

ADDIS ABAB UNIVERSITY

SCHOOL OF GRADUATE STUDIES

**WOMEN AND CLIMATE CHANGE: CHALLENGES AND ADAPTATION
STRATEGIES IN CHOKE MOUNTAIN**

BY:

YARED GEBREMEDHIN GEBREHIWOT

JUNE 2014

ADDIS ABABA

**WOMEN AND CLIMATE CHANGE: CHALLENGES AND ADAPTATION
STRATEGIES IN CHOKE MOUNTAIN**

BY:

YARED GEBREMEDHIN GEBREHIWOT

*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 ART IN SOCIAL ANTHROPOLOGY*

ADVISOR: MERON ZELEKE (PhD)

DEPARTMENT OF SOCIAL ANTHROPOLOGY

COLLEGE OF SOCIAL SCIENCES

ADDIS ABABA UNIVERSITY

JUNE 2014

ADDIS ABABA

**WOMEN AND CLIMATE CHANGE: CHALLENGES AND ADAPTATION
STRATEGIES IN CHOKE MOUNTAIN**

BY:

YARED GEBREMEDHIN GEBREHIWOT

Approved by board of examiners

Advisor

signature

Internal examiner

signature

External examiner

signature

ACKNOWLEDGMENTS

For the effective accomplishment of this thesis, there are few people I would like to thank, for encouraging me to work hard from the beginning to the accomplishment of this thesis.

First and foremost, I am deeply grateful and indebted to my adviser, Dr. Meron Zeleke, for her valuable suggestions, friendly approach and precious comments during conducting the research.

I am deeply grateful to Kiya Gezahegne and Endeshaw Belay for their constructive suggestions before and during conducting the thesis.

I would like to extend my special thank to Dr. Belay Simane for his unreserved financial support through the climate change project.

I am also indebted to thank my brother Ermias Gebremedhin for his brotherly and friendly support. My Special gratitude appreciation extends to YemataWork, Tirfe, Tesfay and his with his wife Haregeweyn, Ebba, Yerosan, Andualem, Dagne (Bibugne woreda Agricultural officer), and Chang Jin-ho.

At last not least my special thanks goes to the *woreda* and *kebele* administrators, officers, community members of the study area and participants, of the study and to all who contribute for the completion of the Thesis.

LIST OF TABLES AND FIGURES

LIST OF TABLES AND FIGURES

PAGE No

Table 1: Land Cover of <i>Bibugne woreda</i>	25
Table 2: Soil Type in <i>Debregiyorgis kebele</i>	26
Table 3: Livestock Population of <i>Deberegiorgis Kebele</i>	27
Figure 1: Map of <i>Bibugne Woreda</i>	22
Figure 2: Community map of <i>Debregiorgis kebele</i>	24
Figure 3: Household structure in <i>Debregiorgis Kebele</i>	119
Figure 4: Some part of the study area	119
Figure 5: Effect of climate change on agricultural productions	120
Figure 6: Ice Fall	120
Figure 7 : Climate Change Impacts On Bean Production	121
Figure 8: Advantage of climate change in the upper valley in regarding to barley.....	121
Figure 9: A woman in household activities	122
Figure 10: Woman on collecting fire wood	122
Figure 11: Woman carrying firewood and waking for long distance	123
Figure 12: Women taking training from trainer	123
Figure 13: Little girls collecting fuel wood from a jangle	124
Figure 14: Part of deforestation in the study area	124
Figure 15: Women caring fuel wood to the market	125
Figure 16: A woman collecting Animal dung waste material	125
Figure 17: A woman collecting animal squander to prepare compost	126
Figure 18: A group of women walking several ups and downs to reach the market	126
Figure 19: Old women walking to the market carrying potato	127
Figure 20: Market Day	127

ACRONYMS AND ABBREVIATIONS

ACSI	Amhara Credit and Saving Institution
ANRS	Amhara National Regional State
APRRCW	Asian-Pacific Resource and Research Centre for Women
CBOs	Community Based Organizations
CSA	Central Statistical Authority
EPA	United states Environmental Protection Agency
FGDs	Focus Group Discussions
FIG	Figure
GOs	Governmental Organization
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
MoFED	Ministry Of Finance and Economic Development of Ethiopia
NGOs	Non Governmental Organization
SGP	Small Grant Program
GEF	Global Environment Facility
UNDP	United Nation Development Program
UNFCCC	United Nations Framework Convention on Climate Change
WEN	Women’s Environmental Network

GLOSSARY OF LOCAL TERMS

ATO : A title equivalent to Mister

DEGA: An area within high altitudinal range, afro-alpine vegetation, and cold climate

GOT: Village

KEBELE: The smallest administrative structure of the country's political organization

QOLLA: An area within the topography of the lowlands and dry climate

TEFF: A type of indigenous grain, with the scientific name *Eragrostis tef*, widely cultivated within Ethiopia for its seed

TEMAD: A local land amusement unit equivalent to one quarter of a hectare

WOINA DEGA : An area characterized with temperate climate. This area is considered to be more suitable for agriculture and living in general.

WOREDA: District

W/ro: An equivalent term for Mrs

TABLE OF CONTENTS

CONTENT	PAGE №
ACKNOWLEDGMENTS	iv
LIST OF TABLES AND FIGURES	v
LIST OF TABLES AND FIGURES	v
ACRONYMS AND ABBREVIATIONS.....	vi
GLOSSARY OF LOCAL TERMS	vii
ABSTRACT	x
CHAPTER ONE	1
1. INTRODUCTION	1
1.1. BACKGROUND OF THE STUDY.....	1
1.2. STATEMENT OF THE PROBLEM.....	3
1.3. OBJECTIVES OF THE STUDY.....	7
1.3.1. GENERAL OBJECTIVE	7
1.3.2 SPECIFIC OBJECTIVES.....	7
1.3. RESEARCH QUESTIONS.....	8
1.4. RESEARCH METHODS	9
1.4.1 SOURCES OF DATA	9
1.4.2 DATA COLLECTION METHODS USED	9
1.5. SCOPE, SIGNIFICANCE AND LIMITATIONS OF THE STUDY.....	16
1.5.2. SIGNIFICANCE OF THE STUDY	17
1.5.3. LIMITATIONS OF THE STUDY.....	18
1.6. DATA ANALYSIS AND PRESENTATION	19
1.7. DESCRIPTION OF THE STUDY AREA.....	19
1.8 ORGANIZATION OF THE STUDY.....	27

CHAPTER TWO	28
2. REVIEW OF RELATED LITERATURE	28
2.1. DEFINITIONS OF KEY CONCEPTS	28
2.2. GENERAL IMPACTS OF CLIMATE CHANGE	33
2.3. THE IMPACT OF CLIMATE CHANGE ON LIVELIHOOD OF WOMEN	36
2.4. WOMEN'S ADAPTATION TO IMPACTS OF CLIMATE CHANGE	47
2.5. GAP OF EMPIRICAL STUDIES ON WOMEN AND CLIMATE CHANGE	50
CHAPTER THREE	52
3. MAJOR IMPACTS OF CLIMATE CHANGE AND LOCAL PERCEPTIONS ON CLIMATE CHANGE IN THE STUDY AREA	52
3.1 MAJOR IMPACTS OF CLIMATE CHANGE IN THE STUDY AREA	52
3.2 LOCAL PERCEPTIONS ABOUT CLIMATE CHANGE IN THE STUDY AREA	61
3.3 THE VULNERABILITY OF WOMEN TO IMPACTS OF CLIMATE CHANGE	68
CHAPTER FOUR	77
WOMEN'S ADAPTATION MECHANISMS TO THE CHANGING CLIMATE	77
4.1 THE MAJOR IMPACTS OF CLIMATE CHANGE ON WOMEN	77
4.2 ADAPTATION TO CLIMATE CHANGE: WOMEN'S COPING MECHANISIMS	84
CHAPTER FIVE	88
CONCLUDING REMARKS	88
5.1. SUMMARY OF MAJOR FINDINGS	88
REFERENCES	94
APPENDICES	102

ABSTRACT

Climate change has become a concern and threat to the livelihoods of billions of people around the globe in general and to millions of people in Ethiopia. It is a known fact that climate change has a direct or indirect impact on people's livelihood. Hence, the effect of climate change appeals to several members of the community across different classes, age and, gender, which makes people from different walks of lives susceptible to the effects of climate change. As studies in different parts of the world show, women tend to be part of the community facing multifaceted challenges as a result of climate change. However, there are limited researches done on the effects of climate change on the livelihoods of women in general and on their adaptive strategies. In line with this, the objective of this study is, therefore, to examine the nexus between climate change and gender in Choke Mountain of Gojjam zone of Amhara national regional state, with particular emphasis on the effects of climate change on women and their adaptive strategies. In order to meet the objectives of the study and analyze my data, I have used informal discussion, systematic observation, in-depth interview, FGD, and case studies. And finally I have also reviewed some secondary sources/ materials during my collection of data. The climate of the area is changing from time to time. This change in climate has put its shadow in the productivity of agriculture and livestock within the community. This impact can be seen either positively or negatively. These impacts of the change also led to an increment in temperature, unexpected and unseasonal rainfall in the study area. As a contributing factor the community believed that the increment of the number of population, this increment in number has led the community to increment in demand to natural resources. Therefore, this the demand in natural resource has lead to deforestation. This deforestation is also believed that it is the major contributing factor for change in climate in the study area. This impact can be positive or negative. Women's are vulnerable to the impacts of climate change this is because of the limited access to education, social responsibilities and low income generating mechanism. This vulnerability leads women to the direct and indirect impacts. From this majorly female headed households are in the front line and vulnerable to the impacts of climate change. As an adaptation mechanism women also play a great role in the adaptation mechanism to climate change this include trade, employment in institutions, ranting the agricultural land, engaged in forestry activity, migration to several urban areas, using new technologies and saving are the major one.

CHAPTER ONE

1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Culture has a tremendous value in shaping individuals way of life (Kottak and Kozaitis 2008). Here, it also includes the physiological and behavioral variation to an assortment of environmental situation. This includes like that of “ultraviolet radiation, heat, cold, high altitude, nutritional availability, and the influence of disease” (Church 2011: 45). In line with this above statement humankind has also high flexibility to changing settings or surroundings around him (Arenillas and Arz 2011: 24).

The relationship between human beings and the natural environments is a phenomenon that has existed since time immemorial. Anthropologists were studying this relationship of human ecology and human culture at different time and place. Anthropology as a scientific study of human beings was looking towards the cultural approaches to study a given socio-environmental relationships. This tendency of addressing the link between culture and different reams of life made anthropology to be unique from that of other social sciences (Milton 1996: I).

In the 21st century, the issue of climate change has become a common challenge for both developed and developing countries. The contribution of the developing countries to the carbon omission accounting for the pollution and overall change of climate is described to

be minimal compared to the share of the developed countries (OECD 2012:5-28). Despite such lower shares, the developing nations are the ones carrying most of the burden and the ones who suffer more due to their susceptibility to extreme environmental proceedings.

Climate change is increasingly being recognized as a global crisis for which finding a solution has become more complex. Different researches have been conducted on the theme seeking a possible solution but this resulting in insignificant positive outcomes (Petit et al. 1999¹ ; IPCC 2007).

According to ISDR Global Assessment Report on Disaster Risk Reduction (2009:3), gender issues in the present day society gives a very complex distinction between “roles and responsibilities, skills and capabilities, vulnerabilities, power relations, institutional structures, and long-standing traditions and attitudes”. Throughout the world, the distinction between men and woman is often defined according to the socio-cultural values given by the society. These socio-cultural values shape different realms of social life as the divisions of roles, responsibilities and identities. Because of this social factors, men and woman develop their own specific skills.

Men and women who are engaged their life in agriculture; tourism and the like are the ones who are more vulnerable to the effects of climatic change². In the present time because of the attachment they have to the climate, woman in developing countries are described to

¹ Petit, J.R., et al. 1999. Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. Nature 399: 429-436.) Available at <http://www.ncdc.noaa.gov/paleo/abrupt/story2.html>. Retrieved on may 24, 2014

² ILO 2008. *Report of the Committee on Employment and Social Policy, Employment and labour market implications of climate change*, Fourth Item on the Agenda, Governing Body, 303rd Session (Geneva), p. 2.

be part of the society much more affected by the climatic change (Nigus 2011:22, Nirmala and Venkateswarlu 2012:987, Johnson-Latham 2007).

According to Nigus Gebremedhin (2011:74), in different parts of Ethiopian northern local *woreda*, mostly at large the agrarians are highly susceptible to the collision of climate variability. From this, more than half of the farmers are food insecure.

[...]Farmers are highly vulnerable to the impacts of climate variability and almost about 80% of the farmers were food insecure (Nigus Gebremedhin 2011:74).

However, the gender aspects of climate change in general and some important contributing factors have been neglected during the study of scholars. Someone confidently can say there is none or little attention was given for both the other side contributing factors in relation to stakeholders of the change in climatic change in Ethiopia.

1.2. STATEMENT OF THE PROBLEM

Climate change has the power to affect each and every one living on earth. The whole part of the world is affected by climate change in multifaceted ways. Even though the degree differs from place to place and from continent to continent, climate change is much more serious for the poor living in the Third world countries (IPCC 2007:12 and 46). As Africa is one of the least developing continent (ibid: 46) the continent in general and citizens in particular are affected by the change in climate.

The change in climate has been and can be considered as a serious hold back factor for developing countries. A change in the natural climate also has a visible challenge on the lives and livelihood strategy of developing nations. In a long run, this climate change will overturn the development goals by developed countries at ground level and the millennium development goal at large³.

According to the Asian-pacific resource and research center for women (ARROW) (2010:3), the change in climate also affects different part of the universe in different ways. This threatening problem is showing its impacts not only in developing countries but also on countries, which are economically and politically strong. So, climate change is a universal problem, which affects communities in different walks of lives. But largely people living in developing regions are much more vulnerable to the effects of climate change. So, people, who are residing in this region, much more affected in several ways like in agricultural product, fishing and the like. This will also affect them to the future (IPCC 2007:49).

According to the Ministry of Finance and Economic Development of Ethiopia Annual Report on Macroeconomic Developments, stated that Ethiopia is known to be economically underdeveloped country and the country's economy spatially relies on agricultural sector (MoFED 2009/2010). This sector is identified for its immense contribution to the economy of the country: it accounts to about 42 percent of the country's Gross Domestic Product (GDP) (ibid). On the other hand, according to the Federal Democratic Republic of Ethiopia Central Statistical Agency (CSA 2011), it is stated that nearly about 84 percent of the country's population depends on the agricultural sector for their livelihood (CSA 2011).

³<<http://www.oecd.org/dac/environment>>. Retrieved on December 21, 2013.

Hence, most part of Ethiopia is agrarian whose livelihood strategy is mainly based on agriculture. Hence most of the community is exposed to the harm to be caused by climate change.

As Abarufa (2011:9) notes, “climate has a potential to influence biodiversity, pasture, water availability, agricultural production, livelihood strategies, so on and this makes the issue current agenda at local, regional and international levels”. Therefore, the issues of climate change needs a wider research in order to control the severe challenge. Nigus (2011:10), similarly alludes that “climate change can influence humans directly, through impacts on health and the risk of extreme events on lives, livelihoods and human settlements, and indirectly, through impacts on food security and the viability of natural resource-based economic activity”. Therefore, climate change has remarkable challenge in the livelihood of a community.

Women in third world have their own burdens and challenges. They are the ones in charge of caring for different members of the community. As they are also socially modified in their activities and roles in the community they are also limited in the opportunities they have their capabilities and choices they can make (Aboud 2011:18).

Ethiopian women are similarly part of the poor and powerless community like that of the other neighboring developing countries (Guday and Eskinder 2013:1-4). According to Nelson, Valerie, et al (2002:51-54), poor people living in developing countries are highly exposed to different problems by the climatic change. The culture and norm have also taken the larger stake in the community social interaction with regard to climatic change (ibid).

In developing regions including Africa women get little or no access to resources to holdup their livelihoods like that of land to plow, financial service, new technologies, trainings and the like. This will have an effect on the adaptation to new agricultural conditions in the future of the climate change (Nigus 2011: 19)

Furthermore, in many developing countries like Ethiopia women are engaged in activities ranging from agriculture, collecting firewood to fetching water, which keeps them in interaction to the environment on daily bases. In a similar manner, women living in the northern part of Ethiopia are in charge of the daily chores of their lives which expose them to face the multiple challenges of climate change a theme further to be investigated in this study. Mostly eastern and northern part of Ethiopia is the most vulnerable part of the country having the highest food insecurity resulting from climate change (Nigus 2011:2). As most northern part of Ethiopia is engaged in agricultural activities, the role of women in the overall agricultural production is quite significant. In other words, due to their active participation in the agricultural activities, women have a great interaction with the environment in one way or another on daily bases. Their roles and chores expose them to the effects of climate change making them the ones much burdened (ibid: 22).

Generally, the changes in climate pose to the community in general and to women in particular direct and indirect challenges. The relationship between women and climate change, is a topic that has received little academic attention in the Ethiopian context. Most researchers are mainly focusing on the impact of the climate change on economic and social aspect of a certain community (Nigus 2011; Getnet 2012).

This study differs from the pre existing researches in two major points. First, it tries to address the neglected topic of the vulnerability of women to climate change. Furthermore, by going beyond understanding the different ways, which make women vulnerable, it also addresses the agency of women in addressing the way women try to cope with the challenges.

The fact that little or no empirical research has been carried out in the area on such fundamental theme makes the research relevant and timely. Thus, my motivation is to fill this knowledge gap. As I try to show in the above paragraphs this thesis has looked towards subsequent things that are outcome of the climate changes in the study area like that of food security, agriculture and the like because these elements have their own impacts. At the same time, impacts of climate change and variability on the livelihood of the rural population of Choke Mountain with regarding to gender equality has been assessed.

1.3. OBJECTIVES OF THE STUDY

1.3.1. GENERAL OBJECTIVE

The general objective of this study is to examine the nexus between climate change and women in Choke Mountain of east Gojjam Zone of Amhara National Regional State, Ethiopia, with particular emphasis on the Women and climate change: challenges and adaptation strategies in Choke Mountain.

1.3.2 SPECIFIC OBJECTIVES

This study has also focused on the following specific objectives:

1. To explore and identify the major elements of climate change in the study area
2. To understand and describe the vulnerability of men and women to climate changes.
By doing so, this study tries to explain how such vulnerabilities vary or tend to be similar for the different sexes.
3. To understand the major multifaceted challenges faced exclusively by women in the community in relation to climate change.
4. To analyze the different coping mechanisms adopted by women in the research area as a way for addressing the challenges pertaining to climate change.

1.3. RESEARCH QUESTIONS

Based on the aforementioned objectives, the following questions were formulated and addressed as part of the research inquiry.

1. What are the multifaceted challenges relating to climate change faced in the study area?
2. What are the major challenges faced by men and women in the community and who is more vulnerable to the impacts of climate change in the context of the study area?
3. What are the major challenges exclusively faced by women in relation to their gendered role?
4. How are women viewed regarding to the conservation of the environment by the community and family of the study area?

5. What are the adapting strategies practiced by the community at large and by women in particular?

1.4. RESEARCH METHODS

1.4.1 SOURCES OF DATA

Primary sources of data have been collected from different informants by using interviews, systematic observation, focus group discussions (FGDs), and case studies. This is mainly done by drawing on lived experiences of key informants coming from different walks of lives.

Secondary sources of data have been used to substantiate the argument and for analysis. Relevant information have been obtained from sources such as books, articles, internet sources, journals and archival materials. Relevant reports and policy documents from different stakeholders like that of *Woreda* and *Kebele* offices, agricultural office, and natural conservation office and other institutions are consulted.

1.4.2 DATA COLLECTION METHODS USED

INTERVIEWS

Interview is one of the important methods in Anthropological studies (Clifford 2003). As an ethnographic researcher, researchers need to give and develop an ear for interviewing. This can be also side by side with the observation (Woods 2011:1). During my stay in the field, I have used both structured and semi structured interviews. This is mainly due to the significance of both tools. Even though structured interviews have an advantage to

organize ones idea qualitatively, the nature of the question, closed questions, will have an effect on the results of the study. Thereby, I have preferred to use the semi-structured interview so as to investigate very deeply (salmon, Stanton, Baber, (et. al.) 2004:13). In addition to this semi structured nature of the interview, it has granted me to have a chance to develop a conversation along one or more lines without most of the usual “chatter” (i.e., extraneous information) that accompanies such talk. At the same time, through the use of open-ended questions, the interviewee is given the opportunity to shape his or her own responses or even to change the direction of the interview altogether (ibid).

