed questions and drawing out the study's main contributions along with the key managerial implications stemming from the research findings. In addition, the limitations of the research are outlined and recommendations for future research opportunities are proposed on the title Assess Awash River flood and its impact on pastoralist food security in Amibara Woreda, Afar Regional State, Ethiopia.

Accordingly, The analysis result depicts that the average mean value score with regard to the extent and influence of flood in the case area is ($M= 2.78$) which is above average and it indicates that floods undermine farm yields and therefore the national harvest, reducing household and national food availability, and therefore the agricultural income derived from crop and livestock sales people who live in the pastoral flood-affected areas of the Amibara woreda of Afar region will face an extraordinarily difficult situation, as a result of the floods, crop pests, and other natural hazards which have destroyed harvests in these areas were happen.

The study used appropriate measurement tools in the study area. The study tries to illustrate the relationship between the participant's demographic profile of the Awash River flood and its influence on pastoralist household food security in order to achieve these objectives, data was collected from research participants and analyzed using both quantitative and qualitative methods.

5.2 Conclusions

Flood in Amibara woreda has for many years' experience this prevalence exposure to have an effect on the pastoralist's household food security sometimes this analysis has investigated that assess the impact of overflowing stream arrive pastoralist household food security. The study area during summer season heavily affected by flood exacerbates their food availability and accessibility in the flood affected pastoralist household.

The household food insecurity access scale is sorted into the four classes of measures HFIAS for example food secure, mildly food insecure, moderately food insecure, severely food insecure. But from the study, it absolutely was solely a couple of percent of the participant within the study area was food secured 15.00%, whereas the food insecure 85.00% (Figure 4.3) the bulk of pastoralist household food insecure.

Once the food consumption score is calculated per the load and frequency of every question then the total of all provides the full food consumption score of the household, as a result, this most pastoralist's households in Amibara Woreda have poor consumption 29%, acceptable consumption 50.50% and borderline consumption score 20.50% (Figure 4.4) with totally different level. Within the study, it's expected that households with economically active and used member's right-angled measure additional food secure than households with members who square measure out of work. So counting on the result of the results, the household size can have a positive or negative impact on food attainment.

Outcomes of coping strategy showed that households displayed a range of food-related header ways within which every header strategy showed a distinct level of perceived severity that's very severe (5.1%), less severe (27.3%), severe (56.3%), and quite severe (11.3%) severally (Figure 4.5). within the study, most respondent keep has 64.3 percent square measure pastoralists during this outcome most of the respondents square measure pastoralists. The qualitative knowledge offer valuable data for understanding the experiences of food insecurity within the study area.

The climatically shock of the flood is one in every of several sources of vulnerability for Ethiopian pastoralists the study tries for instance the connection between the demographic profiles of the participant of the flood influences at the household food security and household financial gain, household size, education level. Food security improves with an increase in household financial gain, tiny relations, and will increase the tutorial attainment of the manage head. The results square measure in line with Rudolph et al. (2012:14), Oluyole et al. (2009:9) to realize these objectives, primary knowledge was collected from the affected household, and administration through questionnaires, field observation, KKI, and FGD, and processed in each quantitative and qualitative approach.

5.3 Recommendations

The study findings show that the impact of the flooded stream flood on pastoralists' family food security in Amibara Woreda, and so the pastoralists' family has exposed to a constraint the way to be managed and decreased the destruction each through Government and also the stakeholders. Stream floods create a significant threat to uncountable individuals living in stream basins worldwide. With a similar token flood could be a significant issue of the studied individuals, during which flood could leave individuals while not shelter, limit potentialities to induce concerned in economic activities, and will increase the burden of diseases. That's why the extent and influence of get the case area is on top of average. The poor, therefore, live invariably below food shortage things though the degree ranges between less shortage and intensely severe shortage. So Government and alternative development actors ought to contribute to up the upbeat and food security of the pastoralist within the study area in many ways in which.

- Emergency relief, within the variety of food, to feed individuals within the flood-affected areas, and supervise and monitor the distribution of humanitarian aid and adequate help within the event of a flood responsible by Afar regional state and NGOs.
- once the event, a special program to watch the event of baby and maternity diets, and also the speedy launch of social services in medical establishments and strengthening of deficiency disease observance systems through community health centers and mobile clinics, and preparation for a supplementary feeding intervention for youngsters but five years, and females within the case area accountable of the federal ministry of health and NGOs.
- Using technologies to produce early warning information to the community, increase the carrying capability of the flooded stream and establish a drain canal, and relocate the community to flood-prone areas can sustainably solve the matter. All of those may be achieved sustainably through the bother of responsible the national basin development agency and non-governmental stakeholders
- Pastoralists have their own header mechanisms and survival methods against varied constraints to their livelihoods. A number of them need deeper understanding and want to be engineered upon. Their own methods area unit clear indications on however actions/interventions work on those lines responsible to the federal ministry of agriculture and disaster risk management commission (DRMC).
- The time of year, drain may be properly clean, community safety precautions may be provided, and adequate transportation and interference groups may be started within the event of a disaster to cut back the chance of individuals and property in authority Afar regional state and flooded geographical area workplace.
- Planed and work pastoralists-centered development and food security improvement programs collaboratively with the stakeholders with governance.

