COLLEGE OF SOCIAL SCIENCES

DEPARTMENT OF SOCIOLOGY

THE EFFECTS OF FLOODING ON THE RURAL PEOPLE AND THEIR RESPONSE STRATEGIES: THE CASE OF JOR DISTRICT, GAMBELLA REGIONAL STATE, ETHIOPIA

BY

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Addis Ababa, Ethiopia

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The Effects of Flooding on Rural People and Their Response Strategies: The Case of Jor District, Gambella Regional State, Ethiopia

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirement for the Degree of Master of Arts in Sociology

By

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Declaration

I, Agwa Oguta Agwa, hereby declare that the thesis entitled: - ***"The Effects of Flooding on Rural People and Their Response Strategies: The Case of Jor District, Gambella Regional State, Ethiopia",*** submitted by me to be awarded with Degree of ***Master of Arts in Sociology at Addis Ababa University***. It's a product of my original work and it hasn't been presented for the award of any other Degree, Diploma, and Fellowship of any other university or institution. This work has also accredited the views of the research participants. To the best of my knowledge, I have fully acknowledged the materials and pieces of information used in the study.

Name: Agwa Oguta Agwa

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Certification

This is to certify that this thesis entitled: "***The Effects of Flooding on Rural People and Their Response Strategies: The Case of Jor District, Gambella Regional State, Ethiopia",*** prepared by Agwa Oguta and submitted in partial fulfillment of the requirements for the award of degree of **Master of Arts in Sociology** in lines with the regulation of the University and meet the accepted standards with respect to originality and quality.

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Abbreviation

KMs: Kilometers

Acronyms	
APFM	Associated Program on Flood Management
AWD	Acute Watery Diarrhea
CSA	Central Statistical Agency
DDRM	Directorate Disaster Risk Management
DPFSA	Disaster Prevention and Food Security Agency
DPPA	Disaster Prevention and Preparedness Agency
DRRM	Disaster Risk Reduction Management
FAO	Food and Agricultural Organization
FDPPA	Federal Disaster Prevention and Preparedness Agency
FDRE	Federal Democratic Republic of Ethiopia
FEMA	American Federal Emergency Management Agency
FGD	Focus Group Discussion
GEOGLAM	Group on Earth Observation Global Agricultural Monitoring
GWP	Global Water Partnership
IPCC	Intergovernmental Panel on Climate Change
IRC	International Rescue Committee
NBI	Nile Basin Initiative
NDRM	National Disaster and Risk Management
NDRMC	National Disaster Risk Management Commission
NGOs	Non-Governmental Organizations
NRC	Norwegian Refugee Council

PAR	Pressure and Release Model
SNNRP	Southern Nation, National, and People Region
SPSS	Statistical Package for Social Science
UN	United Nations
UNDP- EUE	United Nation Development Programme Emergencies Unit for Ethiopia
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNICEF	United Nations International Education Funds
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USA	United State of America
USD	United State Dollar
WMO	World Meteorology Organization
ZOA	Zionist Organization of America

Abstract

Flooding is the most destructive type of natural disaster that strikes humans and their livelihoods system around the world (UN, 2012). However, it was believed that the flooding response's readiness and capacity among the affected communities, societies and countries has determined the level of flooding effects across the globe. In such a way, the level of flooding effects is depend on the level of economic capacity and skills required for effective response toward flooding hazards. It is, therefore, necessary to investigate the low socio- economic status of a given flood victim population in response to flooding hazard. As a result, this study was conducted with the objective of examining the effects of flooding on rural people and response strategies employed among the community living in the flood-prone areas of Jor district, Gambella Regional State, South western Ethiopia. In this regard, a cross- sectional survey design and mixed approach have been employed in order to address specific objectives. Due to the nature of flood vulnerability, 6 Kebeles were selected purposefully out of 15 kebeles with the sample sizes of 250 were selected randomly. In addition to households' survey, Key informant interviews, Focus group discussion (FGDs), Life histories, and observation instruments were also employed. The findings revealed that majority of the population lacks educational training and the necessary skillful (97%) as they are unskilled farmers and practice backward agricultural system with limited crop diversification mechanism. Besides, the findings also indicate that residing or settling in a flood prone area (68.8%) and lack of capacity for resiliency (58.4) were found out as the major underlying causes for community's vulnerability to flood hazard which brought significant effects on crop production (56%), livestock rearing (48%), housing permanency (56%) with over 7,000 people displaced, and in the social services delivery (76.4%). Moreover, the results with regard to community's coping mechanism substantiated that, relying on fishing, collection of wild plants, building muddy dykes, strengthening social networks and emergency support from external sources have been used as coping mechanisms. Furthermore, interviews made with heads concerned institutions have verified that lack of preparedness and prevention plans prior to flooding hazard; insignificant collaboration between the government and humanitarian organizations; and inconsistent supportive schemes from humanitarian organizations operating in the study area were the major obstacles to lessen the burden of victims. Thus, it can be suggested that, there is a need to devices both non-structural and structural mitigation measures

Key words: Ethiopia, Flood, Hazard, Vulnerability, Jor district, Flood effects, and Response strategies

CHAPTER ONE

1. Introduction

1.1. Background of the Study

Natural and man-made disasters pose great threats to human life. Disasters include earthquakes, volcanic eruptions, landslides, tsunamis, floods, and drought. Natural disasters have serious health, social, and economic consequences. Floods are among the most disastrous events of nature among all calamities. Global statistics show that floods are the most frequently recorded destructive events, accounting for about 30% of the world's disasters each year. The frequency of floods is increasing faster than any type of disaster. Though flood disasters are more common in Asia (41%), 17% of recorded flood disasters have occurred in Africa and have affected people mainly through loss of shelter [and other economic and agricultural losses] (Smith, 2009). The Intergovernmental Panel on Climate Change (IPCC, 2001) also predicts that climate change is likely to cause an increase in flood hazards in many areas of the world. Worldwide flood damage upon agricultural, households, livelihood systems, infrastructure and public utilities amount to billions of $USD each year.

In Africa, the study conducted in Namibia shows that Flood has posed disruption on commercial and industrial activities and hindered access to healthcare facilities and schools. These Negative effects on the population include relocation and loss of shelter, human and livestock drowning, closure of hundreds of schools and disruption of education for thousands of pupils, affected potable water and sanitation and infrastructural damage as revealed by DDRM (2011). Besides, UNOCHA has estimated that at least 1.3 million people have been affected by flooding, an expected 481,000 people have been displaced, and 360 people have died following devastating floods across the region of East Africa (GEOGLAM, May, 2020)

According to Mulugeta Abebe (2009), Ethiopia is among the developing countries most vulnerable to natural and man-made disasters. The major disasters are drought, flood, human and livestock epidemics, crop pest, and conflict have been significantly affecting the lives of the communities, especially, rural population. In this regard, flood remains

the second country's leading major hazard next to drought. However, the worst scenario of flood in Ethiopia occurred in the summer of 2006 as the result of prolonged and intensive rainfall which resulted in flash floods and overflow of rivers and dams affecting 199,900 people in eight regions of Ethiopia, resulting in loss of lives, damage of property, and destruction of livelihoods of tens of thousands of people (DRMFSS and MOA, 2013 and Joint Government and Humanitarian Partners, 2006).

Besides mentioning Ethiopia as one among the developing countries, Gambella region is one of the four regional states that are classified as developing regional states (the regions whose social indicators are significantly lagging behind national averages). The region is also prone to both natural and man-made hazards that have led to mortalities, displacements and loss of properties. Among the identified hazards were drought, flood, cross border conflict, internal communal conflict, and South Sudan crisis/Refugee influx and health hazards (such as AWD, meningitis and malaria) (DPFSA, 2014).

According to Gizachew (1999), flooding in the Gambella region has caused widespread damage and loss to property and life, disrupting economic activities and services. It imposes hardship and suffering on those affected, the magnitude of flood disaster is tremendously increased by the after effect namely epidemics and starvation every year.

However, bearing in mind the above-mentioned significant impacts of flooding on the people in the flood-affected area, much attention is needed to explore the effectiveness of provided response either by the government or community themselves in alleviating the existing recurrent flood hazard in the area like Jor district. The purpose of this study is to deeply explore the impacts of flood on the rural communities based on the empirical data and researcher personal experience in the study area Jor district of Gambella region.

1.2. Statement of the problem

Flooding is the single most destructive type of natural disaster that strikes humans and their livelihoods around the world (UN, 2001). Flood losses reduce the assets of households, communities and societies through the destruction of standing crops, dwellings, infrastructure, machinery and buildings, apart from the tragic loss of life (Rahman, 2014).

In Ethiopia, extreme floods push back the development activities and threaten national food security. Whereas at the grassroots level, a flood may displace people, limit possibilities to get involved in economic activities, and may increase the burden of diseases (Haile, A.T., Kusters, K. and Wagesho, N., 2013). The study conducted in Dire Dawa has revealed that the local authorities have come up with coping strategies, but due to poor implementation the authorities failed to realize the expected outcome (Akola, J., Binala, J. & Ochwo, J., 2019). On the other hand, the study conducted in Etang special district, Gambella, (Haile, A.T., Kusters, K. and Wagesho, N., 2013) has also revealed that the 2007 extreme flood event has resulted in severe negative impacts, both on standing crops and livestock, as well as on future agricultural production. However, due to short-term coping strategies experienced among the community like their heavily relying on external assistance from governmental and non-governmental agencies as well as getting support from their social networks, they do not lead the community to long-term adaptation, but rather, they are more likely to erode coping capacity.

Furthermore, according to SW Aboya (2008), the current coping strategies against flood-related health risks in Gambella show at least three major weaknesses: weak institutional capacity, poor infrastructure and lack of flood-specific policy. As a result, these weaknesses threaten the effectiveness and sustainability of the coping mechanisms.

However, the above mentioned empirical evidence did not recognize nor focus on how people in poverty, low income, and people of low socioeconomic status determined the level of flooding effects and its response strategies among the people living in the flood prone areas. While the effects of flooding hazards are more common among people with different cultures living in the flood prone areas, the effectiveness of response strategies make them quite different as a result of variety in level of economic development and

socioeconomic status. So, it is quite important to take into account the influence of poverty and low socioeconomic status on the flood effect and its response strategies among the marginalized people in developing regions like Gambella regional state whose its social indicators are lagging behind national averages such as high rate of illiteracy, inaccessible of roads and transportation, poor infrastructure and technological advancement and lack of access to other social services. In line with its people of low socioeconomic status, it is also important to investigate the response strategies of government sectors and humanitarian agencies in relieving the affected community from adverse impacts of flooding hazards. Therefore, the purpose of this study is to address the knowledge gap, which is how the low socioeconomic status determined or influenced the response strategies against the impacts of flooding on the flood affected rural people in the flood prone areas in Jor district, Gambella, Western Ethiopia.

1.3. Research Questions

The following are the research questions which this study is expected to address

Could the nature of socioeconomic status influence the level of flooding effects and flooding response effectiveness among the affected communities in the study area?

1. To what extent does both institutional and community based response strategies alleviate the effects of flooding among the flooding affected communities in the study area?

1.4. Objectives of the Study

1.4.1. General Objective

To assess effects of flooding on the rural people and their response strategies based on the nature of socioeconomic status in Jor district, Gambella Regional State, western Ethiopia.

1.3.2. Specific Objectives

- To assess the social effects of flooding on the flood affected people in the study area

- To study the influence of low economic status on the response strategies of victim people
- To assess the role of institutions pertinent to response strategies toward the flood affected people
- To examine the level of in situ community response strategies in line with their level of socioeconomic status

1.4. Scope of the Study

Thematically, this study was conducted on the effects of flooding on the rural people and their strategies in Jor district of Gambella, Ethiopia. It does not include flooding risks assessment, impacts analysis and mitigation strategies. Rather, it is limited to the effects of flooding on the rural people and their response strategies based their level of socioeconomic status exclusively.

Geographically, this study has been conducted in Jor district in order to assess the effects of flooding on the rural people caused by Gilo River's flooding and examine the employed response strategies as well. The study is going to target the rural population in Jor district as the main target population.

1.5. Significant of the Study

The study is important because its aims at assessing the effects of flooding on the rural community and examines the response strategies in the study area. This study is believed to have some important significance in many aspects, once it completed. ***Firstly***, the findings of this study are expected to help those flood affected community to prevent themselves from the underlying causes of their vulnerability in the study area. ***Secondly***, this study is envisioned to benefits both government and humanitarian organizations by providing a durable solution to both structural and non-structure response measures so as to tackle the underlined fundamental adverse effects of flooding on the lives of the target communities. ***Thirdly***, it is envisaged that the outputs of this study will be used as key inputs for decision-makers at various levels of administration in designing sustainable response and mitigation measures to minimize the impact of floods and its associated

risks. ***Finally***, this study will be used as a blueprint by other academicians for any further research which needs to be carried out on the same issue in the study area.

1.6. Operational Definitions of Terms

"Disaster Prevention" means the outright avoidance of adverse impacts of hazards and related disaster (FDRE, July, 2013)

"Disaster" means a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeded the ability of the affected community or society to cope using its own resources (FDRE, July, 2013).

"Displacement" means the process of people being forced to move from their homes to other places because of a natural hazard (FDRE, 2013)

"Early warning system" means the set of capacities needed to generate and disseminate timely and meaningful warning information enables individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (FDRE, July, 2013).

"Exposure" refers here to the question of whether or not community/people or values are in the range of flood waters. It also means people, property, system, or other elements present in hazard zones that are thereby subjected to potential losses (FDRE, July, 2013).

"Mitigation" means the lessening or limitation of the adverse impacts of hazards and related disasters (FDRE, 2013)

"Response" is an area of security planning that aims to protect an organization from the effects of significant negative flood events

"Vulnerability" means the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard (FDRE, 2013).

Flood: occur when the river run-off volume exceeds normal flow capacity.

Flood-prone area: is an area subject to inundation by the base flood or risk from channel migration including, but not limited to, an aquatic area, wetland or closed depression.

Hazard” means a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (FDRE, July, 2013).

Jor district is one of the third-level administrative divisions of Ethiopia found along the Gilo River in Gambella.regional state.

CHAPTER TWO

2. Review of Literature

2.1. The Concept of flooding

As part of the hydrological cycle, flooding occurs when the natural or manmade drainage system cannot deal with the volume of precipitation. It occurs when rainfall exceeds the capacity of the natural or manmade drainage system. During periods of persistent rainfall, huge amounts of water flow into rivers feeding them via tributaries, ditches, and other streams, until the normal channel can no longer handle the flows, and flooding occurs on nearby land (Tesfaye, Hailekiros, 2018). Another way to define flood is to say that it occurs when water enters land that is normally dry when rainfall intensifies, disrupting the drainage system, and therefore overflowing (Iloeje et al, 2015).

2.2. Overview of flooding effects

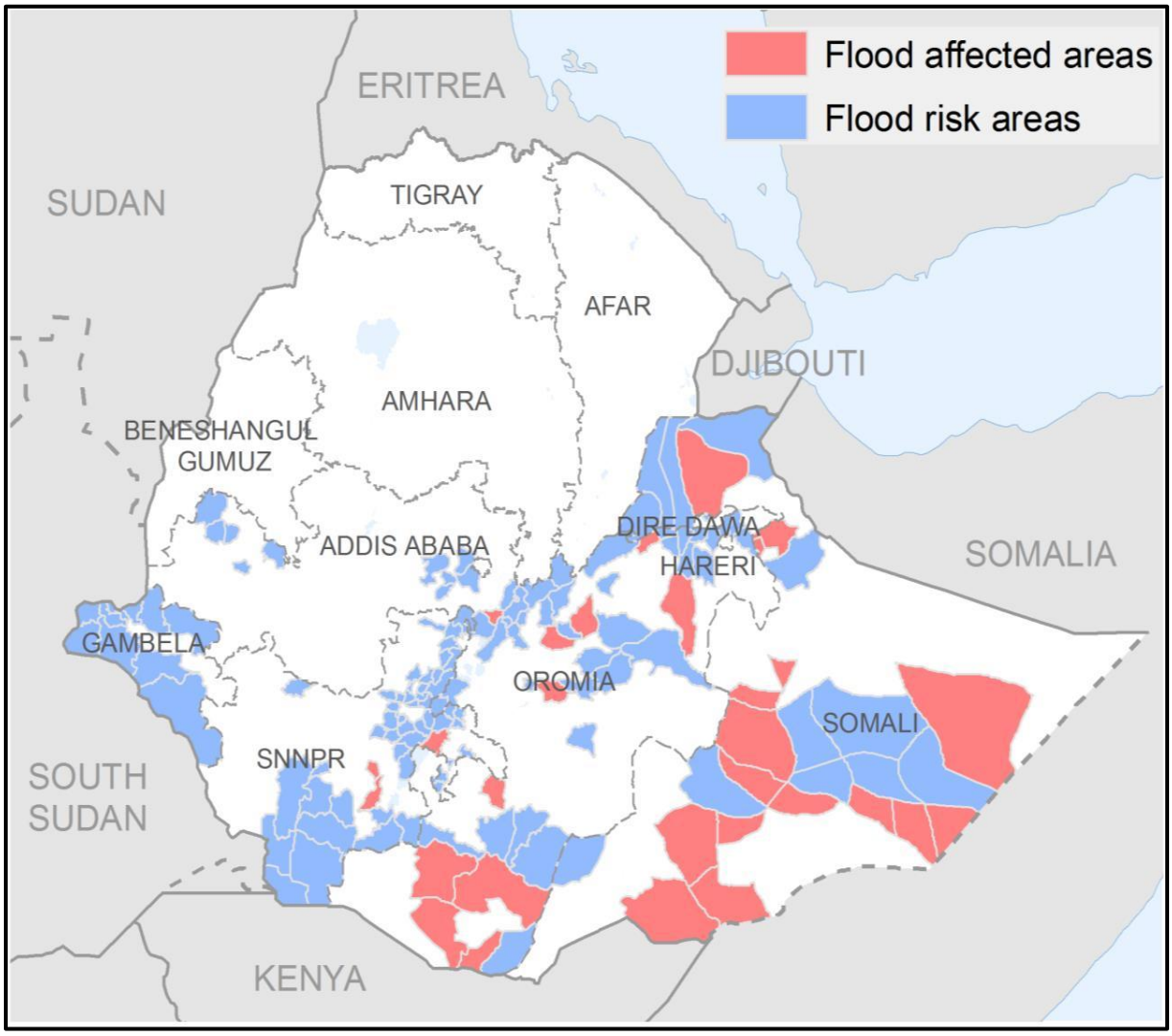
Natural disasters like floods are the most expensive and destructive of all natural hazards. About 50,000 people die from flooding every year, and around 75 million people are affected adversely as a result. The effects of floods have been divided into primary effects and secondary effects. According to recent estimates, 300 million people live in areas that are affected by floods in India and Bangladesh (Rahman, 2014).

According to UNOCHA (2019) report revealed that flooding has significantly brought devastative effects across the each Africa region in which they have estimated that at least 1.3 million people have been affected by flooding, an expected 481,000 people have been displaced, and 360 people have died following devastating floods across the region (GEOGLAM, 2020). Floods in Somalia have also affected agricultural growth, making 5.4 million Somalians vulnerable to food insecurity, with 74% living in emergency conditions (FAO, 2018).

Floods are one of Ethiopia's major natural hazards, which cause significant damage to lives and livelihoods in different parts of the country. The main cause of flooding in Ethiopia is torrential rains and the topography of highland mountains and lowland plains with natural drainage systems formed by the principal river basins. A flood in this

country is due to prolonged heavy rainfall causing rivers to overflow and inundating lowland plains along the river banks (Flood Alert, April 2018).

Figure 2.1: Flood-prone areas in Ethiopia



Source: Flood Alert, (April, 2018)

In addition, flooding damages crops and inundates farmland, resulting in food shortages and malnutrition. According to the Gambella Disaster Agency, 1,650 ha of maize crops were damaged in 2006 due to the floods in the area. The agricultural sector suffered a 20% loss of productivity, mostly due to flooding. Flood victims were primarily very poor and critically vulnerable to food insecurity, as they were extremely vulnerable to floods.