During my interview time, I have preferred to use the in-depth interview method to understand the existing problem from individuals or respondents point of view and learn from their lived experiences.

In-depth interview have been carried out with well-informed, knowledgeable, conversant key informants who have experiences related to the research agenda, particularly aged people who are believed to have good and long time experience in different activities in the study area. Furthermore, I have interviewed government and non-government officials working in different insinuations working on the themes of climate change in the research area. “In-depth interviews are the most widely used interviewing format for qualitative research and can occur either with an individual or in groups” (Barbara and Benjamin 2006:314).

The in-depth interview method is chosen because it helps to engage with the community and obtain firsthand information from the subjects of the research. “Interviews are used to get to know the interviewee better” (ibid). In addition to this, such a discussion with the

subjects of the research helps to best identify some gaps in my own research agenda and hence to get the chance to structure my questions. “In-depth interviews using open-ended questions aim to capture the mental and experiential world of the informant. Individual interviews allow participants to tell their stories, uninterrupted, in a detailed and coherent manner, without worrying about what their peers may think” (AHRQ 2013:2). So, through my interview I had thirty-eight key informants from different part of the community (i.e. both from upper and lower valley) like that of age, gender, class, location and the like. I also have chosen these informants by taking into consideration such variables as their exposure, knowledge and information about the topic of the research. I have chosen these peoples purposefully. I have also used voice recorder with their consent, and write down the interview points.

INFORMAL DISCUSSIONS

In this research, I have used informal discussion with community members. This is done with the aim of having a research method that supplements the interview and observation during the study. In this informal discussion, women and elders have been part of the discussion. This informal discussion has been conducted while socializing with the local community and I believe this have contributed a lot to get an insight into some parts of life which are often not raised during interviews and also those issues which are not observable. Therefore, using this method, it helps me to understand the truth and reliable information from the informant. In line with this the informal discussion helps me to understand well about the existing impacts of climate change.

SYSTEMATIC OBSERVATION

As cited by Nigus Gebremedhn (2011:6), “Observation techniques are methods by which an individual or individuals gather first hand data on programs, processes, or behaviors being studied. They provide evaluators with an opportunity to openly explore the relevant topics”. This systematic observation has been conducted at different occasions in the study area during the fieldwork period. This has given very significant and visible information to the researcher. Therefore, through this method, I have tried to see and understand “the people’s life, their assets and resources, the ups and downs to overcome their daily struggle, their activities for living, so on, would provide valuable and supportive information. Having a good look at physical and socio-economic infrastructures, the land use, housing conditions, the different economic activities people are involved with would provide valuable contributions to understand the existing real situations of the rural poor”(Nigus 2011:6).

Thus, in this study an attempt has been made to carefully observe every situation and understood them. During observation, I have taken field notes and photographs of some important sites. I have stayed for more than three months at the study area. I have documented details related to my observations in a field notebook and keep a field diary to record my position of thoughts, opinion, judgment, feeling, and perception throughout the study.

FOCUS GROUP DISCUSSIONS (FGDS)

Focus group discussion is also essential in triangulating ideas of different informants. FGD play a significant role to collect ideas from groups through discussion from a number of informants at the same time and it also helps to see if there is group consensus on some of the issues raised. This method, hence helped to get real and good information in which the participants tend to provide, check and balance among individuals' (informant's) view. The FGDs further help to focus on important points and topics. And it also helps to understand reliable shared view. Therefore, during the study period, the FGD sections help me in triangulating and check and balance the information obtained from informants. According to Arhinful, Das (et.al) (1996), 'Focus Group Discussion involves bringing together a defined group of respondents in order to investigate opinions and beliefs in an interactive setting' (Arhinful, Das, (et. al) 1996:ii).

In addition to the above paragraph, FGD is "Better way than individual interviewing to explore sensitive subjects in some cultures", The importance of FGD in my study has given me "an excellent means of [getting] information from illiterate communities" Arhinful, K., Das M., Heggenhougen, Kris (et. al) 1996:2).

FGD also has helped to understand the view of the informants who cannot read and write. This also has reduced the discrimination between literate and illiterates. This helped to see if there are points of internal contestation and differences in idea within the community. Through these FGDs, the attitudes of the selected informants towards change in climate at the study area have been understood well. I have conducted five FGDs. The two were particularly focusing women (exclusively focusing on women informants) and the other

three were mixed group of men and women. Each group has seven participants. In addition to this, I have tried to incorporate informants from different age, sets and walks of life.

CASE STUDY

The life accounts and experiences of three of key informants have been presented at length in the text while others are used to support ethnographic descriptions.

I had carefully chosen cases from observation and interview by giving emphasis the relevance, impartiality, and lack of adornment in the description of the cases.

This research attempted to collect extensive data on multiple sources of information. Such detailed account on individual cases has is used to deeply understand problems or challenges and the different adapting mechanism adopted by different women and trying to see if there are commonalities or differences in their accounts during the study period. Throughout my conversation with my informants, I have used tape recorders to record their narratives with their consent. I have also taken photographs to support my evidence in the study area.

ETHICAL CONSIDERATION

Many anthropologists were moved to enter the discipline because of a strong concern for the peoples of the world. During their fieldwork, most have developed a strong empathy for the peoples they have studied and have felt a sense of personal responsibility for their welfare. (Cassell and Jacobs 2006:2).

In anthropological research, the researcher has a lot of duties beyond conducting his/her study. Unlike that of other fields of study, anthropology is more concerned about the

privacy of informants, their safety and giving value to the informant's opinion. Therefore, anthropology has its own ethical codes. Anthropological researchers are expected to consider the ethics of the field. Hence, throughout my research I have paid attention to these ethical codes.

Regarding the privacy of my informants, I have made sure that their privacy is protected in such a way that I refrain from mentioning their names and rather use pseudo-names in those instances where informants want to remain unidentified. Furthermore, before proceeding to an interview I have clearly explained the aim of the research to get their "informed consent (Du Toit, Brian M. 1980:274-286, Bourgeois, Philippe 1990:43-54). In addition, I have taken care of the confidentiality of information given by my informants. Every information received from informants was secretly kept. While I am using any research tools, I have tried to explain why I am using this research tool (i.e. while recording conversation, photographs and so on).

Most of all, I have given respect for every idea of informants and information found from informants. Priority has been given for the matter of fairness in every aspect during the study period. I have not influenced informants in decision making throughout the study.

1.5. SCOPE, SIGNIFICANCE AND LIMITATIONS OF THE STUDY

1.5.1. SCOPE OF THE STUDY

The scope of this study is limited thematically and spatially. As it has been mentioned above, it has focused on Women and Climate Change: the challenges and Adaptation strategies of women. The focal research area was Choke Mountain located in the northern part of Ethiopia, in Amhara National Regional State.

Choke Mountain is found in the highlands of Eastern Gojjam, which is known for its diverse topographical arrangements and various climate changes. The elevation ranges from 1000m to 4000m above sea level. Choke Mountain is known for its water shades that many springs and rainfall water flows towards Abay gorge. In addition, this causes for high rate of soil erosion and land degradation. Formerly, the area, especially the upper hills around “Wabir⁴” to the way to the Debergiorgis (i.e. the study area) was covered by indigenous trees and grasses. However, due to population growth and expansion of farming land, there is high rate of deforestation and soil erosion⁵. The study area is also known for its forest coverage, which covers the larger land mass. But nowadays this forest is changing into arable land (which is prepared to agriculture).

⁴ *Wabir* is one of a small town found near by the Debergiorgis *Kebele*. It is also serving as a market place to *Debergiorgis kebele* and neighboring *kebeles*.

⁵ Belay Simane, et al. 2013. “Agro-ecosystem Analysis of the Choke Mountain Watersheds, Ethiopia” In: <http://www.mdpi.com/journal/sustainability>.

I choose this place because of different reasons. The first reason is mainly related to the fact that this is an area where the effects of climate change can be seen at best (Getnet 2012). By and large, given the fact that the topography of the area is inclusive of different climatic conditions, this study area is the best area where researchers need to focus and study the impact and vulnerability of climate change. In addition, the adaptive strategies of women in this area towards climate change also make the study area suitable for a research aiming to understand the nexus between climate change and women.

During my study, I have limited the scope of my research. This is because of several reasons. The first reason is related to the fact that the study is focusing on the gap identified. This has shaped my research in one-way or another. The second point is related to the time constraint. The third factor that necessitates limiting the scope of the study is pertaining to the budget.

1.5.2. SIGNIFICANCE OF THE STUDY

The major significance of the study emanates from filling an identified gap of research in general and anthropological study on the challenges of climate change and women in particular. The researches done so far in relation to climate change have given greater weight to addressing the challenges faced at a larger communal level, However, this study will contribute to fill the gap concerning climate change and the challenges faced by women in a community by narrowing down the subjects of the research to women. Moreover, by going beyond the dependency syndrome of women who are often described as passive part of the community, it tries to show how women are trying to cope up with the multifaceted challenges they have faced in relation to climate change.

Furthermore, this study is important not only for anthropologists, but also for other scholars from disciplines such as gender studies, sociologists, policy makers, public administrators for it deals with an unfolding challenge of climate change. Generally, the significance of the study could be highlighted in the following statements.

- It helps to widen the knowledge base in relation to climate change and women.
- It will serve as a secondary source of information for those intending to carry out further study on climate and gender issues.
- Policy makers can use the findings of this study to strengthen policy issues related to the role of women in conserving the environment and to understand gender equality within the society being studied.
- It will throw light on issues affecting women and the contribution to environment in one way or another.

1.5.3. LIMITATIONS OF THE STUDY

The first limitation of the study was the climate condition and topography of the region. With a rugged topography of the area, it was difficult to move around freely and cover a wider scope of the study area. As a result of the expected climate variability and with the ups and downs of the study area has affected by study for few days. During my plan to cover a lot of Got within the *kebele*, this to constraints (both climate variability and topography of the study area) has limited me no to move as I have expected.

The second constraint is the time constraint and budget. As the budget is very limited for the research it has limited me not to stay for a long period of time. In line with the budget

shortage the time shortage also plays a negative role in my study. As this kind of study needs movement between places in order to find real information and take good number of samples from each and every *Got's* of the *kebele*, time has limited not to accomplish as expected. Therefore, time and financial constraints played their own limitations on the study. The third limitation was shortage of secondary data, particularly researches undertaken within the *Woreda* related to climate change and strategies of adaptation. During the study period, I can totally say that there were no any documented research or even any material which is helpful to understand the *woreda* within the *woreda* and *kebele* administration office.

1.6. DATA ANALYSIS AND PRESENTATION

The main aim and significance of qualitative data is to analyze different interview with non numerical way of analyses. Basically, I have used and has benefited by this kind of method to administer the analytical questions particularly in interview (i.e. interview with stakeholders of the study area, Choke mountain), observation, compare and contrast data transversely source and the like.

1.7. DESCRIPTION OF THE STUDY AREA

This study was conducted in Choke Mountain particularly in *Bibugne woreda*. The mount Choke is considered as water tank of the country (Assefa 2011). It is located in east Gojjam administrative zone of Amhara regional state. Bibugne woreda is one of the 17 rural administrative districts. It is also one of the main contributors to the River Abay, which

later goes down and joins the biggest river Nile. Choke Mountain is sometimes called Berhan Terara⁶. Choke Mountain is located between 10033'06" to 10050'24" North latitude and 37042'36" to 37058'24" East longitude (Assefa 2011:24).

This study area approximately lies in the altitudes of 3000 to 4413 meters above sea level. *Bibugne woreda* has 17 *kebeles* with total population of 89361. From this total number, 43803 are male and 45558 are female. The *Woreda* has 308 square kilometer or 30879 hectare total land coverage. The *woreda* also covers 3.8 % of the zone. It covers 0.5 % of Amhara regional state. The capital of the *woreda* is *Digo Tsion* town.

As the *woreda* covers larger areas, there are also several agro-climatic regions. These are Woina Dega (Midland), Dega (Highland) and Wurch (Hail) agro ecological zones respectively. According to Assefa (2011:24), Choke mountain is found in six *Woredas* of East Gojjam Zone; *Bibugne*, *Debay Tiltatgin*, *Gozamen*, *Hulet Eju Enssie*, *Machakel*, and *Senan*. People living in this *woreda* are mostly followers of Ethiopian Orthodox Church. In addition to this, all the community members living in this *woreda* speaks Amharic language as their mother tongue, the particular study area is found 370 km North West of Addis Ababa and 80 km east from *Dberemarkos*, which is the zonal capital of the *woreda*.

⁶ [http://www.etharc.org/amhara/about us/demography3.htm](http://www.etharc.org/amhara/about%20us/demography3.htm). Retrieved on February 21st, 2014

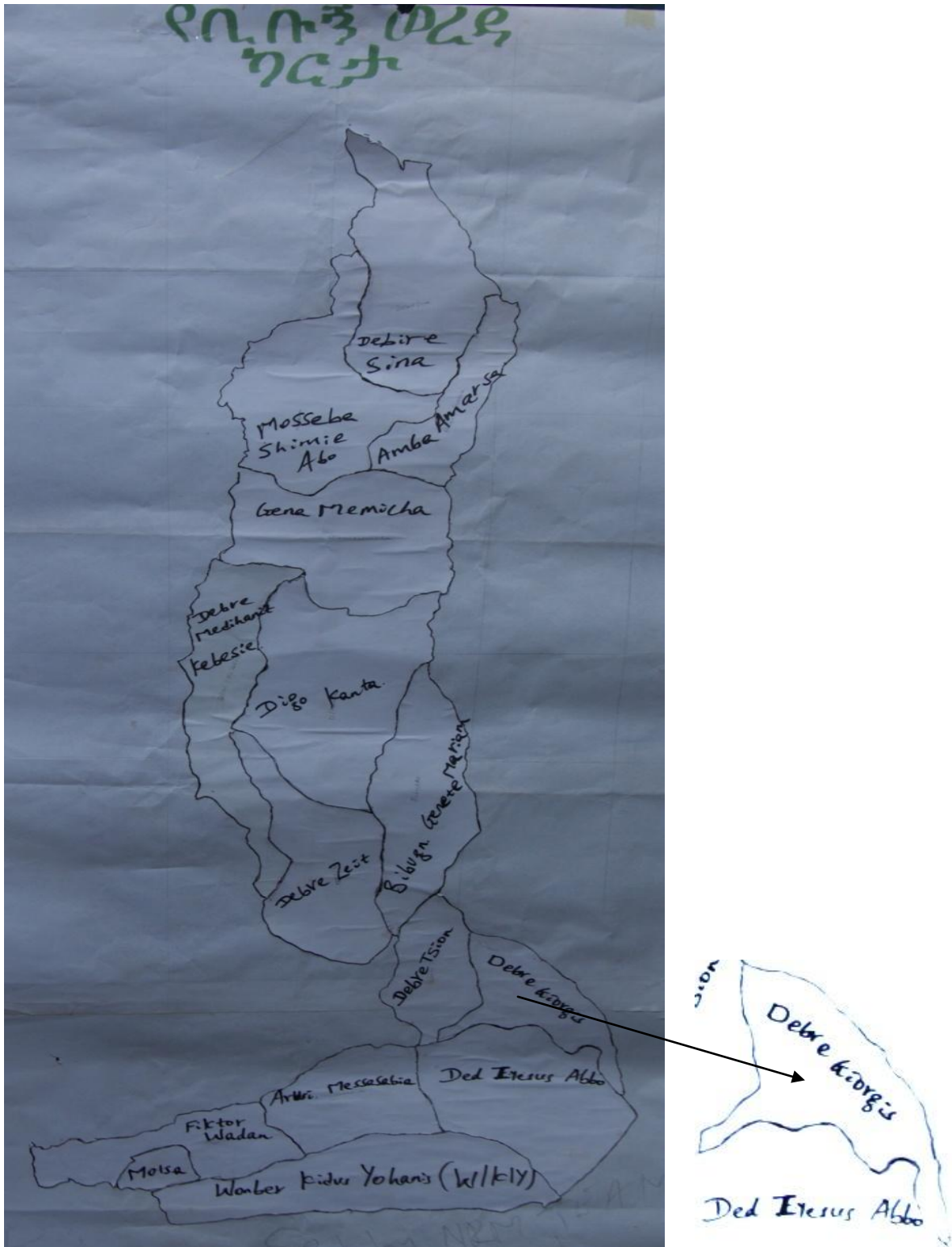


Figure 1 Map of the *Bibugne Woreda*

Source: *Bibugne Woreda* Administration Office (2014)

From these 17 *kebeles* this study mainly focuses on *Dbregiorgis Kebele*. This *kebele* is found at 2600-3500 meter above sea level. Total number of people residing in the *kebele* is 4073 from this 2112 are female and 1961 are male (*Debregiorgis Kebele* administrative office (2014)). This *kebele* is classified in to two valleys: as upper valley and the lower valley. Within these two valleys there are 27 *Gots*.

According to the information obtained from the *kebele* administration office and the *woreda* agricultural office *Deberegiorgis kebele* has a total land size of 1761 hectare. Of this total land, the one that can be plowed is only 675 hectare. The rest is mountainous and stony which is not suitable to agriculture. Other than this, some land is also used for communal activities. In this *kebele*, currently, land covered by natural forest is around 246 hectare. Human made forests also contain 192.75 hectare from the total land. Apart from this, there is a land covered by small trees, which covers about 10 hectare in the *kebele*. As the community members need both land for construction of their houses and grazing lands, 35 hectare is used for their constriction of houses, while 498.75 hectare is being used as a grazing land.

With regards to the rainfall in the region, the highest rainy season in the region is during summer season from the middle of June to early September. In the specific *kebele* in particular and in the *Woreda* in general, there are some potential in production and production of forest. The communities also produce bamboo and eucalyptus trees to the household economical propose. These plants are planted in their private agricultural land. This is because of the deforestation of the communal and natural trees from the Choke Mountain. The deforestation as a result of increment in number of population also causes a problem on the natural and indigenous trees. The study area previously believed to have been covered by a lot of indigenous trees and wild animals. Even the soil was described as being suitable for agricultural production. Informants often associate the fertility of the soil with the intensity of silt coming from the nearby mountains. But currently the soil is losing its fertility.

Table 1 Land Cover of the *Bubigne Woreda*

Source: *Bubigne Woreda* Agricultural Office (2014)

FORMATION OF THE LAND	FORMATION OF THE LAND IN %
River landscape	22
Mountainous	60
High coastal landscape	18

According to the *Bubigne Woreda* administration agricultural office, in this specific study area, there are two types of soils. These are silt and clay types. According to the information obtained from *Debregeorgis kebele* administration office the following are the types of soils and their percentage:

Table 2 Soil Type in *Debregeyorgis kebele*
Source: Debregeorgis Administration Office

TYPE OF SOIL	TYPE OF SOIL IN %
Silt	27
Clay	73

Choke Mountain is also called and considered as the water tank of the region as well as the country. This water tank also has a great contribution to the Nile River. Rainfall distribution in the region is characterized by high temporal and spatial variability with annual precipitation ranging from 500-1000 mm.

ECONOMIC ACTIVITY

In this study area, agriculture is the most important livelihood strategies of the community. Even though there are challenges regarding agricultural productivity, it is the main way of earning their income. The main agricultural product of the woreda and the specific study area is potato. Potato is both used for household consumption and as a source of income.

This area is also known in producing different kinds of trees like that of bamboo trees. The bamboo tree largely covers this area. Every household has planted a bamboo tree. This is

also very important to both for the household use and for the market. The community also produces the eucalyptus tree, this eucalyptus tree conception like that of the bamboo tree has a significant value both for the household conception and for the market. Now a day, there are some youngsters, which work only on planting bamboo and eucalyptus trees, because of the scarcity of land in the area.

Bibugne woreda in general and *Deberegiorgis kebele* in particular are known for their livestock⁷ production. Other than this direct use of livestock, the community benefits from the products of their livestock like diary meat, honey. However, the consumption of the livelihood products is highly limited to the locality and is not widely known both at regional and federal level. This is because of the low capacity in the management of their livestock and livestock production. In addition to the poor management skill to animal production, the quality of the livestock's and climate change has a very serious impact on taking out good livestock production both for the regional and national economy.