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Appendixes
Questionnaire and Interviews
English Version

ANNEX 1: Questionnaires and interview

Dear respondent,

My name is Zekarias Aragaw. I am MSc student at Addis Ababa University in the department of food security and development studies. Currently, I am conducting research topic entitled “**Assessment of Awash River flood and its impact on pastoralist’s food security in Amibara wereda, Afar Region, Ethiopia**”. The aim of this study will be to Assessment of Awash River flood and its impact on pastoralist’s household food security in Amibara wereda, Afar Region, Ethiopia.

The main objective of this questionnaire is to collect primary data. Your responses to the questions are valuable and will be held in utmost confidentiality to be used only for the analysis of this research. If you accept to participate in this research, you will be doing so voluntarily and there will not be any monetary returns. This interview will take about 30 minutes of your time to respond to the questions.

The information you provide used only for academic purpose. So, please put a thick, mark and short answer for the following questionnaires.

“I would like to thank you in advance for your cooperation”

General Information:

Date of interview_____

Kebele _____District_____

1. Respondent's Socio - Demographic Information

No	Questions	Category	Code
1	Sex of the respondent	Male	1
		Female	2
2	Age of the respondent	<15 (less than 15)	1
		16-35	2
		36-55	3
		>56(greater than 56)	4
3	Marital status of the respondent	Single	1
		Married	2
		Divorced	3
		Widowed	4
4	Religion of respondent	Orthodox	1
		Muslim	2
		Protestant	3
		Other	4
5	Household size	1-3	1
		4-7	2
		8-10	
		Above 10	3
6	The education level of the respondent	Cannot read and write	1
		Read & write, but no formal education	2
		Completed Primary school	3
		Completed High school	4
		Completed diploma and above education	5
7	Livelihood of respondent	Unemployment	1
		Pastoralist	2
		Civil servant	3
		Self employed	4
		Retired	5
8	Monthly income (Birr)	500-1000	1
		1001-1500	2
		1501- 2000	3
		2001-2500	4
		above 2500	5

2. How much are the influence of flood in the case site?

No	Questions	Category	Code
1	The magnitude of household flood risk exposure is high?	Strongly disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
2	Perceived household access to food in the study area?	Strongly disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
3	The local coping strategies of pastoralist to prevent food and flood very good?	Strongly disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
4	Flood hazard are the main causes of household food security?	Strongly disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
5	Flood hazards are critical problem for food security in Amibara wereda?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly Agree	5
6	Do you think that Food security is a threat in the study area?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly Agree	5
7	Do you think I already have enough information about flood hazard in the case site?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
8	Do you think the influence of flood	Strongly Disagree	1
		Disagree	2
		Neutral	3

	hazard to pastoralists' food security is high?	Agree	4
		Strongly agree	5
9	The Vulnerability of flood hazard in the case site is high?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
10	Do you feel that you are vulnerable to flood hazards?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
11	Stakeholders think they are working to alleviate the flood risk in sustainable way?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
12	Do you think that your family is exposed to food shortages due to floods?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
		Strongly Disagree	1
13	Do you think enough humanitarian assistance has been provided to the flood –affected family?	Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
14	Do you think that the flood damaged infrastructure has been adequately repaired?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5
15	They were forced to flee their homes due to floods?	Strongly Disagree	1
		Disagree	2
		Neutral	3
		Agree	4
		Strongly agree	5

3. Examine food security status of the pastoralists by using appropriate measurement tools in the case site

3.1 Household Food Insecurity Access Scale (HFIAS) Measurement Tool

NO	QUESTION	RESPONSE OPTIONS	CODE
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q 1.a) 1=Yes	 ___
1.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ___
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q 2.a) 1=Yes	 ___
2.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ___
3	In the past four weeks, did you or any household Members have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q 3.a) 1 = Yes	 ___
3.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ___

4	In the past four weeks, did you or any household Member has to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q 4.a) 1 = Yes	 _
4.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 _
5	In the past four weeks, did you or any household members have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q 5.a) 1 = Yes	 _
5.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 _
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q 6.a) 1 = Yes	 _
6.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 _

		the past four weeks)	
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q 7.a) 1 = Yes	 ☐
7.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ☐
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q 8.a) 1 = Yes	 ☐
8.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ☐
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No Q 9.a) 1 = Yes	 ☐
9.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	 ☐