Regardless of whether it is challenging to link flooding to nutritional status without prior surveys, it is likely that current malnutrition in Ethiopia is exacerbated by the shortages of food induced by flooding (Abaya, 2007).

2.2. Flooding Vulnerability

Vulnerability has no universally accepted definition. Depending on the field, purpose, and interest, it varies. A relationship exists between vulnerability and flood induced hazards, defined by Paul (2013) as a characteristic of groups and individuals in regard to their ability to anticipate, cope with, resist, and recover from hazards. Flood hazards affect people differently depending on their vulnerability patterns (Huq and Akram, 2015). Meanwhile, vulnerability refers to the likelihood that exposed elements such as human beings, their livelihoods and assets will be adversely affected by hazards events. In other words, vulnerability refers to predispositions, susceptibilities, fragilities, weaknesses, deficiencies, or lack of capacities that favor adverse effects on exposed elements (Cardona, et al, 2012).

2.2.1. Contributing factors to flood vulnerability

In general, vulnerabilities can be divided into underlying causes, dynamic pressures, and unsafe conditions. In this sense, vulnerability refers to characteristics of physical, social, economic and environmental factors that make a community more susceptible to hazards. Those conditions or processes that increase the susceptibility of a community to hazards due to physical, social, economic, and environmental factors (UNDP, 2004; and Arakida, 2006: 291, cited in Cardona et al, 2012). Hug and Akram (2015) note that flood vulnerability is influenced by four categories of factors, namely economic, social, exposed and susceptible elements, as well as the capacity to cope.

1. Economic factors

Generally, economic vulnerability refers to potential impacts of hazards on economic assets and processes (ie. interruptions to business operations, secondary effects such as increased poverty and loss of jobs). Individual economic sectors can be vulnerable in different ways. Flood vulnerability is profoundly affected by economic factors. Operational variables related to economics include household income, land ownership,

occupation, economic losses, and aid during floods. Flood related disasters are more likely to affect the poor and those with less economic capacity.

2. Social vulnerability

The socioeconomic and demographic factors affecting community resilience are referred to as social vulnerability (Flanagan et al, 2011). Age, gender, education, social networks, and family size are among the factors that contribute to flood-induced vulnerability.

3. Exposure and susceptibility

In flood-prone areas, exposure is defined as "the condition of the people, infrastructure, housing, production capabilities, and other tangible human assets" (IPCC, 2012). As a result, the susceptibility of the area and duration of flooding play a key role.

4. Coping strategy

Coping strategies reflect accomplishments during emergency situations (Paul, Rourary, 2011). The authors describe two types of coping strategies: structural and non-structural, and indigenous and modern. People in different parts of the world use indigenous strategies for different purposes.

2.3. The effects of flooding on socio-economic conditions

2.3.1. Effects on households' livelihoods Situation

A livelihood refers to the capabilities, assets (tangible and intangible), and activities needed to earn a living. As far as livelihood strategies are concerned, households may choose to cultivate crops, raise livestock, work for wages, do business, send money home, indulge in extractive activities, etc. (Khatiwada et al., 2017).

As stated by Mwape (2009), in Namibia, almost all of the households with stapled crops (94%) reported damage to their crops due to floods. The majority (92%) of crops that were damaged by floods were the main staple crop (maize) followed by sorghum (29%). As discussed under the livelihood patterns section, despite the lack of data on area planted, it is evident that agriculture had an impact on livelihoods and incomes.

2.3.2. Effects on Demographic Situation

According to Kumar et al (2016), in India, people from flood-affected regions in the Biraul block often move to nearby states in search of employment due to food insecurity and lack of employment opportunities. Rural flood-affected areas experience frequent migration. Typically, most migrants live in poor and marginalized communities. Among these communities, migration of males is common.

The damage of the 2007 flood on housing in the Itang special woreda of Gambella (UNECA, 2014) was reported to have been 38 percent, in terms of the number of severely damaged houses from the flood. There are several houses whose foundations are settling every year because flood waters have been undermining the foundation, ultimately leading to the collapse during a flood.

2.3.3. Effects on Social Services function and delivery

When roads are damaged by floods, communities face increased difficulties in traveling, which raise the costs of living, business operation, health and education (APFM, 2017).

The study conducted in Zambia, showed that 38% of the sampled households indicated that school going children experienced disruption due to floods. The disruption was attributed to various reasons such as the road being impassable (32%) and school being submerged (9%) (Mwape, 2009).

On the health issues, according to the study conducted in Namibia by (Shifidi, 2014), has revealed that accessibility to health facilities interrupted and no ante-natal care, some pregnant women reportedly resort to potentially unsafe home deliveries during floods with assistance from inexperienced residents. The infants do not receive immediate medical attention which may be necessary. Home deliveries in the area are however not completely unusual, and in some cases, they are preferred over hospital births. Mothers were also reported to have given birth in flimsy shelters just steps away from stagnant water and debris.

Furthermore, study in India indicated that Water and sanitation are another problem in flood-affected areas. Flood and water logging in the area also influence the water and sanitation practices in the community. Floodwater and water logging in the villages

contaminate the local water supply; like hand pumps which are the main source of water for drinking and domestic purposes. During a flood, many hand pumps get submerged in floodwater and become contaminated which regularly cause the incidence of waterborne diseases such as diarrhoea, cholera, skin diseases and eye infections during times of flood. On the other hand, the researchers went far by revealing that the community region of Darbhanga in India often defecates in the floodwater due to the unavailability of a household toilet or dry land for defecation, creating further risk for waterborne disease and related infections (Kumar et al, 2014).

According to Rahman (2014), it was found out that during the flood period all of the roads were flooded by the flood water. The boat was the only vehicle to maintain social communication as well as to go to any place from the house. During this period, transport and social communication were much more difficult. Therefore, the isolation is felt more during monsoon when there is inundation all around and there is a risk of traveling across the river in the boat because of the overflow on the bridge.

2.4. Response interventions initiatives to flooding and the roles of stakeholders

According to UN Sendai Framework for Disaster Risk Reduction 2015 – 2030 (March, 2015), disasters have continued to exact a heavy toll and, as a result, the wellbeing and safety of persons, communities and countries as a whole have been affected. Over 700 thousand people have lost their lives, over 1.4 million have been injured and approximately 23 million have been made homeless as a result of the disaster. Overall, more than 1.5 million people have been affected by disasters in various ways, with women, children and people in vulnerable situations disproportionately affected. The total economic loss was more than $1.3 trillion. In addition, between 2008 and 2012, 144 million people were displaced by disaster. Therefore, it is urgent and critical to anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and ecosystems, and thus strengthen their resilience.

Moreover, this framework aims at the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and

environmental assets of persons, businesses, communities and countries through the implementation of integrated and inclusive measures (prevention, preparedness and mitigation and its plan of action) by all concerned stakeholders at various levels. Therefore, the literatures have clearly point out that the response made to any hazards including flooding, required an integrated and systematic join-work of all concerned stakeholders (including the victims' community of that hazard) in order to achieve meaningful response and resilience toward the hazard (UNISDR, 2015; NBI, 2013; NDRMC, 2013; DPFSA, 2014).

2.5. Theoretical perspectives on flooding hazard and management

The importance of disaster risk reduction has been recognized by various governments as a means to improve community resilience and reduce vulnerability levels. In the previous time, the government paid less attention to natural disaster like flooding as they considered them as once off event. It was typically non-governmental agencies that provided disaster relief. When responding to natural disasters, the government and non-governmental organizations (NGOs) often take a top-down approach. These interventions failed because they merely provided relief with no regard for societal dynamics, community needs, or perceptions of people (Lawrence, 2017). Therefore, there was a paradigm shift made by governments to alternative approach where community resilience was at the center for disaster risk reduction management. In this regard, the effectiveness of DRRM is more seen when the target is shifted at grassroots level since they are the primary victims of any disaster. Thus, empowering the affected communities through providing them with the necessary skills, knowledge, and training to mitigate the hazard like flooding is the most cross cutting issue now a day (UNISR, 2019). In doing so, employing relevant theory which could help to explain the contributing factors for the vulnerability community to flooding hazard and the devise remedies to the concerned stakeholders in DRRM as well.

2.5.1. Disaster theory: The Pressure and Release Model

First published in 1994 by Blaikie et al. (1994) and again by Wisner et al, 2004, the disaster pressure-Release Model (PAR) has become the internationally accepted model for the explanation of the progression of vulnerability and the progression to safety (risk

reduction). PAR is aimed at showing how vulnerable people are affected by natural hazards. The model consists of two main components. One is "vulnerability" on human or social side and the other is a natural event which is termed as "hazard". In another word, a disaster happens when these two elements come together. A natural phenomenon by itself is not a disaster; similarly, a population maybe vulnerable for many years, yet without the "trigger event", there is no disaster. We can therefore see that vulnerability - a pressure that is rooted in socio-economic and political processes - is built up and has to be addressed, or released, to reduce the risk of a disaster.

According to Lawrence (2017), this disaster risk theory is founded on three key areas: the origin of susceptibility, the vigorous processes and the dangerous surroundings. Moreover, the Pressure model indicates that there are certain underlying causes, dynamic pressures and unsafe conditions which contribute to vulnerability. The root causes lead to dynamic pressures that explain how the unsafe conditions have arisen and persisted.

The three layers or components of social processes of this theory that cause vulnerability are underlined here below:

- ***Root causes***: these include the deep seated factors which create and maintain vulnerability within a society. The factors echo the application and sharing of power in a society, for instance, the political systems. For instance: government negligence of sand mining in that river, the lack of government policy on flood warning systems and land use planning, poor men and women are not allowed to attend meetings on flood mitigation and emergency response preparedness, etc.
- ***Dynamic pressures***: these are the transforming social macro-forces which direct the impact of a negative cause into risky conditions. These processes are often a result of poor or lack of basic services or other major forces. For example: lack of community organization for collective efforts to reduce flood risks, rapid migration tendencies that change the social structure, the lack of local markets for small farmers to sell their produces or buy agricultural inputs, etc.
- ***Unsafe conditions***: these indicate the vulnerability of communities to hazards, which are a risk of disasters. The best example of this could be poor housing

conditions, low income, dangerous location, risky livelihoods, lack of disaster preparedness skills, and so forth (Oxfam, 2012).

Initially, this model takes into consideration the cumulative effect that the ultimate causes, the dynamic pressures and unsafe conditions have on poor communities as illustrated here below:

Figure 1: The Pressure Model or Crunch model

The progression of vulnerability

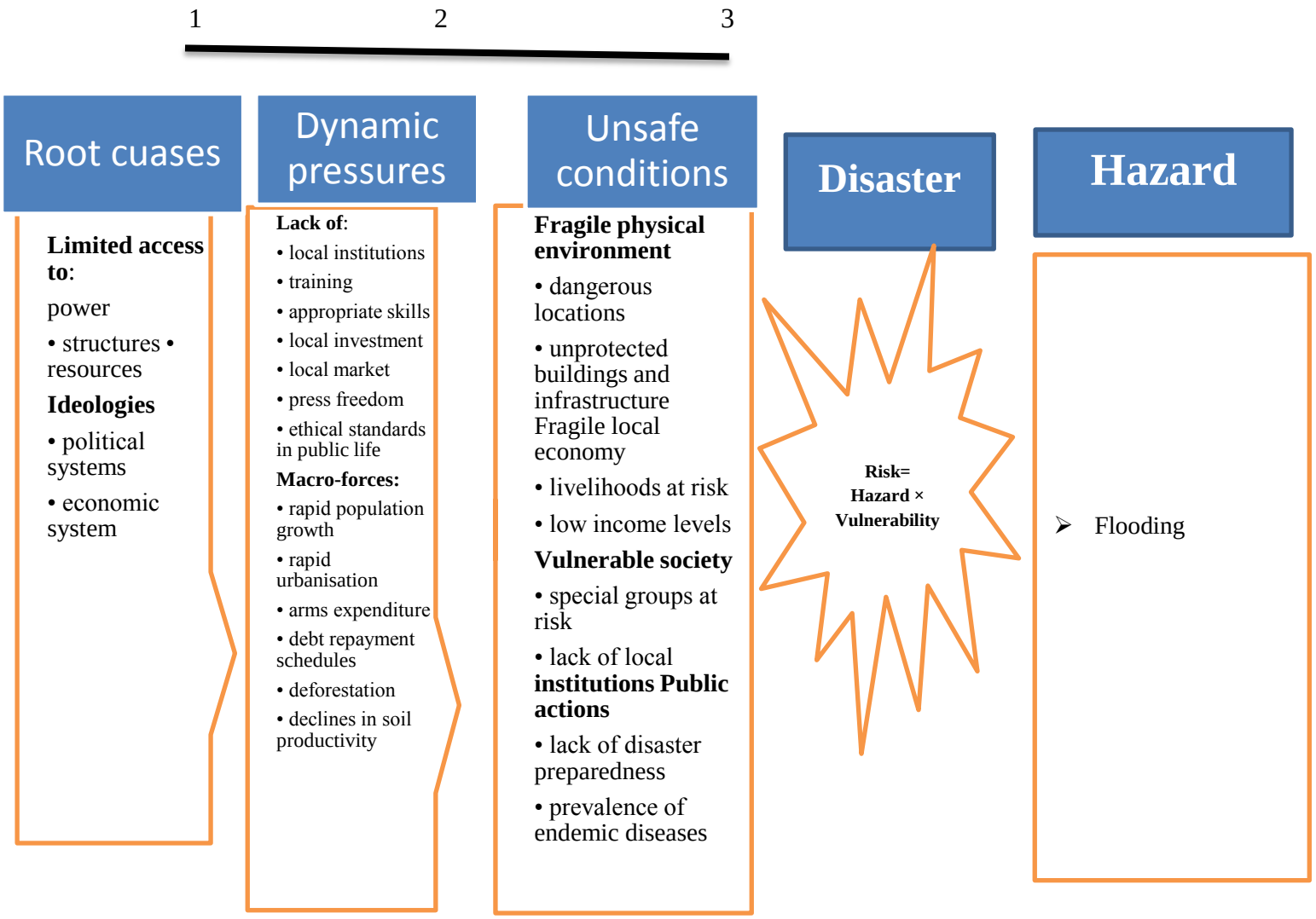
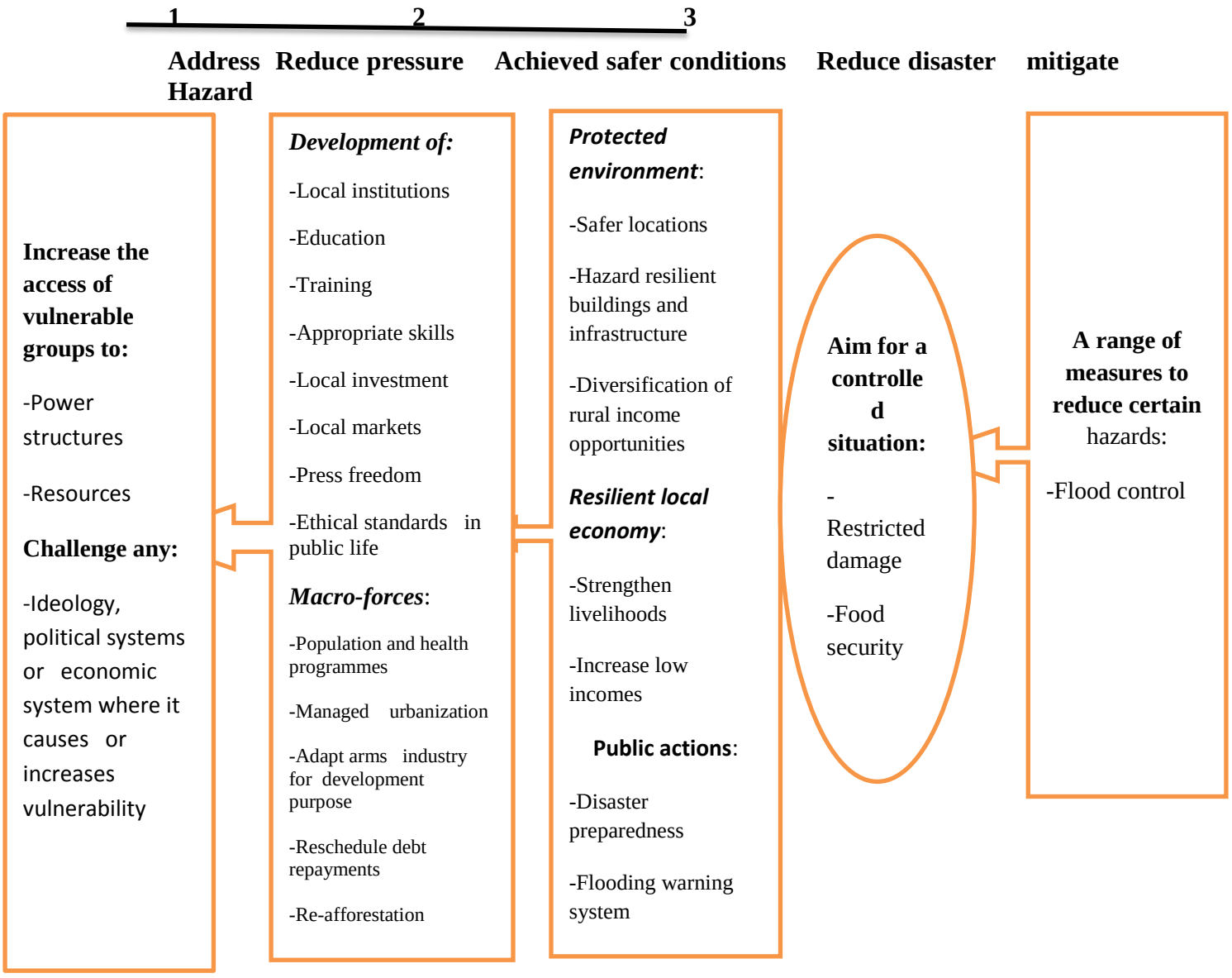


Figure 1: Wisner et al, 2004 pressures that result in disasters: the progression of vulnerability

Generally, this model is known as both the PAR model and the crunch model. Three layers of social processes that cause vulnerability are: root causes, dynamic pressures and unsafe conditions. The root causes lead to dynamic pressures that explain how the unsafe conditions have arisen and persisted. However, the pressure could be released by applying the "the release model" in order to reduce the risk of disaster as presented here below:

Original Release Model

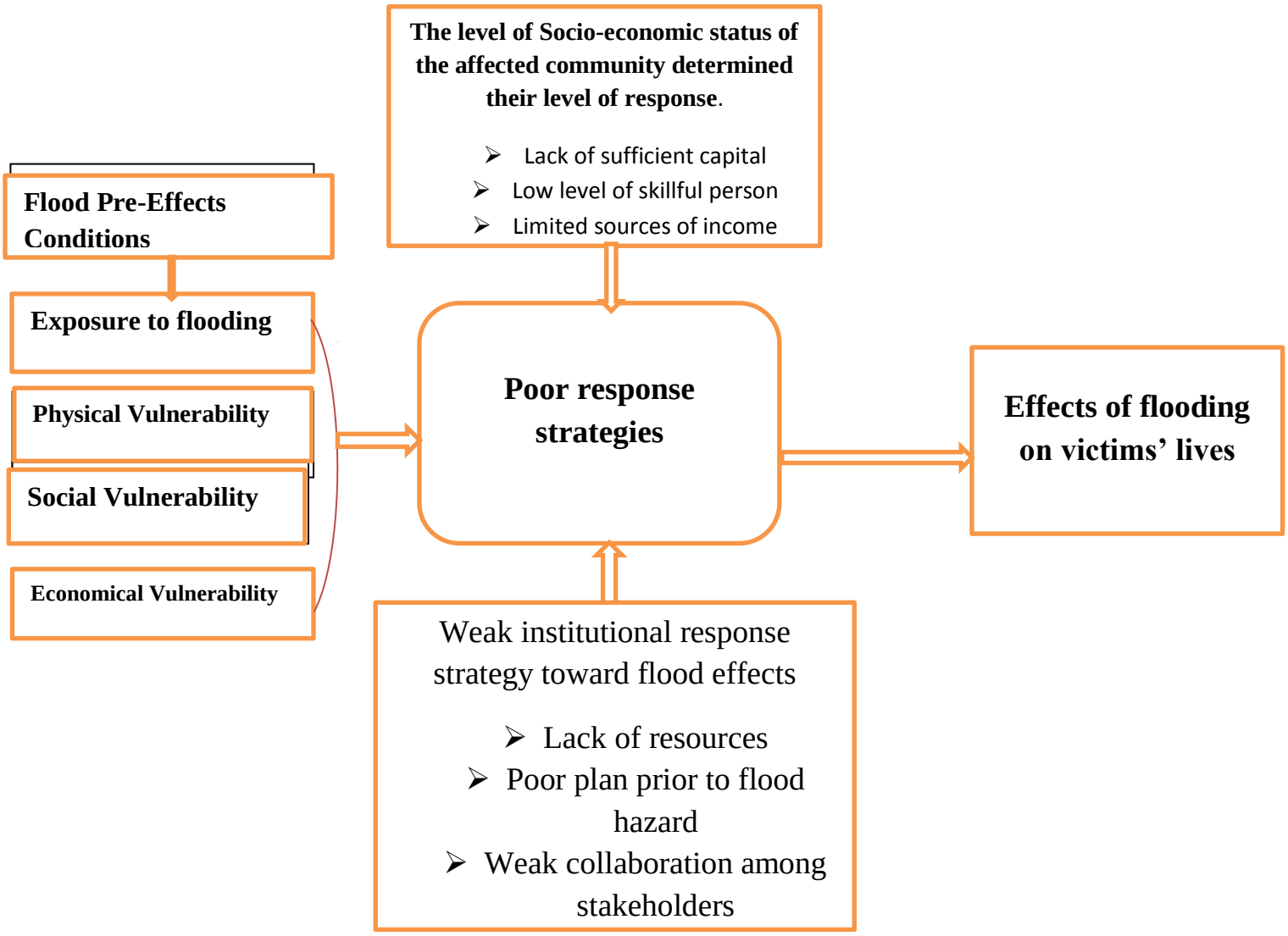
Progression of Safety



Wisner et al, 2004: The release of "pressures" to reduce disaster: progression of safety

Theoretically, the “pressure” between hazards and vulnerabilities should be released to reduce disaster risk. Hazards should be mitigated to reduce their intensity, thus affect vulnerable population less. Vulnerability should also be reduced at different levels: activities need to be undertaken to turn “unsafe conditions” into “safer conditions”, “dynamic pressures” will be reduced and “root causes” will be addressed. These DRR activities aim to achieve a controlled situation and a resilient community, where there is no loss of life, few casualties, restricted damage, food security and capacity to recover quickly from any impact of a hazard (Lawrence, 2017;).