Almost all animal species are local breeds within this study Kebele. All the products are consumed for household consumption.

Table 3 Livestock Population of Deberegiorgis Kebele

Source: Bibugne Woreda Office of Agriculture In 2013

LIVESTOCK	SPECIES POPULATION
Cows	496
Heifer	187
Oxen	644
Bull	226
Calf	284

⁷ Livestock here does not stand for pastoralist, instead it mean animal raring (mixed agriculture)

Sheep	2766
Goats	81
Donkeys	47
Mules	101
Horses	493
Coke	346
Hen	14
Modern beehive	64
Traditional beehive	157

1.8 ORGANIZATION OF THE STUDY

This thesis is organized in five chapters. The first chapter comprises with a general introduction, statement of the problem, objectives of the research, research methods, significance of the study, scope of the study, limitation and ethical consideration of the study and the background information of the study area. The second chapter presents review of related literature. The third chapter deals with major impacts of climate change and local perceptions on climate change in the study area. In line with chapter three in chapter four vulnerability, impact, and adaptation mechanisms are intensively seen. The final chapter, chapter five deals with the conclusion section.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. DEFINITIONS OF KEY CONCEPTS

In this section, a few significant notions have been defined to understand the overall contexts of the study. These defined terms are central to the study and hence a clear discussion of how they are conceptualized in this study is a prerequisite.

One of the key terms often featured in this study is climate change. Morton (2007) defines climate change as a change in climate for those of who are dependent on the natural resource. In line with this definition, the Intergovernmental Plan to Climate Change (IPCC) report; climate change is defined as “a change in any climatic condition that stays for a long period of time in a given area” (IPCC 2007:6). It is a change in climatic condition or variance within the climatic condition of an area. This change can be a result of human activity or natural unpredictability. It can also be referred to as “a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods” (ibid: 872). Mitchell defines it as “all forms of climatic inconstancy, regardless of their statistical nature (or physical causes)” (Mitchell et al. 1966:79). According to the famous ecological anthropologist Conrad P. Kottaks⁸ a change in climate is considered as a climate conditions beyond previous experience the climatic region or area. He furthermore

⁸ Climate change or what he terms it “ecological” change.

notes that climate change affects the living condition of people in several ways. It is a change and experience in a change of climate that impacts the life of people. However the effects of the climate change are elements that are more understood by the locals. This depends on local peoples understanding, knowledge and perception of the ecological change (Boissière, Manuel, et al. 20013:1).

The other key term used in this study is the notion of vulnerability. Because of such variability of the natural environment, people living in that area will be vulnerability to several problems (Abarufa 2011). Scholars throughout the world, dealing with climate change and vulnerability, have defined climate vulnerability in different ways. According to Nigus (2011:13), climate vulnerability is “the extent to which a system is susceptible to or unable to cope with, adverse effects of climate change, including climate variability and extremes [...], which depends not only on system’s sensitivity but also on its adaptive capacity”. According to him vulnerability is a susceptibility to hardship to cope with the challenges. This can be environmental or climatic impact. According to Smith & Pilifosova (2001), it is also a vulnerability of being exposed to the climatic change and they also describe and characterize vulnerability of someone or a group affected by several climatic problems. According to them vulnerability “can be thought of as the capacity to be wounded: it is a measure of the susceptibility to harm in a system in response to a stimulus or stimuli” (Smit & Pilifosova 2003). In line with Smit & Pilifosova (2003) and Ford & Furgal (2009) delineate and distinguished vulnerability as the negative impact of something, which affects either directly or indirectly (Ford & Furgal 2009:2). On the other hand Kelly & Adger understand vulnerability as both to the “exposure and sensitivity [to

certain] climatic risks” (Kelly & Adger 2000), According to Nigus when a community member is not capable to cope or safer to cope to a certain climatic change effects. This climate vulnerability is not only all about the sensitivity but also the adaptive capacity to a certain change (Nigus 2011).

Vulnerability from the perspective of Intergovernmental Panel on Climate Change, is, “a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, the sensitivity and adaptive capacity of that system” (IPCC 2007:6). With this in mind, people are vulnerable to the climate stimuli in one way or another, which puts the notion of sensitivity at a core point within a community. Hence, sensitivity is explained as “the degree, to which a system is affected, either adversely or beneficially, by climate-related stimuli” (ibid: 21). The effect may be direct (e.g. change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to sea-level rise) (ibid). Hence the term vulnerability in away attends to the direct and indirect ways of exposure to the impacts of climate change and its usage throughout the thesis is informed by this conceptualization.

The other key notion is adaptation to effects of climate change. During the incidents of climatic change, vulnerable groups need to adapt to the change happening in that area. As the problem that rises from such climate change differs from society to society, the vulnerability and adaptation mechanism also differ accordingly using different knowledge, skill, and mechanisms (Aguilar 2009:59). Thereby, understanding what adaptation means is important in dealing with climate change. According to Smit and Pilifosov (2001:879),

adaptation is “a response to change in the climate and to cope up with the change within a certain area”. Bringing up adaptation as an adjustment or modification of oneself to certain ecological, social or economic changes, Barry and Olga conceptualize adaptation as “changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change”. It is “modifying in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC 2007: 27). Unlike to the intergovernmental plan on climate change, the well-known ecological anthropologist Kottak brought to light the role of culture as an adaptation mechanism to climate change. In explaining this, he noted that it is imperative to understand “culture mediations in ecological processes rather than treating culture as epiphenomenal and as a mere adaptive tool.” Hence, to his argument, adaptation to the climate change without the inclusion of culture is impossible (Kottak 1999:23). Therefore, in general, adaptive capacity is defined as “a capacity or an ability of a system [human or natural] to adjust to climate change (including climate variability and extremities) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (IPCC 2007:869) (Kelly & Adger 2000). In relation with this, another common term used in climate change study is the concept of climate resilience. The term resilience in general, has no common definition. But according to the Intergovernmental Panel on Climate Change, the term resilience is defined as “the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt naturally to stress and change” (IPCC 2007:880). It is a tendency to maintain integrity when subject to disturbance (UNDP 2005). The term

resilience can also be defined as “the ability of a community to resist, absorb, and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions and identity”.

Every change in climate affects the society in general across religious, age, gender, professional backgrounds. Encyclopedia of Social and Cultural Anthropology defines sex as “biological and physiological characters of female and male bodies” (*Barnard and Spencer* 2002). On the other hand different anthropological works defined gender as “the meaning that a particular society gives to physical or biological traits that differentiates males and females. (Mascia and Nancy 2000:1) ” Similarly Lavenda and Schultz 2012:365 define gender as “the cultural construction of beliefs and behaviors considered appropriate for each sex”. According to Lwanga (2002:1) the term gender is defined “as a dynamic and culturally determined social pattern created by men and women to define their relationships with each other and with their environment. On the other hand, Kottak & Kozaitis (2008) in their joint article defined gender from the culture environment relationship. And they defined gender as it refers to the cultural construct that defines acceptable male and female behavior. Gendered socialization and gender roles are different from place to place. “Anthropologists have identified recurring themes in gender divisions of labor, but gender roles differ with the environment, economy, and political system of societies” (Kottak & Kozaitis 2008:146). In line with this Lwanga also supposed it is these very relationships that determine decisions and activities that in turn have been affected in both the management and utilization of the environment”(Lwanga, Margaret 2002).

2.2. GENERAL IMPACTS OF CLIMATE CHANGE

The climate condition of a place is changed through time in decades and more (IPCC 2007). The climate change can happen for different reasons. This can be due to natural or human intervention to the natural ambiance (UNFCCC 2006). Climate change put several impacts in both developed and developing countries. Mainly climate change hardly affects the developing countries in sustaining their potential development (Nigus 2011; Demetriades and Esplen 2008). As factors of the climate change, these regions are vulnerable to serious and rooted poverty leading them to a chronic hunger. According to Nigus (2011) climate change can affect, human being directly or indirectly. This also includes health, way of life, source of revenue will be directly affected by climate change. Unlike to the direct impacts, problems of food insecurity occur. This areas or regions are also challenged economically. Like that of the above impacts as a result of the climate change people start to compute on very scarce resources. This mainly includes clean water, land for several proposes. The scarcities of resources lead the community to conflict. Furthermore climate change pushes the community member's particularly specific gender and specific age groups to migrate to other areas.

According to EPA⁹ (2010), climate change also includes the change in temperature and rainfall. These changes in temperature and rain also have an unfavorable impact on the livelihood and health of human in general. These climate changes also have indirect impact

⁹ United states Environmental Protection Agency (EPA). 2010. Climate Change Science Facts. www.epa.gov/climatechange. [Retrieved on May 7, 2014].

regarding the socio economic livelihood of the community in regions like Africa, which have the least adaptive capacity to climate change faced impacts. As most of the communities in Africa are dependent on the natural environment, climate variability and change put a black footprint. This is for the reason that of the strongly dependency to the physical environment.

Within these regions incidents like that of flooding, drought, and health problems are very common with in this poor regions nations (Gross 2002). Some products are affected like that of agriculture, forestry and livestock are weather dependent or climatic dependents. This climate variability has direct or indirect impact on productivity with in this region. It also has a general impact on the livelihood of the community members (USAID 2007). . According to Nigus (2011:21-22) in developing countries like Ethiopia most of the people is more near to the effects of climate change in this region. The livelihood of 85% of the total population depends up on the natural resources. Most of Ethiopians livelihood depends up on agriculture, which is very seriously related to the climate. This will make the Ethiopian agrarian to be rendered vulnerable to climate change. But recently most of Ethiopian agrarian and agro-pastoralists are becoming very much vulnerable to the climate change to the natural environment. They are also the first to be affected by climate change. Peoples in developing countries like Ethiopia and local communities within this region are largely dependent up on natural resources in their daily livelihoods. Such higher scale of dependency worsens the livelihood of the local community:

... In contemporary thinking the term climate change has become a core issue in various developmental, environmental, social and

political forums at the grass roots, national, regional and international level ... (Akililu and Alebachew 2009:13).

As a result of this climate change the local agrarians face multiple problems like huge amount of death in animal, distraction of crops, soil fertility, land degradation and the like (Bewket 2010; Assefa 2011; Nigus 2011).

As mostly experiential in Ethiopia it is usual to observe droughts and famine because of change in climate. This change in climate has brought a change and shortage of both food and water within the community (IGAD, 2007). In addition to this the country is vulnerable to continuous drought and some health problems consequently coming after the drought and the climate change (Bewket 2010).

On peoples whose livelihood depends on rain fed agriculture the impacts for climate change become. According to Assefa (2011), the major cause to vulnerability of climate change in African region is the dependency to the natural environment and resources. “dependence on rain fed agriculture which is very sensitive to climate variability and change, under-development of water resources, low health service coverage, high population growth rate, low economic development level, low adaptive capacity, inadequate road infrastructure in drought prone areas, weak institutions, lack of awareness, etc”. NAPA (2007) cited in Assefa (2011) has stated that Human health, Agriculture, and Water are vulnerable sectors in human livelihood.

2.3. THE IMPACT OF CLIMATE CHANGE ON LIVELIHOOD OF WOMEN

As Demetriades and Esplen (2008) noted, during every climate change studies the gender magnitude has been abandoned. Most scholars do not give serious attention to the gender aspects of the impact of climate change. According to these scholars, the impact of climate change is more likely gendered. As Nelson (2002:51) explains, such difference between men and women, especially in developing countries, women are challenged by the lack of power, control, and access over resources taking this into account; therefore, women are considered to be more vulnerable to climate change than men (ibid).

Guday and Eskinder (2013), compared to men, women are considered as the ones, which are closer to nature in their everyday activities. Therefore, women's contribution for environmental protection is significant.

In developing countries, women are expected to serve and take care of their family (IPCC 2007; Devereux 2000). The household chores in this community are mostly performed by women. Beside these, women are also burdened with different community development projects with unpaid labor. According to Caroline Moser, women in developing countries are expected to engage in several activities this is what Moser calls it "triple burden". Women are also active in several important activities within their household (Moser 1993). Therefore, in all these chores, women participate and have a daily contact with that of their surrounding environment (Nelson 2002:51). In one-way or another, thereby, women are more vulnerable within a community with regard to climatic change. On the other hand, women become more beneficiary when the climate is sustained. This is because women work load and burden to some extent will decrease. But will the climate changes and varies

continuously women burden also increase. Their contribution to protect or degrade the environment is also indispensable (ibid).

Regardless of this, according to Nelson (2002:52), the gender impact of climatic change has been neglected out from both theoretical as well as empirical studies, which has shown an impact on the development of policy options. There is not that much emphasis given on this serious issue. As a starting there are some projects rising up. These active projects have bright futures for the continent. According to Lwanga (2002:5), gender and environment are two faces of one coin. Both environment and gender interchangeably have a strong relationship. "In Sub-Saharan Africa environment issues include deforestation, decreasing availability of water and desertification. Increased deforestation leads to soil erosion and flooding, reducing agricultural productivity, contributes to decrease water availability and contributes to the burden of women". According to her, both genders have their contribution in making human made hazards like deforestation and the like, which lead them to the serious hazards. For people living in sub-Saharan Africa it is challenging for the availability of necessities because of human contribution to the climate change.

Like that of most developing countries in Africa and Asia, Ethiopia is one of the food insufficient countries from these developing regions (Wondmunegn 2012: iii). For this food insufficiency, there are several reasons and factors. This can be both human and natural factors. The climate change has its contribution to the problem faced to the food insufficiency (Met office and WFP 2012:1). But susceptibility to the natural ecological degradation and natural problems can also cause a problem side by side to the poverty (Valerie et.al. 2002:51).

In one way or another effect of the climate change has significant impact on agriculture on peoples living in developing regions (Nirmala and Venkateswarlu 2012:988). Mostly peoples living in this regions use rain feed or they are rain dependent to produce their productions. As a result of the community expect the natural rain and depend on it for their food production, the natural hazards will also affects them as a result of the climate change (Wondmunegn 2012:iii). So climate change has a multiple impact on their agricultural food production (ibid).

The relationship between gender and environment is can be seen in several ways but according to Margaret Lwanga (2002:1) defines the relationship of environment and gender is a;

... dynamic and culturally determined social pattern created by men and women to define their relationships with each other and with their environment. It is these very relationships that determine decisions and activities that in turn have been affected ...

In line with this it is important to understand climate change does not affect only one group. Therefore, one should not simply focus on men but also on women who are affected by the change. For instance, even though every work is on the shoulder of the women and girls, but they are still under the influence of the social expectations (Guday and Eskinder 2013). Evenly with the possible impacts of household facilitating the impact of rain-feed agriculture is not steel well understood by undeveloped nations (developing countries) mainly in countries like Ethiopia (Nigus 2011:18).

People who plow their land in traditional manner are the ones who are highly affected (McCauley 2003) by the impact of climate change in humid and sub humid areas. In sub humid areas they are vulnerable to the impacts of “many environmental hazards including frequent floods, droughts, tropical cyclones, storm surges and high temperatures” (Genene et.al. 2007). So normally if there are some natural hazards or impacts then the issue of agricultural food security will be engendered (Medany et al. 2006). Climate change has made several severe impacts on livestock production. Like the agricultural production the animal husbandry is not also successful in this in most developing regions (Pastoralism 2010). Because of the climate change mostly people living in less developed regions are much more vulnerable to scarcity of land for grazing and death of the livestock (Negus 2011).

Because of the environmental variability people go long way to find water and grazing land. This also will have an impact n the community at large (Thomas and Stephanie 2010). During this long journey to find the water and pasture they sometimes face lose of livestock. According to Negus (2011) other than the above problem the less productivity of the animals is also another challenge.

Like that of the most developing countries in Africa, Ethiopia also has these kinds of climatic problems. As most Ethiopians use mixed agriculture they also suffer from the problem and outcome of the climate change regarding to their product (Sefya 2010). In most part of the community this livestock production is the 2nd main important method of revenue next to agricultural products (Assefa 2011: 36-44).As land is very important to agricultural production it is also very important to animal rearing and grazing.

Economically this has significance to the community at large and household in particular.

The major economical significance of livestock is;

..... a source of manure and fuel, pay land tax, buy fertilizers and as a saving to buffer bleak seasons of food/seed shortage. Oxen are the major ploughing engines. Donkeys, horses and mules play a significant role in the transportation of people, water, and goods....
(Nigus 2011:31)

According to Nigus (2011), crop production and livestock rearing cannot be separately. Both have strong linkage between them. Nigus also tries to explain about the basic social importance of livestock's at a household level and communal level. Even though the community uses their livestock's as household consumption but the remaining have a significant value to cover their needs. This can be both social and economical need. After the consumption they take to the market and sell the livestock for several purposes. After selling the livestock they use for;

..... Seed and sold to pay credits, government obligations, purchase of fertilizer, household financial expenses and others....

According to Assefa (2011) compared to men women have a daily direct interaction with natural environment. As most of the work in local community is directly or indirectly related to the natural resources and women, women are the one who are facing several problems regarding to the climate change (Assefa 2011:1). It is true that man and boys are also venerable and also facing the impacts in several ways but in regarding to the climate change women and man cannot be compared (Assefa 2011:12-13).

According to Guday and Eskinder (2013), women's are the one who do have restricted rights in the community. They are not allowed to give any comment on how to cope with their vulnerability. According to Guday and Eskinder (2013), women's in many developing countries are neglected from different accesses like that of control over resources, lack of power in decision makings and the like. In line with the above argument the commonwealth secretariat (2012:19) states that

Therefore, to sum up both genders are the one affected because of the climate variation and change. This is because the livestock is one of and the basic component of their livelihoods (Abarufa 2011). As most of the time women's are the one who take credits from association in order to subsidize their economy and in order to compensate what they have lost from the agriculture and agricultural products.

Women essentially female-headed households require traveling long distance in order to find animal grazing land and water. Through the travel there are several challenges (Women's Commission for Refugee Women and Children (2006)). This unlike to the man several impacts will be faced by the women (Nigus 2011). Therefore the problems are very much serious on women than the man from any perspective (Demetriades and Esplen 2008). Even though a woman does not have a lot of cattle but directly or indirectly she will face the fruit of the problem (Abarufa 2011). Culture, norm and value have their own say on the women not to engage in several activities in which she is interested (Nigus 2011:22). Women cover more than half of the world poor (Demetriades and Esplen 2008:24). Women are also in the frontline to be affected by climate change and variability (Assafa 2011:12).

As Africa is one of the big continents in the world there are also several problems inside the continent. As the continent is one of the big continents in the world the problems or concern are also multidimensional in this regions. One of the biggest concerns of Africa is the climate change in the present day (Robert et.al. 2000; Paul 2002). Like that of other regions in particular and continents in general, the region of the horn of Africa is also very much vulnerable to the change and the outcomes of the change. There are several reasons that Africa is affected by this change in climate (Assefa 2011; IPCC 2007; UNFCCC 2007). According to UN Department of Economic and Social Affairs (2013:3) As Africa is one of the biggest continents in the world, also it has millions of people living within the continent and this is also expected to be doubled in the near 2050 from 1.1 to 2.4 billion. From this big number of population more than half of the population is belong to women and girls (ibid). As this number of women covers the large domain of the community but still are dominated and are not allowed to several experiences outside their home or kitchen. In this continent most of the time women and man are different in any activities and opportunities in the community (Guday and Eskinder 2013). Even though there is an absence of investigation in regarding to the ways in which ideas of maleness or what scholars call it masculinity forms gender menace are mainly focused on the ability and main concern in the face of change in climate. The word powerlessness is departs the man and the boys in this big continent. Women's are the one, which are highly affected by several activities and experiences in their community livelihood.

..... The default response has been to talk about women and their vulnerabilities not surprising given the entrenched structural disadvantages faced by women in many societies. Yet, the

inadequacies of focusing on women in isolation have long been recognized in gender and development circles: women live in communities, they live in families, and they live with men. Abstracting women from their social realities eclipses the relational nature of gendered power and the interdependency of women and men, and paints a distorted picture of women's vulnerabilities, choices and possibilities (Demetriades and Esplen 2008:25)

The other major problem with the consequence of the climate change is inequality among the two genders (Samy 2011:99-101). Mainly in many developing continents basically in the continent like that of Africa women's and men are not equal in several ways. The one and one of the major impact pressure is the climate change. As women's are much more close to the environment in developing countries they are much more vulnerable to the change in climate (Tahir 2013:1-4). The poorness of gender also makes it stronger in this developing region.

