

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
COLLEGE OF SOCIAL SCIENCE
DEPARTMENT OF SOCIAL ANTHROPOLOGY

MA Thesis

On

**The Socio-Cultural Aspects of Building Climate Resilience in
the Face of Changing Environment among Agricultural
Communities in the Blue Nile Basin**

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Acronyms

ASDEP	Accelerated and Sustained Development to End Poverty
CCFE	Climate Change Forum Ethiopia
CIER	Center for Integrative Environmental Research
CRGE:	Climate–Resilient Green Economy
CSA	Central Statistical Agency
FGD:	Focus Group Discussion
FDRE:	Federal Democratic Republic of Ethiopia
KI:	Key Informant
MoFED:	Ministry of Finance Economy and Development
ODI:	Overseas Development Institute
OSSREA	Organization for Social Science Research in Eastern and Southern Africa
St:	Saint
USAID	United States Aid for Development

Glossary of Local Terms

Abä Lāj: fictive-kinship relationship established through god-parenthood and childhood¹

Amaga: communally owned open access grazing land

Āngido: *Avena sepp*², a type of crop grouped under the family of barley species

Tahisase: December

*Aräkiē*³: homemade (local) liquor

Away-Qôllé: the local benevolent spirit, which has mostly venerated to be secured from any kind of involuntary climate change risks

Badāma/rəst: *a form of land holding system based on hereditary rights to the use of land*

Bale-zar: Zar bearer

Bārnos: the traditional respected cloth of hero men

Choqé: cold place, open access communal land, the place where animals stay during the daytime

*dābtāra*⁴: *a church-educated person who can participate in church ceremonies or religious education, or who could deal in magic and medicine as well as in church-related matters (such as the church music)*

Däga: highland ecological zone⁵

Dägāgna: the people who lives in the highland

Dāboo: groups of people who create work parties

Dārg: *the name of the military government which ruled Ethiopia from 1974-1991*

Ejäseri: local artisans who can make clay and weaving

Eqqub: A form of rotating saving associations⁶

Injera: the staple pancake⁷

Gībto: local crop item, which is used by the local communities to recover soil fertility

Gēsho: a plant particularly its leaves are used to make local beers

¹ *Guday (2005:210)*

² *Belay (2013:603)*

³ *Guday (2005: 210)*

⁴ *ibid*

⁵ *ibid*

⁶ *Assefa (1999:iv)*

⁷ *Assefa (1999:iv)*

goğgo bét: a traditional small round hut made of wood, mud and grass or a small house with a thatched roof⁸

Iddir: communal self-help association, ⁹especially when death occurred

šämmäni: look Ejäseri

Izzin: the food offered by members of Iddir, which could be eaten immediately after the funeral ceremony of someone has completed in order to be with the family of the dead person

Känja: Oxen Pairing¹⁰ in which poor farmers system of uniting their oxen in order to plow their farm land turn by turn

Kebelé: the smallest administrative unit

Kibkäba: the trend of get together that the farmers bring all of their animals together and they sprinkle the blood of the slaughtered chicken in order to protect them for the coming season

korkoro-bét: iron-corrugated roof

Kûraz: traditional lamb used in the rural areas for lightening the dark during the night

Lémat: a kind of reciprocity that neighbors share food and drink during weddings, construction of houses and big funeral feasts

mahābār: voluntary monthly religious (EOC) association¹¹ organized around a parish church in honor of a chosen Saint and members take turns providing food and drinks

Mäskäräm: September (the beginning of Ethiopian New Year)

mulmule: əngoča¹² thick traditional bread, usually made from wheat flour (locally made bread)

Nähassé: August

Qôlla: hot lowland ecological zone¹³

Qollägna : lowlanders,

Rist: hereditary rights to the use of land

Sänbäté: voluntary weekly (on Sundays) religious as well as social gatherings around a parish church (EOC) and members take turns providing food and drinks ¹⁴

Simintegnaw shi: 8th millennium, the local view towards the end of the world

Tabôt: novena of the Arch of covenant

Täla: homemade beer¹⁵

Téff: a cereal mostly used to make Injera

Täkärchem: matrilocal marriage that the husband goes to the house of his wife and start to live with her

Tsäwa: the chalice which rounds from one house to another following the feast of the mähābār

⁸ *Guday (2005:211)*

⁹ *Ibid.*

¹⁰ *Mamo (2013:23)*

¹¹ *Guday (2005:212)*

¹² *Ibid:211*

¹³ *Guday (2005:212)*

¹⁴ *Ibid:213*

¹⁵ *Assefa (1999:v)*

Tût Mätbät: Suckling from the Breast, one form of fictive relationship

Wokäch: a bad malevolent spirit against the harvest and animals, which has invoked through the sights of some people