2.6. Conceptual framework of Flooding Effects Model



Source: modified Lindell (2011).

This is the basic framework of disaster research that indicates the effects of a disaster are determined by three pre-impact conditions– **hazard exposure**, **physical vulnerability**, and **social vulnerability**. There also are three event-specific conditions– hazard event characteristics, improvised disaster responses, and improvised disaster recovery. Two of the event-specific conditions, hazard event characteristics, and improvised disaster responses combine with pre-impact conditions to produce a disaster's physical impacts. Physical impacts, in turn, combine with recovery actions to produce a disaster's social impacts (Socioeconomic Impacts) (Lindell, 2011).

CHAPTER THREE

3. Research Methodology

3.1. Description of the Study Area

3.1.1. Geographical location of the Study area

Jor district is one among the thirteen districts of the Gambella regional state of the Federal Democratic Republic of Ethiopia. It is found 167 KMs and 933 KMs away from regional town and Addis Ababa to the southwest respectively. The district is categorized under Anywaa administrative zone, one of the third zones in the region and it is found in the south-western part of the region. The district is also known for its rich petroleum potential in the region. The study area is bounded by the Republic of South Sudan in the south, the Nuer Zone in the north-west, the Gambella National Park Reserve in the north-east, the Abobo district in the east, and the Gog district in the south-east (Charter Center, 2020).

The terrain of Jor is flat, and the eastern part is swampy; the elevation ranges from 300 to 400 meters above sea level. Important rivers in this woreda include the Gilo. According to the *Atlas of the Ethiopian Rural Economy* published by the Central Statistical Agency (CSA, 2007), around 15% of the woreda is a forest. A notable landmark is the Gambela National Park, which occupies the woreda north of the Gilo. The **Gilo River** is a river in the Gambella Region of southwestern Ethiopia (CSA, 2007).

3.1.2. Demography of the study area

The 2007 Census conducted by the CSA, reported the total population of the district around 9,366 people. However, the district health office (2019) revealed a total population of 13,514 people (of whom 6487 of them are male and 7027 are female); with an area of 3,342.31 square kilometers. Jor has a population density of 2.80, which is less than the Zone average of 4.83 persons per square kilometer. A total of 1,808 households were counted in this woreda, which results in an average of 5.2 persons per household, and 1,766 housing units. The majority of the inhabitants said they are Protestant, with 75.91% of the population reporting they observed this belief, while 7.93% were Catholic,

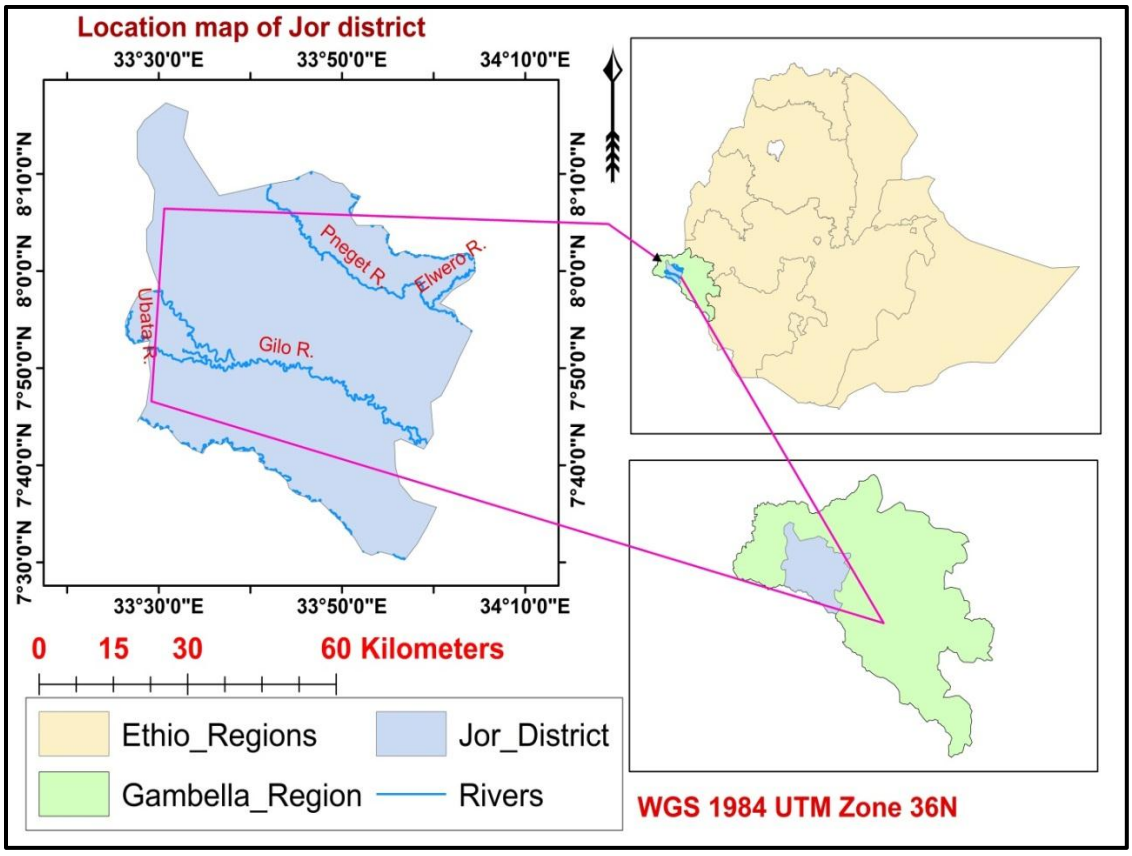
7.71% practiced traditional religions, and 4.54% of the population practiced Ethiopian Orthodox Christianity, 1.48% was Muslim (CSA, 2007).

The largest ethnic group in Jor is the Anuak (99.69%), and Anuak was spoken as a first language by 99.81% of the inhabitants interviewed. The majority of the inhabitants said they were Protestant, with 56.3% of the population reporting they practiced that belief, while 33.57% practiced traditional beliefs (CSA, 1994).

3.1.3. Administrative Structure of the study area

Jor is one of the five districts under Anywaa administrative zone of Gambella regional state. It was established soon after the EPRDF took over power in 1991. The district has a total of 15 Kebeles. According to DPFSA (2016), 11 of these Kebeles were categorized under a high level of vulnerability to flooding hazard. On the other hand, the remaining four Kebeles were categorized under both low and medium of vulnerability to flooding hazards (DPFSA, 2016).

Figure 3.1: Map of Jor district



3.1.4. Infrastructure development of the study

However, the district is relatively poorer than the other areas in the Region in terms of infrastructural development. Concerning the education coverage, Jor district has nineteen (19) both 1st and 2nd cycle primary schools (11 Elementary and 8 primary schools), and three Secondary schools. The two secondary schools are found in the Rural Kebeles, whereas, another one with preparatory school found in the district's town. With regard to the health facilities, the district has only five health posts out of fifteen kebeles and one health center in the town. The district is also known for its lack of road network access which would connect the town to its peripheral kebeles. Despite the absence of basic social infrastructure, there is one and only solar based electricity under construction in the main town of the district (Charter Center, 2020).

3.1.5. Economy system of the study area

Moreover, agriculture is the most predominant economy; especially Maize and sorghum, surrogate with other minor crops, are the major food crops grown in the region in general and Jor district in particular. Though localized and on a small scale, animal husbandry is also an important enterprise in the area. For example, in Jor district, fishery and livestock are the main sources of income for the residents (DPFSA, 2019).

3.1.6. The main livelihoods: crop production activities in the study area

The data presented in the above table, shows the main staple food in the study was maize and Sorghum which constituted 96% of the respondents in the survey distribution. In addition to that, 12.4% of the respondents responded that Sweet- Potato and Cassava can be produced as part of main staple food as presented below:

Table 3.1: The distribution of main staple food in the study area

s/n	The main staple food crop production	*Alternative/option*	*Frequency*	*Percentage*	*Cumulative percentage*
1	Maize and sorghum	Yes	240	96%	100%
		No	10	4%	
2	Rice	Yes	-	-	100%
		No	250	100%	
3	wheat	Yes	-	-	100%
		No	250	100%	
4	Sweet-potato and cassava	Yes	31	12.4%	100%
		No	219	87.6%	

Source: Household Survey (2020)

However, they argued that both Rice and Wheat are less likely to be produced in the study area. Accordingly, the main staple foods of the region in general and Jor district in particular are maize and sorghum (RDPFSA, 2019).

3.2. Research Design

The study design is the blueprint by which the researcher could be guided during the study. As stated by Strydom et al, (2005:132), a research design is a plan or blueprint of how you intend conducting the research. A research design focuses on the end product, formulates a research problem as a point of departure and focuses on the logic of research. In this regard, the proper survey design for this study was an approximating survey with a cross-sectional survey, because the study was conducted on the issue entitled as the impacts of flooding on the rural population and response strategies in the flood prone areas in Jor district. This has been realized through investigating the issue understudied from various observation units so as to provide relevant data over the current and the previous years. Furthermore, this research design was conducted by employing a mixed approach or triangulation method so as to obtain accurate data.

Therefore, the appropriate survey design for this study was a cross-sectional survey in which data are collect at one point of time in order to limit the time and resources capacity.

3.3. Research Approach

In this study a mixed approach (Methodological Triangulation) was employed as a research approach. In this regard, the researcher has employed a mixed approach for the purpose of triangulation. Literal speaking, mixed approach or triangulation method is the combination of both quantitative and qualitative approaches. In another word, triangulation means mixing approaches to get more viewpoints upon the things being studied. According to Olsen (2004), in social science triangulation is defined as the mixing of data or methods so that diverse viewpoints or standpoints cast light upon a topic. One of the reasons why researcher has employed triangulation was for the purpose of bridging the limitation of each method being employed for data collection. The concept of triangulation is based on the assumption that any bias inherent in a particular data source, investigator and method would be neutralized when used in conjunction with other data sources, investigators and methods (Strydom et al, 2005).

3.4. Samples selection and size determination

The target populations, for the study, were the households. However, for further information regarding flooding impacts and responses strategies, concerned institutions (Both governmental and non-governmental) and community leaders and practitioners were selected purposively. The total sample size of the key informants was 15 individuals. The participants from both government and NGOs were selected based on their past experience on assessment conducted on flooding impacts analysis. In addition to that, the community leaders were also incorporated with the assumption that they have better understanding about the community based resilience and response strategies during the flood hazard.

In the case of household survey, Six Kebeles out of 15 kebeles in the district were selected purposively based on their highest level of vulnerability. According to DPFSA (2016), these kebeles were categorized under both a high and highest level of

vulnerability in the district. The sample frame of household heads was received from DPFSA field-office at the district level in order to understand the level of flooding effects in the study.

Table 3.2: The sample size draw from the household population in selected

S/No	Selected Kebeles	Total Household heads	Sample size	Level of vulnerability
1	Alami	96	20 -19	Highest
2	Othwol 01	190	38	Highest
3	Tuo	304	61	High
4	Lero	90	18	Highest
5	Shentoa 01	456	92	High
6	Oranga	102	21	Highest
Total		**1,271**	**250**	

Source: District's Disaster prevention and food security Agency's Office (DPFSA, 2020)

Moreover, in order to determine the household sample size, probability sampling was used by the researcher following the sampling techniques and procedures. In this regard, based on the total population of households (1,271) of selected six kebeles, 250 sample sizes were selected by using multistage random sampling to determine the sample size of household heads. In selecting the sample size, the value of the 5^{th} interval has been applied in generating the sample by using the K^{th} value method.

Thus, the following Yemane (1994) formula for sample size determination was applied as follow;

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

Where: **S**= Sample Size

1 = Constant

N = Population size

e = Margin of Error, usually 5% (0.05) for 95% confidence level

In applying the formula, these figures were obtained as follows:

$$S = \frac{1,271}{1+1,272\ (.05)^2}$$

$$= \underline{\mathbf{250}}$$

3.5. Research Procedure

The data was collected sequentially. In this regard, a household survey, life histories, key informants interview and Focus Group Discussion (FGD) part was conducted from March till mid-April (2020) in the first phase of data collection. With regard to COVID-19, the researcher has taken into account the protocol for pandemic and used to maintained physical distance and contact as per the rule and regulation imposed by the government in effect. This was applied effectively throughout the data collection. In the second phase, observation was conducted extensively throughout the summer season mainly during the flooding period so as to explore the real nature of flooding in a comprehensive manner.

All in all, pilot testing was done after collecting data, aiming at verifying the effectiveness of the instruments of data collection in answering the main objectives of the study. After successfully carrying out the pilot testing, the researcher has found out that some of the items in both questionnaire and Key informants Interviews guides were not responded by the target groups. Specifically, these items were preventive measures and Strategic response procedures (which included both short-term and long-term response strategies supposed to be carried out pre-flooding hazard, during flooding hazard and post-flooding hazard sequentially) by the local community and Informants respectively. These items were remained not answered due to the fact that disaster preparedness was more likely not being practice both at community and institutional levels. As a result, the researcher has decided to avoid and omitted these items both from the data collection and results analysis. Following that, the analysis of main findings was made.

3.6. Instruments of Data Collection

Instruments of data collection are the basic tools for obtaining vital information in regard to the issue under investigation. In order to, thus, gain detailed information about the

problem under investigation; the researcher was convinced that triangulating different methods of data collection is vital. With this in mind, the researcher attempted to triangulate the household survey, focus group discussion, interview, Life-histories and observation as significant tools to obtain accurate information.

3.6.1. Household Survey

A household survey was conducted with a sample of household heads of the district residents from six kebeles who are living in the flood-prone areas under high level of vulnerability. This method was employed to basically answer basic specific objectives on the impacts of flooding rural population and the possible response strategies carried out at the community level.

The appropriate sampling design used for this study was simple random sampling modified with multi-stage cluster sampling. Moreover, the researcher has attempted to select six kebeles which were found at the flood-prone areas and categorized under a high level of vulnerability. Then, within each of the sample Kebeles, all household heads sample-frames were received from the DPPA field office at the district. As a result, 250 household heads samples were selected randomly out of 1,271 total household's heads in the selected kebeles.

Therefore, all household heads in the selected Kebeles have been given an equal chance of being selected to represent the survey population. Thus, here **the unit of analysis** was **the household heads** in the sampled Kebeles of the district.

3.6.2. Life Histories

Life histories are very important in understanding the experience of other people and the meaning they make of that experience so as to unfold and uncover their lived world prior to scientific explanations. Kvale (in Strydom et al, 2005) defines qualitative interviews as "attempts to understand the world from the participant's point of view, to unfold the meaning of people's experiences, and to uncover their lived world prior to scientific explanations". In this study, the researcher has employed life-histories as an instrument of data collection. Accordingly, the unstructured one-to-one interview, also sometimes referred to as the in-depth interview, merely extends and formalizes conversation. It is

referred to as a "conversation with a purpose". The purpose is not to get answers to questions, nor to test hypotheses, and not to "evaluate" in the usual sense of the term. At the root of unstructured interviewing is an interest in understanding the experience of other people and the meaning they make of that experience. It is focused and discursive and allows the researcher and participant to explore an issue.

According to Yeraswork (2010), life-histories consist of biographical material assembled about particular individuals - usually as recounted by themselves. Life histories do not necessarily cover the whole span of an individual's life or all of its main aspects. Rather, Life histories shade over into oral history - i.e., verbal accounts of the past supplied by those who lived through the events.

Therefore, the purpose of life histories method in this study was to collect in-depth information about the adverse impacts of flooding on the rural population from the few experienced individuals/residents in the study area so as to understand the trend of problem under investigation by allowing them to share their own experience and knowledge as residents as well as flood's victims. As a result, the researcher has selected 4 individuals purposefully (basically from Twoho (1 participant), Thoo (1participant) and Shemtoa 02 (2 participants) as well) to share their experiences on the issue under investigation. So, the main **observation units** in this regard were the **community members.**

3.6.3. Focus-Group Discussion

According to Strydom et al (2005), the purpose of focus groups is to promote self-disclosure among participants. It is to know what people really think and feel. Morgan (1997: 6) describes focus groups as a research technique that collects data through group interaction on a topic determined by the researcher. Whereas, Krueger (quoted in Kingry et al., 1990: 124) defines the focus group as a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment. In this regard, the researcher has conducted two FGDs in two selected Kebeles (specifically, in Shentoa 02 and Tho kebeles which were categorized as the high vulnerability and highest vulnerability) with different segments of the district residents including practitioners in the frontline, community leaders, and women and the youth

representatives. The number of FGDs was limited due to the rules and regulations imposed by the government regarding COVID-19 pandemic. However, the researcher has made an effort to make sure that FGDs was representative for the selected six kebeles by considering their vulnerability (which led FGDs held these kebeles from both high and highest vulnerability in nature). The discussions were held consisting of eight individuals each. Therefore, practitioners and community leaders, and youth and women representatives were the **observation units** here.