... Cultural and/or religious restrictions on their mobility, which may inhibit them from travelling to clinics without permission from and accompaniment by a male family member... (Demetriades and Esplen 2008:25)

Therefore, usually women particularly are the one which are much more vulnerable to the climate change. Even though there are majorly affected by the change in climate women's have their own ideas to cope with the environment. In most developing regions like that of Africa even though women have knowledge, skills and contribution but there is little or no attention given to this part of the community. In addition to this the role of women doesn't allow her to engage in communal activities mainly there have no opportunity to hear their voice (Laddey, Kumamoto and Treichel 2011:1).

The knowledge and solution for a certain change like that of the climate change comes with an experience they had with the natural environment. The climate is acting like universities for the poor women living in this region. So involving women's in to the decision making process is very much important at any circumstances (ibid).

As women's also play a great role in maintaining and managing the natural resources that they have in several ways. These natural resources are always the one, which are affected by the change in climate like that of agriculture, forestry and animal husbandry. Because of women's aware of the consequences of the climate change in their life (like that of drought and the vulnerability to other problems) they will try to modify themselves to the change in climate (ibid).

Currently in some regions of this developing countries do not give power women or girls to own/ administer lands. So because of this women will safer to implement and to show her knowledge even in a household level. These obstructions are additional make worse by gender prejudice/ unfairness towards assumption like that of women cannot be like male farmers. Women's devoid of right to use to "land, credit and agricultural technologies, women farmers face major constraints in their capacity to diversify into alternative livelihoods" (Demetriades and Esplen, 2008:26). Most of the time women are given some advantage for the historical subordination through affirmative action. Female headed households, elders and children and landless peoples are described to be more vulnerable to climate change and variability. As to the respondents justification females headed households' vulnerability to climate change was found higher. This is because women were engaged in too many tasks as compared to other segments of the society (UNDP 2007).

According to Azmeraw Ayehu (2010) women's especially poor women are the main victims of climate change in Ethiopia. Like that of other African countries climate change is also a hindering factor for the women to change their livelihood. In addition to this the capacity to adapt and cope within that environment between the two genders but also it creates in equality between man and women in a certain community. Azmeraw also argue that women's in Ethiopia are the primary victims of the climate change.

In addition to the aforementioned points, gender division of labor and restriction of women to domestic service or chores, marks a difference in income generating activities and livelihood strategies of men and women (Demetriades and Esplen 2008:27). According to (Noah 2009, GTZ 2010:5-7), the quest for water and fuel wood and the long journey associated with it is one of the problems that women face in supporting the family and maintaining their livelihood. In addition, women also face challenges due to climate change such as frequent flood; heavy rain falls and the like have put black shadow within female headed households. This impacts have their own challenges with in this communities including land degradation and unsuitability to agriculture and livestock productions, challenges in the living condition of women, increment of burden and the like on the shoulder of the women in particular(Demetriades and Esplen 2008:27). Such challenges are more frequent in female-headed households. The impacts, therefore, in such households are multidimensional including financial, economical or social problems (ibid).

Even though, climate change affects mainly the developing countries rather than developed countries in the world, this change in climate is not particular to certain ecological zone but it is worldwide problem (Demetriades and Esplen 2008:24). Because of

the climate change more than million people have been in great-risk. In some part of the world also there are some continents in general and countries in particular hardhearted by climate problem like that of droughts, floods, earthquake and the like (Muyeye and Jesper 2010:7; The World Bank 2012: xvi). As climate change is a global phenomenon, it does not have solitary impact but it may have several impacts both in the social and natural environment of human being (Nellemann et.al. 2011:5). During these hazardous impacts, women and children are the first to vanguard in the issue of climate change (Lwanga 2002:1-2), (Nigus 2011:22, Nellemann et.al. 2011:5).

As I tried to explain in the above paragraphs the impact between genders is different. This was also highly elaborated by different scholars at different times. According to Goh, Amelia H.X. (2012:1-25) human beings are challenged by the climate variability in his/ her region in the current time. The impact of climate change is becoming increasingly affecting both genders but the impact is different among them. This hardship of climate change in women's is gating worth. The thing that makes it worst is because of women cannot cope with the negative impacts of the change in climate in that specific area and community. According to Goh (2012: II), there have been several problems and impacts from this, this are the major one.

1. Impacts related to agro-pastoral production,
2. Impacts related to food security,
3. Impacts on health,
4. Impacts related to water and energy sources,
5. Impacts from climate-related migration and conflict, and
6. Impacts from climate-related natural disasters.

According to Crate, Susan A. and Mark, Nuttall (2009:13), in one way or another this climate change is affecting through several ways the indigenous people and their tradition in particular and their indigenous knowledge in general. According to this writer in Anthropology and climate change, they have clearly stated that many experts and policy makers never seen towards the rights of ingenious peoples this also make things to gat worth than the effect of the climate change.

2.4. WOMEN'S ADAPTATION TO IMPACTS OF CLIMATE CHANGE

As immense problem of poverty and the degree of difference in ability to adapt to real challenge causes by climate change is also different in both men and women (Demetriades and Esplen 2008:24). According to different climate change researchers the degree of vulnerability differs among the two. According to the intern governmental plan in Climate change, in developing country specifically climate change has a multifaceted problems in a society in general and certain part of community like that of the “elderly, the very young, the powerless, indigenous people, and recent immigrants, particularly if they are linguistically isolated, i.e., those most dependent on public support. Impacts will also differ according to gender” (IPCC 2007:374). The climate change disaster impact and the problem within it is different for man and woman (ibid: 398). According to Nirmala and Venkateswarlu (2012:987) in their joint article discoursed that men and women are affected by different aspects of the climate change but still the outcome may be different and classified in to two. These outcomes are women will face several workloads and

several additional times and man will migrate to another places to change him-self because of the climate change. This worsens f the outcome of the problem.

Both men and women are influenced in a different way by both natural and environmental vulnerability because of differences “in traditions, resource use patterns, and gender specific roles and responsibilities” (Guday and Eskinder 2013). In addition to this Inequality among a community by itself have its own impact of venerability (Kelkar 2009:5). Mostly women are the most subordinated part of the society and they live in a very complex situation. One of the challenging factors for women found both in developing and developed countries is climate change (Aboud 2011:5).

In this region women are highly exposed to climate change spatially women in developing nations, they have responsibility in many household tasks (IPCC 2007:374). This exposure of women to the climate change is also different in degree (Nellemann et.al. 2011:6). In Comparing to the women’s in developing countries women in developed nations will be much more affected by climate-related disasters. This is because the livelihood condition of women’s or culture of women in developing nations (IPCC 2007:374). In this region (i.e. developing region) the adaptation of women to the climate change depends on several factors beyond the degree of the vulnerability to direct impacts of climate change . To talk about the venerability, adaptation and resilience of women to the climate change we need to understand the pressure of livelihood, culture, value, “gender, social status, economic poverty, power, access, and control and ownership over resources in the household, community and society”. In addition to this the natural environment has also its contribution to the above social challenges (Nellemann et.al. 2011:6).

Mostly human beings living in some parts of the continent like that of “Andes, Africa and Asia” human in general and women/girls in particular living in mountainous area or highland areas are influenced or affected by the climate change. These peoples living in this topographic region are also vulnerable to the impacts of the climate change in several ways because of several reasons (ibid).

Women are the one, which are predictable regarding the vulnerability of climate change. To cope or adapt to the new environment they always setup their own mechanisms to cope the change. This is also true regarding the climate change women have their own way, knowledge, skill attitude and mechanisms to cope or survive within the new environmental change (UNDP 2011:1). But there are some hindering factors that affect women not to apply and contribute their skill, knowledge and etc to the problems they are facing. This is also different from place to place from continent to continent but in most developing countries, women's are much more vulnerable to climate change (Nellemann et.al. 2011:7) and futures of climate change (UNDP 2011:1). As spatially women's in the developing region are much closer and dependent to the natural environment. They are also the one and the most part of the society that are affected by the change in climate (Aklilu and Mesfin 2013). But because of the powerlessness of women, and basically the role of women in a community is unfair, when we compare men and women, women's are always subordinated and are not allowed to show their opinion, idea and knowledge to the public. These kinds of problems are quite common in developing regions. And there are also major problem to women's to show up their idea in general and their knowledge and skill to solve the problem of the change in climate in particular (Guday and Eskinder 2013).

Women's adaptation to the climate change will be affected by several hindering factors can be because of the gender role of socialization in a certain community structure. This difference affect women to not to adapt the change in climate (Assefa 2011:12).

In most societies there are differences and inequalities between women and men in responsibilities assigned, activities undertaken, access to and control over resources, as well as decision-making opportunities. Gender is part of the broader socio-cultural context.

According to the Common Wealth Secretariat (2012) "Gender equality" is simply defined as equal opportunity and fairness in accessing basic needs by both the (male and the female) or (by the boy and girl) or (men and women). Here, gender equality also stands to refer to equal treatment regarding rights, obligations and opportunities (Common wealth Secretariat 2012:19). Currently education and number of family plays a great role in regarding to cope and conserve several impacts and outcome of hazards (Guday and Eskinder 2013).

2.5. GAP OF EMPIRICAL STUDIES ON WOMEN AND CLIMATE CHANGE

Women' as part of the community member at large and as the one have a serious interaction with the natural environment in particular face multifaceted problems in a community as presented in the review of literature above. From these women, very young children's and old peoples are the one affected by this climatic change (Abarufa 2011; Bewket 2010). According to Guday and Eskinder (2013) gender equity in access to and control over resources is critical for rural women's social, economic and political

empowerment. In Ethiopia, equitable gender relations in access to and control over resources are serious to women since women are responsible to ensure household food security by their community.

Empirical studies show that equitable gender relation in Ethiopia has not been achieved since women do not enjoy equal rights with men in accessing and having control over resources due to socio-cultural norms (Guday and Eskinder 2013). There are number of anthropological and non anthropological researches in Ethiopia done on the socioeconomic role and status of women (Hirut 2000, Eva Poluha 2007, Meron 2010) Different studies have also addressed the place of women in female headed households (Meehan 2004). The variability of the climate is currently making the society in general and women in particular to suffer in these regions.

The impact of climate change is also a topic that is addressed well in Ethiopia (Dudu 2012, Mulinge and M. Getu 2013). However there is little research on impacts of climate change on women in Ethiopia. There is an obvious gap of research and this study contributes towards filling the gap.

CHAPTER THREE

3. MAJOR IMPACTS OF CLIMATE CHANGE AND LOCAL PERCEPTIONS ON CLIMATE CHANGE IN THE STUDY AREA

Chapter four presents the results of the study. In this section results found during the field research will be discussed at length. This chapter presents to readers findings of the study mainly on the major impacts of climate change in the study area, the local perceptions on the impact of climate change and the vulnerability of women to climate change. These three central points of the chapter are developed along three main objectives of the study specifically: exploring the major elements of climate change in the study area, understanding the community's perception on climate change and understanding the vulnerability of men and women to climate changes.

3.1 MAJOR IMPACTS OF CLIMATE CHANGE IN THE STUDY AREA

The first and important objective of the study is to authenticate the major impacts of climate change through understanding of the respondent's response in the study area. According to informants several impacts of climate change hazards are particularly distinguished in the study area for the past few years. These changes also have a direct or indirect impact on the livelihood of the community at large from different face of their life. Recurring drought disasters have multiple impacts on rural communities of the woreda.

During the interview and FGD section informants were asked about the major element to cause the climate change in the study area. Most of the informants agree on the over

population. The number of population increases from time to time. This number of population increases the demand to natural resources increase at the same time.

According to the agricultural office, the climate condition of the area is changing from time to time for different reasons. This change is a slight change happening on the previous climatic condition of the study area. This change has also put negative shadows in relation to climate related products produced by the local community. As the study area is mainly their livelihood depends on the agriculture and livestock production, as a result of the climatic variability and change the degree of agricultural productivity and livestock productivity is depreciating from time to time. This is also measured in terms of quality and quantity. As a result of the climate condition, the previous quality has decreased. Because of the quality of products declined market for the products also declined at the sometime. In terms of the quantity the quantity is negatively affected by climate variability. This insufficient production of crops also affects the community members directly or indirectly in for food insufficiency. This food insecurity also leads the rural community to an extreme poverty particularly for specific community members. This includes women, children and the elderly in particular.

Similar to the agriculture the livestock production also has been adversely affected by the climate variability. As a result of lack of grazing lands, insufficient water and the like has affected the productivity of livestock in the study area. As a result of the population increment within the study area, there are shortages in regarding to grazing lands. Unlike to the overpopulation, the area closer also has an impact on livestock production of the study area. Most of the youngsters are engaged in animal husbandry this is since there is

lack of agricultural lands. Therefore, this part of the large community is affected because of the area closers and scarcity of land. These youngsters are commonly uses the communal grazing lands this are also occupied by climate change projects by the Small grant program (SGP). This has affected them with the collaboration with the climatic change. There are some insects that affect the grating land what the local community calls it “aids” and “wage” this two have a direct impact in production and productivity of the rural community in the study area. Like that of the agriculture, the livestock production is also decreasing from time to time. These also can be seen in terms of quality and quantity. The quality of the livestock is decreasing from time to time. As a result of paucity in grazing lands, the quantity is decreasing at the same time. This also mainly affects the landless part of the community in the study area.

There are some changes in regarding forestation. Previously the study area was covered by lots of trees (indigenous trees), but a result of the overpopulation rapid deforestation has been occurred. But in the mean time by the help of UNDP /SGP projects the area has been recovered by planting some indigenous plants. But during the FGD section most of the farmers in the upper valley, except the government officials doesn't like the reforestation. These are for the reason that of it has an impact on the productivity of agriculture. According to the informants from the upper valley, the current climatic conditions are somehow suitable for their agricultural production even though it also has some impacts. These informants prefer the current climatic condition to the productivity of their crops. According to them new products are emerging as the result of climate change. But the lower valleys have a fear to loss their productivity if it continues in variability in temperature and rainfall. Therefore, community members are interested in forestation

activities and reforestation activities. The UNDP/SGP project of reforestation was successful in this area (i.e. in the lower valley) unlike to the upper valleys.

Several changes have happened in the study area in the past few years. As I have stated earlier the one and the major one was increment in number of population. As a result for the increment of the population without of the capacity of the land to hold and the increment in demanding for natural resources has increased. This includes land (land for agriculture, and grazing), water, fuel wood, and the like. Therefore, the interfering and extreme exploitation of these resources of human beings to the natural environment made the community to pay for the challenge and impacts of climate change. Therefore, as a result of rapid deforestation, the climate change also has rapidly changed. This change in climate has put its shadow of impacts on the livelihood of community members living in the study area.

According to my informant from different Gots, agree on the change in rainfall pattern. In the study area the rainfall pattern also has changed in the past few years. Irregularity in rainfall is becoming common in the study area. This Irregularity of rain has an impact on the productivity and production of the local farmer. Mostly when the rain falls, this fall is very strong and which mostly contains big ice. This wasn't previously known in the study area. The rainfall pattern is varied from time to time. According to informants sometimes the rain comes very sooner or let. This also plays a negative role in agricultural production and productivity. According to the data obtained from *Bibugn Woreda* agricultural office in 2013 shows, the consistency of the rainfall is negative. This inconsistency has also negative impact on the crop production in the study area. In line with this, the historical record of

the woreda in regarding to the rainfall pattern is decreasing every single year. As a result of the rainfall pattern, farmers in *Deberegiorgis kebele* are negatively affected in their livelihood.

According to narratives of informants and the discussion that was reise in the focus group discussion to the contrary, the amount of rainfall has increased in the summer unlike the previous days. This change in rainfall has started to occur in the past 5-10 years. Most of my informants, agreed and shared this point. In addition to the above statements, informants also stated currently the amount of rain in *Deberegiorgis kebele* has decreased in the winter.

Previously any one cannot walk at this time; we were having a lot of rainfall. The area is known for its good winter rainfall. But as you see, there is no rainfall right now. But for the last 5 – 10 years, the amount of the rainfall is decreasing slightly. Unlike to the winter, the summer rainfall is increasing. Actually, even though we like rain for our productivity, we don't need excess rainfall. This is because it causes a massive distraction to the agricultural products and causes both serious land degradation and erosion at this area. In general, I believe this is as a result of the climate is changing (I2: lower valley, 21-01-2014)

In addition to the idea raised above, some have also indicated and explained that the short-lived rainy seasons are occasions when the amount of rainfall tends to be very lower. According to these informants, the season for the rain is very much decreasing and the dry season is taking longer than the previous years. According to my informants, prior to 10 years or in the previous period, the rain is there throughout the year. Spatially there was enough rainfall during every harvesting period. Even the rain doesn't come earlier or later

in the previous time, it doesn't also fluctuate from seasons to seasons and from year to years. But recently, for the last 5 -10 years back the climatic change has brought the rainfall to decrease and fluctuate. Rainy seasons are becoming very short and timely fluctuating. This has an indirect impact on their agricultural productivity of crops. This also led the farmer to extreme food insecurity and drought.

This area is not known for loss of rainfall throughout the year. But unlike to the past years which I can say before 10 years back then there were no any impact in regarding to food insecurity and drought. But the in the present time in the yearly range from 5-10 we are challenged by the rainfall variability.... The rainy season is too short. It continuously fluctuate sometimes unexpected rains happen. This is challenging to live for the farmer... how can some on live without producing for its consumption? The change is challenging the farmers (I2: lower valley, 21-01-2014).

In addition to this, even though the rainy season is to short but currently it is causing a lot of damage in the livelihood of the local farmers. According to one elder informant, during my FGD section from the lower valley responds;

... Peoples spatially living in the lower valley are highly affected by the land degradation and soil erosion. As a result of unexpected rain sometimes high amount of rainfall falls in the upper valleys... This people are comparatively found in the mountainous landscapes. Therefore, as a result of the heavy rainfall the cultivated land soil is degraded and eroded to the lower valley... In addition to this erosion and degradation of land, the running water also causes damage to the neighboring valley. This is because of the lower valley is found in the lowland of the *kebele*. This eroded soil also causes a big problem in the overall livelihood of the lower valley (G3: lower valley, 21-01-2014)

To sum up, according to the agricultural office and the informants living in the *kebele*, clarify that the climate change has put a negative impact in regarding to the rainfall of the region. The rainfall also put negative shadows in the productivity and livelihood of the community living within the particular *kebele*. Even though the amount of rainfall is decreasing and the unconditional nature of the rainfall has also caused several troubles among the community members. It is also slightly changing and changing each and every year in comparatively to the previous 5-10 years with prior to the previous 10 years back. The decrement as well as the increment in water or rain content also has affected the agricultural products and productivities. For instance, because of the amount of rain increased the erosion of soil has also increased than before. The running water plays a great role in washing what the farmer's plant. Whenever farmer's plant necessary plants for the personal consumption and for subsidizing the economy, unexpected running water washed-out the planted seeds, This washed-out of the plants have caused uneconomical problems as well within the farmers livelihood of each household in the *kebele*. According to farmers in the study area the running water is caused as a result of both by natural and human made problems.

According to the discussion with informants from the study *kebele*, they respond that, in regarding to the human made problems, deforestation is the major one. According to the agricultural officer of the *woreda*, *here also* the rapid increment of population has caused a high demand for their livelihood from the overall covered land. This cutting down of trees for their demand has caused unconditional climatic change. This climatic change as a result of the deforestation also caused uncontrollable erosion to the farmers. In line with this,

farmers in the study *kebele* (i.e. *Deberegiorgis*) also share the agricultural officer's idea. Dissimilarly to the human made causes, the natural problem also have a big contribution. According to the agricultural office of the *Kebele* there are also few stated natural problems. According to the officer from the *Woreda* as the area is mountainous, the nature of the landscape is not suitable for several activities. In addition to this, the tectonic activity of the earth has made the land to be degraded. This land degradation has contribution to the current climatic change. In addition to this, because of the *werch* cold and ice has put big impact in regarding to the agricultural challenge.

Like that of the rainfall pattern, the temperature pattern has also changed. This change in temperature has both positive and negative impacts in the particular community. The study area is known for its very cold temperature. As a result of this, the area is found in a mountainous or high altitudinal area. As I have clearly stated in the area description the upper *Got* is very cold and not suitable for agriculture and other activities in comparing with the lower valley *Gots*. As a result of the change in temperature the upper valley *Got* like the change in temperature. This is for the reason that it is suitable to their livelihood. suitable to agriculture, livestock, lifestyle, and the like. But unlike to the upper valley, the lower valley *Gots*, are not happy with the change and pattern of the temperature. This is because of the change and increment in temperature has adversely affected the livelihood of the community members. It also put a negative impact on agricultural and livestock productions.