Wuqabé/ Zar: benevolent spirit of the family members, which is living mostly with women

Wonfāl: a mutual labor agreement¹⁶ whereby two or more individuals work together on each others' plots for an equal amount of time

Woreda: the second administrative unit above the kebelé

Yädām Mārét: the land that causes for conflict and leads to blood feud

Yätut Lāj: ceremonial son hood through sacking the thumbs of the “father” or the “mother”

Yätut Lāj (breast child)

yätut læḡ foster child (lit. “breast-child”¹⁷)

Yätut Abat: foster father (lit. “breast-father”¹⁸)

Yätut ānat: foster mother (lit. “breast-mother”)

Yätsäwa mahābār: voluntary monthly religious (EOC) associations among the members of the parish

Yäfäräsägnoch Mahābār: horse ride associations, especially in the commemoration of St. George

Yäzämäd Mahābār.

Yäzämäd Mahābār: voluntary monthly religious associations of relatives

¹⁶ Giday (2005:2013)

¹⁷ Giday (2005:214)

¹⁸ Ibid.

Abstract

The main objective of this study is to explore and analyze the socio-cultural aspects of building climate resilience in the face of changing environment among the agricultural communities in the Blue Nile Basin of Ethiopia. More specifically, it attempted to identify and analyze the socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change; to investigate the socio-cultural values and institutions employed by the local communities as adaptive strategies to climate change; and to examine to what extent climate change mitigation strategies address the needs and interests of different social groups in the local communities. To address these objectives, the study employed a combination of ethnographic methods consisting of in-depth interviews, focus group discussions, case studies, systematic observations and informal conversations. Secondary data sources were also critically reviewed to identify the research gap and to supplement the ethnographic data with conceptual and theoretical insights. The data collected through primary and secondary sources were thematically organized and analyzed through triangulation.

The study found that women, children, elders and the poor are social groups vulnerable to climate change. Local belief systems, feasts, work habits, blood feuds, gender norms, population growth, dependence on rain-fed agriculture and eucalyptus tree are also found to be factors contributing to vulnerabilities of different social groups to climate change in the study communities.

The study also found that the culture of sharing experiences as well as resources and indigenous knowledge systems are used by the local people as adaptive strategies to climate change. Marriage institution, consanguinal as well as fictive kinship systems, community-based organizations, craftwork, off-farm activities are also used by the local people as adaptive strategies to climate change.

The study further found that restriction on utilization of open access communal lands, construction of trenches on farmlands, land registration and certification, maintaining of spring waters, ground water harvesting and utilization, planting indigenous trees, adopting improved crop species and chemical fertilizer, crop mixing, adoption of improved animal breeds, and production of organic fertilizer are climate change mitigation strategies implemented by the local government in the study communities.

Finally, the key findings related to local socio-cultural norms and practices contributing to the vulnerabilities of women, children, elders and the poor to climate change need to be addressed through further investigation on why the local people adhere to these norms and practices. Moreover, the local socio-cultural values and institutions used as adaptive strategies to climate change need to be nurtured and recognized by the local government when it attempts to mitigate climate change vulnerabilities. Furthermore, some of the strategies implemented by the local government to mitigate climate change vulnerabilities need to be re-examined in line with their being properly addressing the needs and interests of the local people.

Chapter One

Introduction

1.1 Background of the Study

Climate is a broad concept, which encompasses the untouched and external nature of this world and all the pieces of our daily lives-“from the water we use to wash our carpets to the air we breathe on our way to work each day.” As consumers of the environment, we humans are part of the nature itself. Sometimes, there are symbiotic relationships between the environment and us if we contribute our knowledge to our planet’s environmental protection (King & Carthy 2009:2). Nonetheless, we are agents of climate change even to its worst extent. “Nature is far more complex and variable and considerably more resilient than the metaphor of the evolution of an individual organism suggests”. However, due to human factors, ecological systems are experiencing sudden and catastrophic stress, and the long-delayed effects of climate change could not be recovered within few years (ibid.:32).

Nowadays, the problem of climate change is becoming one of the world’s difficult treat. Even if we humans are contributing for climate change in our planet, its impact goes to the risking of global wellbeing as a whole. The system of pollution and protection also varies according to the society and their cultural values and norms of the specific environmental zone (Brauch, et al 2011:412). Some others also argued, “culture is the medium through which people interact with their environment.” This is to mean that the society’s indigenous norms, values, and habits as part of the cultural elements have great role for the substantial as well as social wellbeing of the respective society. Culture is not only determinant of the society’s living structure; rather it is from culture that people understand the unstable and frequently changing environmental world (Milton 1996:23).