3.6.4. Key informants interview

In this study, the researcher employed key informant interviews as an important tool for data collection. In doing so, some knowledgeable individuals from different backgrounds were selected purposively in order to generate relevant data on the issue under investigation in the study area. The researcher has conducted KIIs with government sectors (such as DPFSA, Education Bureau, Health Bureau, Agriculture Bureau, Fishery and Livestock Bureau, Water Resources and Irrigation development) Community leaders and different NGOs (such as ZOA, Action Against Hunger, Norwegian Refugees Council (NRC) and World Food Program). Thus, the researcher has selected 15 Key Informants (being presented in the appendices part) from the above mentioned observation units purposefully. The rationale behind the participants in government and NGOs was based on the fact that those individuals have some experiences on the issue under study. They were once participants on Multi-Agency meher assessment and rapid assessment as well on flooding hazard.

3.6.5. Observation

In this study, the investigator has employed an observation method of data collection. The purpose for using the observation method was to explore the untold facts about the adverse impacts of flooding on the infrastructure damage and disruptions, and the effect it brought on the households livelihoods (the damage of crop products and crop field by floods) of the communities in the flood-prone areas in the study area. Therefore, the observation was conducted during the flooding period (July- November, 2020). In order to explore the issue under investigation, the researcher has visited every selected Kebeles

and observed the effects of flooding on their livelihoods especially, and social infrastructures as well.

3.7. Sources of Data

3.7.1. Primary sources

The primary data of this study was the target population in the study area. The data were basically obtained from the target groups mainly households, community leaders, experts from both government and Non-governmental Organizations who participated in this study. In order to realize the intended results, the researcher has used self- administered data collection tool with the help of four data assistants having BA degree in different fields.

3.7.2. Secondary sources

In addition to primary sources, the researcher also used secondary data sources in order to comprehensively understand the nature of the issue under investigation from the available secondary sources on the same topics under study. In order to acquire further information, the researcher did rely on secondary data such as books; articles, reports and social Medias either published by government or private individuals/organization as well.

3.8. Data Analysis, Presentation, and Interpretation

The purpose of the analysis is to reduce data to an intelligible and interpretable form so that the relations of research problems can be studied tested and conclusions are drawn. In other words, the purpose of analyzing data is to obtain usable and useful information. The analysis, irrespective of whether the data is qualitative or quantitative, may: describe and summarize the data, identify relationships between variables, compare variables, and identify the difference between variables, forecast outcomes. For this study, Data Entry Screens were developed in SPSS version 26 for Data Entry. This was applied to the quantitative data collected by employing the statistical methods of data analysis tabulation, bar graph, pie chart, and Correlation.

Whereas in qualitative the Data analysis is the process of bringing order, structure, and meaning to the mass of collected data. Qualitative data analysis is a search for general

statements about relationships among categories of data. Therefore, the data for this study were analyzed and interpreted in a thematic manner. As stated by Hitchcock and Hughes (1995:295), qualitative data analysis is “the ways in which the researcher moves from a description of what is the case to an explanation of why what is the case is the case."

As a result, data interpretation has been made through the process of attaching meaning to the data irrespective of quantitative and qualitative data collected. Therefore, the interpretation demands were made in a fair and careful judgment so as to come up with good research results.

3.9. Fieldwork encounters and limitations of the study

During data collection, the researcher has encountered different challenges in the process of data collection. Among others, few are presented here: inaccessibility of road networking was very challenging both during dry season and summer season. During the dry season, when the researcher conducting household survey questionnaire, he used to walked on foot from village to village which take him a journey of 60s kilometers walked since departure from the district’s town. At the movement, there was a great fear of insecurity from cross-border attack on the way as it has been the case in the study area, especially, during dry season. Whereas during the summer season, the commuting from place to place is so difficult due to the fact that the whole area was occupied by flood water intensified. However, despite the challenges all the along the way for fieldwork, the researcher has took a great courage to make sure that the data was collected and he was also able to manage the situation in order to reach to the destinations which has been intended. The second challenge was that the data was collected at the mid of time for cultivation. At this time, the researcher have to waited until the sampled household head has comeback from the farm so as collect the data from him/her. And this has made the progress for data collection so lagging behind.

With regard to the limitations of the study, the most challenging issue was the case of COVID 19. The data collection for Key Informants Interview was conducted at the mid pandemic where most of the officers from both government sectors and humanitarian organizations were so reluctance to participate in the study. At this time, absenteeism was very high in the workplace. And on the other hand, some officers fear of close contact for

an interview. As result, the researcher has tried to manage this case by distributing these interview questions to the interviewees and to be filled out by themselves as a remedy for their reluctance to participate in the study. The last one was lack of sufficient budget which could help the researcher to assign data collectors so as complete the task within short period of time.

3.10. Ethical Consideration

Ethical consideration is the major pillar always in carrying out scientific research. In this study, researcher has paid due emphasize to ethical consideration especially during both data collection the field observations in the study area. With regard to the participation of the research participants, it was conducted based on the voluntary participation by ensuring that the information they're going to provided will be used for study purpose only and also keeps confidentially. Generally, the researcher has guarantee that he will not use any name and addresses in the final report, or categorize information using names and addresses. Any information being provided during the collection will not be disclosed, unless permission is granted to do so. In addition, after the final report, the right to comment is preserved and the researcher is highly committed to comply with the data protection Act 1998. Thus, the consensus between researcher and the participants during the fieldwork have gone successfully with the proper application of ethical consideration.

CHAPTER FOUR

4. Data Analysis and Presentation on the effects of flooding on the rural Community and their response strategies

4.1 Introduction

In this chapter, the key findings obtained from household survey method, focus group discussion, secondary data sources and observation were coded, analyzed, and presented. Since the research was a mixed approach or triangulation method, the data results were analyzed in a concurrent triangulation approach and presented in line with the community based response strategies on flooding impacts stated in the objective of the study. While the main focus was on community flood response strategies, the first part was devoted to the nature of flood hazards which involves the underlying causes of vulnerability and the social impacts of flooding on the rural population in the study area. As a matter of fact, the major descriptive statistics like frequency tables, percentages, charts and graphs were employed for the quantitative data.

The chapter has 4 sections. The first section focuses on quantitative analysis of the socio-demographic profile of households' survey participants. The *Second section* deal with the underlying causes of the community's vulnerability to flooding hazards. The *third section* dealt with the impacts of flooding on the rural population living in the flood prone areas of the study area. The *last section* was devoted to the community based response strategies to the flooding impacts. And the last section was devoted on the governmental and humanitarian response strategies in the study area.

4.1.1. The age and sex distribution of the respondents

In this study, the age and sex cross-tabulation was made with the aim to examine the age distribution by sex. The age distribution of the individual's respondent was collected mainly to see the variation towards the experience of flood hazards across different age categories. In this regards, it was grouping and coded into below 30, 30- 40, 40- 50, 50- 60 and above 60 ranges of categories. On the other hand, the sex distribution has been quantified where each of the sex of individual respondents was collected and coded into Male and Female categories. In this regard, the age distribution fall in the column; whereas, the sex distribution are in the row category respectively.

Figure 4.1: distribution of respondents by age and sex

		Sex of the Respondents				**Total**	
		Female		**Male**			
		Freq	***%***	***Freq***	***%***	***Freq***	***%***
Age of the respondents	Below 30	4	1.6%	13	5.2%	17	6.8%
	30- 40	19	7.6%	33	13.2%	52	20.8%
	40- 50	24	9.6%	72	28.8%	96	38.4%
	50- 60	8	3.2%	65	26%	73	29.2%
	Above 60	2	0.8%	10	4%	12	4.8%
Total		**57**	**22.8%**	**193**	**77.2%**	**250**	**100%**

Source: Household survey (2020)

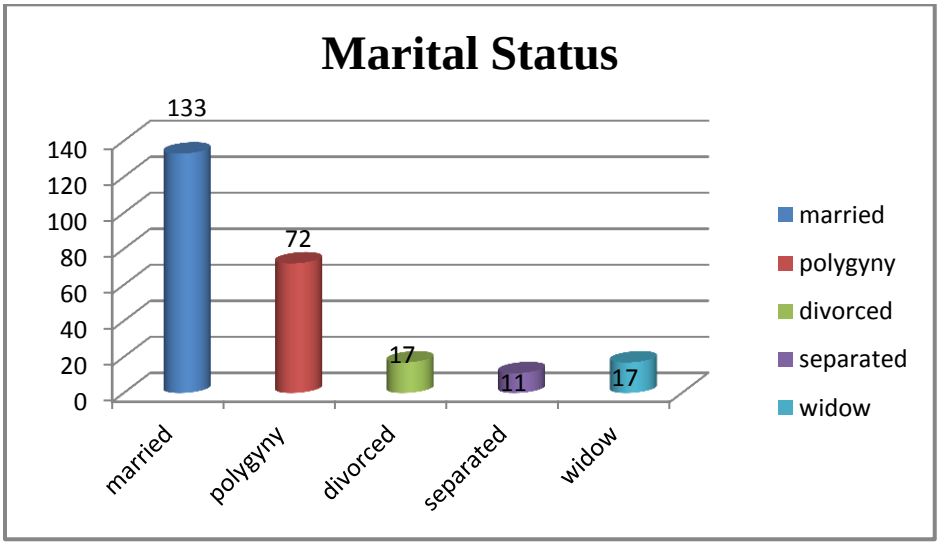
As indicated in the above table, 38.4% (96 Samples) of the respondents fall under the age category of 40 – 50 of which 28.8% are male respondents while 9.6% in the category are female respondents. On the other hand, 29.8% of the total respondents were fall under the 50 – 60 age categories of which 26% are male and 3.2% are female respondents of study area. Furthermore, 20.8% of respondents fall in the range of 30 – 40 from the total distribution of which 13.2% are male respondents while 7.6% are female respondents. Whereas, the less proportion for age categories in the distribution were found among the respondents who fall in the range of below 30 and above 60 categories constituted of

6.8% (5.2% are male and 1.6% are female) and 4.8% (4% are male and 0.8% are female) respectively. Moreover, the overall sex distribution within the age distribution could be summarized as 77.2% constitute male respondents, whereas, female constitute 22.85 of the total respondents in the study area.

4.1.2. Respondents' Marital status

In this study, the marital status distribution of the respondents was collected and coded into married, polygyny, divorced, separated, and widow categories as well. The main objective behind this was to see the variation of flood effects across different categories of marital status. The data here below shows how the variation in marital status distribution presented as follow:

Figure 4.3: The marital status distribution of respondents



Source: Household survey (2020)

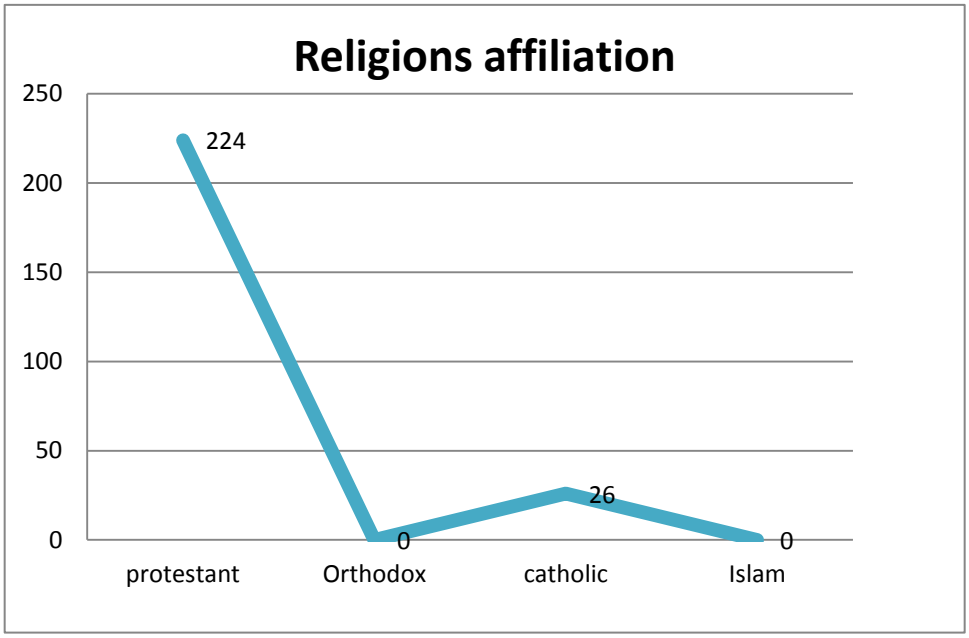
The above graph shows us the distribution of marital status of the respondents. In this regard, 53.2% of the total respondents were married which included both male and female in a pair partnership. Following that 28.8% of the total respondents were Polygyny. Polygyny in this regard, refers to the marriage system which allows males to marry more than one woman. Accordingly, the Anywaa marriage system polygyny is common practice; despite the fact that 89.6% of the total respondents were claimed to be protestant followers. As per researcher understanding, being a Christian in the study area

is perceived as having monotheism kind of belief system. Furthermore, attending church is something like a fashion and it is practiced by youths only without the involvement of parents. However, despite the homogenous believing system in the rural area, we can find different followers of different religions in the district's town as discussed in the next section under Religion affiliation. On the other hand, the respondents who were Divorced and Widows share equal position as 6.8% and 6.8% of the total respondents respectively. Lastly, 4.4% of the respondents were separated from their spouses in whom they have the fewer shares in the distribution.

4.1.3. Religion affiliation distribution of the respondents

In this religion affiliation has been found out as crucial point in studying the effects of flooding especially, with regard to the believe system toward the cause of crime. The religion affiliation of the respondents was collected and coded as Protestant, Catholics, Orthodox, and Islam categories of distribution. As indicated in the graph below, 89.6% of the respondents were Protestant followers who share a large part in the distribution. On the other hand, the less share of distribution of the respondents was affiliated to Catholics church religion which constitutes 10.4% of the total respondents.

Figure 4.4: The distribution of household respondents not by Religion affiliation



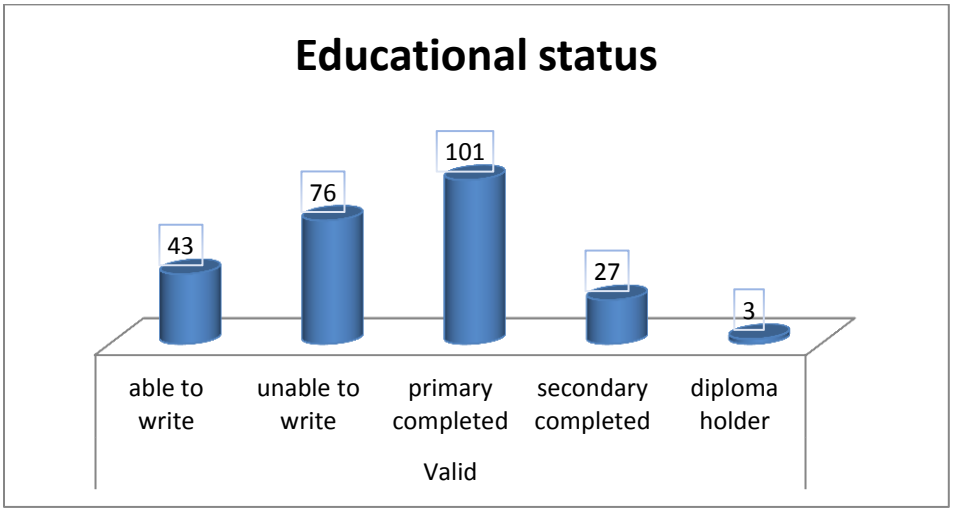
Source: Households Survey (2020)

Moreover, the data shows that both Orthodox and Islam are not among the common religion being practiced in the study area. However, according to CSA (2007), the majority of the inhabitants said they were Protestant, with 75.91% of the population reporting they observed this belief, while 7.93% were Catholic, 7.71% practiced traditional religions, and 4.54% of the population practiced Ethiopian Orthodox Christianity, 1.48% was Muslim. Despite this fact, religion diversity is limited to the town due to the fact that other religions like Islam and Orthodox, are predominantly practiced by highlanders community (referring to Habbesh); whereas, the Protestant is being dominated by the indigenous community (referring to lowlanders). The reason why Protestant followers took the lead in the distribution was believed to have some historical evidence for modern religion expansion in the study area. Historically, the American Missioners began the evangelism project for the first time among Anywaa society in Akobo-Sudan in1938- 1950 and Pokwow-Ethiopia in 1950- 1962. In this regards, according to Don McClure presented by Partee (1990), a pioneering missionary, the reason for shifting the missionary base was to find the center where the largest concentration of the Anuak population could be found. As a result, Don was successfully found the missionary center on Gilo River and entirely in Ethiopia at last (Partee, 1990).

4.1.4. Educational status distribution of the respondents

Understanding the level of education of a given community is very important to know the level of their socio-economic status. In this study, the level of education has taken into account in studying the effects of flooding on the rural community and their response strategies in dealing with flooding hazard. In this regards, the education status of the respondents was collected and coded in unable to write, able to write, primary school completed, secondary school completed and diploma holder categories. Below here is show how the educational status distribution was presented:

Figure 4.5: Educational status distribution of respondents



Source: Household Survey (2020)

As indicated in the above graph, the distribution of educational status of each individual respondent was collected and coded into unable to write, able to write, primary school completed, secondary school completed and diploma holder categories. In this regard, the data results for educational status shows us that 40.4% of the total respondents have completed their primary school; followed by those who unable to write constituting 30.4% of the total distribution. Whereas those, were 'able to write', have 'completed secondary' and 'diploma holder' constituted 17.2%, 10.8% and 1.2% of the total respondents respectively.

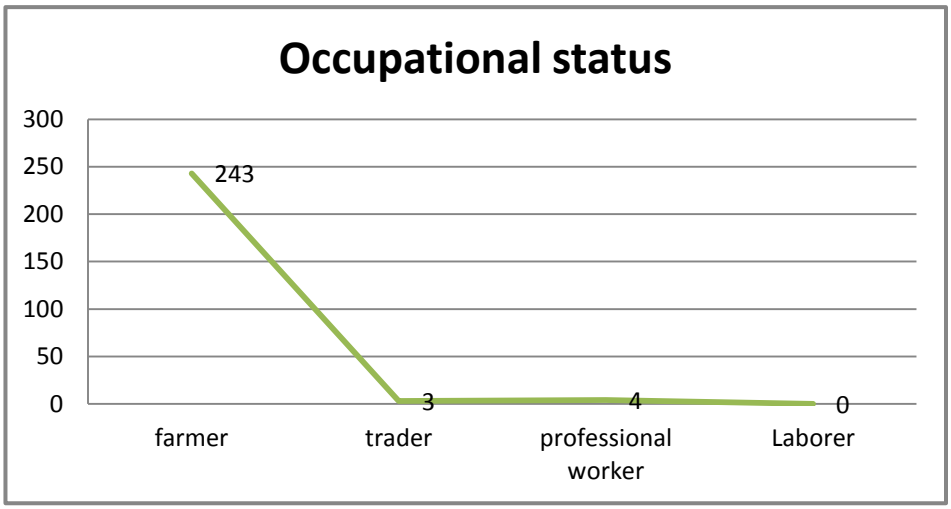
Thus, this implies that the educational status distribution was low among the target population in the study area due to the fact that about 88% respondents were under primary school completed. This could give us more confidence to proven that there is less skillful of human resources could probably resulted in less sharing, access to disaster risk reduction and climate adoption information and knowledge to prepare strategic response in the face of flooding hazards (Cardona et al, 2012).

4.1.5. Occupation distribution of the respondents

In this study, occupational status has been considered as an important parameter in studying the effects of flooding on the rural community and their response strategies in line with the nature of socioeconomic status of the target population. The occupational

status was believed to have great influence in determining the level of flooding effects and the quality of response being employed by the flood affected community. In this regard, the occupational status of the respondents was collected and coded into different categories as Farmer, Trader, Professional worker, and Laborer. Thus, occupational data has been presented as follow:

Figure 4.6: The distribution of respondents by occupational status



Source: Household Survey (2020)

The occupational status distribution among the respondents was collected and coded into farmer, trader, laborer and professional worker categories. As the data on the graph indicated 97% of the total respondents in the distribution were farmers. On the other hand, the data fell steadily among the respondents who were traders, professional workers and Laborers constituted 1.2%, 1.6% and 0.00% respectively.