In regarding to the general impact of climate change on agriculture and agricultural production, as a result of the climate variability there is both negative and positive impact

in regarding to the agricultural products and productions. As I mentioned in the previous paragraphs earlier, the temperature and the rainfall pattern has their own impact. But the impact of climate change on agriculture and agricultural products is deferent even among the *kebele*. The lower valley was suitable for agriculture and agricultural products, but the upper valley was not suitable for the agricultural productions at all.

According to most of my informant from the upper valley, the previous temperature and rainfall doesn't allow them to produce major agricultural products. This was as a result of the climate variability as well. Agricultural production is adversely affected by climate variability. According to the agricultural office of *Debregeorgis kebele* as an outcome of the climate change alien insects and pastes are becoming common among the farmers in the study area. This insects and alien pasts are the outcome of the climate change and climate variability. As agriculture is the backbone for the rural community in the study area the invention of these alien crop diseases has hardly affected their livelihood.

Like that of the increment and decrement of the rain has negative impacts on the temperature variability plays a negative role for agrarian communities. As the climate change affects the agricultural products, the livestock production is also indirectly affected. This is for the reason that of mostly agrarians of the study area feeding crop remnants of the livestock products.

According to one of the elder informant in *the kebele* and informant of mine states that, the mount choke area was covered by a batch of trees in the previous time some of the informants respond they remember when the mount *coke* was covered by indigenous trees.

This has stayed also until the Derg regime fail down. In this area there were “*shifita’s*” that use to hide themselves from enemies and hide what they still from community. During this point in time, it was very cold. There was also high amount of rainfall in the area previously because of the area were covered by indigenous trees. But this previously largely covered area is currently deforested by the community living. So, the area is becoming hot the weather (rainfall and temperature also varies from time to time).

Populations engaged in agriculture (livestock production and farming) are particularly at risk from drought as agriculture is the main stay of the rural poor. The impact on crops and animals was the most important.

3.2 LOCAL PERCEPTIONS ABOUT CLIMATE CHANGE IN THE STUDY AREA

This sub-section presents the understanding of the community towards climate change. Such a variation in perception as to be presented in these sections shows a significant variation across sex, age and educational background. Furthermore, this section also presents the main factors that affect the perception people have about climate change.

The term “climate change” is defined differently among the community members. The understanding of the term “climate change” is different even among the two sexes on several ideal variations. Most of the male and illiterate part of the community members of the study area conceives climate change as a change and increment in temperature and decrement in the amount of water and rainfall. In addition to the above definition, the few male literate part of the community members also believe that climate change is unconditional and unexpected change of the climate from the previous existing natural

climatic condition. According to informants the term “climate change” also can be considered as climate variability. In addition of the above definition, climate change also includes impacts on several activities or livelihoods of the community living within a specific area. The impact of the climate change is mostly negative in its outcome.

In line with the above paragraph like that of the male informants, female informants are also asked how they understand the term climate change. According to informants climate change is seen in terms of production. Illiterate female farmers delineate climate change as a change and variability in terms of the previous production. This includes both positively gain and loss in regarding of the production. In addition to the above definition defined by the community which are considered as illiterate, where as the literate women in the study area define the term “climate change” as a change and continuity in regarding to the pre-existing environment.

By and large as the term climate change is defined by the community members in the study area, climate change is a rapid or a slightly changing of environment from the previous climatic condition to a newly emerging climatic situation/ condition.

Even though women are the first to vanguard in the issue of climate change, the women or informants living in the study area perceive the climate change differently. Informants have been asked about their perception towards the climate change.

Most of informants in the study *Kebele* perceive climate change as meaning the changing patterns in the weather condition in their area, which they have observed over time. Almost all agreed on the change in the climate from time to time. But even though they

agree on the change happening to the climate, women are different in their understanding of what the change in the physical environment entail. During the interview, FGD, and informal talk one can observe a difference along their educational and economic backgrounds. The one who have joined the formal educational system explain it in a detailed manner by associating it with the global developments. In addition to this wealthy¹⁰ and women who participate in meetings and other informative forums explain the change in climate from different perspectives according to their understanding. Therefore, the perception of the community on climate change varies to a great degree in general and this variation is also observable in the case of women.

The internal difference in perception of women about climate change can best be seen from the data obtained from the two different valleys within the same study *kebele*. The understandings are also different in a community living in a same got. During my interview I have found that the upper valley *Gots* and the lower valley *Gots* having different perception and view towards the change in climate as to be presented in the following paragraphs.

Women living in upper valley *Gots*¹¹ see climate change positively. Most of the women living in this area for a long period of time say that the temperature is changing slightly. During the interview section, I have asked several women about the previous and current temperature trend of the area. Most of them almost all said they know there is a change but

¹⁰ The term wealthy here refers to a person who accumulated wealth in terms of land hold, number of livestock and the like and has the opportunities given to participate to several meetings unlike to the poor.

¹¹ The upper valley includes (Zera Terara, Choma, Adagne, Tomail, Sebehata, Abeshe, Tomaile, Mamo, Mezgebo, Barena)

the change is insignificant. Previously, this area as they describe it tends to be very cold and now a day this area is getting warmer and warmer. Sometimes, it will be much colder than the previous time, but yet it is not to the extent that one can talk much about a huge difference.

They have highlighted the significance of the change. For them, the changing pattern in the climate has positive impact on the animal rearing, and farming. When amount of the temperature increases in the study area, the products that farmers produce will successfully grow. When the amount of the temperature decreases, ice, fog, and flooding kill the seed. So, they understand the temperature change in this way. Informants have been asked about the different ways in which they obtain information regarding to the climate change in their *Got*. And all informants have accented that they do not have any access to obtain new information. Some of the information about the temperature impact is obtained from schools through their school attending children. Additional information is coming from their husbands.

The lower valley *Gots*¹² has slightly different perception towards the climate change. During my FGD and informal desiccation, informants have highlighted the fact that the temperature at this valley ends to be harsh and that the society is living under a state of alarm. According to the discussions raised during FGD, the temperature in this area is described to deteriorate on daily bases in such a way that the temperature in the area is described to get hotter and hotter. Unlike to the upper *Gots*, the change in the climate is associated to health problems occurring in the area. Peoples living in this lower valley *Gots*

¹² The lower valley includes (Donzo, Garo, Azmach Arso, Yenache, Ebes, Beret, Defech, Solo, Chereqa Mender, Dereq Sar, Solo, Deber, Mekebekebiyaw, Fengeta, Mehal Mender, Gena Memecha, Semeya, Delh)

get the information from the government and non-government organizations such as UNDP/SGP that the temperature is changing currently as a result of several factors. This is mainly because of this area is highly exposed to several activities because of the community members of this valley are close to the *Kebele* administrative office. They are advantageous in having information about the change in everything in their surroundings.

Generally, regarding to the temperature change and perception of women, women in both upper and lower valley *Got* have limited information on what climate change entail. This is because of several barriers affecting women.

The general understanding of the community on the effects of climate change also varies significantly across age. According to my finding from the field study older peoples or respondents are the one who said there is a change in relation to the pattern in rainfall. But unlike to this old informants ¹³the young informants ¹⁴who have been living in this situation cannot as such refer back to the older days and describe the change they observed in the long duration. Actually, living in a certain area for a long period of time is the major thing to compare the previous and the present. So, the youngsters could have some gap to compare the past and the present. But this does not mean they totally do not understand and feel. For instance during my interview with one of the young women informant called “Selamneshe”, said;

¹³ The term old refers to the informant which their age is from 45 and above years old.

¹⁴ The term young refers to informants which their age is less than 45.

... I am 23 years old. I was born in this got and lived for 23 years....
The amount of the rainfall we have been having for these years is the same. And it has never been changed, but according to my grandparents, they complain that it is changing from time to time.... The rainfall is also decreasing from time to time (C3: Lower valley, 20-02-2014)

Therefore, almost more than half of young respondents share Selamneshe's argument. This was supported during the FGD and informal discussions. During the FGD session respondents (i.e. old respondents) mention that previously the rainy season in the area used to have a regular pattern and this was suitable to agricultural production. As a result, large plots of land in their neighborhood were covered by trees and erosion has also very less impact. In line with this, the number of population living throughout the *Kebele* used to be lower. But unlike to the past the trend in rainfall is changing each and every year.

Women in the study area have limited knowledge or understanding about the very idea of climate change. This is mainly due to the fact that women are engaged in household activities, which affects their exposure to the public sphere. This makes women not to understand what is happening with in there surrounding. Even though they can understand changes, it seems the change is only for themselves or their village. So, women are limited to speak with themselves. Different organization both the governmental (GOs) (from the governmental organization local agriculture offices, Amhara Credit and Saving Institution (ACSI), Amhara Development Association (ADA) and the like) and non-governmental organizations (NGO's) (from NGOs UNDP/SGP/GEF programs and the like) have given some trainings to the local women'. Even though this training is given, it does not address each and every women of each household. Mostly, also women are not

attending the meetings held by the government organs. This is because their husbands do not give them the permission or chance and they lack interest. Husbands give them permission if the meeting or training has common significance to the family.

If the woman is going to the meeting who is going to cook and prepare the house? No one is going to cook for her. If she went to the meeting without my permission, then she will not return back. The bible said women should hear the voice of the man. I don't want to lose my statues given by the community. If I am not capable of managing my wife, then I am not capable of managing anything which happens with in my community. (A2: Upper valley, 26-01-2014)

As it is the case with other Ethiopian women found in the other parts of the country, even those women who are educated (literate) are also victims of this dominant community ideology, when it comes to getting the exposure to attend such informative meetings. During my interview session, I came across a graduate from higher institution of Bahir Dar University explained this as:

Even though the government says that we [women] are equal to men, in real terms such an understanding is not yet internalized by the larger mass [Men] should be the one who have to head the family and women should support their husbands. Women are also expected to follow his rules and regulations to be respected among the community. (D2: Lower valley, 26-01-2014).

During the FGD, women who are literate¹⁵ and who have some information about the climate change mention that the current climate change is a result of several factors. The major and the first thing that changes the climate is the deforestation. The same question

¹⁵ In this context the literate one is included someone who have good information about something, educated (from local religious school to the university level)

was raised to the women who are illiterate or uneducated (i.e. formal education), they say that the climate is changing but they don't know the reason behind. But they assume or consider it as a punishment from God. According to this, the major climate change is strongly seen on the amount of temperature and rain the study will also see these two views from women's perspective.

3.3 THE VULNERABILITY OF WOMEN TO IMPACTS OF CLIMATE CHANGE

In most developing countries, women are much more vulnerable to climate change than men. According to Eriksen and Rosentrater (2008), African women in general and eastern African women in particular are vulnerable due to several problems. For instance, the limitation to access to education, social responsibility, employment in other income-generating activities is majorly seen affecting women not to compete with the men. Above all, other than the above stated problems, the social and cultural roles, voiceless and limited empowerment, access make women to be vulnerable to climate change.

As several roles are given to the women, these roles are not natural from the exposure of the natural environment. Women are in the front line to the natural environment. These roles given to women also make women very much closer than man to her environment (Nellemann, Verma, (eds) 2011).

This is also true in study area as well. Like to the other part of Ethiopia, the study area is conservative in the issue of women. According to the culture of the area, knowledge is believed to be obtained from the man. Women are believed as they are idol for every

activity with no power, Authority, and several basic accesses but with full-fledged responsibilities and roles. Every door for access to is closed with several social and cultural roles and responsibilities.

As discussed earlier, women in the study area are finessed through different challenges. The limitedness of access to education has made women narrow-down there understanding the rest of their surrounding world. As mostly schools are far from the living area, girls are not also allowed to visit school as their peer male friends. Unlike to the school going girls was forced to engage in social responsibilities. These roles and responsibilities also have direct relationship with the natural environment. The daily activities, roles and responsibilities of women are exposed to make very much closer to nature. As the study area community uses intensively the natural resources for their livelihoods, women take the most stakes to visit and utilize the fruit of the climate change. In line with this issue, the voiceless and limited empowerment access has also weaken women.

Climate change is the biggest concern of all community members living in a certain climatic zone. Climate change, according to reports of WEN (2010), is known to affect certain groups of society who are discriminated and underrepresented, which in most societies include women (ibid:5-6).

Confided within the gender ideology of the public/domestic dichotomy, women are confronted with the challenges of climate change in their day-to-day activities. In order to fulfill the responsibility they are bestowed upon within the household, women struggle to cope with the challenges that rise due to climate change, particularly in relation to water

for home consumption and firewood, which are eminent resources for household consumption. In relation to these, in their quest for resources, which are in scarcity, All over the developing world, women and girls bear the burden of fetching water for their families and spend significant amounts of time daily hauling water from distant sources.

In Ethiopia, women comprise the majority of the population, which are encounter with the impacts of climate change(Nigus 2011). Women are also in the front line with regard to the overall challenges and of climate hazards. Aside from being victims of climate change, women also share a responsibility in tackling the problems that arise as a result of such changes. Women and the natural environment have a strong bond. As Ethiopia is one of the developing countries, women are dependent to the natural environment. As woman is the one expected to take care of her family, women use firewood's majorly for household consumption sometimes to support their economy. This fuel source is from the natural environment. But because of several reasons like that of over population, scarcity of resources has led the study area for rapid desertification. This led women to marginalization.

Demetriades and Esplen (2008) and Nellesmann, Verma, and Hislop (eds). (2011), as is evident in most cases, when women travel to find basic needs, they might face sexual harassments, including rape. This is particularly an issue with female-headed households. Compared to the women in male headed households, domiciliary headed by women are more vulnerable, both directly and indirectly, to the impacts of climate change (Klasen, Lechtenfeld, Povel 2011).

Like that of other regions, women in this region also have a big responsibility of taking care of their family. In line with climate change and scarcity of resources, in an attempt to sustain the family, women engage in additional roles, which cause stress and tension. This, in turn, has an effect on their physical and emotional well being causing health related and economic problems within the household (Pluha 2007). In accordance with this, the activities involved in fetching water and collecting firewood particularly, have direct relation with climate change. Similar to such resources, whose scarcity depends on the climate of the surrounding area, grazing land and water sources are also another important resources which become a challenge in relation to climate change for women and female headed households (Mehhan 2004). In accordance with livestock raising activities, women being the responsible one are affected by climate change with regard to water and grazing land. Moving away from the domestic chores, in terms of economic activities, women are also inclined to participate in subsistence agricultural production and plantation activities (Assefa 2011; Nigus 2011), which makes them prone to climatic hazards. In such economic activities, due to climate change, the agricultural production could decline. As a result, women are forced to reduce the intake of the family both in quantity and quality. This, in turn, affects the livelihood and physical well being of the family, particularly children.

Women in female-headed households are more vulnerable compared to other women. Female-headed households are living in a serious poverty than the male-headed households (Mehan 2004). In all economical and other aspects of the livelihood, female-headed households are forgotten by every level of hierarchy in every level in the *woreda* and the community and community associations. Female-headed households are also marginalized in socio economic activities within their areas. Within this specific

marginalized community member's culture play a great role in influencing women and engage in several activities to support their livelihoods. Female-headed households are also marginalized in regarding to the harvesting periods, during donations, training, capacity building and the like. So, women are limited in knowledge, productivity, and the like within these households. Generally, this group of the community is extremely affected and limited by both climate and human factors. Particularly female headed households can be seen and understand that, unlike to women and girls living within male-headed households, they are much poorer and vulnerable as well as affected by climate change.

The majority of women in *Deberegiorgis kebele* depend on agriculture, contributing to agricultural farming and livestock production. Hence, their relationship with nature and the natural environment is strong. Women contribute in several ways both for the crop and livestock productions.

As the finding of this study clearly shows, women are also more vulnerable because they have less access to education and information. Having such access to information would enable women to manage climate-related risks to crop and livestock. Unlike to the literate communities in the study area, the illiterate ones are vulnerable because of several reasons. According to my informants explained during trainings and meetings they have delimitation to understand as feat to trainings and meetings as the literate ones. Even some training terms are confusing to understand to the illiterates. Therefore, it limits the rural illiterate through incommutability with the natural environments. The other thing is lack of information, as most of the time this women stay in the house. They are not exposed to latest information mainly in regarding to technologies and newly invented important

things to their livelihood. Therefore, they have limitation on information and information gathering, which is important to their livelihood. Both lack of information and education has a negative shadow in their livelihood for instance in their production to agricultural and livestock. This also affects their livelihood and lifestyle in deferent ways. If this community member doesn't have clear information, they will be vulnerable and impacted at a front line. As Demetriades and Esplen (2008), this is as a result of "Unequal intra-household distribution of power and resources, such as food and property" (ibid 2008). It is also the same true in the study area as well.

I am not aware of anything. This is because I am not exposed to any of the offices nearby. Trainings are always given to the man. If it goes beyond, the one who nominate calls for women who have a husband. This is because there is corruption. I don't get any trainings and the like. I never had seen also any support from any one. Rather, they discriminate.... (A2: Upper valley, 26-01-2014).

Like that of other Ethiopian rural women, women living in *Debregeorgis kebele* are also responsible for the imputes and day-to-day activities of the household. To accomplish their daily activities and responsibilities of a household, women are directly or indirectly related to the natural environment. This also includes through collecting firewood and fetching clean water. This natural environment from time to time is getting varied through different factors. Therefore, these responsibilities laid on women are always susceptible to climate change hazards. As long as the relationship, be it direct or indirect, between women and the natural environment exists, the issue of vulnerability to climate changes. As the life of most women's livelihood depends upon agriculture, the issue of vulnerability will also be there. The degree of vulnerability, however, differs from society to society, from got to got,

from household to household, or from individual to individual. The understanding of vulnerability also differs in space and time. For instance, as I tried to point out in the above paragraphs, women living in the lower valley and in the upper valley differ in their vulnerability towards climate change.

Regarding agriculture, women's contribution starts from the early beginning. This includes the period before and during the preparation of land with unlimited contribution until the final collection of products. During this harvesting period, women are also engaged in preparing dams, natural composts, and the like to maximize the agricultural product. Women also attach in giving care to the seeds until the final day of collection of products. This includes several activities if needed. Like that of making terracing or making shelter and the like. Therefore, women also face challenges before, during and after harvesting periods.

Like that of the agriculture, women also contribute a lot in regarding to livestock/ animal husbandry. I can say a lot of workload is added to the women in addition to other activities for the livestock rising. Women are expected to take to grazing land. This is because children now days are going to school. Therefore, the responsibility is laid on the shoulder of women. These responsibilities are taking animals for grazing far away from their area, taking livestock to rivers for looking of water; taking care of livestock, cleaning the barn of the livestock (cleaning and collecting animal waste materials for preparation of compost) and the like are expected role of the women.

If the above stated both activities are affected negatively by any intervention including climate change and the like, women also face challenges and add additional burdens on the shoulder of women. Marginalization of women in most aspects of decision making, especially economically, environmentally and socially, have an input on the vulnerability of women as a result of climate change. (Guday and Eskinder 2013) (GCCASP 2012:23). In addition to decision-making, subordination of women in terms of access to and control over resources, affecting the livelihood of women in the study area, has also a say in their vulnerability due to climate change. As the community member is ruled by patriarchal, man has an exclusive power in ruling his household among the community. During the study period women has less opportunity and power which is nearly zero opportunity to give opinions in any activity of their community and household. Women are also subordinated and limited in regarding to several access. As the man controls all resources, women are affected in terms of lifestyle and livelihood.

.... I am married before 25 years ago. My husband is responsible for everything. These properties are belong to my husband. He has made everything. I need a permeation to do any activities from my husband. My power is only in my kitchen. It doesn't go beyond..... I always ask what is needed to the household. And he will give me what I asked for, if it is important. It is also true to other external activities. I can't decide by myself. This belongs to my husband... (B14: Lower valley, 22-02-2013)

As I have discussed earlier, because of the climate variability and change in the study area, currently it is featured by drought, flood, ice wave and the like, women and female headed households are the ones vulnerable to variability in climate. This will also lead women to a

seriously up-and-coming potential risk, which is linked to climatic problem. During the climate variability, women, elders, children's are much more vulnerable through the climate change (Nigus 2011:73).