In most cases, policymakers, environmentalists, and government bodies advocate about climate change in relation to industrialization. However, the aggravation of climate change in non-industrial societies, like the hunter-gatherer communities of different areas of the world, the burning and shifting system of horticultural societies, and the system of farming among agricultural communities is not taken under consideration (Milton 1996:23). Besides, without identifying the understanding of the local community towards climate change and its resilience, these people were totally blamed for being pollutants of the climate (ibid.:28).

Climate change in Africa is by now noticeable in shifting rainfall patterns and more repeated or unreliable tremendous weather events such as overflows, drought, and high temperature influence (Badege, et al 2013:11-12). These impacts are causes for the loss of the agricultural production capacity of the continent to its large extent. Extreme climate factors like drought and flood are highly affecting the continent's agricultural productivity and society's structure of living (ibid.).

In order to bring transformation to climate change vulnerability, and to enhance climate change adaptation in Africa, different contemporary strategies have been implemented especially in Africa. However, these adaptation measures did not consider the inherent knowledge of the local community about climate change, and the locally developed climate change adaptation and mitigation strategies were not valued. Hence, as many research findings long-established, effective adaptation measures of climate change mitigation strategies are found within the local communities even if the degree of availability of adaptation tools vary from one community to another (Vientiane, et al 2010:18).

In relation to the dependency on rain-fed agriculture, the Ethiopian economy is mostly vulnerable to climate risks. As a result, the country has subsistence economy. Moreover, due to the rugged and vulnerable nature of the Ethiopian topographies, the agricultural sector and livestock production was/and is affected by the devastating effects of environmental hazards (World Bank 2010: 6). The risk of climate change in Ethiopia is highly related to the physical vulnerability of the natural land. This geographical vulnerability to environmental risks also causes for food insecurity, population dislocation, and erosion of the socio-cultural

fabric (USAID 2011:18, 20). Edwards (2010:219) also confirmed that the Ethiopian rural society, being highly dependent on natural resources, is prone to impacts of climate change. The agricultural economy, water resource, biodiversity and the human health are vulnerable to non-predictable climate change. As a result, drought, food insecurity, and suspended poverty are common recent past and current problems of the country.

The Ethiopian highlands, particularly the Blue Nile Basin, are the main water tower of the country, and they are rich in biodiversity. However, climate change within the country is the cause for environment related constraints and recurrent drought, which affects the socio-economic setting of the region (CCFE 2011:xii). As a result, the amount and type of production, the land use system, season of cultivation, the diversity of fauna and flora are affected by the recurrent climate changes in the area (ibid.).

1.2. Statement of the Problem

“Human populations are socially organized and oriented by means of particular cultures”. Their social wellbeing as well as cultural activities have “impacts upon the land, climate, plant, and animal species, and other humans in their environments, and these, in turn, have reciprocal impacts” (Barnard & Spencer 2002:256). This might be done purposely or unintentionally which might shape the environment. Several ecological anthropologists such as Julian Steward and Marvin Harris argued that humans as social animals are not engaged fully with the surrounding environment. Rather, we have the particular orientation to the broader environment in which we might be institutionalized through the technology we use, the system of production, housing structure, and clothing style, etc. These are generally grouped as the socio-cultural environment of human population (ibid.).

The problem of climate change is highly related with the history of human development. In the progressive living, humans have always been challenged through periodical climate change. However, “historically, the problems were isolated and only affected specific people in specific ways.” Population growth, technological

advancement, and massive production are the main contributors of “environmental degradation, global climate change, and loss of biodiversity, which affect all peoples now and forever” (Norgaard 1994:2).

According to Sutton & Anderson (2010:xiv), the anthropological study of climate change with the context of socio-cultural aspects of the society are not merely to discover the impacts of climate change. However, the focus of an anthropological investigation is proper to explore how the local culture of the society is affecting climate change vulnerability and how it is functioning to build climate change resilience as well. Culture is the potential system of humans’ adaptation to a given environment. Humans respond to the respective environment through different forms of cultural responses such as through their social organizations, technological advancement, political structure, socio-economic systems, and housing styles, etc. In relation to the context of climate change, some cultural responses acquired from others and transmitted to the next, and the existing cultural elements might be modified. Even though, in most cases, cultural needs are only understood in the form of religion, social organization, and different forms of rituals, it is through culture that the society fulfills their biological needs. “As the environment changes, humans adapt both biologically and culturally” (Sutton & Anderson 2010:97). When there is climate change, culture plays an important role in maintaining environmental stability through fulfilling constant adjustments. The role of culture here is twofold: on the one hand, it helps the inhabitants to adapt to the dynamic environment, and on the other hand, it plays a crucial role to mitigate the rapid growth of climate change itself (ibid.:97-98).