Therefore, there is less likelihood of occupation variation/diversification among the target population of the study area. Thus, the population with less occupation diversification is more likely to be vulnerable to hazards; compared to those with high diversification in their occupational status (Oxfam, 2012).

4.1.6. The main sources of livelihoods distribution among the Respondents

The main source of income or food of each individual respondent was obtained and coded into Crop production, Trading, Livestock keeping, Fishing, Labor and Salary

categories. In addition, each category was also recoded in Yes or No due the fact that a single respondent had a possibility of selecting more than one main source of income or food as you see in the following table.

Table 4.1: The distribution of main sources of livelihoods among the respondents

s/n	*Main Source of Income or food*	*Alternative/option*	*Frequency*	*Percentage*	*Cumulative percentage*
1	Crop production	Yes	227	90.8	100%
		No	23	9.2%	
2	Trading	Yes	15	6%	100%
		No	235	94%	
3	Livestock keeping	Yes	124	49.6%	100%
		No	126	50.4%	
4	Fishing	Yes	186	74.4%	100%
		No	64	25.6%	
4	Labour	Yes	3	1.2%	100%
		No	247	98.8%	
5	Salary	Yes	4	1.6%	100%
		No	246	98.4%	

Source: Household survey (2020)

As indicated in the above table, 90.8% of the respondents responded that crop production was their main source of food/income followed by fishing activities which constituted 74.4% of the respondents in the study area. Next to that, livestock keeping was found out to be the third share in the distribution by constituting 49.6% of the respondents. Lastly, trading, labor and salary as means of income or food, share the least portion in the distribution constituting 1.2% and 1.6% of the respondents respectively. This implies that the main subsistence in the study area was predominately agriculture.

While crop selling is an important source of income for Majang Zone and Agnuwa Zone Dimma and Abwobo woreda, selling livestock and livestock products is the main income source especially in Nuer zone and Jor woreda of Aynwaa zone. Accordingly, all kebeles of Jor district supply livestock for the local market. Because of this livestock have a significant contribution to the supply of livestock to the market (DPFSA, 2016 & 2019).

On the other hand, the supply of cereals and other food items to the market from local production was very low, but the supplies of staple food (maize & sorghum) were from neighboring regions. As a result, the price of staple food crops like maize and sorghum were increasing in the market. The increase of staple food commodities was attributed to low local production, population pressure to the region (immigration), flood, pests and unusual /unseasonal rain falls affecting harvesting time for maize crop on the farms (Ibid, 2019).

Moreover, the other sources of income in the Region are fishing, selling of fruits (mango etc.) , vegetables (tomato) and grass, fire wood, charcoal and casual labour (which is available in some commercial farms) (Ibid, 2019). Thus, fishing is also a common source of living for both consumption and income generation among the population in the study area next to livestock and livestock production.

4.2. Underlying cause or source for community's vulnerability to flood hazards

According to Oxfam (2012) in describing the PAR model, a natural phenomenon by itself is not a disaster; similarly, a population may be vulnerable for many years, yet without the "trigger event", there is no disaster. We can therefore see that vulnerability - a pressure that is rooted in socio-economic and political processes - is built up and has to be addressed, or released, to reduce the risk of a disaster. As a result, In order to protect people from a hazard event, researchers, governments and other organizations must first understand how vulnerable a target population is and why as we are going about it here below.

Table 4.3: The distribution of underlying sources of community's vulnerability towards flood hazard

s/n	Underlying cause or source of vulnerability	*Alternative/option*	*Frequency*	percentage	*Cumulative percentage*
1	Residing in a flood prone area	Yes	172	68.8%	100%
		No	78	31.2%	
3	Lack of alternative livelihoods	Yes	114	46.6%	100%
		No	136	54.4%	
4	Lack of capacity for resiliency	Yes	146	58.4%	100%
		No	104	41.6%	

Source: Household Survey (2020)

As revealed by the respondents in the above table, 68.8% of the respondents believed that being residing in a flood prone area was more likely to be the source or undying cause of their vulnerability to hazards in the study. The existing literature also added more evidence that, the physical environment of the study are of itself was a low-lying areas which makes this area geographically to be a fragile and flood prone area. Accordingly, while in Jor woreda all kebeles were affected, the access to the settlements along the course of the Gilo River is possible only by helicopter or boat up to date (UNDP- EUE, 15 Oct, 1996; NDRM, 2020).

Furthermore, the respondents mentioned that lack of capacity for resiliency was another factor for their vulnerability to the hazards constituted 58.4% of the total respondents. Whereas lack of alternative livelihoods was constituting 46.4% of the total respondents count as the underlying causes of vulnerability to flooding hazards for the population in the study area.

Moreover, according to the Pressure and Release (PAR) Model, vulnerability of any community to the disaster risk goes through a progression process which involves vulnerability to limited access as a root cause of vulnerability, dynamic pressure, and unsafe conditions. With regard to unsafe conditions, communities could be vulnerable because of the fragile physical environment, fragile economy, vulnerable society, and poor public action as well (Oxfam, May, 2012). Therefore, the unsafe conditions as revealed in above table proved the argument of this model by the fact that, people living in the study area are residing in the flood prone area which caused them destitute/poverty life; and eventually resulted in lack of alternative livelihoods and lack of capacity for resiliency in the face of recurrent flood disaster.

4.3. The effects of flooding on the rural community

Flood is one of the major natural hazards in Ethiopia which causes significant damages to lives and livelihoods in parts of the country. In Gambella, there has always been high and continuous rains from the end of July up to mid of October which may cause especially, riverine floods. As result of this, many people have been affected and displaced; crops in the farm lands were damaged, livestock are dying due to parasitic diseases resulted from flooding. However, in order to better understand the significant effect of flooding on rural community in the study area, the researcher has taken look at the crop production, livestock roaring, housing permanency, and in the services delivery in the study area. Based on these major affected areas of concern, the researcher has attempted to examine the perception of the participants on the level of effects of flooding by collecting and coding the perception of the respondents toward the level of flooding effects into no effect, slightly affected severely affected and entirely destroyed/collapsed categories. Thus, the participants' perception on the effects of flooding is deeply presented under subsections such as crop production and food security, livestock roaring, housing permanency, and in service delivery as presented one by one here below:

4.3.1. Crop production and food security

In this study, the results from household survey and field observation have revealed that the recurrent flood hazard imposed great significant effects on crop production. As the crop production exposed to the flooding hazard, the food security in the study area will be

deteriorated. As indicated in the table below, the results show that flood hazards have affected the crop production severely which constituted 56% of the total respondents in the study area loss one hectare of their crop field. On the other hand, 32% of the respondents revealed that flood has destroyed the half of hectare of their crop production on the crop-fields. On the contrary, 8% and 4% of the respondents reported that flood has damaged below ½ of hectare and entirely destroyed the crop field respectively.

Table 4.4: The level of flooding effects on crop production

Crop damages due to flooding			
s/n	**Variables category**	**Frequency**	**Level of damage in percentage**
1	Below half of hectare	20	8%
2	Half of hectare	80	32%
3	One hectare	140	56%
4	Entirely destroyed the crop field	10	4%
	Total	250	100%

Source: Household survey (2020)

According to the field observation carried out by researcher, the damage of crop production early before they are not ready for harvest in the field has been widely observed. Almost every crop field was being flooded severely. Similarly DPFSA (2016) reported that the main causes of crop damage in Anywaa Zone and Jor district in particular was flooding which led to the losses of 146 hectares crop production in the year of 2016. As the Agency reported, this district was not only vulnerable to flood hazard, but also, the area is vulnerable to cross-border attack which directly or indirectly disrupted the agricultural activities in the study area. This is due to the fact that, the displaced persons could not cultivate on their own food.

However, even though, above figure (146 hectares) indicated the significant loss of crop production during the flood period, the results from observation and FGDs with the

community estimated the loss to be higher than that. During the field observation, the researcher found that flooding hazard can even destroy the entire farms land as it can be illustrated from the pictures here below:

Figure 4.7: The damages caused by flood hazard on crop production

Source: Field work (2020)

Moreover, the researcher witnessed the loss of crop productions from almost every key informant across various organizations of both governmental and non-governmental one. The key informants claim that floods firstly attack the crop fields which would result to severe food insecurity in the study area since agriculture is the predominantly source of economy of the target population. In another word, flooding in the study area was more likely to damage the fundamental livelihoods (crop productions) of the people instead of their inhabitant area.

Thus, this implies that flood has significantly affected the community's main source of livelihoods which provoked serious food insecurity and starvation among the target

population as observed by the researcher. In this regards, A 30 years old lactating mother has shared her story how starvation affected her and her 3 month child as follow:

> *What I understood so far, I didn't see flooding hazard and food insecurity as separated problems. Rather, flooding is always been the root cause of food insecurity due to flooding we were facing all along. Personally, I can't forget the starvation I faced with my 3 months old child, when I lost food to eat and which eventually led my breast to dry- up and couldn't able to produce milk to feed my child. At that moment my child survived by relying on goat-milk. Because of this, now we are discussing with my husband to leave this place as many have done so far. Because, I don't see any hope.*

4.3.2. Livestock

DPFSA (2016 & 2019) made it clear that, Livestock and livestock products are the main source of income especially in Jor woreda of Aynwaa zone. Accordingly, all kebeles of Jor district supply livestock for the local market. Because of this, livestock has a significant contribution to the supply of livestock in the local market But, the excessive rains starting from –mid of July up to November has created flooding that undulated pasture land and affected the availability of Livestock pasture particularly in the study area.

Table 4.5: The level of flooding effects on Livestock during the last flooding

S/n	*Category of livestock loss*	*Frequency*	*percentage*
1	1- 5	120	48%
2	6- 10	80	32%
3	11- 15	40	16%
4	Above 15	10	4%
	Total	**250**	**100%**

Source: Household survey (2020)

However, in the above table, the study revealed that 48% of the household loss their livestock with the approximated of 1- 5 per household during the last flooding period.

Whereas, 32% of the respondents reported that they have loss livestock of 6- 10 estimated per household in the same year. Moreover, 16/% and 4% of the respondents reported that the number of livestock losses during the last flooding could range from 11-15 and above 15 respectively.

Accordingly, Livestock physical condition became poor due to scarcity of pasture (Pasture land covered by flood) and Livestock productivity reported poor. As indicated in the reports, Livestock disease has killed 3,529 cattle 1,509 sheep 3,318 goats 7,903 chickens (RDPFSA, 2019).

Furthermore, the fieldwork results show that many more livestock lose their lives during and in te post-flooding period. The FGDs with the community members revealed that flood affected livestock of the community every year in the following way: *"Floods not only destroyed our crops production, but also led us to lose our livestock particularly, the cattle yearly."*

The same story was also shared by a 30 years old one of the livestock experts in the Bauru of Livestock and Fishery at the district level. According to him, parasitic diseases were the root causes for the death of livestock in the district due to the fact that flood water used to occupy the grazing areas. As a result, these parasites like Snails are more likely to be caused great health problems which could probably led many lives to death as described by expert as follow:

> *"The loss of livestock mainly cattle, is at a higher rate due to the facts that they are grazing mostly in the water. The death of cattle is more likely believed to be caused by parasitic diseases especially, snails. This has become the most common causes for the death of cattle. This is happens because, when cattle are grazing, the snails float on the water while the cattle are grazing. And then the cattle will eat them altogether with the grass. As a result, this will causes serious disease on the livestock or cattle which may likely led them to die or loss their lives*
>
> *District's livestock and fishery Expert*

As a result, the income generated by the target population in the study area from the livestock gets slow-down and eventually paves the way to food insecurity. Due to this, communities lose something to be taken to the market when they are in need of buying food to respond to the existing food insecurity. As a matter of fact, losing own sources of livelihoods like livestock would lead the community to migrate as results of the existing food insecurity. In this regard, 62 year old participant has shared his life history like this as follow:

> *As a head of a family, the most challenging life I had faced in life was the flooding hazard which is the root cause for my migration to this village today. In 2004 E.C flood has destroyed my crops production in a consecutive manner leaving no single maize in the field. However, the worsen one was the death of my 28 cattle in consecutive three years as a result of flooding; and eventually led me to leave my ancestral land.*

4.3.3. Housing

The flood hazard is believed to have significant effects on the vulnerable community living in these flood prone areas. Because of the possibility of housing during flooding season, researcher has given due emphasis to housing and assessed to what extent does flood affect the housing of the target population. In this regard, we are going to see the level of impacts on housing in the following table.

Table 4.6: The level of flooding impacts on housing in the study area

S/n	*Category of houses lost per Household*	*Frequency*	*Percentage*
1	Submerged by floodwater	140	56%
2	Demolished due to flooding	70	28%
3	Taken away by floodwater	40	16%
	Total	**250**	**100%**

Source: House survey (2020)

The household survey's results in the above table show that the flood has a significant effect on housing in the study area by the fact that 56% of the total respondents have reported that their houses were submerged by floodwater during flooding. Following that, 28% of the total respondents have revealed that food has their houses have been demolished aas a result of flooding effects. Moreover, 16% of the respondents have reported that their houses were being taken away by flood water. As the researcher observed, the flood water in most rural kebeles of the study area seems more likely to be surround the villages and leave the inhabitants area dry except for some villages and district's Town who's their pictures are being attached below here.

Figure 4.8: The damages caused by flood on housing in the study area

Source: field observation (August, 2020)

The above pictures were taken in Twoho kebele and Ongogi town during the flooding period. The pictures show the significant effects of flooding on housing in the study area. The hazard has led to the displacement of the whole community to the nearby school facilities in both affected areas. In this year, 2020, over 7000 thousand people were displaced in the district due to flooding hazard (NDRMC, 2020).

4.3.4. Services delivery disruption

Flood hazard is believed to bring disruption on social services delivery and accessibility in these affected areas. When roads are damaged by, or inaccessible due to, floods, communities face increased difficulties in traveling, which raise the costs of living, business operation, health and education (APFM, 2017). In many cases, for example: no

veterinary services visited the affected areas due to the inaccessibility of the roads leading to the areas affected by floods. As a result, many cases also went unreported to veterinary services for investigations as it is revealed by the local residents (Shifidi, 2014).

It is very important to assess the nature of this disruption on services delivery. As the results indicated from the household survey, 76.4% of the total respondents show that flooding has severely affected the services delivery in the study area by putting them out of provision completely. Whereas, 21.6% of them reported that service delivery has been able to provided partially during flooding period. On the other hand, 2% of the total respondents did reveal that services provision are being carried out effectively on regular basis during flooding.

Table 4.7: The level of social services disruption caused by flooding hazard in the study area

S/n	*Category on services delivery disruption*	*Frequency*	*Percentage*
1	Fully provided on regular basis during flooding period	5	2%
2	Partially provided during flooding period	54	21.6%
3	The services delivery is out provision completely	191	76.4%
	Total	**250**	**100%**

Source: Household survey (2020)

Therefore, the significant disruption brought by flood hazard on services delivery has been more pronounced in function and accessibility of road network, education system, health system, WASH and so forth which we're going to see in the following here below.

4.3.4.1. Education System

Educational function

Flooding most of the time disrupted the educational system significantly. According to the results obtained from Key Informants in Jor district revealed that flooding has disrupted the national calendar for the educational system in the study area by opening the schools lately and clossing the schools earely prior to the harmonized calendar as participants revealed. One of the school's superviser has expressed his view on disruption brought by flooding on educational system as following:

> "*The issue of flooding has brought great disruption to the educational system every year mainly on six to seven kebeles, since the whole area is occupied by flood water. The schooling usually begins in late November due to the fact that the flooding did not permit the teachers to go on foot carrying their food with them easily. So, the only way is to go with a boat facilitated by the education sector in collaboration with wareda administration so as to let the teachers reach their destination and ensure that the educational system is functioning. Therefore, this delay in beginning the school year on time has significant impacts on the schedule of the national education calendar."*
>
> *School's Supervisor*

In addition to that, the FGDs 1 held with the community members have confirmed that road impassability was the main reason which restricted the movement for both Teachers and Students to reach their respective work places and schools respectively. This movement restriction imposed by flooding hazard has significantly disrupted the national calendar for educational system and function in the study area. Not only that, but also, untimely overflow of the river and flood water occupation mostly forced the Teachers to leave the work place earlier. Thus, these reasons have paid significant attribute to the educational system disruption by opening the schools lately and closing again earlier as well as presented here below:

With regard to the education functional system, most of the participants agreed that flooding has greatly affected the normal function of education, especially on the National calendar on education. National calendar design on education is harmonized nation-wide, but, when we came to Jor district things went in opposite manner. For instance, the schools are opening late and closing earlier before the calendar due to the floods factor. First, the teachers delay going to their workplace because the way is impassable unless the local government take them with their food items by board lately through collaboration of other stakeholders. Second, when the teachers reached there, they also faced food shortage since the residents' crops were damaged during flooding. There is no nearby market to buy food; rather they used to send their students to the town to buy food which eventually took those two weeks comeback. Due to these challenges, closing the school before the calendar could be an alternative for the sake of their safety especially in the first semester. Similarly, in the second semester the teachers used to go back to their workplace late in the middle of Mars and closed the schools soon after the national exam was being taken.

FGD 1 Participants (2020)

Educational Accessibility

Despite the school function, school accessibility is another area of concern for students who live far from school and children whose ages are reaching for schooling. According to FGD, students who live far away from school arrived late to school; while, the children whose age are reaching for schooling couldn't able to attend school because of road impassibility as he express has follow:

"On the other hand, the majority of FGD participants argued that, floods have great impacts on school accessibility. Since, the flood water occupied the area for a long period of time, the children living

in the village far away from the schools suffered to attend school in advance and they used to reach school late. Due to this, some students decided to migrate temporarily where the school is found. Not only that, but also children whose their age are reached for schooling couldn't able to go school earlier as their age is permitted; rather then, they go to school lately especially at the age of 10 to 11 due to flooding".

FGD 2, 2020

On the other hand, school infrastructures damages was confirmed by informant from regional education bureau that school's materials and infrastructures were also got damaged due to flooding . Likewise, the economic and social burdens experienced by the affected community in the post flood could dramatically increase the students' dropout rate also get increases in the study area and in the region in general as presented below:

"In regards to our sector (Education Bureau), we have identified a number of problems. These are damage to infrastructures; damage to the community's livelihood; human death; school damage and school materials as well; unusual opening and closing of schools; dropout rate increase; school enrollment decrease; late comers increase; and fear of crossing the river".

Curriculum and implementation director at regional level (2020)

4.3.4.2. Health System

According to the study conducted by Shifidi (2014), revealed that accessibility to health facilities was interrupted and no ante-natal care, some pregnant women reportedly resort to potentially unsafe home deliveries during floods with assistance from inexperienced residents. The infants do not receive immediate medical attention which may be necessary. Home deliveries in the area are however not completely unusual, and in some cases, they are preferred over hospital births. However, according to participants from FGD2, report that the health status of the district is under surveillance because of lack of road access which couldn't permit the Ambulance services to bring the patients from kebeles to district town where health center is found, dysfunctional of health posts

available in the district during flooding period, insufficient pharmaceutical logistics and so forth. During discussion with community the participants have expressed their view as follow:

> "*The FGD participants have revealed that the health status of the district is under surveillance due to dysfunction and poor standard of health facilities. First, not only the distribution of health facilities is not sufficient, but also the available facilities are not fit to meet the health problems of the communities since they all are health posts. Second, there is not enough pharmaceutical logistics in these facilities. Third, there are ambulance services which could have taken the patients to the higher health facilities in other areas. Even if the district could have had ambulance services, there is no road connection between the towns to each kebele. Therefore, flooding, in one way or another, is the main factor for the above mentioned issues. Moreover, the issue of lack of roads, insufficient pharmaceutical facilities, and lack of Ambulance services exacerbated health problem during the flooding*
>
> FGD 2 with community members, 2020

With regards to health facility accessibility, road access was the major challenging factor. Despite the unavailability of functioning facilities in the area and the long distance walk to reach the health facility in order to get health care services. As revealed by the participants, the problem of inaccessibility has made the follow-up for immunization difficult for pregnant women in the far rural areas in the study. Not only that, but also, it's prohibited the implementation of delivery program at the facility as recommended in the national health's policy. Due to this, home delivery has become common practice among the target population. And this practice has led many women to lose their lives resulting from inaccessibility to health facilities for the community. One of the 45 year old women has shared the life histories of her deceased sister as follow:

> *You see, we live in a place where there is no health facility as you can see by now. And then, when my sister got pregnant, she took immunization two times. Because of the far distance of walk and*

impassibility of the road because of flood water, she decided to cut-off the immunization follow-up till the delivery period. However, during delivery a complication occurred; as a result she passed away due to lack of road, near facility and Ambulance services to save her life.