In line with the above statement, flood, drought and the like create a great disaster. The degree of climate variability possibly concerns several issues including "breakdown of normal social controls and protections" (Nellemann, Verma, and Hislop (eds). 2011).

As a result of women's relationship with the natural world in their day-to-day activities, women are in the study area are much more related and are friendly users of the natural environment than men. Their daily activity, mostly depending up on natural resources such as colleting firewood, animal remnants, fetching water from rivers, increases the interaction of women with that of the natural environment. When this relationship is disrupted by change, the life and interaction of women with the natural environment will be adversely affected. One of my informants during the interview period explained how her daily activity affects her livelihood. She said;

My husband has only a responsibility to mange somehow the agriculture, which is happened during plowing and putting seeds to the ground. The other responsibilities are laid on the shoulder of the women. My daily activities almost are related to the natural environment, for example will take care of the livestock, agricultural products, household needs and the like. During keeping all the above responsibilities we also collect firewood, animal dung's, fetching water from rivers, and the like. (A2: Upper valley, 26-01-2014)

CHAPTER FOUR

WOMEN'S ADAPTATION MECHANISMS TO THE CHANGING CLIMATE

This chapter is structured into two sub sections 4.1 focusing on impacts of climate change on women and 4.2 on Women's Adaptation mechanism to climate change. These two sub-sections are organized on the bases of two of the research objectives of the study mentioned under chapter one namely: understanding the major multifaceted challenges faced exclusively by women in the community in relation to climate change and understanding the different coping mechanisms adopted by women in the research area as a way for addressing the challenges pertaining to climate change.

4.1 THE MAJOR IMPACTS OF CLIMATE CHANGE ON WOMEN

The purpose of this chapter is not to excessively follow the complex literature on the idea of climate change and its effect on livelihood of women. It is enough to say that, the idea of climate change from the perspective of women have been neglected within the study of climate change in Ethiopia in general. It is with such conviction that I set out to analyze the relationship between women and climate change, particularly on impact of climate change on women by presenting the data obtained from the fieldwork.

Climate change is the biggest concern of all community members living in a certain climatic zone. Climate change, according to reports of WEN (2010), is known to affect certain groups of society who are discriminated and underrepresented, which in most societies include women (WEN 2010:5-6).

In Ethiopia, women comprise the majority of the population, which are directly or indirectly encountering the impacts of climate change. Women are also in the front line with regard to the overall challenges and of climate hazards as it has been discussed under section 3.3 in the preceding chapter. Aside from being victims of climate change, women also share a responsibility in tackling the problems that arise as a result of such changes.

As that of many rural parts of Ethiopia, the major economic activity in this study area is agriculture. The rain-fed nature of the agricultural practice within the study area affects adversely the livelihood of every agrarian household. Such dependence on the rain and the climatic condition of the area makes the agricultural production prone to the impacts of climate change. In addition, land degradation as a result of unwise use of land for agricultural purposes, is evident within this area, which has an input to climate change. Deforestation also plays a great role in climate change and hence in changing the livelihood of women from time to time. Deforestation has direct or indirect impacts on the agricultural products of the community members in several ways. As a result of deforestation other climate related hazards would follow, such as flood, soil erosion, drought and others. According to informants, floods which are concerns of the lower valley population may cause asset distraction¹⁶ and in the extreme case human death. Such climate related hazards, therefore, would have a significant impact on the livelihood of a household economically¹⁷, environmentally,¹⁸ socially and physiologically¹⁹. This is very

¹⁶ Asset distraction can be destroying standing crops, livestock, infrastructure and buildings

¹⁷ Because of the climate change hazards there is a loss in property, crop fields, livestock and the like.

¹⁸ Environmentally, the soil lose plays a great role in affecting human being for their livelihood

¹⁹ Climate change cause a loss of life, disease (i.e. psychologically and health performance), displacement

much a concern when it comes to women and female-headed households. Female-headed households are neglected from any activities and are restricted and limited. This is as a result of female-headed households doesn't have strong support like that of male-headed household women. In regarding to female-headed household, every problem is very strong because of internal and external factors.

Temperature increment is also another impact of climate change within the *kebele*. However, such increment in the temperature is considered as positive impact on the upper valley and a negative impact for the people living in the lower valley. This is from the perspective of production quality, quantity and type of production. As women informants from the upper valley explained, during the FGD session and during informal desiccation, I informants from the upper valley explained the temperature change and temperature trend of their area. Temperature is increasing from time to time. This also has increased the variety of products and seeds. According to them, the temperature change or increment has increased the quality and quantity of products.

On the other hand, temperature increment in the lower valley is changing the area into an arid climatic zone making the area unfavorable for agriculture. In this area, farmers are either expected to change their livelihood mechanism or produce at subsistence level. Besides agricultural production, this increment in temperature has a negative impact on declining of biodiversity, difficulty in storing food, and health problems both on human and on livestock. Migration and dependency is also among many problems that resulted due to temperature increment. According to W/o Berhan Azmeraw (B14: lower valley, 22-02-2013) explained the impact:

The increment in temperature has adversely affected our life.... Temperature variability puts its fingerprint negatively on our livelihood. I have a fear of losing everything even what we have currently. The temperature is increasing in an alarming rate which put some negative impact in the current livelihood of women. The workload has increased from time to time for women. Migration and dependency are becoming part of the identity women have. (B14: Lower valley, 22-02-2013)

Another point worth mentioning in relation to climate change and agricultural products is the question of food security. Since there is no enough production, as a result of the aforementioned environmental problems, the people living in the study area are directly and adversely affected. The issue of food security, when traced down to the households, affects women more than any other part of the society. As women are the responsible ones to take care of the family, they will be affected. The workload increases among women farmers. As the study area is depending on rain-feed agriculture, climate variability has its own impact on their activities and productivity. The variability also has an adverse effect on productivity. If there is no productivity (insufficient productivity) food security will be in danger.

As agriculture has a major income-generating mechanism, technology is much needed. Technological advancement is important to develop their capacity and to change their lifestyle. Technology in every aspect of human life basically to simplify any existing problem, technology has a solution. Technology is the window between the natural world and human being (Kottak 1999). But this is not seriously seen in the study area. Basically, female-headed households have a limitation in utilizing technologies. As most agricultural products are sensitive to climate variability, new technologies are important to use to

increase and productivity. Technology comprise from simple to sophisticated technologies. According to the *kebele* agricultural officer, women in the study area are resistant to new invention of technologies. According to him this resistant behavior to new invaded technology has affected women directly and indirectly. This has negatively affect women to resist and adapt climate change as soon as possible. These also lead this specific part of the community to serious poverty, food insecurity, and low production quality, quantity and type. Therefore, women are become weakened economically.

As I said earlier most agricultural products are sensitive to climate variability. For example, bean, barley and potato are the major production of the study area. However, these products are very sensitive to climate variability. Mainly depending on the climatic region, the impacts of climate change can be either positive or negative. For instance, while the people living in the upper valley *Got* are positively affected by the climate change, those in the lower valley are affected negatively. The people living in the upper valley are living in “Dega” or alpine area, which is very cold region. This people living in this area particularly women need the temperature increment. This is for the reason that the women started to produce new product, which never exist in that specific area. In addition to this, when the temperature increases the productivity has increased from time to time as well. In line with this quality and quantity also increased in line with the productivity. Unlike to the upper valley regions, the lower valley members were not satisfied or interested with regarding to the temperature increment. This is because the lower valley is considered as much more hotter than the upper valleys when it get more hotter from time to time the previous products that were produced previously were rapidly extinct from the region. These traits

in particularly to women give them a fear in regarding to the issue of food insufficiency to the future.

With this in mind, climate changes have both negative and positive impacts on the livelihood of women farmers particularly. Women vulnerability to climate change hazard is very high. Within this area, the exposure, sensitivity and low capacity of women to adapt within the community takes the leading part since vulnerability can be adapted by high adaptive capacity (Ludwig et al. 2007).

As a result of the climate change evident in the study area, deforestation, desertification, rapid population growth, land degradation, dependency on rain (rain-fed agriculture), lack of access to new environment friendly technologies makes the community vulnerable at large and women in particular. As a result of gender ideologies within the society's culture, lack of information and education, women and female headed households are much more vulnerable to climate change.

In line with the above impacts and vulnerability of climate change towards a community, landholding size and livestock holding also have their own contribution to the vulnerability of climate change. According to the information obtained from the Woreda land administration office the study area, land holding cover is decreasing from time to time as a result of overpopulation. The density of the community is increasing from time to time. Besides demographic factors, the marriage practice of the society has also an impact on land shortage. The cultural practice of "*Gojo Mewecha*²⁰", a land, which is given to the bride and the groom upon their wedding from both families, has led to segmentation of land and

²⁰ *Gojo Mewecha* is a gift, which is given during mirage. This can be either for the bride or groom .

hence land shortage. A better off family, according to most of my informants, is a household in possession of at least four “Temad²¹” lands. This land will be further divided among family members when they leave the household and establish their own. Refusing to give land to family members will result in ostracism in different activities of the community and he/she will be given a name, “Nifug²²”. Thence, so as not to lose face and voice within the community, people till now give land as a wedding gift. Here, women are vulnerable because the land size is decreasing from the previous. The economy also goes down when ever give to the extended family. Sometimes, they may give all “Temad” land to the children. This also has an impact in the livelihood of each household in general and women in particular. The vulnerability increases whenever the women don’t have alternative survival mechanisms. In addition to this, as women is one part of the community whenever a household is affected due to land lose women at the same time suffer with the man sometimes more. Therefore, land lose by itself has an impact in with the collaboration of climate change hazards to the rest of products and product loss.

As mentioned in the previous sections of this chapter, women in this region are vulnerable to several health impacts, which are the outcome of the climate change hazards. Being in charge of maintaining the household by preparing food, women walk for a long distance to gather firewood and fetch water. In such journey, they might face sexual harassment or rape. Other than this, women are also forced to work on communal labor activities like terracing and building dams on rivers, which also have an impact on the physical well being of women.

²¹ *Temad* is a local land amusement unit equivalent to one quarter of a hectare.

²² *Nifug* is a person or someone who do not give what he excessively has.

Besides economic and health problems, the impact of climate change has gone to the extent of social problems, regardless of the attempts to decrease the impact. According to women in the study area, climate change impacts have become worse leading them to further poverty.

I have been planting several trees and vegetables but because of the change in temperature I have lost everything. I don't have anything to compensate with ... I need someone to help me. My children are stopping their education so that they can help me in several activities of the households (A15: Upper valley, 09-02-2013).

As a result of climate change, household's particularly female-headed households are getting worse and worse. The poor are getting poorer. Therefore, to reduce the vulnerability of community members from both human and natural hazards, women have developed some adaptation mechanisms.

4.2 ADAPTATION TO CLIMATE CHANGE: WOMEN'S COPING MECHANISMS

In response to the impacts of climate change within the study area, informants have differentiated and identified several adaptation mechanisms. In general, women have adapted or created adaptation mechanisms to climate change. However, these mechanisms differ from place to place, from person to person and from time to time. Some of these mechanisms include diversifying agricultural products and engaging in livestock rearing. By planting drought resistant and shortly harvested crops and diversifying their economic activities to that of livestock rearing, community members attempt to adapt to the climate change and its consequences.

Furthermore, women also play a great role in the adaptation mechanism to climate change hazards. Women, during harvesting season, change their involvement from agricultural activity to non-farming activities. Like trade, employment in institutions and the like are women now a day's started to engage in. In the other hand, women also engage in producing vegetables by using irrigation schemes established in the area. Women adaptation mechanism is different from the man in different ways. Women have started to shift new economic systems very lately. This also affects their lifestyle and livelihood. Women also shift from agriculture to other alternative adaptive mechanism is since five to ten years. There is no specific time agreement when they have shifted to other activities other than agricultural activities.

To supplement the agricultural economic activity, some women engage in agro-pastoral activity. Mixing agriculture with that of livestock rearing, women in this study area try to sustain the family. Livestock production in this area is becoming a very important way of subsidizing agriculture. This is also much more important for female headed households.

By renting their agricultural land to other farmers, exclusively men, female-headed households earn half of what is produced on the land. In addition to this income, they also engage in livestock raising and marketing the livestock and their products. By taking credit from government institutions, women earn start-up money for livestock rearing. According to many of my informants, animal products are much more demanded in the market than agricultural products, and thence more profitable. According to Yetnayyet Mulatu livestock are;

.... livestock are my everything More than everything. They have compensated what I have lost. Previously, I was waiting to God to give me his will but currently it is all about how I put my effort on my animals. Please don't compare the previous life with the current life. As a woman, I can say we all are re-born ones again. As we start to produce My livestock play a great role in my life (A19: Upper valley, 04-02-2013)

As a result of the climate change, to avoid women facing several impacts when they travel long distance for searching of water and firewood, they plant trees such as eucalyptus trees nearby their houses and mostly within their compound. Besides avoiding the problems women face in their quest for firewood and water sources, planting such trees also holds on soil, preventing running water and flood. Therefore, forestry is one of the mechanisms that women use to adapt to the impacts of climate change.

Land is gating scarce, the population is growing in a fast and alarming rate. Deforestation is also seen and going in an alarming rate. This is because of the above reasons. So, for this loss as a woman to reduce my challenge I have planted some trees which are very much important for my household (A19: Upper valley, 04-02-2013)

Migration is also one way of adapting mechanisms of women in *Deberegiorgis Kebele*. Women in their middle ages (in the middle of their 20's and 30's) are expected to help their families. Sometimes, these women migrate to big cities like *Deberemarkos* and Addis Ababa. According to them, if they are "lucky" and if they have relatives and some money, they also migrate to the Arab world or the Middle East.

... Migration is one adaptive mechanism from my perspective. This is because I need to help my family. I need to secure my family's existence. So, I will migrate to survive. (B3: Lower valley, 25-01-2013)

Another way of adapting mechanism within the community is technological advancement in crop production. Through the help gained from the *Woreda* administration office and the *Woreda* agricultural office, improving the technological equipments used in crop production is one mechanism of adapting to climate change. Using such new technology has relieved women from extra efforts implemented on agricultural production.

In line with this, women in particular also adapt the climate change through tactical and strategic adaptation mechanisms. This includes planting times, using irrigation technologies, using compost, and using new products that can cope with the climate variability. These are all under the tactical adaptation mechanisms. Under the strategic farming adaptation mechanisms include managing the soil, using new selective crops, branching out the crop varieties (Assefa 2011).

As an adapting mechanism women also have joined institutions like ACSI (Amhara Credit and Saving Institution) to support their livelihood. So, a woman as an adapting mechanism has joined the fanatical management system.

Borrowing and Saving: Saving is another adaptive mechanism of women, though it is few who have access to such mechanism The Amhara Credit and Saving Institution (ACSI) has given an opportunity to few women to get some credit by saving some money. Taking credits from this association transforms the life of women, enabling them to engage in different economic activities.

CHAPTER FIVE

CONCLUDING REMARKS

5.1. SUMMARY OF MAJOR FINDINGS

This study has focused on understanding the multifaceted impacts of climate change with a specific attention to women. By going beyond presenting women as mere victims of this natural disaster it has also attempted to present the agency women have in coping with the multiple challenges caused by the severe climate change. Hence, the study has set the objectives of: exploring the major elements of climate change in the study area; understanding the vulnerability of men and women to climate changes, understanding the major multifaceted challenges faced exclusively by women in the community in relation to climate change; Understanding the communities perception on the role of women in environmental conservation; learning the different coping mechanisms adopted by women in the research area as a way for addressing the challenges pertaining to climate change.

As climate change is linked with several problems including food security and poverty, climate variability is a challenge for every household. Like that of Tigray and Afar and regions with in this altitudes are marginalized (Nigus 2011), as this Amhara region has nearly the same climatic vegetation with Tigray and Afar, this region, is also under the variability and impact of climate change. The Amhara region is much vulnerable to several challenges due to climate variability. Within this specific region rain and temperature variability is common. This also has a challenge on the livelihood of the region. This impact

is seen in regarding to agriculture and livestock productivity. This is also consequently to shortage and variability of water and pasture.

The study area is known to variability of climate trained. High deforestation and forest degradation is rapidly increasing from time to time. As a result of the community in the study area increases the demand of natural resources for different proposes. The community also over exploits the natural test of the area. The increment in population is also one factor for the deforestation and degradation to happen in the study area. This is also because of the basic need of the community members. Land expansion is the major problem among the community. When the number of the population increases the demand to expand the agricultural land towards the land covered with forests. Consequently, heavy and unpredictable rainfall and temperature variability are becoming the identifying sign of the study area recently.

The study area livelihood has depended on agriculture and livestock productions like cow, sheep, mule and horse. Due to the climate variability, these products are also decreasing from time to time. Recently, the condition and status of this key livelihood resources are decreasing from time to time. As a resource, the area was reach in water resource but recently as a result of the climate variability happened in the study area, the water resource is also endanger.

During the study period the farmers²³ perception on climate variability is explained its challenge in regarding to rain and temperature. The climate condition and pattern is varied

²³ The term "farmer" stands for women farmer in the study area.

from time to time and from period to period. In regarding to the rain, the rain is decreasing and varied from period to period. The amount of rain is also different even among the same region. There is high variability in both the amount of rain and time duration of the rainy season. This is also expected to vary and affect the community at large in the future. Like to the rain the temperature also has increased than before. This is also having impact on several activities on the livelihood of the farmers. This is perceived in regarding to the crop and livestock production.

Women in particular are in the front line both to the impact and vulnerability of climate change. The extent to vulnerability of women is deferent from women to women and from place to place. It is also different among households. The vulnerability also varies among women who are wealthy and educated. Even among women themselves, age and household responsibility also matters to the degree of vulnerability within the study Kebele. Elders, children and female-headed households are in the front line to the vulnerability and variability of climate change. Unlike to the man, women have engaged in to several activities including social, economic and political activities. In line with the above idea, women are also the one expected to challenge her problems. Therefore, the workload is increasing from time to time. It is also expected to be doubled in the future if it continues like this.

Based on data generated from the study the climate variability has caused several troubles in several livelihoods of farmers in general and women farmers in particular. This climate change impacts are mainly seen on crop and livestock production of the farmers. This is also as a result of climate variability (i.e. temperature and rainfall variability). As a result of

variability in rainfall and temperature, the crop and livestock productivity has varied from time to time. These also led farmers to further poverty and loss. This variability also sees to the extent of cropping pattern. Therefore, different crops have been replaced by some other crops which are suitable to the variable climatic condition or sometimes short cycle crops. In regarding to the livestock production, the number of the livestock is decreasing from time to time. This is as a result of the variability in temperature and rainfall. The scarcity of pasture increase as a result of temperature and rainfall variability. These lead farmers to decrease the number of livestock.

The climate change plays an unenthusiastic role in damaging the livelihood and resources of the study area. This damage includes soil erosion, unpredictable increment and decrement of water, sometimes the water dry and unsuccessful plant growth are the few and major challenges. Several severe challenges have happened as a result of the climate hazard. Women mainly face critical challenges in regarding the productivity of both the agriculture and livestock. In regarding to the livestock production, the productivity decrease from time to time and the like are one implications of loss among the community. This loss is very much serious for a woman or female headed household.

As a result of climate variability and its shocks and the population growth are directly linked with scarcity of important resources. These resources also include land, water, firewood and the like. This increment of population has got worsen the serious problem with the collaboration of the climate change. Due to the climate change, shortage of grazing land has decreased from time to time. This leads a number of farmers to decrease the number of animal produced. The variability of the climate also challenges the agricultural

production through rain and rainy season variability. This is very much a big problem for female-headed household both in crop production and livestock production. Therefore, the vulnerability also increases whenever the climate induced shocks increase both in livestock and crop production.

By and large, women farmers in *Debergiorgis Kebele* are extremely susceptible to the challenges of climate change unpredictability or inconsistency. Even though currently NGOs and GOs support the community in recovering the forest and secure food security to the community. However, most of the female-headed households are still under the impact of climate change and climate hazards. This makes the problem very much worse for women in the study area.

The adaptive capacity of the area is very weak. However, except few community members the study area is much known for the unsatisfactory adaptive capacity. This can be measured through little using of technologies for both the crop and livestock production. These lead farmers in general and women farmers in particular to further poverty. But even though the adaptive capacity is very low they use some mechanisms to adapt to the changing and challenging climate change. People in this area use several adaptive mechanisms like diversifying the crop, decreasing the number of livestock and migration are the major adaptive mechanisms of the community members in general and women in particular.