Nevertheless, the focus of protecting climate change through environmental laws is not a long time phenomenon even in the world. Hence, some legal provisions were declared that entertain environmental protection directly or indirectly. For instance, in Ethiopia, “The Law of Kings” (“Fetha Nägäst”) in the 13thc affirms about environmental issues regarding wild animals’ conservation and radiation of ultraviolet rays. The FDRE (2007) proclamation No 541/2007 also promotes the local community’s active participation in the development, conservation and utilization of wild life. However, there was no formal rule, which was enacted to environmental protection at the national level until recent times (Edwards 2010:1). Lately, in November 2011, the Government of Ethiopia initiated the Climate–Resilient Green Economy (CRGE) scheme to protect

the country from the adverse effects of climate change and to build a green economy that helps to realize its ambition of reaching middle-income status before 2025 (Belay, et al 2012: 613).

According to Belay, et al (2012:612), the local community's capacity "to resist, absorb, and recover" the effects of climate change, as well as their ability to preserve and restore the environment makes them resilient community. Besides, the resilience and adaptive capacity of the society varies among different communities, and even within the same community, that a challenge for one group might be an opportunity for the other. Similarly, development planners have understood the existing climate change and its impact among the peasant communities of the Blue Nile Basin differently. Government officials and different institutions who are working on the area perceive the local community's ways of adaptation as a contributing factor for climate change. In addition, experts from different fields of study are forwarding their views towards by creating environmentally resilient society in the Blue Nile Basin. Hence, according to Belay, et al (2012:612), in order to alleviate the crisis of climate change in the agricultural communities of the Blue Nile Basin, "community-based ecosystem approach" has to be followed, which enhances community's participation by sorting out "a new local institution called the community-based innovation platform".

Different scientific justifications and research findings proved that there is a rapid climate change in the Blue Nile Basin. For instance, Belay, et al (2012:617) stated that the agro-ecological system in the Blue Nile Basin shows dramatic climate change within the last twenty and thirty years. Reduction of precipitation and increasing of temperature are scientifically recognized problems. As a result, the local communities adjust the system of living by shifting the cropping seasons and crop species. Among previously conducted research works, Bewket in his MA thesis entitled "Analysis of Farmers' Perception and Adaptation to Climate Change and Variability: The Case of Choqué Mountain, East Gojjam (2010)", explored the adaptive strategies of farmers towards climate change, and the hindrances of climate change adaptation. Assefa, in his study "Community Based Watershed Development for Climate Change Adaptation in Choqué Mountain: The Case of Upper Muga Watershed in East Gojjam of Ethiopia (2011)" also identified the key livelihood resources in the Blue Nile Basin. According to Assefa (2011), climate change and people's vulnerability are common

problems of the area and the community based development projects are playing crucial role in order to adapt to climate change. Moreover, Shegaw in his MA thesis entitled “An Assessment of Critical Environmental Concern and Sustainability: The Case of Choqué Mountain Watersheds, East Gojjam (2011)”, examined the environmental concerns of the Blue Nile Basin focusing on the land use system of the local community. According to Shegaw (2011), lack of commitment to implement the proper land use system, and inappropriate ways of border demarcation that differentiate one district from another district are some of the contributing factors for climate change.

Furthermore, Temesgen, et al (2008), in their study entitled “Analyzing the Determinants of Farmers’ Choice of Adaptation Methods and Perceptions of Climate Change in the Nile Basin of Ethiopia”, came across with the basic strategies of the farmers to adapt to climate change in the Blue Nile Basin. Besides, they examined the factors that influence the local community’s preference towards climate change mitigation, and the hardships of climate change adaptation. Belay, et al (2013), in his study entitled “Agro Ecosystem Analysis of the Choqué Mountain Watersheds, Ethiopia,” further identified various agro-ecosystems in the Blue Nile Basin and described the essential components of the diverse agro-ecosystems.

However, since it was not their focus, the above studies did not investigate the socio-cultural aspects of building climate resilience in the face of changing environment among the agricultural communities of the Blue Nile Basin. More specifically, the reviewed studies did not explore the socio-cultural norms and practices as reasons for the vulnerabilities of different social groups to climate change, and the socio-cultural values and institutions employed by the local communities as adaptive mechanism to climate change in the Blue Nile Basin. In addition, these studies did not come up with to what extent the climate change mitigation strategies address the needs and interests of different social groups in the local communities of Blue Nile Basin. In this context, Belay et al (2013:595) verified that in order to understand the community’s exposure to climate change, and to differentiate their adaptive capacity and vulnerability to its effect, the socio-cultural aspects of the society need to be studied.