3.2 Food consumption score

How many days, in the last 7 days, have you eaten the following food Items?	A	B	FCS
	Number of times (frequency) 0-7	Weighting	Food Consumption Score Calculation (A*B=FCS)
Cereals and tubers		2	
Pulses		3	
Vegetables		1	
Fruits		1	
Meat and Fish		4	
Milk		4	
Sugar		0.5	
Oil		0.5	
Condiments		0	

3.3 Food Coping Strategy Index (CSI)

Behaviors: In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:	Frequency	Severity Weight	Weighted Score = Frequency X weight
1. Rely on less preferred and less expensive foods?		1	
2. Borrow food, or rely on help from a friend or relative?		2	
3. Purchase food on credit?		2	
4. Gather wild food, hunt, or harvest immature crops?		4	
5. Consume seed stock held for next season?		3	
6. Send household members to eat elsewhere?		2	
7. Send household members to beg?		4	
8. Limit portion size at mealtimes?		1	
9. Restrict consumption by adults in order for small children to eat?		2	
10. Feed working members of HH at the expense of non-working members?		2	
11. Reduce number of meals eaten in a day?		2	
12. Skip entire days without eating?		4	
Total Household Score			

ANNEX 2: Focus Group Discussion / FGD/ Guides designed for Amibara wereda selected study area pastoralists, Kebeles officials and agriculture experts.

Dear respondent,

The main objective of this FGD guide is to collect primary data to undertake an assessment on ‘Awash River flood and its impact on pastoralist’s food security in Amibara wereda, Afar Region ‘. Your responses to the questions are valuable and will be held in utmost confidentiality to be used only for the analysis of this research. You will not be identified by name in any case. If you accept to participate in this research, you will be doing so voluntarily and there will not be any monetary returns. You are also free to refuse to respond to any questions you do not feel comfortable answering or to withdraw from the research all together. This interview will take about an hour of your time to respond to the questions.

1. Do you feel that you are vulnerable to flood hazards? If ‘yes’ or ‘no’, describe how?
2. What is the relationship between flood and food security in the case area?
3. What specific example do you have for the flooding disasters in this area? Please describe deaths, resource damages, and others list?
4. Which month is very severe in flood in this area?
5. Please explain the flood and pastoralist household food security vulnerability of residing along Awash River in Amibara wereda.
6. What are the coping strategies of pastoralist to prevent food and flood?
7. What do you suggest for the protection of flooding hazards in this area? Please describe the responsibilities of the government, community, and NGOs?

Thank you very much for your time & professional support!!

ANNEX 3: Key Informant Interview / KII / Guide designed for Amibara weredas Agricultures and food security and disaster risk management expert, and Kebele officials.

Dear respondent,

The main objective of this KII Guide is to collect primary data to undertake an assessment of ‘Awash River flood and its impact on pastoralist’s food security in Amibara wereda, Afar Region’. Your responses to the questions are valuable and will be held in utmost confidentiality to be used only for the analysis of this research. You will not be identified by name in any case. If you accept to participate in this research, you will be doing so voluntarily and there will not be any monetary returns. You are also free to refuse to respond to any questions you do not feel comfortable answering or to withdraw from the research all together. This interview will take about an hour of your time to respond to the questions.

1. What are the main causes of flood household food security in the study area?
2. Do you think that Awash River flood is a problem pastoralist household in Amibara wereda? If ‘yes’ please describe in detail.
3. What do you think in Amibara wereda the major causes of flood?
4. What do you recommend to mitigate the flood hazards in Amibara wereda? Please mention in detail.
5. Do you explain the extent and influence of flood in the case site?
6. Do you describe the household food security situation in the study area?
7. What are there any measures taken so far? If ‘yes’ describe what has been done by the government, the community, and NGOs?
8. Do you think that the flooding hazard is increasing over years in this area? If ‘yes’ or ‘no’ describe how

Thank you very much for your time & professional support!!