Women in the study area has created some activities to adapt the climate change in addition to the housework. By the project of NGOs the area closures, grazing land management, liming, and preparation of compost, multiplication and distribution of

farmers' important local of important varieties, and forestation and forest protection was given as a training for the local community based organizations (CBOs) to support and managed by themselves with the donation of the SGP/GEF project program. This is currently both an advantage and disadvantage for the community at large. The advantage is as a result of trainings and supports in different mechanisms. But the disadvantage comes from un-participating of the local indigenous community in assessing there need and interest. Sometimes, because of the community members are not clearly aware, conflicts occur among them several times. This also adversely and positively affect women livelihood.

To challenge the problem, the *Woreda* and *Kebele* administration office of agriculture in collaboration are trying to minimize the climate-induced shocks and maximize the adaptive capacity of the community. The office also majorly works on water resource conservation, rehabilitating deforested and degraded areas buy working ditches and channels to conserve the soil from the above impacts.

REFERENCES

Abarufa Jatani Wario. 2011. Climate change and variability and its impact on the livelihood of pastoralists: Case Study in Dire Woreda of Borana Zone, Oromia region. MA thesis. Addis Ababa University.

Aklilu Amsalu, Desalegn Wana, Mesfin Kassa and Negash Teklu. 2013. Climate change impacts on Pastoral Women in Ethiopia: some evidences from the Southern lowlands. http://phe-ethiopia.org/pdf/Final_Brief_CC_women.pdf. PHE Ethiopia Consortium. [Retrieved on December 21, 2013].

Aboud, Georgina. 2011. Gender and Climate Change Supporting Resources Collection. BRIDGE, Institute of Development Studies (IDS), United Kingdom.

Asian –Pacific resource and research center for women. 2010. Climate Change, Population, Sexual & Reproductive Health & Rights. An Annotated Bibliography. Published by Sida. Malaysia.

Arenillas, Ignacio and Arz, Jose Antonio. 2011. In: H. James Birx (eds). 2010. 21st Anthropology a reference handbook.. vol 1& 2. London and New York: SAGE Publications.

Arhinful, K., Das M., Heggenhougen, Kris (eds). 1996. How to use applied qualitative methods to design drug use interventions. INURD social scientists working group. Working draft December 1996. Available at <<http://www.epa.gov/climatechange/impacts-adaptation/international.html>> [Retrieved 15 December 2013].

Azmeraw Ayehu. 2010. Effectiveness and Governance of Community Based Participatory Watershed Management, in Choke Mountain; the case of Chemoga Watershed. East Gojjam: Unpublished MA thesis in Addis Ababa University, Ethiopia.

Belay Simane, et al. 2013. Agro-ecosystem Analysis of the Choke Mountain Watersheds, Ethiopia In: www.mdpi.com/journal/sustainability. [Retrieved on September 6].

Barnard, Alan and Spencer, Jonathan. 2002. Encyclopedia of social and cultural anthropology. London & New York. Routledge.

Bourgeois Philippe.1990. Confronting anthropological ethics: ethnographic lessons from Central America. Journal of peace research, vol.27, No. 1 (Feb., 1990) 43-54. <<http://links.jstor.org/sici?sici+00223433%28199002%2927%3A1%3ACAEELF%3E2.0.CO%3B2-5>>. [Retrieved 10 February 2013].

Barbara DiCicco-Bloom & Benjamin F Crabtree. 2006. Making sense of qualitative research: The qualitative research interview. Blackwell Publishing Ltd 2006. (MEDICAL EDUCATION 2006; 40: 314–321).

Cassel, Joan and Sue-Ellen, Jacobs. 2006. Handbook on Ethical Issues in Anthropology. Joan Cassell and Sue-Ellen Jacobs (eds). A special publication of the American Anthropological Association number 23.

CSA (Central Statistically Agency). 2011. Agricultural Sample Survey Volume V. Addis Ababa, Ethiopia: The Federal Democratic Republic of Ethiopia Central Statistical Agency. Addis Ababa. Ethiopia.

Church, Jill M. 2011. In: H. James Birx (eds). 2010. 21st Anthropology a reference handbook. vol 1& 2. SAGE Publications. London and New York.

Demetriades, Justina and Esplen, Emily. 2008. The Gender Dimensions of Poverty and Climate Change Adaptation. IDS Bulletin Volume 39 Number 4 September 2008. Institute of Development Studies.

Devereux, S. (2000). Food insecurity in Ethiopia, a discussion paper for DFID. Addis Ababa, Ethiopia.

Du Toit, Brian M. 1980. Journal of Anthropological Research Vol. 36, No. 3 (autumn, 1980), pp. 274-286 Published by University of New Mexico.
<http://www.jstor.org/stable/3629524>. [Retrieved December 10, 2013].

Eriksen, Siri, Brien, Karen O' and Rosentrater, Lynn .2008. Climate Change in Eastern and Southern Africa: Impacts, Vulnerability and Adaptation. GECHS Report 2008:2. Department of Sociology and Human Geography. University of Oslo

(UPEPA) United States Environmental Protection Agency. 2010. Climate Change Science Facts. <Http://www.epa.gov/climatechange> . [Retrieved on May 7, 2014].

USAID (United States Agency for International Development). 2007. Adapting to Climate Variability and Change a Guidance Manual for Development Planning. Addis Ababa, Ethiopia: USAID.

Felix, B., and Romuald, S. 2009. Do Climatic shocks matter for Food Security in Developing Countries? France.

Ford, James D. & Furgal, Chris. 2009. Foreword to the special issue: climate change impacts, adaptation and vulnerability in the Arctic. Polar Research 28 2009 1-9.

Fiona Meehan.2004. Female Headed Households in Tigray, Ethiopia a Study Review. December 2004.

Getnet Berhanu .2012. Valuation of Choke Mountain Range Wetland Ecosystem, East Gojjam, Amhara Region, Ethiopia: Application of Choice Experiment Valuation Method. MA thesis in Addis Ababa University.

Gross, Joachim. 2012. The Severe Impact of Climate Change on Developing Countries. 96 Medicine & Global Survival, February 2002; Vol. 7, No. <http://ippnw.org/pdf/mgs/7-2-gross.pdf>. [Retrieved on May 23, 2014].

Goh, Amelia H. X. Met office and WFP. 2012 Food Insecurity and Climate Change http://www.metoffice.gov.uk/media/pdf/8/7/mo_pup_insert_food.web.pdf [Retrieved 17 February 2014].

Guday Emirie & Eskinder Teferi. 2013. Gender Relations in Access to and Control over Resources in Awra Amba Community of Amhara Region, Ethiopia. In Ethiopian Journal of Social Sciences and Humanities, Special Issue, Vol.IX, No.2. pp1-36

ILO.2008. Report of the Committee on Employment and Social Policy, Employment and labour market implications of climate change, Fourth Item on the Agenda, Governing Body, 303rd Session (Geneva), p2.

IPCC (Intergovernmental Panel on Climate Change). 2000. Special Report on Emissions Scenarios. [N. Nakicenovic and R. Swart (eds.)]. Cambridge University Press.

IPCC. (Intergovernmental Panel on Climate Change) 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability. IPCC Working Group II, Third Assessment Report. [McCarthy, J.J., O. F. Canziani, N.A. Leary, D.J. Dokken, and K.S. White (eds.)]. Cambridge University Press

_____ 2001. Working Group 2, 2001. Third Assessment Report, Annex B: Glossary of Terms.

_____ 2007. Intergovernmental Panel on Climate Change Working Group 2, 2007. Third Assessment Report, Annex B: Glossary of Terms.

James, Clifford. 2003. On The Edges of Anthropology (Interviews). Prickly paradigm presses Chicago.

Johnsson-Latham, Gerd. 2007. A study on gender equality as a prerequisite for sustainable development. Report to the Environment Advisory Council. Sweden.

Kottak, C. P. 1999. The new Ecological Anthropology. VOL.101.No.1. New York: McGraw-Hill. University of Michigan.

Kottak, C. P., & Kozaitis, K. A. 2008. On being different: Diversity and multiculturalism in the North American mainstream (3rd ed.). New York: McGraw-Hill.

Kelly P. M. & Adger W. N. 2000. Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climate Change* 47, 325–352.

Laddey, Ryan, Kumamoto, Mihoko and Treichel, Pia. 2011. Discussion Paper Series: Africa Adaptation Programme Experiences Gender And Climate Change: Advancing Development through an Integrated Gender Perspective. Vol. 1 March 2011.

Lavenda and Schultz .2012. *Anthropology: What Does It Mean to Be Human?* Second edition 365 pp.

Lwanga, Margaret. 2002. Gender, Environment, and Sustainable development. A Paper presented at the Conference on “Sustainable Development, Governance and Globalization: An African Forum for Strategic Thinking towards the Earth Summit 2002 and Beyond” Nairobi Kenya 17 – 20 September 2001.

Mahmud,Y. Salvatro, D. Temesgen, D. Claudia,R and Gunnar, K. 2008. The Impact of Climate Change and Adaptation of Food Production in Low Income Countries. Evidence from the Nile Basin, Ethiopia. IFPRI. Discussion Paper No 00828. Centre for Environmental Economics and Policy in Africa. Pretoria, South Africa: University of Pretoria.

Marcia Lees, Frances E. and Nancy Johnson Black. 2000. *Gender and Anthropology.* waveland press.

M. Mulinge and M. Getu. 2013. Impacts of climate change and variability on pastoralist women in sub sharan Africa.

Meehan, iona. 2004. Female Headed Household in Tigray, Ethiopia A Study Review. DCG Report No. 35 December 2004

Mendelsohn, R. O., W. N. Morrison, M. E. Schlesinger, and N. G. Andronova . 2000. 'Country-specific market impacts of climate change', *Climatic Change*, 45, 553-569.

Mendelsohn, R.O., M.E. Schlesinger, and L.J. Williams. 2000. 'Comparing Impacts across Climate Models', Integrated Assessment.

Meron Zeleke. 2010b. The Mother and the Bread Winner: The Socio Economic Role and Status of Gumuz Women. Munster: Lit Verlag.

Medany, M., Niang D., Nyong, I., Tabo, T., and Vogel, C. 2006. Background paper on impacts, vulnerability and adaptation to climate change in Africa. For the African Workshop on Adaptation Implementation of Decision 1/CP.10 of the UNFCCC Convention. United Nations Framework Convention on Climate Change. Accra, Ghana.

Mitchell JM Jr, Dzerdzeevskii B, Flohn H, Hofmeyr WL, Lamb HH, Rao KN, Wallén CC .1966. Climatic Change. WMO Technical Note No 79, World Meteorological Organization, Geneva, pp 79.

Milton, Kay.1996. Environmentalism and Cultural Theory. Exploring the role of anthropology in environmental discourse. Routledge publishing company. New York.

MoFED. 2009/10. Annual Report on Macroeconomic Developments. Addis Ababa, Ethiopia: Ministry of Finance and Economic Development of Ethiopia. Addis Ababa. Ethiopia.

Nelson, Valerie and Meadows, Kate. 2002. Uncertain predictions, invisible impacts, and the need to mainstream gender in climate change adaptations. Gender and Development Vol. 10, No. 2, July 2002.

Nellemann, C., Verma, R., and Hislop, L. (eds). 2011. Women at the frontline of climate change: Gender risks and hopes. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal.

Nirmala, G. and Venkateswarlu, B. 2012. Gender and climate resilient agriculture: an overview of issues. Current Science, Vol. 103, No. 9, 10 November 2012.

Nigus Gebremedhin. 2011. The Impacts of Climate Change on Rural Livelihood and Their Adaptation Methods: the case of Alamata woreda, Southern Tigray. MA thesis in Addis Ababa University. Addis Ababa, Ethiopia.

OECD (Organization for economic co-operation and development). 2012. Green growth and developing countries: a summary for policy makers. Paris. <<http://www.hfidtc.com/research/methods-reports/phase-1/hf-design-evaluation-methods.pdf>> [Retrieved December 12 2013].

Patricia Dudu, Violet :2012. Impacts of Climate Change on Coffee Farming in Ethiopia: Stakeholders 'analysis- adaptation strategies to the impacts of climate change on coffee farming in Ethiopia March 14, 2012.

Poluha, Eva. (2007).The World of Girls and Boys in Rural and Urban Ethiopia. Forum for Social Studies.

Petit, J.R., et al. 1999. Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. Nature 399: 429-436.) Available at <http://www.ncdc.noaa.gov/paleo/abrupt/story2.html>. [Retrieved on May 24, 2014]

Salmon p., Stanton N., Baber C., (eds). 2004. Human factors design & evaluation methods review. <http://www.hfidtc.com/reserch /methods-reports/phase-1/hf-design-evaluation-methods.pdf> .[Retrieved on December 15,2013].

Smit B, Pilifosova O, I Burton, B Challenger, S Huq, R Klein, G Yohe. 2001. Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change.

Smit B. & Pilifosova O. 2003. From adaptation to adaptive capacity and vulnerability reduction. In **J. Smith et al. (eds.):** Climate change, adaptive capacity, and development. London: Imperial College Press.

Stephan Klasen, Tobias Lechtenfeld and Felix Povel. 2011. What about the Women? Female Headship, Poverty and Vulnerability in Thailand and Vietnam. <http://www.oecd.org/dev/pgd/46982877.pdf> [Retrieved on May 23, 2014].

Third Global Congress of Women in Politics and Governance. 2008. Background and Context Paper for the Conference, Manila, Philippines, 19-22 October, www.capwip.org/3rdglobalcongress.htm [Retrieved 19 November 2008].

Thomas W. Hertel and Stephanie D. Rosch. 2010. Published by Oxford University Press, on behalf of Agricultural and Applied Economics Association.

Tol, Richard S. J. 2008. The economic impact of climate change, ESRI working paper, No.255.

UNFCCC (United Nation Framework Convention on Climate Change). 2007. Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries report on the workshop on climatic related risks and extreme events. [Retrieved October 10, 2010], from Noted by The Secretariat. FCCC/SBSTA. UNFCC. Bonn, Germany.: [Http://unfccc.int/resource/docs/2007/sbsta/eng/o7](http://unfccc.int/resource/docs/2007/sbsta/eng/o7)

Women's Commission for Refugee Women and Children. 2006. Beyond Firewood: Fuel Alternatives and Protection Strategies for Displaced Women and Girls. <http://www.refworld.org/pdfid/4a54bbfe3.pdf> New York.

Wondmunegn Kebede. 2012. The Effect of Climate Change Induced Productivity Change on Food security And Food Market of Ethiopia: CGE Modeling. MA thesis. Addis Ababa University.

Woods, Martin. 2011. Interviewing for research and analyzing qualitative data: an overview. School of health and social services Massey University. New Zealand.

APPENDICES

APPENDIX I: GUIDING RESEARCH QUESTIONS

Introduction: My name is Yared Gebremedhin. I am studying Social Anthropology in Addis Ababa University for my Master's Degree and I am doing my Master's thesis on climate change on eastern Gojjam: The effects of climate change, vulnerability of women and their coping mechanism in Choke Mountain, Bibugn Woreda. Before everything I am grateful for your collaboration in giving important information and time for the success of this work!

Thank you in advance for participating!

PART ONE: Research Site Identification and Background of Interviewee and Key Informant

1. Woreda _____ 4. Specified place of Interview _____

2. Kebele _____ 5. Time of Interview _____

3. Valley _____ 6. Date of Interview _____

Name _____ Marital Status _____ Sex _____

Educational Level _____ Age _____ Occupation _____

Number of children _____ (if there is)

1.1. IN-DEPTH INTERVIEW SECTION

Part Two: Questions forwarded to informants in regarding to the general understanding of informants towards climate change and their perception to Climate variability and vulnerability in the study area.

1. What is your responsibility in your family? And your husband's role? How is it different?
 - 1.1.1. Can women take a man responsibility? Can it be reciprocal?
 - 1.1.2. What will be your role in your house? (For those who don't have husbands)
 - 1.1.3. What will be your role outside home or in your Kebele or "got"
2. What is the main income source for your family?
3. What is your contribution to your family? In what way do you support your family?
4. If we assume the man's contribution as 10 then how much would you rate your contribution to your family from 1-10? Why?
5. Do you or your family member have another source of livelihood other than agriculture?
6. If your answer for Q5 Is 'yes', what kind of activity is it?
7. How many "Temad" lands dose your family own?
8. Is your land registered in your husband name in the government? Do you think you have a right in this land?
9. How many livestock do you own? Do you think this all livestock belongs to your husband? Can you clam both in your land and livestock's?
10. Number of livestock before and know? (if there is)

PART THREE: Questions forwarded to informants in regarding to climate variability and vulnerability in the study area

1. Can you explain about your climate? Do you think this climate has been changed?

2. Compare the water with before and the present time? (There is climate variability, the climate has totally changed, and the climate has not changed)
3. Is there change in the timing (duration) of the rainy season?
4. If yes, how it has been changed?
5. How does the climate change is affecting your livelihood? (it can be both in terms of rain or T^0)
6. What changes you have seen in your crop production?
7. Please explain about your daily activity? How do you think daily activity of a woman is affected? How do you think the daily activity of a man can be affected?
8. Is your crop productivity increased or decreased? What do you think the cause?
9. Do you think your livestock production has been changed in the past and now? If yes how? Why do you think it has happened?
10. Where do you feed your livestock's? Who herd your livestock's? If women, then how many hours and how often in a week does she do this work? Do you think this is women's work/ responsibility?
11. If not yours then whose responsibility is this?
12. Is there any effect of the grazing land by the climate change? Compared to the past environment for grazing livestock has been changed?

12. What do you think the possible ways to minimize the impacts of climate variability or change on your livelihood?

13. Do you have access to get credit from any institution as a woman?

14. How did the government, GOs and NGO's responded to reduce the impact?

PART FOUR: questions forwarded to interview informants in regarding to adaptation mechanisms in the study area

1. Are there any adaptation practices that you have used? What kind of coping mechanisms you practiced to minimize climate related shocks?

2. What would you suggest to solve this problem?

3. What are the major constraints that hinder you to adapt the impact of climate change?

Is there any locally practice coping mechanisms? Please explain?

4. What do you think the responsible factors for change on vegetation pattern and land use type of your area?

THANK YOU FOR PARTICIPATING!

1.2.FOCUS GROUP DISCUSSION GUIDE

General Introduction: the purpose of this FGD is to gather information related to women and climate change: challenges and adaptation strategies in choke mountain. the data to be collected from this FGD will be used only for an academic purpose. Your responses will be kept confidential. No one will know what respondents said therefore, I kindly request you to participate in this study voluntarily. The quality of this study depends on your genuine response and I would also like to ask your voluntariness to record your voice through tape recorder because it is hard to jot down your responses.

Thank you in advance for your time and kind cooperation!

Part One: Research Site Identification and Background of Participants

1. Woreda _____ 5. Specified place of Discussion_____
2. Kebele _____ 6. Time of Discussion_____
3. Valley _____ 7. Date of Discussion _____
4. Number of Participants _____

• Name _____ Marital Status _____

• Sex _____ Educational Level_____

• Age _____ Occupation_____

• Religion _____

1. Do you believe that there is a change in climate within your kebele?
2. How do you perceive climate change?

3. What are the major production and livelihood activities with in your area?
4. Do you believe that you are vulnerable to climate related effects?
5. Do you think you are also vulnerable to the variability and effects of climate change?
6. Which part of the community is much more vulnerable? Why?
7. What are the major impacts of climate change mainly on women?
8. Which part of the environmental condition affected and varied within the study area?
9. What are the major impacts of climate change?
10. Is there any climate related shocks particularly affecting one of the genders?
11. Is there variability in time in regarding to rain and temperature? Please explain?
12. How does the local community cope with the change? Is there any change on coping pattern of your area?
13. What are the adaptations strategies employed by the local community?
14. What are the possible ways to minimize the impact of climate variability and impact?

THANK YOU FOR PARTICIPATING!