Therefore, by considering the relevance of the reviewed research works conducted in the Blue Nile Basin, this study attempted to fill the research gap by exploring and analyzing the socio-cultural aspects of building climate resilience in the face of changing environment among the agricultural communities of the Blue Nile Basin.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of the study is to explore and analyze the socio-cultural aspects of building climate resilience in the face of changing environment among agricultural communities in the Blue Nile Basin of Ethiopia.

1.3.2. Specific Objectives

In the light of the above general objective, this study has addressed the following specific objectives:

1. To identify and analyze the local socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change;
2. To investigate the socio-cultural values and institutions employed by the local communities as adaptive strategies to climate change; and
3. To examine to what extent climate change mitigation strategies address the needs and interests of different social groups in the local communities.

Based on specific objectives, this study attempted to answer the following research questions:

- Who are vulnerable social groups to climate change, and what are the societal norms and practices that contribute to the vulnerabilities of different social groups for climate change?
- What are the local institutions and values operational for adaptation strategies of the local communities to climate change?
- Which socio-cultural values are used for adaptive strategies of climate change, and how much climate change mitigation strategies address the needs and interests of the local community?

1.4. Research Methodology

Research methodology is the order or arrangement of methods, and the strategy of implementing these methods in a proper way (Crotty [1998], 2006:7). It also includes the rationality of choosing methods related to the objective of the study. Hence, the research methodology shapes the relevance of particular methods for the expected outcome of the study (ibid.).

1.4.1. Research Approach

In social science research, both quantitative and qualitative approaches are very useful. Quantitative research approach emphasizes on the quantification of the collected data, and the interpretation of the data is to prove or disprove the predesigned hypothesis or grand theory. As a result, social researchers who are advocates of quantitative approach consider that knowledge or reality is independently found in its own context, and the role of researchers is to discover this reality through representative samples (Bryman 2004:19). However, according to qualitative research approach, knowledge is existed within the society, and this knowledge could be constructed according to the outlook of different social groups. Since it gives much emphasis for the roles

of individual's worldview, researchers who follow qualitative approach construct knowledge and interpret it according to the specific context and situation (Ibid.:20).

Ethnography is one of the qualitative methodologies that are used to study communities in their natural setting (Bryman 2000:11). Through ethnographic study, social meanings and experiences of different social groups could be explored without the imposition of external knowledge (ibid.). Due to this, doing ethnography is one way of following the qualitative approach to construct the real-life situations of communities through flexible and participatory methods. In ethnographic research, information are collected in every day contexts of the study area other than measuring of the pre-defined circumstances of armchair researchers (Ibid.:18-19).

In this study, qualitative approach has been used because the objective of this study is to explore and analyze the socio-cultural aspects of building climate resilience in the face of changing environment among agricultural communities in the Blue Nile Basin of Ethiopia. More specifically, in order to study the socio-cultural norms and practices as factors of climate change vulnerability and as an adaptive or mitigation strategy in building climate resilience in the face of changing environment in the Blue Nile Basin, I (the researcher) have used ethnography as the main qualitative methodology. This is because the expected knowledge is found within individuals and different social groups in the study communities. Therefore, my role in this study was immersing myself within the study communities by systematically observing and exploring local socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change on one hand and local socio-cultural values and institutions used to build resilience to climate change on the other hand.

1.4.2. Methods of Data Collection

1.4.3.1. Primary Data Collection Methods

A. In-depth Interview

In-depth interview is one of the methods of data collection about how people in-group or as an individual perceive their surroundings. This helps to understand the local community's personal, communal, and argumentative ideas, beliefs, and values within their natural and social environment (Bernard 2006:299). This is done by asking related questions for different members of the community in age, gender, and religious background, etc. However, this is not to mean that interviewers use the same wording of questions and they probe equally, but the purpose of the question posed to the study should be similar (ibid.:148).

In this study, in-depth interview has been employed to explore the vulnerable social groups for climate change, and to examine the socio-cultural norms and practices contributing to their vulnerabilities. In addition, through this method, the socio-cultural values and institutions employed by agricultural communities as adaptive strategies to climate change have been investigated. As a result, key informants (women, youths, and leaders of different locally organized social groups) were purposely chosen among the members of agricultural communities. Key informants were selected through the help of local leaders and environmental workers of Senan Woreda by giving almost equal chance to both study Kebelés. The total numbers of key informants were 37 individuals from both Yeted and Dangulé Kebelés (See Appendix IIIA).

Before conducting the actual fieldwork (25 January 2014-30 March 2014), I, with the supervision of the thesis advisor, prepared interview guiding questions in English and translated into Amharic (the local language) (See Appendix IIA). Based on these guiding questions, the relevant data were collected by arranging individual key informant interview sessions with the consent of the informants. During the interview sessions, field notes were taken as well as tape recorder was used with the consent of informants.