ANNEX 4: Socio demographic profile

Sex of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	124	39.8	39.8	39.8
	Female	186	60.2	60.2	100.0
	Total	310	100.0	100.0	

Age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-28	83	14.6	14.6	14.6
	29-45	58	67.3	67.3	81.9
	46-60	81	14.6	14.6	96.5
	above 60	20	3.5	3.5	100.0
	Total	310	100.0	100.0	

Marital status of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	20	6.4	6.4	6.4
	Married	230	74.3	74.3	80.7
	Divorced	32	10.5	10.5	91.2
	Widowed	27	8.8	8.8	100.0
	Total	310	100.0	100.0	

Religious of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	Orthodox	52	17.0	17.0	17.0
	Muslim	239	77.2	77.2	94.2
	Protestant	18	5.8	5.8	100.0
	Total	310	100.0	100.0	

House hold size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3	56	18.1	18.1	18.1
	4-7	181	58.5	58.5	76.6
	8-10	72	23.4	23.4	100.0
	Total	310	100.0	100.0	

Educational level of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cannot read and write	38	22.2	22.2	22.2
	Read & write	194	62.6	62.6	84.8
	Completed Primary school	47	15.2	15.2	100.0
	Total	310	100.0	100.0	

Livelihood of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unemployment	54	17.5	17.5	17.5
	Pastoralist	199	64.3	64.3	81.9
	Civil Servant	41	13.5	13.5	95.3
	Self employed	14	4.7	4.7	100.0
	Total	310	100.0	100.0	

Monthly income of the respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	500-1000 birr	69	22.2	22.2	22.2
	1001-1500 birr	172	55.6	55.6	77.8
	1501- 2000 birr	58	18.7	18.7	96.5
	2001-2500 birr	11	3.5	3.5	100.0
	Total	310	100.0	100.0	

ANNEX 5: The extent and influence of flood question

How much are the extent of flood in the case site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	27	8.8	8.8	8.8
	Low	110	35.7	35.7	44.4
	Medium	109	35.1	35.1	79.5
	High	63	20.5	20.5	100.0
	Total	310	100.0	100.0	

What are you think the household food security statuses in the study area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	52	17.0	17.0	17.0
	Low	92	29.8	29.8	46.8
	Medium	100	32.2	32.2	78.9
	High	65	21.1	21.1	100.0
	Total	310	100.0	100.0	

The local coping strategies of pastoralist to prevent food and flood?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	29	9.4	9.4	9.4
	Low	90	29.2	29.2	38.6
	Medium	132	42.7	42.7	81.3
	High	52	17.0	17.0	98.2
	very high	5	1.8	1.8	100.0
	Total	310	100.0	100.0	

Flood hazard are the main causes of household food security?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	4.1	4.1	4.1
	Disagree	69	22.2	22.2	26.3
	Neutral	145	46.8	46.8	73.1
	Agree	65	21.1	21.1	94.2
	Strongly agree	18	5.8	5.8	100.0
	Total	310	100.0	100.0	

Flood hazards are critical problem for food security in Amibara wereda?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	14	4.7	4.7	4.7
	Disagree	94	30.4	30.4	35.1
	Neutral	125	40.4	40.4	75.4
	Agree	69	22.2	22.2	97.7
	Strongly agree	7	2.3	2.3	100.0
	Total	310	100.0	100.0	

Do you think that Food security is a threat in the study area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	3.5	3.5	3.5
	Disagree	49	15.8	15.8	19.3
	Neutral	137	44.4	44.4	63.7
	Agree	98	31.6	31.6	95.3
	Strongly agree	14	4.7	4.7	100.0
	Total	310	100.0	100.0	

Do you think I already have enough information about flood hazard in the case site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	14	4.7	4.7	4.7
	Disagree	116	37.4	37.4	42.1
	Neutral	135	43.9	43.9	86.0
	Agree	43	14.0	14.0	100.0
	Total	310	100.0	100.0	

Do you think the influence of flood hazard to pastoralist food security is high?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	2.9	2.9	2.9
	Disagree	96	31.0	31.0	33.9
	Neutral	126	40.9	40.9	74.9
	Agree	70	22.8	22.8	97.7
	Strongly Disagree	7	2.3	2.3	100.0
	Total	310	100.0	100.0	

The Vulnerability of flood hazard in the case site is high?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	21	7.0	7.0	7.0
	Disagree	78	25.1	25.1	32.2
	Neutral	101	32.7	32.7	64.9
	Agree	101	32.7	32.7	97.7
	Strongly agree	7	2.3	2.3	100.0
	Total	310	100.0	100.0	

Do you feel that you are vulnerable to flood hazards?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	1.8	1.8	1.8
	Disagree	43	14.0	14.0	15.8
	Neutral	134	43.3	43.3	59.1
	Agree	126	40.9	40.9	100.0
	Total	310	100.0	100.0	

Stakeholders think they are working to alleviate the flood risk in sustainable way?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	3.5	3.5	3.5
	Disagree	63	20.5	20.5	24.0
	Neutral	108	35.1	35.1	59.1
	Agree	103	33.3	33.3	92.4
	Strongly agree	23	7.6	7.6	100.0
	Total	310	100.0	100.0	

THANK YOU!!