INTERVIEW GUIDE FOR *WOREDA* AGRICULTURE OFFICIALS AND OTHER EXPERTS

1. Name _____
2. Position/profession _____
3. Is there any form of climate change or variability of women in your 'got' or *Kebele*? If yes, explain?
4. If the answer to Q3 is yes, would you like to explain the degree of climate change and variability impact on crop and livestock of your *Woreda* or *Got*?
5. Whom do you think is much vulnerable to the climate change? And why? What makes you think that the stated group is vulnerable?
6. Is there any change in number of livestock than previous in your *Woreda* level and particularly the *kebele* level?
7. Unlike to the number, is there any change regarding to the livestock composition and feeding in the *Kebele* level and the *Woreda* level?
8. What are the local coping mechanisms used to mitigate the impacts?
9. What is the institutions effort to reduce future impacts?
10. What are the main challenges and how do you think they can be improved?

THANK YOU FOR PARTICIPATING!

APPENDIX II: PROFILES OF RESEARCH PARTICIPANTS

INTERVIEW PARTICIPANTS

General Characteristics of Respondents from the interview

PERSONAL INFORMATION	NUMBER OF RESPONDENTS		
	Upper valley	Lower valley	TOTAL
Age Groups			
15-29	5	10	15
30-50	11	6	17
>50	3	3	6
Sex			
Male	10	4	14
Female	9	15	24
Marital Status			
Single	4	1	5
Married	10	13	23
Divorced	3	2	5
Widowed	2	3	5
Educational Level			
Illiterate	18	18	36
Primary Education	-	1	1
Secondary Education	-	-	-
University/College	1	-	1

Occupation			
Student	-	-	-
Farmer	10	4	14
Housewife	9	15	24
Office Employee	-	-	-
	-	-	-

KEY INFORMANT INTERVIEWS FROM THE UPPER VALLEY

Region: Amhara National Regional State (ANRS) **Zone:** Eastern Gojjam

Woreda: Bibugne **Kebele:** Deberegiorgis

No	Name	Age	Sex	Marital status	Educational background	Occupation	Place of interview	Date and Time of interview
A1	Alemitu Alema	41	Female	Married	Illiterate	Housewife/ Farmer	Upper valley	09-01-2014 3:00-5:00
A2	Belete Abera	50	Male	Married	Illiterate	Farmer	Upper valley	10-01-2014 8:00-10:00
A3	Melkam Zinabu	33	Male	Married	Illiterate	Farmer	Upper valley	10-01-2014 10:30-12:00
A4	Zewdu Ayana	24	Male	Married	Illiterate	Farmer	Upper valley	11-01-2014 3:00-4:00
A5	Mulu Balcha	61	Female	Married	Illiterate	Housewife	Upper valley	11-01-2014 4:15-6:00
A6	Mamo Tesfahun	47	Male	Married	Literate	Farmer	Upper valley	11-01-2014 9:10-11:25
A7	Ayal Mamo	30	Female	Married	Illiterate	Housewife	Upper valley	13-01-2014 7:30-8:50
A8	Fiqerte Mekonnen	30	Female	Married	Illiterate	Housewife	Upper valley	14-01-2014 4:00-5:30
A9	Semegne Alemayew	26	Female	Married	Illiterate	Housewife	Upper valley	14-01-2014 11:00-12:00
A10	Demelashe Dereba	41	Male	Married	Illiterate	Farmer	Upper valley	20-01-2014 2:00-3:00
A11	Alemneshe Azmach	33	Female	Married	Illiterate	office /Housewife	Upper valley	20-01-2014 4:00-5:00
A12	Bekele Arso	26	Female	Married	Illiterate	Housewife	Upper valley	20-01-2014 9:00-10:30
A13	Feleke Wondyrad	26	Male	Married	Illiterate	Farmer	Upper valley	21-1-2014 3:30-5:05
A14	Haila Melkam	51	Male	Married	Illiterate	Farmer	Upper valley	21-01-2014 8:55-9:40
A15	Aselefech Mesganaw	45	Female	Married	Illiterate	Housewife	Upper valley	22-01-2014 3:00-4:00
A16	Brhanu Beqalu	39	Male	Married	Illiterate	Farmer	Upper valley	22-01-2014 5:00-6:30
A17	Beqalu Amtataw	33	Male	Married	Illiterate	Farmer	Upper valley	23-01-2014 3:10-4:00
A18	Bereket Azemem	32	Male	Married	Illiterate	Farmer	Upper valley	23-01-2014 9:25-11:10

A19	Yetnayet Mulatu	26	Female	Married	Illiterate	Housewife	Upper valley	24-01-2014 11:00-12:00
-----	-----------------	----	--------	---------	------------	-----------	--------------	---------------------------

KEY INFORMANT INTERVIEWS FROM THE LOWER VALLEY

Region: Amhara National Regional State (ANRS), **Zone:** Eastern Gojjam,

Woreda: Bibugne **Kebele:** Dberegiorgis

No.	Name	Age	Sex	Marital status	Educational background	Occupation	Place of interview	Date and Time of interview
B1	Enguday Shewaferaw	21	Female	Married	Illiterate	Housewife	Lower valley	09-02-2014 3:00-5:00
B2	Tenebeb Debalqa	19	Female	Single	Illiterate	Student	Lower valley	10-02-2014 8:00-10:00
B3	Kedest Tekeste	19	Female	Divorcee	Illiterate	Housewife	Lower valley	10-02-2014 10:30-12:00
B4	Ayelu Mankusa	38	Female	Widow	Illiterate	Housewife	Lower valley	11-02-2014 3:00-4:00
B5	Amsalu Metka	28	Male	Married	Illiterate	Farmer	Lower valley	11-01-2014 4:15-6:00
B6	Amele Tadesse	35	Female	Married	Illiterate	Housewife	Lower valley	13-02-2014 9:10-11:25
B7	Tseganeh Menker	41	Male	Married	Illiterate	Farmer	Lower valley	14-02-2014 7:30-8:50
B8	Hiwot Baila	40	Female	Married	Illiterate	Housewife	Lower valley	14-02-2014 4:00-5:30
B9	Abebe Mola	29	Male	Married	Illiterate	Farmer	Lower valley	20-02-2014 11:00-12:00
B10	Teruneshe Alemu	32	Female	Married	Illiterate	Housewife	Lower valley	20-02-2014 2:00-3:00
B11	YeshiGata Bekure	32	Male	Married	Illiterate	Farmer	Lower valley	20-02-2014 4:00-5:00
B12	Adanech Gelaw	51	Female	Widow	Illiterate	Housewife	Lower valley	21-02-2014 9:00-10:30
B13	Asnaqu Abebe	55	Female	Married	Illiterate	Housewife	Lower valley	21-02-2014 3:30-5:05
B14	Berhan Azmeraw	60	Female	Married	Illiterate	Housewife	Lower valley	22-02-2014 8:55-9:40
B15	Hirut Bekele	18	Female	Married	Illiterate	Housewife	Lower valley	22-02-2014 5:00-6:30
B16	Meseret Yehanew	19	Female	Divorcee	Illiterate	Housewife	Lower valley	23-02-2014 3:10-4:00
B17	Tsehay Aytegeb	17	Female	Divorcee	Illiterate	Housewife	Lower valley	23-02-2014 9:25-11:10
B18	Worqeneshe Alsema	22	Female	Married	Illiterate	Housewife	Lower valley	24-02-2014 11:00-12:00
B19	Azezu Mola	24	Female	Married	Illiterate	Housewife	Lower valley	25-02-2014 11:00-12:00

IN-DEPTH INTERVIEW INFORMANTS

Region: Amhara National Regional State (ANRS) **Zone:** Eastern Gojjam

Woreda: Bibugne **Kebele:** Dberegiorgis

No.	Name	Age	Sex	Marital status	Educational background	Occupation	Place of interview	Date and Time of interview
C1	Meseret Andargachew	34	Male	Married	Illiterate	Farmer	Upper valley	09-03-2014 3:00-5:00
C2	Alebachew Mebrata	36	Male	Married	Illiterate	Farmer	Lower valley	10-03-2014 8:00-10:00
C3	Selamneshe Agate	23	Female	Widow	Illiterate	Housewife	Lower valley	10-03-2014 10:30-12:00
C4	Bisrat Azmeraw	22	Male	Married	Illiterate	Farmer	Lower valley	11-03-2014 3:00-4:00
C5	Woinishet Azeze	24	Female	Married	Illiterate	Housewife	Upper valley	11-03-2014 4:15-6:00
C6	Alem Mekurya	43	Female	Married	Illiterate	Housewife	Upper valley	13-03-2014 9:10-11:25
C7	Lealem Mekuwanent	35	Female	Married	Illiterate	Housewife	Upper valley	14-03-2014 7:30-8:50
C8	Mersha Belhu	37	Male	Married	Illiterate	Farmer	Upper valley	14-03-2014 4:00-5:30
C9	Estifanos Debarq	38	Male	Married	Illiterate	Farmer	Lower valley	20-03-2014 11:00-12:00
C10	Melkam Asnaqe	49	Male	Married	Illiterate	Farmer	Upper valley	20-03-2014 2:00-3:00
C11	Nebyou Melkam	46	Male	Married	Illiterate	Farmer	Upper valley	20-03-2014 4:00-5:00
C12	Tessema Amha	42	Male	Married	Illiterate	Farmer	Lower valley	21-03-2014 9:00-10:30
C13	Welda Wedel	51	Male	Married	Illiterate	Farmer	Upper valley	21-03-2014 3:30-5:05
C14	Mulu Mekuwanent	50	Male	Married	Illiterate	Farmer	Lower valley	22-03-2014 8:55-9:40
C15	Tsionawit Belachew	46	Female	Married	Illiterate	Housewife	Lower valley	22-03-2014 5:00-6:30
C16	Admassu Bekele	42	Male	Married	Illiterate	Farmer	Upper valley	23-03-2014 3:10-4:00
C17	Munaye Abebe	22	Female	Married	Illiterate	Housewife	Upper valley	23-03-2014 9:25-11:10
C18	Ababa Demela	22	Female	Married	Illiterate	Housewife	Upper valley	24-03-2014 11:00-12:00
C19	Ayeleche Zerfa	23	Female	Married	Illiterate	Housewife	Lower valley	25-03-2014 11:00-12:00

INFORMAL INTERVIEW PARTICIPANTS

Region: Amhara National Regional State (ANRS) **Zone:** Eastern Gojjam

Woreda: Bibugne **Kebele:** Dberegiorgis

No.	Name	Age	Sex	Marital status	Educational background	Occupation	Place of interview	Date and Time of interview
D1	Belaynesge Marqos	19	Female	Married	Illiterate	Housewife	Upper valley	09-04-2014 3:00-5:00
D2	Trngo Ambachew	21	Female	Married	Illiterate	Housewife	Lower valley	10-04-2014 8:00-04:00
D3	Tenaye Azemeraw	22	Female	Married	Illiterate	Housewife	Lower valley	10-04-2014

								10:30-12:00
D4	Tadelech Belhu	35	Female	Married	Illiterate	Housewife	Upper valley	11-04-2014 3:00-4:00
D5	Webalem Kebere	31	Female	Married	Illiterate	Housewife	Lower valley	11-04-2014 4:15-6:00
D6	Demequ Kenda	23	Female	Married	Illiterate	Housewife	Lower valley	13-04-2014 9:10-11:25
D7	Muluneshe Asnake	29	Female	Widow	Illiterate	Housewife	Upper valley	14-04-2014 7:30-8:50
D8	Asefach Ayelework	19	Female	Married	Illiterate	Housewife	Lower valley	14-04-2014 4:00-5:30
D9	Beletu Deblqa	21	Female	Married	Illiterate	Housewife	Upper valley	20-04-2014 11:00-12:00
D10	Tringo Werede	25	Female	Married	Illiterate	Housewife	Lower valley	20-04-2014 2:00-3:00
D11	Ayelech Amsale	25	Female	Married	Illiterate	Housewife	Upper valley	20-04-2014 4:00-5:00
D12	Yewebdar Mekebeb	25	Female	Married	Illiterate	Housewife	Lower valley	21-04-2014 9:00-10:30
D13	Byenu Demoza	19	Female	Married	Illiterate	Housewife	Upper valley	21-04-2014 3:30-5:05
D14	Alemenesh Belay	15	Female	Married	Illiterate	Housewife	Upper valley	22-04-2014 8:55-9:40
D15	Habtam Mengist	19	Female	Widow	Illiterate	Housewife	Lower valley	22-04-2014 5:00-6:30
D16	Alganesh Selabat	22	Female	Married	Illiterate	Housewife	Lower valley	23-04-2014 3:10-4:00
D17	Agarneh Habtamu	38	Male	Married	Literate	Housewife	Upper valley	23-04-2014 9:25-11:10
D18	Meselu Mezgebu	34	Female	Married	Illiterate	Housewife	Upper valley	24-04-2014 11:00-12:00
D19	Amsal Mekibeb	39	Female	Married	Illiterate	Housewife	Upper valley	25-04-2014 11:00-12:00

FOCUS GROUP DISCUSSION PARTICIPANTS

General Characteristics of Focus group discussion participants

PERSONAL INFORMATION	NUMBER OF RESPONDENTS		
	Upper valley	Lower valley	TOTAL
Age Groups			
15-29	3	7	10
30-50	8	7	15
>50	3	-	3
Sex			
Male	7	7	14
Female	7	7	14

Marital Status			
Single	-	-	-
Married	14	12	26
Divorced	-	-	-
Widowed	-	2	2
Educational Level			
Illiterate	14	14	28
Primary Education	-	-	-
Secondary Education	-	-	-
University/College	-	-	-
Occupation			
Student	-	-	-
Farmer	7	7	14
Housewife	7	7	14

Table 4 Focus group discussants (FGD) general information

FOCUS GROUP DISCUSSION (FGD 1)

Region: Amhara National Regional State (ANRS) **Zone:** Eastern Gojjam

Woreda: Bibugne **Kebele:** Dberegiorgis

No.	Name	Age	Sex	Marital status	Educational background	Occupation
E1	Beleteb Abera	50	Male	Married	Illiterate	Farmer
E2	Zewedu Ayana	24	Male	Married	Illiterate	Farmer
E3	Demelashe Derba	41	Male	Married	Illiterate	Farmer
E4	Feleke Wondyrad	26	Male	Married	Illiterate	Farmer
E5	Hayla Melkam	51	Male	Married	Illiterate	Farmer
E6	Befqadu Amtataw	33	Male	Married	Illiterate	Farmer
E7	Brhanu begalu	39	Male	Married	Illiterate	Farmer

Place of FGD: Upper valley

Date of FGD: 09-01-2014

Time of FGD: 4:00-5:00

FOCUS GROUP DISCUSSION (FGD 2)

No.	Name	Age	Sex	Marital status	Educational background	Occupation
F1	Alemitu Alema	41	Female	Married	Illiterate	Housewife
F2	Mulu Balcha	61	Female	Married	Illiterate	Housewife
F3	Asselefech Misganaw	45	Female	Married	Illiterate	Housewife
F4	Yetnaynet Mulatu	26	Female	Married	Illiterate	Housewife
F5	Ayal Mamo	30	Female	Married	Illiterate	Housewife
F6	Semelashe Mamo	41	Female	Married	Illiterate	Housewife
F7	Muluemebet Yehaneu	43	Female	Married	Illiterate	Housewife

Place of FGD: Upper valley

Date of FGD: 05-01-2013

Time of FGD: 4:00-5:00

FOCUS GROUP DISCUSSION (FGD 3)

No.	Name	Age	Sex	Marital status	Educational background	Occupation
G1	Enguday Shewaferaw	21	Female	Married	Illiterate	Housewife
G2	Tenebeb Debalqa	19	Female	Married	Illiterate	Housewife
G3	Hiwot Bila	40	Female	Married	Illiterate	Housewife
G4	Meseret Yehaneu	19	Female	Married	Illiterate	Housewife
G5	Azezu Mola	24	Female	Married	Illiterate	Housewife
G6	Worgeneshe Alsema	22	Female	Widow	Illiterate	Housewife
G7	Zelalem Mezgebu	48	Female	Widow	Illiterate	Housewife

Place of FGD: Lower valley

Date of FGD: 18-01-2014

Time of FGD: 4:00-5:00

FOCUS GROUP DISCUSSION (FGD 4)

No.	Name	Age	Sex	Marital status	Educational background	Occupation
H1	Amsalu Metka	28	Male	Married	Illiterate	Farmer
H2	Teganeh Menker	35	Male	Married	Illiterate	Farmer
H3	Abebe Mola	29	Male	Married	Illiterate	Farmer
H4	Yesjigata Bekure	32	Male	Married	Illiterate	Farmer
H5	Estifanos Debalq	38	Male	Married	Illiterate	Farmer
H6	Tessema Amha	42	Male	Married	Illiterate	Farmer
H7	Zenebe Kurabachew	33	Male	Married	Illiterate	Farmer

Place of FGD: Lower valleys

Date of FGD: 21-01-2014

Time of FGD: 4:00-5:00

FOCUS GROUP DISCUSSION (FGD 5)

No.	Name	Age	Sex	Marital status	Educational background	Occupation
I1	Tarikuwa Qumelachew	32	Female	Married	Illiterate	Housewife
I2	Zewedu Ayana	35	Male	Married	Illiterate	Farmer
I3	Beleteb Abera	50	Male	Married	Illiterate	Farmer
I4	Mamita Denela	41	Female	Married	Illiterate	Housewife
I5	Abebe Mola	29	Male	Married	Illiterate	Farmer
I6	Yaynaabeba Yehunbelay	33	Female	Married	Illiterate	Housewife
I7	Atetegeb Meqanent	30	Female	Married	Illiterate	Housewife

Place of FGD: with mixed of the two valleys

Date of FGD: 22-02-2014

Time of FGD: 4:00-5:00

N.B

- Abbreviation like (A, B, C....) are used for informants and to classify in terms of gender time and space key informants, in-depth interview informants and FGD informants respectively
- The names indicated here are pseudonyms.
- The date added in the tables is in Gregorian calendar.
- The time of interview in this table is in Ethiopian calendar.

APPENDIX IV

ILLUSTRATIONS



Figure 3: Household structure in the Debregiorgis village
Photographed by: Yared Gebremedhin (20-02-2014)



Figure 4: Some part Debergiorgis *kebele* in the lower valley
Photographed by: Yared Gebremedhin (30-02-2014)



Figure 5: Negative impact of climate change on agricultural productions
Photographed by: Yared Gebremedhin (05-01-2014)



Figure 6: Ice Fall and impacts on production in *Deberegiorgis Kebele*
Photographed by: Yared Gebremedhin (03-01-2014)



Figure 7: Climate Change Impacts On Been Production
Photographed by: Yared Gebremedhin (12-03-2014)



Figure 8 Advantageous of climate change in the upper valley in regarding to barley agricultural production **Photographed by:** Yared Gebremedhin (04-01-2014)



Figure 2: A women in engaged in making *Injera*
Photographed by: Yared Gebremedhin (14-02-2014)



Figure 3: A woman collecting fire wood
Photographed by: Yared Gebremedhin (19-03-2014)



Figure 11: women's carrying firewood and waking for long distance
Photographed by: Yared Gebremedhin (21-02-2014)



Figure 12: Women attending a training in *Deberegiorgis Kebele*
Photographed by: Yared Gebremedhin (12-02-2014)



Figure 13: Little girls collecting fuel wood from a jungle
Photographed by: Yared Gebremedhin (13-01-2014)



Figure 14: Part of deforestation in the study area
Photographed by: Yared Gebremedhin (30-01-2014)



Figure 15: Women caring fuel wood to the market
Photographed by: Yared Gebremedhin



Figure 16: A woman collecting animal dung squander material
Photographed by: Yared Gebremedhin (19-02-2014)



Figure 17: A women collecting animal squander to prepare compost
Photographed by: Yared Gebremedhin (19-02-2014)



Figure 4: A group of women walking several ups and downs to reach the market
Photographed by: Yared Gebremedhin (02-02-2014)



Figure 5: Old woman walking to the market carrying potatoes on her back
Photographed by: Yared Gebremedhin (13-01-2014)



Figure 6: A market place in *wabir*
Photographed by: Yared Gebremedhin (21-03-2014)

DECLARATION

This document describes an ethnographic work undertaken as part of Social Anthropology Master Degree program at Addis Ababa University. All views and opinions expressed in this thesis, therein, are my original work and all material sources featured in the thesis are duly acknowledged.

Student: **YARED GEBREMEDHIN**

Signature:

Date: **30-May-14**

This thesis has been submitted for examination with my approval as a university advisor.

Advisor: **DR. MERON ZELEKE**

Signature:

Date: **30-May-14**