B. Focus Group Discussion

Focus Group Discussion (here after FGD) is the data collection method through which groups of people are chosen to discuss on the selected and specific subject under the facilitation of the moderator (Given 2008:352). By bringing different individuals who have common background, FGD plays essential role to

build meaningful data from common societal issues and confrontations to one another. Participants of the FGD were selected based on the pre-defined criteria of choosing those who share similar perspective towards the issue because such type of group composition generates active exchange among participants (Ibid.).

In this study, FGD was used to collect data on local socio-cultural values and institutions employed by agricultural communities as adaptive strategies to climate change. In order to examine to what extent climate change adaptive/mitigation strategies address the needs and interests of diverse social groups, FGD participants from the study communities were chosen to reflect their views on common issues. This helped me to understand which social groups are more vulnerable to climate change. It also enabled me to explore different climate change adaptive and mitigation strategies used by different social groups. Furthermore, through this method, I have attempted to know which social groups' needs and interests are addressed by the local climate change adaptive/mitigation strategies.

Accordingly, I held two FGD sessions (one from each research site) with members selected among community elders, religious leaders, local government representatives, members of women's association, and youths' league (See Appendix IIIB). In each FGD session, the members of participants were eight and participants were purposely selected among different social groups by giving appropriate representation for different sections of the community, namely, elders, religious' leaders, local government representatives, women and youths.

The FGD sessions were conducted by using guiding questions, which were prepared in English language with the supervision of the thesis advisor and translated into Amharic (the local language) (See Appendix IIB). Throughout the FGD sessions, notebooks and voice recorder (based on the consent of FGD participants) were used. In order to run the FGD sessions effectively, I facilitated all the sessions with a research assistant.

C. Case Studies

Case study is a method, which is employed by staying longer time within the study community. In order to understand the contemporary societal problems and to explore the society's real life, case studies play vital role (Moeran 2006: x, 121). A case is not necessarily an individual; rather it can be social groups, institutions or a particular issue, and a case should represent only its selected population. Since the data obtained from cases is subjective, based on the data obtained from individual knowledge, concluding to the wider population leads to hasty generalization (Singh 2006:147). As Bryman (2004:188) argued, cases are particular events or situations that can be lessons for the wider society.

In this study, I used case studies in order to look into the most vulnerable members of the study communities or specific social groups to climate change in the agricultural communities of the Blue Nile Basin. I employed 13 different case studies (See Appendix IIIC) selected among the two study communities (6 cases from Yeted and 7 cases from Dangulé). These individual/group cases were selected after my practical observation of their levels of vulnerabilities to climate change as well as through their adaptive and mitigation strategies. In order to document the data obtained from case study informants, I took intensive notes and recorded their voices individually with their consent.

D. Systematic Observation

The concept of 'systematic observation' is partly different from 'participant observation' in its form and purpose. Unlike 'participant observation', in which the researchers fully participate in the overall activities of the society for long period, 'systematic observation' focuses on gathering empirical evidences on specific issues through short-term observation. In systematic observation, data could be collected by looking and experiencing visually presented human activities, and the data could be evaluated and triangulated with further results collected through other data collection methods (Blaikie 2003: 15). Researchers use systematic

observation when they need to evaluate verbal information collected through other methods, and this helps them to maximize their precision on the relevance of the collected data (ibid.).

In this study, the data collected through in-depth interviews and FGDs were cross-checked with systematic observation aimed at understanding the degree of vulnerabilities and adaptation strategies of different social groups to climate change. Accordingly, I conducted systematic observation among the study communities for two months (25 January 2014-30 March 2014). During my systematic observation, I took intensive field notes and photographs (See Appendix I) with the consent of local community members.

E. Informal Conversation

In this study, I also employed the relevant data that I found through informal conversation with the male adult farmers in the study communities. Since there was no recording research equipment or any formal interview session, informants were sharing their life experiences freely in the form of conversation. In this regard, I held informal conversations with male adult farmers by attending different occasions such as Sänbäté, funerals and market days.

1.4.2.2. Secondary Data Sources

In addition to the primary data gathered through in-depth interviews with key informants, FGDs, case studies, systematic observation, and informal conversation, relevant and related conceptual and theoretical frameworks, empirical studies, local documents, and statistical information were critically reviewed. The reviewed theoretical and conceptual frameworks were used to understand key concepts used in the study, where as reviewing of related empirical studies enabled me to identify the research gap attempted to be filled by this study. The review of locally available documents and statistical information were used to describe the study area and the people.

1.4.3. Methods of Data Analysis

During the course of the fieldwork, I transcribed all electronically recorded documents into written forms, and then field notes and the transcribed information were translated into English language. After that, all the translated data were organized into specific themes based on the specific objectives of the study.