4.3.4.3. Water and Sanitation facilities system

According to observations carried out by researcher, sallow-wells, rivers, and Boreholes are the main sources of drinking water in the study area. In most of the Kebeles, Sallow-wells are used for drinking and home consumption; whereas, River and Boreholes are used for livestock. On the other hand, in other four kebele and sub-kebele without shallow-well in the district, people used to rely on River and Boreholes water for drinking and consumption for both human and domestic animals as well.

However, during the flooding period, these sources of water are being affected significantly. According to an Interviewees from Water bureau at both district and regional levels revealed that flood affected these sources of water by contaminating the existing water supply schemes. As a result of these effects, flooding brought health problems on the community living in the flood prone areas in the study area. Here below is how the research participants express their views as follow:

"Yeah, of these sources of water pond, borehole, shallow-well could be affected seriously because when the flood came out, it occupied the whole areas including the sources of water. When the sources are getting affected, the community tended to rely on flood water for drinking which may eventually cause many health problems and others."……. "Following the completion of rapid assessment, the following problems have been identified as the major effect of flooding in line with our sector focus area. 1) Contamination of the existing water supply sources. 2) Abandonment of water schemes by displaced people. 3) Lack of road passage due to the existence of water in the areas. 4) Lack of budget to maintain non-functional water schemes. And finally, lack chlorine for disinfection of existing water schemes"

Water, Irrigation and Energy bureau head at district level (2020)

Figure 4.9: The level of flooding impacts on existing drinking water sources schemes in the study area

Sources: fieldwork (2020)

With regards to sanitation facilities, the researcher observed that there is a lack of existing sanitation facility especially, Latrine in the study area. The people living in the study area are more likely to practice open defecation. According to the water bureau head at the district, the main factors behind lack of existing latrine in the study were associated with the type of soil available in the area. The soil type in the area is characterized by Clay soil. As the nature of this soil, they get cracked during the dry season; as a result, it permits flood water to penetrate in the Latrine's holes and eventually led the holes to be demolished. As a result, when flood water occupied the inhabitant area, people no longer far distance for toilet and this would resulted in serious health problems on the community as narrated by head office as follow:

> *'Yeah usually, Sanitation facilities like toilets become poor during flooding, due to common practice of open-defecation reasons. First, before flooding, people used to go far distances for toilets. However, during flooding, poor sanitation becomes a serious problem on community well-being; because, the whole areas are occupied by flood water and people no longer go to the far distance for toilet. They used open-defecation because there were no available latrines. Lack of available latrines is sometimes rooted in the culture of the community. On the other hand, is not a choice by the community, rather then, the place is not conducive for constructing latrines due the fact that the types of soil are clay. And then when the season turns to summer and*

flooding begin; these latrines being made become demolished due to the bad type of soil. Otherwise, the toilet/Latrine which is made of concrete (Cement) could survive during flooding"

Water, Irrigation and Energy bureau head at district level (2020)

4.3.4.4. Road and Transportation Networks

According to the observation carried out by the researcher, the issue of road and the intercommunication among the communities within the district is the most challenging for the target population in the study area. Apart from the poor road which used to connect the district's town with Gog district, there are no other roads that exist within the district. On-foot is the only mode of transportation by the target communities used to relied on in the study area which could probably take them about 60s KM of walked to get to district's town and the last Kebele of the district. In another word, there is no internal roads connection within the whole district. Thus, the evidence from this study could truly prove us that the life in this district is more likely associated with primitive way of life.

Figure 4.10: The available mood of transportation system in the study area

Source: Field observation at Shentoa 02 kebele: From Ongogi Town (District town to Shentoa 02 (August, 2020)

In the same way, the participants from FGD 1 expressed their concern in the following manner.

> *In this regard, during summer when the flood water occupied the whole district, the movement from place to place became so much difficult and delayed to reach our intended destiny. For example, the distance of an hour and half before flooding, will take us to six hours on the way to get to the destination; whereas, the distance of four hours on the way before flooding, will be more likely to take us twelve hours on the way to reach. As a result, the delays in journeys become worse whenever someone gets sick in the community. In doing so, people used to rely on traditional medicine or if the case goes beyond the capacity, the local board became the only means in transporting*

the sick person through the River which could probably take some days or a week even to reach the place where we could find a health facility. This is happening due to lack of motor board in the district either from the local government or business person.

FGD 1 Participants (2020)

4.4. Community based response strategies

4.4.1. Community based preparedness

Hazard preparedness at any level always involves an action plan and contingency plan towards the upcoming flooding hazard. In this regard, the data shows that the community based preparedness and action plan for flood was very low. As indicated in the table below, 96.4% of the respondents have revealed that cultural preventive measures were the more likely preparedness mechanism in the study area. On the other hand, with regards to weather condition update from the government to community was weak. The Early warning information and public mobilization via training from the governmental institutions was more likely poor as results of 3.6% and 0.8% respondents revealed respectively.

Table 4.8: The existing prevention mechanisms in the study area

s/n	*Flood prevention mechanisms*	*Alternative/option*	*Frequency*	*percentage*	*Cumulative percentage*
1	Receiving early warning information from government institution	Yes	9	3.6%	100%
		No	241	96%	
	Cultural preventive measures (intensive fishing, building dykes and collecting fruits and leaves)	Yes	241	96.4%	100%
		No	9	3.6%	
3	Public mobilization through training	Yes	2	0.8%	100%
		No	148	99.2%	

Source: Household Survey (2020)

Similarly, the DPFSA (2016) reported that the district's officials and the community know the time of flood occurrence and Kebeles that are highly affected by flood hazards in the region. But, the preparedness for flood hazard is more likely poor/low; and almost all districts including Jor, do not have preparedness and action plan for flood.

As a result, communities in the flood prone areas tend to rely on cultural preventive measures as mentioned above which aims at two important coping mechanisms during flooding hazard. The first one deal with construction of muddy dykes in order to prevent flood waterlog from inundating the crop fields. Whereas, the second one was based on the assumption that, since the flood hazard have been always destroying the major livelihoods of the community, the community used carried out intensive fishing and selling out some living household assets (like cattle) to buy food during dry season in order to avoid severe starvation during flooding period. For further understanding, we are going to talk about these coping mechanisms in detail under the following topic.

4.4.2. Community's based coping mechanisms

As the data obtained from the target group, the coping mechanism employed during flooding season more likely shows cultural based practice. These major coping mechanisms can be categorized into two parts: 1, building mud dykes so as to prevent flood water from penetrating into crop fields. This could be done either privately or cooperatively at community level. At the private level, individuals' households can initiate building dykes whenever his/her farm under flooding attack. Whereas, at the community level, the community's leaders do initiate the construction of mud dyke through the collective efforts of the community members to avoid the damage of crop production from the flood hazard. However, this effort has less capacity to prevent flood water to penetrate into crop fields due to the fact that the dykes were built up out of mud. Thus, the dyke can be easily destroyed by either flood water pressure or water volume increased so that it can overflow the dyke as shown in the picture below:

Figure 4.11: The dykes built to detach flood water a way

Source: Fieldwork (2020)

The second part was concerned with response to predictable or actual food insecurity resulted from the damages of main staple food of households by flood hazard. In predictable response to food insecurity, the target population used to carried out intensive fishing activities mostly carried out in the ponds (Maay ki bithe) and River (gaar ko obiidhi ka Ajaap). In this regards, the fishes products brought out from Ponds used to be prepared in a long lasting manner (locally called "Nginynyo and Peete") for both consumption and market by dried them up either via fire heat ('Nginynyo' or sunlight heat ('peete'). The one for consumption would be saved at home until the right time for consumption would appear; whereas, the one prepared for market will be taken to market place in order to earn money which could help to buy food during food insecurity.

Figure 4.12: The fishes products activities (dry fishes) in the study area

Source: fieldwork (2020)

Furthermore, the response during the actual food insecurity involves collection of wild leafs and roots as the observation results revealed in the study area. This was found out by the researcher that the community employed this kind of coping mechanism as the last option in order to escape the death fear. With this regard, collection of leaves carried out more likely by Women in the swamp areas (include Awiik) as well as in the crop fields (include Amooro, Ajada and so forth). So, these leaves can be consumed either purely or by mixing with dried fish products. One the other hand, the collection of Roots took place during food insecurity especially, aftermath flood hazard. According to the community leaders, the most likely used roots in the study area is Yam found on Gilo River's bank as shown in the picture below:

Figure 4.13: The types of foods being consumed during the food insecurity

Source: fieldwork (2020)

Moreover, these coping mechanisms may not adequately support the life of the community in a sustainable manner. As a result, the fieldwork results show that households do sometimes rely on external support or assistance in different ways which could be either through social networks (Such as relatives, neighborhood, diaspora and so forth) or institutional (both governmental and none governmental organizations/agencies) support as discussed under the following sub-topic.

4.4.3. External Support to flood affected population

According to data results obtained from the target population shows that the external assistance being received by the affected community was emergency support in their characters. In another word, the support was temporary and has no sustainability aspects. In this regards, the researcher has attempted to assess the support being provided at the grassroots level and the one at macro level which include the following assistance expected bodies: social network, Government, NGOs and Religious Organization as well.

Table 4.9: The sources of support for the flood affected in the study area

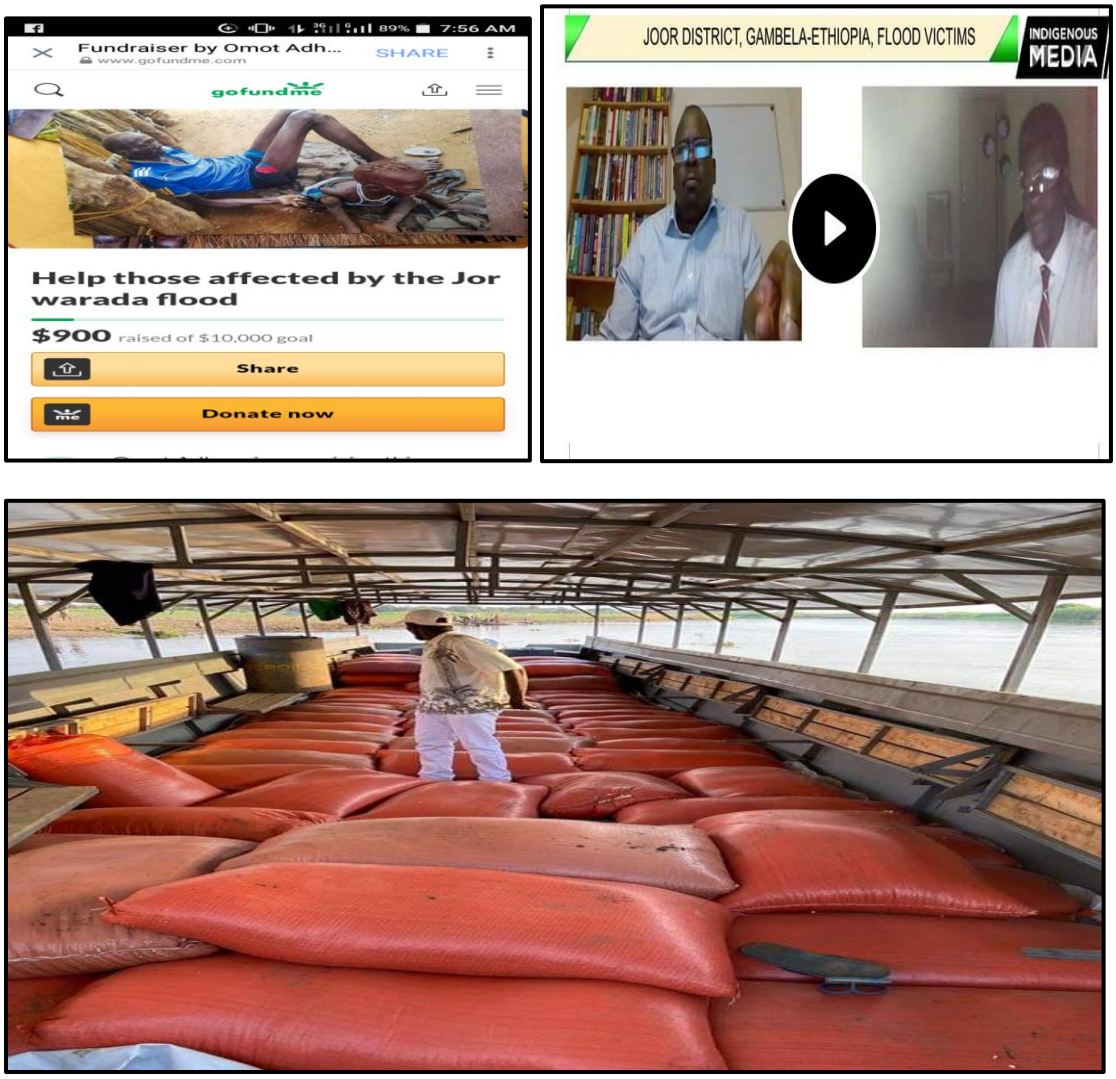
s/n	*Sources of support*	*Alternative/option*	*frequency*	*percentage*	*Cumulative percentage*
1	Social network (relative, neighborhood, diaspora etc	Yes	125	50%	100%
		No	125	50%	
2	Government	Yes	250	100%	100%
		No	-	-	
3	Non-governmental organization (NGOs)	Yes	10	4%	100%
		No	240	96%	
4	Religious organizations	Yes	4	1.6%	100%
		No	246	98.4%	

Source: Household survey (2020)

As indicated in the above table, 86.8% of the total respondents reported yes by the fact that they received emergency assistance from the government. Following that, 50% of the household respondents revealed that they received assistance from their social network such relatives (within the community and abroad) and neighborhood as well. On the other hand, NGOs and religious organizations play less in providing emergency assistance to the affected community constituted 4% and 1.6% of the total respondents respectively.

As a matter of fact, the emergency assistance is a kind of support being provided during the incidence of flood hazard. However, the government in this regard does provide assistance for post-flood hazards. In reality, this has to do with the recovery intervention period. But the researcher revealed that, most of the time community tend to rely on support from their respective social networks such as relatives (both within the country and abroad), neighbors and even diaspora members. For instance, in the year of 2020 the flood hazard in Jor district among the rest of districts in the region has caught the attention of many individuals living within the country and abroad. As a result, the community members in diaspora have made great mobilization through social media which eventually led them to donate funding for the affected community.

Figure 4.14: Media attention and support of Diasporas toward the flood victims in the study area



Source: Social Media (Facebook, 2020)

Furthermore, the external assistance involves providing shelters, food assistance, materials and financial assistance either by the government or by the social networks to the affected population in the study area. As clearly indicated here in the table below, the household heads reported that they received food assistance which has accounted for 96.8% of the total respondents. The food assistance was more likely provided by the government especially, aftermath of the disaster. This has happened due to lack of dry land to drop the food aid because the whole area was occupied by flood water. On the other hand, 70.8% of the respondents revealed that they have received materials

assistance such as cooking materials, sanitation materials, and so forth. Moreover, the participants claimed that they also used to received less support of shelters, financial gifts and also less access to borrowing money which constituted 25.6%, 13.6 and 3.2% of the total respondents respectively

Table 4.10: The distribution of types of support being provided to the flood victims in the study area

s/n	*Types of support being provided*	*Alternative/option*	*frequency*	*percentage*	*Cumulative percentage*
1	Shelters	Yes	64	25.6%	100%
		No	186	74.4%	
2	Financial gift	Yes	34	13.6%	100%
		No	216	86.4%	
4	Food assistance	Yes	240	96%	100%
		No	10	4%	
5	WASH materials	Yes	177	70.8%	100%
		No	73	29.2%	

Source: Household survey (2020)

4.4.4. Community's based coping mechanisms in relation to transporting food during flooding

The mood of the transportation system in the study area is more predominantly on-foot and navigation system. According FGD 2, the community got to receive food aid being provided after long work on foot of 60KMs distance which may take them a week during flooding period and two days in the dry season to reach to the place where food aid is being stored. The pictures here below show the coping mechanisms in supplying their food through water.

Figure 4.15: The coping mechanism for supplying food during flooding period via on-food

Source: Fieldwork (2020)

On the other hand, some community members used to rely on traditional navigation systems to transport the foot aid to their respective destination. This navigation system involves a local board and plastic sheets made as a container to load food items. The plastic sheets made as a container are more likely to load more shakes then that of the local board does. However, there is a risk of shrinking or loss of food; while supplying food homes.

Figure 4.16: The local food supply system as coping mechanisms via Gilo River

Source: fieldwork (2020)

Moreover, during fieldwork, the researcher has found out that the target population has been relying on the above shown pictures as means of logistic and supply system as coping mechanisms. This happened because of the lack of motor board and road network as well in the district. However, until recently, the regional government has bought two longest motor boards which were designed for both food supply and transportation for Jor and Akobo districts. As a matter of fact, we'll discuss more about motor boards in detail in the next chapter.

4.5. Governmental and Humanitarian Response Strategies on Flood affected community

In this chapter, the findings obtained from key informant interviews and focus group discussion were analyzed and presented thematically. Beside this, some data obtained from secondary sources were also used in an integrated manner concurrently with primary data as well. Moreover, this chapter has consisted of four major sections. The *first section* focused on an institutional preparedness towards flood hazard in the study. The *second section* has been devoted to the provision of emergency responses/intervention to the affected community during flooding. The *third section* deals with recovery intervention/response strategies to the flood affected population. And the *last section* was concerned with the extent and level of institutions' collaboration towards the common mission.

4.5.1. Preparedness and Public Action of Institutions Prior to flood Hazard

Various literatures witness that Gambella region is a flood prone area which is always affected by the seasonal floods in the months of heavy rains in every year (DPFSA, 2016). According to UNDP Emergencies Unit for Ethiopia (UNDP-EUE, 1996), the major rivers causing flooding in the region are the Gilo, Baro and Akobo rivers which started to overflow every year in June due to continuous heavy rains in the central highlands. The same is true, the assessment results show that heavy rainfall both in the central high land and local area were the root causes of recurrent flooding as indicated as follow:

> *In Anywaa zone which includes Gambella Zuria, Gog and Jor districts, the intensity of the rains became very high starting from end of July up to mid of November which caused flooding. And this resulted in displacement, damage to crop production, death of livestock, food insecurity and so forth.*
>
> Early Warning Officer at regional (2020)

However, the KIIs results with RDPFSA show that the agency didn't work on preparedness prior to flood hazard. In this regard, lack of training, local investment, local media and disaster preparedness being provided for better community's resilience were the major factors. In addition to that poor integration of stakeholders and lack of budget were also revealed by the participant as constraints in making good preparedness. The Key Informant has forward his argument as follow:

> *Most of the time, when the national meteorology Agency forecasts the early warning regarding the upcoming flood hazard we do not make ourselves ready to confront the potential damage brought by flood in the people. This is happens always due to the fact that the nature of the settlement pattern of the people make them vulnerable to hazard; because, most of the villages are being settled closely along the rivers banks. As a result, people are always suffering from annual flooding because they reside in flood prone areas; no matter how the early warning system department keeps updating the people with available information, there will be no place for evacuation.*

On contrary, the informant has revealed that the reluctance and irresponsiveness of the local government toward the recurrent flooding hazard which have significantly impacted the life of many residents, particularly in the district and the region in general. The key informant went further by disclosing that preparedness and prevention which may include contingency plan and reserved budget for emergency are out of the activities under flooding response strategies in the region. Not only that, but also the issue of response has been viewed by the government as if the mandate and primary responsibility of

regional disaster prevention and food security Agency (DPFSA) and Humanitarian Agencies only without their involvement as presented in the following:

> *On the other hand, the government did not take primary responses such as natural disasters in different ways. First, unlike other regional states of Ethiopia, Gambella regional state does not carry out preparedness activities such as contingency plan and budget for the upcoming disaster like flood so as to reduce it impacts on human life and properties. Second, while the government failed to allocate sufficient budget to us that could accommodate the disaster response, the regional government viewed the issue of disaster response as the mandate of RDPFSA and humanitarian assistance agencies only without their intervention which is totally contradict with the humanitarian assistance law that say "the primary responsible body for any hazard threat to human life is the government rather than the humanitarian assistance agencies". So, when the problem goes beyond their capacity then the humanitarian assistance agencies could intervene as a means of supporting the government in relief of the victim's population. But, here in Gambella, things are going and doing in the opposite direction.*
>
> DPFSA- Early Warning Officer at regional (2020)

4.5.2. Emergency intervention to the affected community during flooding

Emergency intervention is an urgent and critical plan for and reduces disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and ecosystems; and thus strengthen their resilience (UN, March, 2015). In this study, the researcher has attempted to look into the major kind of emergency intervention being provided by either local government or humanitarian organizations based in the region in saving the life of the flood's victims.