After the organization of the data into specific themes, I analyzed and interpreted by giving rigorous attention to the non-verbal expressions and intonations of informants' voice. In the analysis, due attention was given to the local/'emic' perspective. Finally, the data gathered through various methods were analyzed through triangulation to increase the reliability and validity of the study findings. Secondary data sources were also incorporated in the analysis part of the study in order to substantiate the primary data sources.

1.4.4 Fieldwork Personal Experiences

The fieldwork for this study was conducted between 25 January 2014 and 30 March 2014. Based on the support letter that I obtained from Addis Ababa University, I got permission from Senan Woreda officials to conduct the field research without any delay. I stayed in Rob Gäbya, the Woreda's capital town, during the first week of the fieldwork and visited the two rural Kebelés (Dangulé and Yeted) with the transportation services provided by the Woreda government officials.

My first task in the fieldwork was identifying key informants among different social groups being assisted by local elders and government representatives at the Kebelé level. I started the interview sessions with some selected key informants with appointments

During my fieldwork (25 January 2014-30 March 2014), I encountered many experiences. Some of my personal fieldwork experiences are described as follows:

1. I used to walk for two hours and more on foot though it was not a big challenge for me since I had such experience as I was born and brought up from a rural community. However, since I developed serious asthma, which is triggered by the cold weather, it was a challenge for me for two months particularly in Dangulé Kebelé, which is colder than Yeted Kebelé.
2. Some young male community members challenged me by letting dogs to bite since dogs in the rural area are not friendly with a new person.
3. Some young community members considered me as a photographer. Hence, when they see me taking pictures, they used to come in-group and ask me to take their pictures and to give their photographs.
4. Some key informants did not respect the time for their appointment to be interviewed, whereas some others totally cancelled the appointment.
5. Some adult male community members considered me as a government representative and they were complaining on the policies and strategies of the government by raising questions of why this, and why not that. Since they were suspicious, some of them gave me false information by saying, “now there is no climate change, since this bright government like the sun protected us”. However, through time, after they realized that I am a student, they started to provide me with correct information.
6. Some Woreda government officials assisted me to select key informants for in-depth interviews and created suitable conditions for the field study by calling their friends and local workers in the rural villages through their cell phones. Some others invited me to the Café houses in Rob Gäbya town and advised me to be strong in my research work.
7. Some adult community members in both rural Kebelés (Dangulé and Yeted) invited me for dinner and served me the best food, which was always kept for guests. In addition, the adult male members in Yéted Kebelé took me to the feast of Sänbäté, and they gave me the seat, which is reserved for respected persons.

1.5. Scope and Limitation of the Study

1.5.1 Scope of the Study

This study was focused on the socio-cultural aspects of building climate resilience. More specifically, this study attempted to explore and analyze the socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change on one hand and socio-values and institutions employed by the local communities to adapt to climate change on the other hand in two selected agricultural communities.

Geographically, the study was conducted in two rural (agricultural) Kebelés (Dangulé and Yeted) of Senan Woreda, East Gojjam Zone of Amhara Region. These two Kebelés were selected based on their diverse agro-ecological zones. More specifically, Dangulé belongs to Däga (highland) agro-ecological zone, whereas Yeted belongs to Qôlla (lowland) agro-ecological zone.

1.5.2 Limitation of the Study

This study has the following limitations:

1. Geographically, this study was focused only on the two agricultural communities (Yeted and Dangulé) among 17 Kebelés of Senan Woreda in East Gojjam Zone of Amhara Region due to financial and time constraints.
2. Methodologically, this study was merely based on qualitative data gathered through a combination of ethnographic methods consisting of in-depth interviews, focus group discussions, case studies, systematic observation, and informal conversations due to the nature of research objectives and questions. More specifically, I found qualitative methods more appropriate to explore the local socio-cultural norms, practices, values and institutions of the study communities as factors of climate change vulnerability and means of adaptation/mitigation.

3. Thematically, the study mainly addressed socio-cultural issues pertaining to climate change vulnerability and adaptation/mitigation strategies from anthropological perspective since these issues have not been addressed by previous studies.
4. The problem of translating Amharic transcripts into English language was the limitation of this study due to the difficulty of finding equivalent English translation for some Amharic transcripts.

1.6. Significance of the Study

The anthropological contribution of this study adds knowledge to the academia and to the diverse world. By identifying the local socio-cultural norms and practices contributing to the vulnerabilities of different social groups to climate change, and by investigating the adaptation and mitigation strategies of the local communities, this study helps to make participatory and locally acknowledged frameworks in building climate resilient developmental policy. For further project interventions and for environmental protection programs, policymakers and project formulators can use the findings of this study as baseline data sources. In addition to the requirement of academic fulfillment, this research opens the gate for further academic and applied studies on issues under investigation, and this paves the way for further research on factors contributing to vulnerability and adaptation mechanisms of the agricultural communities in the face of climate change.