In this regard, most of them revealed that the emergency intervention deployed by their respective organizations were more likely Non-food items (NFIs) in addition to the provision of medication for both human and livestock during the hazard period. According to key informant from Water resources and irrigation development bureau, water purification of chemicals, soaps, water storages and collection containers were being provided in collaboration with WASH cluster as expressed as follow:

> *Actually, there is no effective strategy being taken by the water and irrigation resources development bureau for the flood victim. But, the bureau has to do only with supply of Water purification chemicals and maintenance of existing non-functional water schemes in the storm areas……. In the case of service delivery approach, the water bureau has collaborated with WASH cluster, international partners/humanitarian agencies in order to find financial resources so as to maintain the non-functional water schemes, provision of non-food items like purification chemicals, soaps, and water storage and collection containers.*
>
> Water Resources Administration officer at regional level (2020)

In addition to that, the emergency response report in Jor district shows the exhaustive list of NFIs and WASH distributed by Action Against Hunger to the affected population in 8 Kebeles of Thoo area of the district. This was characterized as the most highly vulnerable area to flood hazard in the district. This intervention was targeted a maximum of 986 households as beneficiaries as indicated here in the following table:

Table 4.5.2: The list of NFIs and WASH materials distributed to the flood victims in the study area

S/No	Description	Unit	Quantity requested Per HH	# of house holds	Total quantity
1	Plastic sheeting/tarpaulin	Pcs	2	850	1700
2	Rope Min 20m, 6-14mm	Pcs	1	850	850
3	Blankets	Pcs	2	850	1700
4	Plastic mate	Pcs	2	850	1700
5	Long Lasting Insecticide Treated Nets (LLITNs)	Pcs	2	850	1700
6	Plate	Pcs	2	850	1700
7	Cup	Pcs	4	850	3400
8	Cooking pot	Pcs	1	850	850
9	Kettle or Jug (2l)	PCs	1	850	850
10	Cooking Ladles	PCs	1	850	850
11	Jeri can 10 liter	PCs	1	850	850
12	Ladel Stainless Steel	PCs	1	850	850
13	Laundry Soaps	PCs	12	986	11,832
14	Bathing Soaps	PCs	12	986	11,832
15	Washing Basin	PCs	1	986	986
16	Bucket 20 liter	PCs	1	924	924
17	Jerri can 20 litter	PCs	1	1078	1078
18	Water Purification /Bashan Gari/	PCs	60	986	59,160

Source: Progress report by Action Against Hunger on Emergency flood response in Jor (2020)

Moreover, the participants mentioned that the emergency medications were also being provided to those affected communities. Accordingly, the key informant from the health bureau has revealed that emergency drugs were distributed to those affected populations including the tablets which are used to treat water for drinking at home. In addition to

that, nutrition support was also addressed with the collaboration with UNICEF. However, meeting the above mentioned needs of the affected population was very challenging as revealed by the experts at the frontline and FGD 2 participants in the study area. This is because of the inaccessibility and dysfunctional of the health facilities in these affected areas. Specifically, *"health infrastructures were full of water and no treatment as a result of spoiling of provided medications due to over coolness temperature for storages"* as stated clearly by the group participants here below:

> *It's become so difficult for the community to get access to health services especially during flooding. At this time, the vulnerable groups used to suffer a lot, mainly women and children, more than any other segment of the community. For example, during flooding, children are the most vulnerable to malaria, fever, coughing and others. So, in order for a health facility to seek treatment it's so troublesome due to the fact that the road is impassable and inaccessible to the community.*
>
> FGD 2 with community members (2020)

Therefore, the researcher found out the emergency food assistance to those flood affected populations was part of emergency intervention during flood hazard except for NFIs, WASH materials, emergency drugs/medications for those affected in the study area. According to a key informant from DPFSA, emergency food assistance is always delayed for more than 2 months without being received by the target population. This happened because the responsibility of the food security response was vested in the federal government and international donors as will be discussed later on. This was also true that as one of the community leaders from Twoho Kebele revealed the reluctance of government when the community got starved as follow:

> *When the flood submersed the whole village and displaced the residents to school for two months. The government responded nothing; even if we have been writing letters for support to the local government. None even a single official came to see our situation, leave alone providing food assistance.*
>
> Community leader (Kebele's chairperson) of Twoho Kebele (2020)

Likewise, the key informant from DPFSA has reaffirmed the delayed for response particularly, the food assistance to the target groups in need. According to him, the response management is operating out of the rule and regulation of humanitarian principle which stated that the victims of any hazard need to be reached within 72 hours. However, the food assistance toward flood affected population delayed for more than 2 months without delivery as discussed below:

> *As a matter of fact, until now there is no problem with the response, but, the main problem is that is delayed for almost 2-3 months. According to the law of response, when someone is victimized by disaster (e.g. being displaced) he/she is expected to get an emergency response within 72 hours. But, unfortunately, the response here in Gambella delayed for more than 2 months while the people are critically in need of urgent support. This is due to the fact that the government has vested the responsibility of humanitarian assistance in RDRMFSA and donor NGOs. Actually, it takes time for humanitarian assistance agencies to respond urgently due to the fact that they have to communicate with their head offices at the national level on the issue of budgeting and funding for the existence impacts; and in between that the victim's population suffered a lot as they received aid after rehabilitation on their own.*
>
> DPFSA- Early Warning Officer at regional (2020)

4.5.3. The recovery intervention/response strategies to the flood affected population

Early recovery interventions are a very important component of response strategies in rebuilding the livelihood of the community and also consider undertaking the necessary recovery programs, initiate restocking projects in flood affected communities (NDRM, 2020). In this study, researcher has tried to look into the early recovery intervention

activities carried out by stakeholders in rebuilding the community's livelihood both in the study area and region in general.

According to the key informants, the main early recovery intervention activities were basically the provision of seeds and food relief assistance in the post hazard period. This was because in the woreda the flood started in March every year when the community started crop plantation. Due to this, Jor has been at the forefront of food insecurity (Action against Hunger, 2020). As a matter of fact, a key informant revealed that food relief assistance delivery should be provided following the recession of flood water for consecutive six months. The relief assistance attempted to target all Kebeles in the district. And each household received 25KG of ration per month which is not satisfactory to feed the whole household members. As researcher observed, the beneficiaries from all kebeles were expected to come to the district's town in order to receive their food since there is no road network access in the area. With this regard, the implication of such intervention has nothing to do with alleviating the existing food insecurity unless some financial institutions are intervening in building up the economic capacity of the target population.

On the other hand, livestock treatment and vaccination also carried out by the office of Fishery and Livestock as part of the early recovery intervention. According to the head office of the sector, the mass vaccination and treatment was carried out after flooding hazards. In doing so, the medications were always provided by the National Veterinary Instituted in collaboration with the regional bureau of fishery and livestock. The Key informant went further by adding that restocking also could be done some time when needed.

> *Based on the problems being identified in livestock health situations, mass vaccination will be carried out mainly after flooding. We got vaccination medications from the National Veterinary Institute through collaboration with our office at the regional level. In case of huge death livestock in these flood affected areas, restocking would be the last option when needed.*
>
> Fishery and Livestock Bureau regional Head (202)

However, in terms of vaccination coverage for livestock, the same FGD participants argued that all livestock in the study did not receive vaccine due to road impassibility to the target areas and the short time limit for prepared medications for vaccination. The medications got spoiled before finishing the work. This is because the medications were prepared for a limited short period of time.

Furthermore, a Key informant from Education has revealed that the social infrastructures maintenance would be carried out in the post flood hazard in their respective sectors. Accordingly, the informant has reported that their office used to rehabilitate some damages school facilities by constructing temporary classrooms and providing school materials as presented here below:

> *Depending on the identified problems, we have employed the following response strategies to alleviate the existing problem. These are constructing temporary classrooms; providing educational materials; psychological support trip for key teachers to reach out for children*
>
> Curriculum Development and Implementation officer at regional Education Bureau (2020)

On the other hand, the key informant from water bureau has claimed that the sector used to carry out maintenance of non-functional water schemes in the stormed areas. According to him, the rehabilitation came after in the post flood period which involved the supplying of necessary chemicals and maintaining for non-functional water schemes as expressed here below:

> *Following the provision or supply of Water purification chemicals, maintenance of existing non-functional water schemes will be carried out in the stormed areas.*
>
> Water Resources Administration officer at regional level (2020)

Moreover, in response to the problem of road network access and transportation, the regional government has successfully bought two moter- boards for Jor and Akobo districts. Of course, these two districts were known for their disconnection with the world and poor infrastructure in the 21st century. Accordingly, the board was believed to solve

the fundamental problem of transportation of the population found on the lower Gilo River bank by using a navigation mood transport system. This motor- board was also a multipurpose for both food supplying and transportation as well as shown here below:

Figure 4.5.1: The Motor-board bought in response to the transportation problem facing by flood victims in the study area

Source: Social media (2020)

4.5.4. Strategic intervention and the roles of respective stakeholders

The strategic intervention is based systematic and well-designed institutional response strategies which used to take into account the response in term of short- term and long-term. According to results obtained from KKIs, there is no clear response activities being designed based on the phases of the flooding effects progression. The same is true, these respective sectors have no both short- term and long- term in their intervention. In this sense, the research results shows the main factors behind lack of strategic intervention are lack of commitment, poor leadership, lack of knowledge and lack of budget. Likewise, the respondents have expressed their concern has follow:

> *To be honest, the regional government has failed to allocate sufficient budget to DPFSA in order to accommodate the cost for flood hazard response. Rather, the government viewed the issue of flood hazard*

response as the mandate of DPFSA and humanitarian assistance agencies only without their involvement; which is contrary to the humanitarian assistance law which say "the primary responsible body for any hazard threat to human life is the government rather than the humanitarian assistance agencies".

DPFSA- Early Warning officer (2020)

Moreover, the issue of hazards intervention is believed to a collective responsibility of various respective stakeholders working on humanitarian assistance. However, the results have revealed that the sense of responsible body on flooding response is loos mainly between the governmental concerned sectors and humanitarian assistance organizations. There is a gap in defining who the primary concerned body is really when it came to response/intervention toward the flood effects on the lives of the people. In this regard, the regional government has been witness that it lack commitment and so reluctance in taking lion share and taking lead toward positives response. On the other hand, the humanitarian assistance organizations are criticizing the government for not discharging their responsibility as a primary responsible; rather, the government itself is looking for humanitarian organizations to take the full intervention with the resources at the disposal as presented here below:

"According to the humanitarian's law "the primary responsible body for any hazard that threatens human life is directly a concern of the government, rather than, the humanitarian assistance agencies'. So, when the problem goes beyond their capacity, then, the humanitarian assistance agencies could intervene in supporting the government in order to relieve of the hazards victim's population"

WFP program officer (2020)

Therefore, the failure in having strategic intervention and active stakeholders in the region in general and in the study area in particular is the collective results of lack of commitment, sufficient resources, technocrat leaders, and integrated or collaboration among the respective sectors and stakeholders on the ground as discussed below the next sub-topic.

4.5.5. The collaboration between government and humanitarian organizations

Any hazard disrupting the social life of a given community is the common concerned for both government and humanitarian organizations available in that area. In this regards, it was became important for the researcher to assess the extent of collaboration among government sectors and concerned humanitarian organizations on the issue under investigation. According to almost all key informants, there was significant inter-sectoral collaboration among both government and non-governmental institutions basically on flood impacts assessment and response strategies in these affected areas.

However, the researcher found out that the collaboration was limited at both federal and regional levels. There was no single humanitarian organization working in the frontline with the community except Action against Hunger currently in this year. Instead, these concerned humanitarian organizations donated the fund to the government and then the NDRM or DPFSA will facilitate the process of resources utilization at the disposal either independently or in collaboration with partners. Accordingly, the key informant from DPFSA has described the process of roles distribution between the local government and partners' humanitarian organization in response towards any disaster affecting the life of the people as follow:

> *Next to that the comprehensive report can be prepared and it will be given to donors based on the response cluster of concerned donors. For example: concerning food insecurity, it's directly related to federal support; with health issues, it is UNICEF that must deal with it; and with political issues, IRC, ZOA, and the like based on their respective response clusters.*
>
> DPFSA- Early Warning officer (2020)

On the other hand, the key informants from government and NGOs expressed their concern that there is weak participation of some humanitarian organizations resulting from less accountability taken by the government on hazards response as a common goal. As a matter of facts, the reluctance by government manifested among the top managerial

bodies at the regional level. They don't allocate sufficient budget in order to make timely and effective responses to the affected community. The key informant as expressed the lack of readiness shows by the local government in many ways as follow:

> *On the other hand, the government did not take primary responsibility for disaster responses like natural disasters in different ways. First, unlike other regional states of Ethiopia, Gambella regional state does not carry out preparedness activities such as contingency plan and budget for the upcoming disaster like flood hazard so as to reduce its impacts on human life and properties. Second, while the government failed to allocate sufficient budget to DPFSA which could help to accommodate the disaster response, the regional government viewed the issue of disaster response as the mandate of DPFSA and humanitarian assistance agencies only without their intervention, which totally contradicts the humanitarian assistance law. According to the law "the primary responsible body for any hazard that threatens human life is directly a concern of the government, rather than, the humanitarian assistance agencies'. So, when the problem goes beyond their capacity, then, the humanitarian assistance agencies could intervene in supporting the government in order to relieve of the hazards victim's population. But, here in Gambella, things are going and doing in the opposite direction.*
>
> DPFSA- Early Warning officer (2020)

Moreover, poor infrastructures especially, road inaccessibility has been mentioned by some experts from NGOs as the main constraints for direct intervention expected from them to the flood victims in the frontline. Therefore, in order to resolve the above mentioned problems and ensure sustainable development in the study area the government has to take a lion share commitment so as the donors could get moral to work with them collaboratively. Here below was their concern:

> *The Jor woreda was neglected due to the inaccessibility problem. There are natural and manmade disasters in the area every year which*

need NGO's intervention, but due to lack of infrastructures' in the woreda NGO's couldn't manage to go there to intervene. During this flood emergency, Action Against Hunger is the only INGO which responded to this disaster.

Action against Hunger- community advisor's report (2020)

Moreover, another key informant from World Food Program (WFP) similarly expressed his view on how the government shows weak commitment and reluctance in the process of flooding response. Accordingly, the poor coordination and commitment showed by UN agencies and other NGOs from the local government have led them to take part below the expected position; as presented in the following statement:

Off course, there are constraints in the region that need to be addressed first, especially the regional government should strongly lead the coordination to mobilize the resources in order to strengthen the reluctance/less participation of UN and other NGOs Agencies in the Regional development is the main problem.

World Food Program- Program manager (2020)

6.1. Discussions

Jor district is known as the most flood prone area in the region. Its susceptibility nature to recurrent flood hazards has attracted the attention of researcher to conduct this study on the effects of flooding on rural population and the possible response strategies being provided by the community themselves and the local government as well as humanitarian organizations to the population in the flood prone areas in the district. While understanding the effects of flooding on community lives was the important in this study, the main focus was devoted on response strategies which had aimed at examining how the low socio-economic status of the target population influence the community and institutional based flood response activities toward flood hazards.

This study revealed that residing in a flood prone area was the root cause of vulnerability (68.8%) for the targeted population toward the recurrent flood hazard. Whereas, on the other hand, the participants revealed that lack of capacity for resilience, poverty and lack

of alternative livelihoods were the underlying sources of their vulnerability which comprised 58.4%, 46% and 46.4% of the total respondents respectively. This means that the communities living in the flood prone areas of the study area have been exposed to the recurrent hazard which makes them physically and socially vulnerable. The findings of this study also go hand in hand with the following literatures. The HPN (2014) argued that the impact of the disaster is greatly inclined by the degree of the community's vulnerability to the hazard.

Accordingly, this vulnerability is not only natural, but also it could also involve the human dimension which may result from the whole range of economic, social, cultural, institutional, political and even psychological factors that shape people's lives and create the environment that they live in. On the other hand, the study conducted in Ethiopia by Zerihun (July, 2008) particularly in Dembia district of northern Gonder Zone part of Amhara National Regional State, found out that the population pressure and associated farmlands expansion has brought people close to the Rivers which make them more vulnerable to flooding. This was true according to the anthropologist Kurimoto (1996), who studied the subsistence economy of the Anywaa (Anuak). In his book, he refers to the Anywaa people as "People of Rivers or Riverine people "because, their subsistence economy is attached to the rivers. Agriculture on the riverbank provides a very stable and productive food supply. The river is also the place where fishing is conducted. Hunting is carried out in the dry season, when wild animals migrate to the riverine area in search of water and pasture. Cattle are transferred there in the dry season for the same reason. Many edible plants are also collected on the riverbank and riverine area. Thus, the riverine characterization of Anywaa people in general and Jor district in particular has made their settlement pattern to be along the rivers banks and which eventually made them vulnerable to flooding up to date.

On the other hand, with regards to the significant effects on the community living in the flood prone areas in the study area, the results of this study revealed that 56% of the respondents felt that their crop production and food security has been negatively affected by flooding. While in the study 90.8% confirmed that crop production was their main source of food/income. Accordingly, the main staple food was reported to be Maize and Sorghum which counted 94% of the total households surveyed in the study. This is

followed by sweet-potato and Cassava as the main staple food in the study area which consisted of 12.4% of the total Survey. The study findings by P. Mwape (2009) in Namibia, confirmed the above findings that the most staple food for households (94%) indicated that their crop fields were damaged by floods. Further, he empirically indicated that the crops which were damaged by floods, most of it (92%) was the main staple crop (maize) which was followed by Sorghum at 29%. Similarly, Zerihun (2008) in Ethiopia also in his study revealed that most (64%) of the respondents reported that they have lost various types of crops to flooding. Hence, the effects of flooding on livestock have also been witnessed in this study. 48% and 32% of the respondents revealed that livestock were severely affected by flood hazard at least 1- 5 and 6- 10 livestock approximately have been losses during. According to the study's results, livestock counted 49.4% as the main sources of income in the study area. In this regard, Lammy et al. (2012) in their study found out that disease and parasite outbreaks, is one of the major factors affecting livestock production. Several cases of unhealthy livestock were reported by local residents, with 68% of the households confirming cases of affected livestock soon after flooding. In addition to that, flood has also affected housing, with 56% of the households confirming a significance effects on housing by submerging their houses; and displaced over 7000 people in the district in the study this year (NDRM, 2020). The literature shows similar results on the negative impacts of flooding on communities' lives and their livelihoods as follows. The findings by Gizachew (1999), in Gambella revealed that the inundation of water in the plain area of the region has caused remarkable damage both to human and animal lives. As a result, huge numbers of people had migrated to the neighboring villages and districts in search of shelter for existence either temporarily or permanently.

Furthermore, 76.4% of the respondents revealed that the flood has affected the services delivery (mainly drinking water schemes, education, and health and transportation services) in the community severely by facts that social services delivery provision completely impossible during flooding. In this regard, most of the respondents revealed that their main sources of drinking water included shallow-wells, River, and Boreholes as well. And the flooding used to affect these sources significantly which accounts for Contamination of the existing water supply sources. The finding by Shifidi (2014) has

confirmed the current finding that 71% of the households indicated that their main source of drinking water was the river followed by borehole and dambo at 13% and 9% respectively. In the case of Education, significant educational system disruption has been revealed during the study which included scholastic materials destruction, high rate of drop-out, late school attendence by children whose ages were ready for school, lately opening and early closing of schools despite the National calender in the study area. The same is true, the health system was one of the affected by recurrent flooding in the study area. Basically, road accessibilty was found out as the main challenges for ensuring health system in the area; despite, the dysfunctioning and inaccessibility of the existing health facilities in the study area. As a result, this has been attributed to the high mortality rate of children under five and women due to the fact that the antenatal care and delivery at facility implementation was impossible and unattainable in the study area. So, such disruption of social services as a result of recurrent flooding has been confirmed by the following literatures. The study by Mwape (2009) showed that 38% of the sampled households indicated that school going children experienced disruption due to floods. The disruption was attributed to various reasons such as the road being impassable (32%) and the school being submerged (9%). On the health issues, with accessibility to health facilities interrupted and no ante-natal care, some pregnant women reportedly resort to potentially unsafe home deliveries during floods with assistance from inexperienced residents. The infants do not receive immediate medical attention which may be necessary. Home deliveries in the area are however not completely unusual, and in some cases, they are preferred over hospital births (Shifidi, 2014).

Moreover, regarding the response strategies being taken by the victim's communities, the local government and the humanitarian organizations in the study area, the study results revealed the Institutional based preparedness was very low in the study area and regional level in general. In this regard, early warning and public mobilization (training provision) consisted of 3.6% and 0.8% of the total respondents respectively. While at the local level, the community engaged in cultural preventive measures which constituted 96.4% of the respondents involved in technical and economic activities as response strategies. The technical part involved building dykes along the farm and village in which individuals and the public took part respectively. On the other hand, economical activities were

intensive fishing, gathering of wild vegetables, mutual support through social networks have been witnessed in the study area. In the case of intensive fishing, it's always being carried out during the dry season as a means of preparation for the prior flooding hazard which has both consumption and trading values. Whereas, the collection of wild vegetables and mutual support are being conducted immediately during flooding when they are starved as a result of crop destruction. Likewise, different literatures have confirmed the following: According to E. Kurimoto (1996), both fishing and hunting are carried out in the dry season and are important means for supplying protein in the Anywaa diet. In the dry season, when the water level decreases, fish return to the main stream from tributaries, flooded plains and pools. 'Anywaa fishing methods take advantage of this seasonal migration. The fishing methods (Mai) are done collectively in pools. Then fish are killed with fishing spears and sticks. Surplus fishes were mainly dried (peeto) and smoked (Nginyo) and then preserved because they have high trading values. On the other hand, Kurimoto has also found out that gathering edible wild plants have still plays a significant role in Anywaa subsistence. These edible wild plants may be classified into three categories: (1) herbs and leaves cooked in soup, (2) fruits eaten as snacks by children, and (3) tubers, fruits and seeds cooked as a substitute for staple food. During famine, more wild plants are collected eaten.

Meanwhile, with regards to institutional based response, Sendai Framework (the framework for Disaster Risk Reduction 2015-2030) was adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015 with the vision toward achieving Sustainable Development Goals by 2030. In doing so, many analysts have recognized the most significant shifts as a strong emphasis on disaster risk management as opposed to disaster management, the definition of seven global targets, the reduction of disaster risk as an expected outcome, a goal focused on preventing new risk, reducing existing risk and strengthening resilience, as well as a set of guiding principles, including primary responsibility of states to prevent and reduce disaster risk, all-of-society and all-of-State institutions engagement (UNISDR, 2015). The framework was mainly aimed at tackling any possible hazards including flooding hazard primarily by state institutions while building resilience capacity among those affected communities.

However, in the current study, the results revealed that there was weak effort made on preparedness and preventive measures by concerned state institutions (National Meteorology Agency and Disaster Prevention and Food Security Agency) in the region in general and in the study area in particular. In the study, the major factors which have contributed for the failures of the above mentioned institutions were the nature of settlement pattern in the study area, poor integration of multi-sectoral approach, lack of budget, training to update the community with available information, local media to advocate on the issue, and local investment towards recurrent flooding hazard. This contrast with the Sendai framework's core emphasis on the urgent and critical anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and ecosystems, and thus strengthen their resilience (UN, March, 2015).

Following the absence of preparedness and preventive measures prior to the occurrence of the hazard, the results of the current study shows that the flooding emergency response toward the affected population has always been lagging or delayed for more than two months following the hazard incidence. In between the flood incident and the response delivery period, the flood victims' population got starved significantly. As a result, they tend to rely on social networks and edible wild plants as coping mechanisms to food insecurity. In addition to that, currently the members of the district in diaspora have organized fundraising and provided one time food aid in response to the starved flood's victims in the study area.

Moreover, the study showed that the regional and national governments through the donation and support from the international humanitarian organizations provided None Food Items, WASH materials, medications, vaccination (for livestock) and food relief (for consecutive six months) to the affected population. However, the researcher revealed that there was no single humanitarian organization and assistance in the study area to address the humanitarian need of the flood's victims. And the response activities being carry out by the stakeholders revolved around the emergency response rather than building resiliency and reducing existing flood hazard and vulnerability among the flood affected population in the study area. The readiness, inter-sectoral integration and the timely nature of the response strategies by concerned bodies was merely against the

National policy and strategy on disaster risks management which envisioned the reducing and eventually preventing disaster risk and vulnerability, building resilience to withstand impacts of hazards and related disasters, and, through provision of appropriate and timely response, minimizing potential losses from disasters by establishing a comprehensive and coordinated disaster risk management system (FDRE, 2013).

CHAPTER FIVE

5. Conclusion and Recommendations

5.1. Conclusion

This study was intended to investigate the impacts of flooding on the rural people and the possible response strategies being employed to alleviate the flood hazard being faced in the flood-prone areas of Jor district, Gambella Regional State, western Ethiopia. In this regard, much attention has been devoted to investigating the contribution of low socio-economic status of the target population on flooding response in fixing and alleviating the possible impacts of the flood hazard.

In this study, the effects of flooding on social lives of the targeted population has confirmed that the recurrent floods affected the over livelihood system of the affected community. As the flood hit the source of livelihood, community situation became deteriorated as a result of food insecurity, inaccessibility and dysfunctionality of the social services as well. According to the results obtained from the study, the effects of flooding in the area led displacement, damage of field-crops, and death of livestock and blocked the delivery of social services. However, the reason for their vulnerability is inseparable from the physical landscape of the area and lacks of economic capability were the main underlying causes.

Beside this, the level of community based response and coping mechanisms to such deteriorated effects of flooding was basically lagging and more of back-warded in nature. The results from the study show that the community responded from both materially and technically as well. The former, confirmed that the community do make preparation ahead of the flood incident by carrying out intensive fishing and collecting wild vegetables aftermath as well. Whereas the later, shows the immediate response carry out during onset of the hazard by building dykes alongside the field-crops either publicly or privately. However, this community based response and copping mechanism doesn't improved the existed situation in either ways. Therefore, the level of coping mechanisms played at the community level has nothing to do with flooding effects reduction; rather, it

is only help the victims' population to survive in the face of this recurrent flooding effects with food insecurity it imposed on their life.

Moreover, with regard to the role of institutional strategies toward the flood affected community, the results shows that there was a lack of prepared systematic disaster reduction management system (which include lack of preparedness, prevention, mitigation and recovery as well) across different levels under regional structure. In addition, inaccessibility of the study area due to its poor infrastructures, make it much difficult for humanitarian assistance organizations to intervene and delivery the support expected from them. As results, the study has revealed that there is no humanitarian organization operating in the area in response to the effects of recurrent flooding on the targeted population.

5.2. Recommendations

Based on the study's findings on the issue under investigation, the researcher has suggested the following recommendations in order to bridge the knowledge gaps and ensuring effectiveness response which will alleviate the effects of recurrent flooding in the study area. These recommendations are categorized into two parts as follow:

Part I: Non-structural mitigation measures

- Empowering the capacity of DRM's steering committees to be able to provide effective public training, flood forecasting, flood warning, emergency planning and situation analysis in the study area. This will help the targeted population to stay updated prior to flood hazard on their life aspects.
- The government needs to allocate sufficient budget to regional disaster prevention and food security agencies so as to ensure effective preventive measures on flooding hazard.
- The collaboration between the government and humanitarian organizations need to be more tightened from the federal level up-to the district level.
- The concerned humanitarian bodies on flooding hazard need to make a direct intervention at district level by working harmoniously and monitoring the humanitarian need of the flood victims' population closely in the study area.

- ❖ Crops diversification in the study area is need to be introduced by government and other concerned bodies especially, these crops with the capacity of flood resistance

Part II: Structural mitigation measures

- ❖ The government and other stakeholders should remain committed and create a conducive environment by installing road connections in the study area so as to make the flood's victims communities accessible for situation analysis, humanitarian assistance as well as overall intervention coordination.
- ❖ The government should take a strong hole by closing these water-releasing outlet streams on the River's bank so as to avoid the release of high amounts of water discharge from the river. If this is going to be done successfully, the risk of flooding and the high level of flooding impacts will be easily reduced as much as possible.
- ❖ If this should not work effectively, the government and other concerned humanitarian projects also need to build concrete dykes and flood canals along the Gilo River.
- ❖ Finally, as the last option, the government at both national and regional levels should join hands to build Dam or reservoir from the upper stream of Gilo River which will help to reduce the flow of water during the rainy season. This will ultimately make the community safer, especially those living in the flood prone areas will be free from any possible flooding's risk.
- ❖ Moreover, when the structural mitigation measures have done successfully, these multidimensional flood impacts and the existence constraints (inaccessibility) to provide effective flooding response will be addressed fundamentally.

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Appendices

Appendix A: Questionnaire for household heads' survey

Addis Ababa University

College of social sciences

Department of sociology

Survey Questionnaire for Household Heads

Drear Respondent:

The purpose of this research is to assess the impacts of flood on the rural people and the response strategies in the flood prone areas of Jor district. The result of the study is expected to indicate how the nature of socioeconomic status can affects the flood hazard's response strategies of people living in flood prone areas which will in turn helps to provide necessary suggestions or recommendations on how to tackle their problem. Your experiences and exposures to the issue under investigation are worthwhile for this study; and I'm confident that you have appreciate the effort and cooperate by offering accurate information and frank responses**.**

Thank you so much for your tireless cooperation

Structured Survey Questionnaire for Household Heads

A. Household information profile

A. **Date of interview**_____

B. **Kebele's Name**:_____

C. **Sex**:
1. Female
2. Male

D. **Age**: _____

E**. Religion**:
1. Protestant,
2. Catholic,
3. Orthodox,
4. Islam.

F**. Marital status**:
1. Married,
2. Polygyny,
3. Divorced,
4. Separated,
5. Widow.

G**. Level of educational attend**:
1. Able to write
2. Unable to write
3. Primary completed
4. Secondary completed
5. Diploma holder

H**. Occupation**: 1. Farmer.
2. Trader
3. Professional worker
4. Laborer

B. Main Questions for household heads

1. What are the main sources of income or food?
   A. Crop production
   B. Trading
   C. Livestock keeping
   D. Fishing

E. Laborer

F. Salary

2. What is the main staple food crop production cultivated in your locality?

   A. Maize and Sorghum

   B. Rice

   C. Wheat

   D. Sweet potato and cassava

3. How do you measures the impact of flood on people's live based on the following table (indicate your answer with marking x sign)?

	No effect	Slight affected	Severelyeffected	entirely destroyed/collapsed
Crop production				
Livestock				
Housing				
Service delivery				

4. What do you think as the underlying causes or sources of vulnerability?

   A. Residing in a flood prone area.

   B. Poverty

   C. Lack of alternative livelihood

   D. Lack of capacity for resilience

5. In which manner do you prevent yourself prior to the occurrence of flooding hazard?

   A. Receiving early warning information from government institutions

   B. Using cultural preventive measures

   C. Public mobilization through training

6. What are the types of coping mechanisms were employed?

   A. _____

   B. _____

   C. _____

   D. _____

E. _____

F. _____

7. Any external emergency support you have received?
   A. Yes
   B. No
8. If so, specify source of emergency support you have received which helps you to cope up with the impact of flooding hazard?
   A. Social network
   B. Government Agency
   C. NGOs
   D. Religious organization
9. What were the types of support being provided to you?
   A. Shelter
   B. Financial gift
   C. Money borrowed
   D. Food assistance
   E. Material assistance
10. Any preventive measures being done in your local area to ensure that the flooding is not severely affecting the community live and livelihood? (please, provide the detail information in the following table)

Preventive measures	***Preventive actions***
1. To protect inundation of houses	A. _____ B. _____ C. _____ D. _____
2. To protect household properties from flood damages	A. _____ B. _____ C. _____ D. _____

3. To protect standing crops from flood damage	A. _____ B. _____ C. _____ D. _____
4. To protect cattle	A. _____ B. _____ C. _____ D. _____
5. To protect fowl from flood damage	A. _____ B. _____ C. _____ D. _____

Appendix B: Interview Guide for Key Informant in government sectors and NGOs

Addis Ababa University

College of social sciences

Department of sociology

Interview Guide for key informants

This Key informant's interview guide is designed to collect information for the study entitled as *the impacts of flooding on the rural people and response strategies in the prone areas in Jor district of Gambella, western Ethiopia.* The purpose of this research is to assess the extent and effectiveness of response strategies being employed in the flood prone areas of Jor district. The result of the study is expected to indicate the significant response strategies to flood on rural people's socioeconomic status which will in turn helps to provide necessary suggestions or recommendations on how to tackle their problem. Your knowledge and understanding on the experiences and exposures to the issue under investigation are worthwhile for this study. The information you provide will be used only for research purpose and you are guaranteed that the researcher has no any other hidden agenda. Accordingly, you're cordially requested to freely respond to the questions presented by the interviewer. Hopefully, I'm confident that you have appreciated the effort and cooperate by offering accurate information and frank responses during the interview session**.**

Thank you for your tireless cooperation!!!!

Interview Guide for Key Informant in government sectors and NGOs

Sector: _____

Date of Interview: _____

Name: _____

Organization: _____

Position: _____

Dear key informant, you are cordially requested to answer the following questions?

1. How do you see the effects of recurrent flooding hazard on the rural people living in the flood prone areas?

   _____

2. Taking into account the devastative nature of flooding on community lives and livelihoods, any situational analysis being conducted for flood hazard in these affected districts?

   _____

3. If so, what are the major activities being carried to find out the real situation of the target population?

   _____

   _____

   _____

4. What were the flooding impacts and problems being identified in line with your sector/organization areas of concerns?

a. _____
b. _____
c. _____
d. _____
e. _____

5. Based on the major identified problems, what were the response strategies being employed on your part in tackling the existing community problem?
6. What are the major strategies your organization/sector to alleviate the devastating impact of flooding on socioeconomic activities in communities impacted by flood

_____

_____

_____

_____

_____

_____

_____

_____

_____

7. What service delivery approaches applied by your organization/sector in responding to flooding effects

_____

_____

_____

_____

_____

_____

Response strategies based on the sequences phases of flooding hazard		
Hazard phases	**Short- term response strategies**	**Long- term response strategies**
1.Before flooding		
1. 2. 3. 4. 5.	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
2. during flooding		
1. 2. 3. 4. 5.	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
3. after flooding		
1. 2. 3. 4. 5.	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____ _____ _____

8. While implementing and coordinating these response strategies, any humanitarian agency or government sector you are in partner with in achieving the common milestone? Who are these partners?

   _____

   _____

9. Does the above mentioned response strategies help your organization/sectors to lift up the flood affected community from the impacts of flood hazard sustainably or durably?
10. If your answer is yes, what are the indicators that can prove it?

    _____

    _____

11. If your answer is "No", what are the major constrains which challenge your organization/sector to do so?

    _____

    _____

    _____

12. Above all, does your response strategies gave due emphasize on the people of low socio-economic status by making them so resilience in the face of such hazard?

Appendix C: Focus group discussion (FGD) Guideline

Addis Ababa University

College of social sciences

Department of sociology

Focus group discussion (FGD) Guideline

Drear Participant/s:

This Focus group discussion (FGD) guide is designed to collect information for the study entitle as *the impacts of flooding on the rural people and the response strategies in the flood prone areas of Jor district of Gambella, western Ethiopia.* The purpose of this research is to assess the extent and effectiveness of response strategies being employed in the flood prone areas of Jor district. The result of the study is expected to indicate how the nature of socioeconomic status can affects the flood hazard's response strategies of people living in flood prone areas which will in turn helps to provide necessary suggestions or recommendations on how to tackle their problem. Your knowledge and understanding on the experiences and exposures to the issue under investigation are worthwhile for this study. The information you provide will be used only for research purpose and you are guaranteed that the researcher has no any other hidden agenda. Accordingly, you're cordially requested to freely respond to the questions presented by the moderator. Hopefully, I'm confident that you will provide the required data and I would appreciate the effort and cooperation for offering accurate information and frank responses during the interview session**.**

Thank you so much for your tireless cooperation

FGD participants (Comprised of section of the community from different background)

Name	Organization	Position

Flooding impacts

1. Is the flooding the top prioritize problem in this district/community?
2. Do you think that these adverse impacts can be extended to social services function and accessibility on the following areas please?
   A. Education:
   B. Health:
   C. agriculture and livelihoods**:**

What are significant impacts of flooding on agriculture and livelihoods activities?

Response strategies or coping mechanisms

What are the problems encountered by community in responding to food insecurity either during or after flooding?

   D. Road and transportation Networks:
   E. Demographic**:**

3. Since then, is there Respond and adjustment had been made to address flooding impacts?

Appendix D: Key informants profiles

S/No	Name	Sex	Organization/Sector	Position	Administration Level
1	*Mr. Abduraman*	*M*	*Agriculture and Natural Resources Bureau*	*Officer*	*Regional Level*
2	*Mr. Dingor Ojulu*	*M*	*ZOA*	*Monitoring and Evaluation*	*Regional*
3	*Dereje Tefera*	*M*	*Education Bureau*	*Curriculum Development and Implementation*	*Regional*
4	*Nhiel Biel*	*M*	*Water Resources and Irrigation Development Bureau*	*Water Resources Administration*	*Regional*
5	*Thok Makuach*	*M*	*Health Bureau*	*Public Health core Officer*	*Regional*
6	*Okello Owiti*	*M*	*World Food Program (WFP)*	*Program Unit-Monitoring Assistant*	*Regional Sub-office*
7	*Mekiyu Jemal*	*M*	*Action Against Hunger*	*Nutrition Program Manager*	*Sub-office*
8	*Jieng Nhial*	*M*	*Norwegian Refugees Council (NRC)*	*Monitoring and Evaluation officer*	*Sub- Office*
9	*Okoth Odol*	*M*	*Action Against Hunger*	*Community Advisor*	*Sub- Office*
10	*Anteneh Tesfaye*	*M*	*Fishery and Livestock Bureau*	*Head*	*Regional*
11	*Seifu Wolde*	*M*	*DPFSA*	*Early Warning Officer*	*Regional*
12	*Lam Omod*	*M*	*Fishery and Livestock Bureau*	*Animal Health core process officer*	*District*
13	*Omod Olock*	*M*	*Education Bureau*	*School's supervisor*	*District*
14	*Deng Obuthi*	*M*	*Shentoa 01Kebele administration*	*Kebele's Chairperson*	*Kebele*
15	*Obang Olegn*	*M*	*Twoho Kebele administration*	*Kebele Chairperson*	*Kebele*