Chapter Two

Conceptual and Theoretical Frameworks

2.1. Conceptualization of Key Terms

2.1.1 Environmental Change

Environment refers to the overall surrounding of our universe that includes the physical elements of the planets up to the invisible air we breathe, and all the social and cultural elements of humans. As a result, environment has been conceptualized as the totality of the natural and social world with its elements of living and non-living things (King & Carthy 2009:1-2). Naturally, humans are part of the environment, however, in their relationship; one is the consumer of the other. Since all the elements of environment are interrelated, the well-being of one element is necessary for the existence of the other. In this regard, environmental change is the disturbance or change of its elements such as climate change, ozone layer depletion, global warming, loss of biodiversity and others (Ibid.).

2.1.2. Climate Change

Climate “is generally defined as the average state of the atmosphere for a given time scale (hour, day, month, season, year, decade and so forth) and for a specified geographical region”. When we say the average state of the atmosphere, it is not only the mean temperature and precipitation. However, it includes the speed and nature of the wind, the cloudiness, and sunshine character of the

sky, humidity, fog, etc. Therefore, to say the climate of a given area is optimal, at least the above elements should remain constant for some time (Houghton 2002:3).

As many environmental change researchers stated, climate change is the physical and mechanical change of the surrounding or universal environment and contributes for the socio-economic and geo-political problems on the living population (Haenn and Wilk 2006:412). Climate change is one of the most pressing global problems of our time (Dessai & Sluijs 2007:7). However, the nature and impacts of climate change varies according to the country's topographical arrangement, ecosystems, and the ways of life of the local community. On the other hand, even if the rate of climate change varies from one place to another, each factor has significant contribution for global warming to the wider extent (CIER 2007:10).

The consequences of climate change are also diverse in their forms such as natural disaster, health problems, drought and hunger, flooding, etc. For instance, in Africa, frequent drought and rainfall variability are mostly visible climate change vulnerabilities (Aklilu& Desalegn 2013:18)

2.1.3 Climate Change Vulnerability and Vulnerable Social Groups

Climate change vulnerability is the inability of humans or any other living things to adapt to climate change extremes. In this context, vulnerability is the exposition of some living organisms towards climate change risks, and not be able to recover as soon as possible (Pérez, et al 2010:14). On the other hand, climate change vulnerability is the condition through which different social groups are getting prone to climate change risks, and their inability of responding against it (Guigan, et al 2002:6).

Climate change vulnerability will be physical or social according to the level of its impacts and its type. When we say physical vulnerability, it shows the concrete and measurable impacts of climate change risks like drought, flood, earthquake, acid rain and other clearly understood impacts. On the other hand, social vulnerability is the exposure of the community or individuals to climate change in a non-measurable manner. This type of vulnerability is visible especially in the form of social disintegration, stress, and losing of hope and joy in the individuals or groups' life (Adger 1995:4). Adger further noted that,

Social vulnerability in general encompasses disruption to livelihoods and loss of security. For vulnerable groups it is often pervasive and related to the underlying economic and social situation, both lack of income and resources, but also to war, civil strife and other factors. Social vulnerability to climate change and other causes of vulnerability are not easily separable, and analysis of the interactions is a key research issue (Ibid.:4-5).

Moreover, the level of vulnerability to climate change is diverse through various geographical locations of the countries, the existence of natural resources, and other naturally catastrophic factors. Accordingly, within a single country, with the same natural resources and type of production, there are diverse social groups in terms of economy (wealth), property ownership, social status, age, gender, and other religious and political factors. These social groups are differently affected by climate change vulnerabilities. Their role in adapting or mitigating to climate change is also different. Some are motivated with less vulnerability rate, while others are highly prone to climate change and they are voiceless to propose their solution to climate change. Among these voiceless social groups, women, children, and the poor are highly vulnerable to climate change (Walker 2012:2).

According to Walker (2012:3) geographically, mountainous communities are more vulnerable to climate change compared to the others because these communities are living in high topography, which is vulnerable to runoff and drought. Besides, since their system of production is monotonous and they are far from the market interaction, compared to the lowlanders and the border societies, mountainous communities have limited resources (Ibid.:3).

As Aklilu & Desalegn (2013:19) articulated, climate change vulnerability also has gender dimension. Due to their limited access to own basic resources such as land and livestock, lack of power in the domestic sphere, women are more vulnerable social groups than men. Likewise, the vulnerability of women to climate change is also related to the domestic responsibilities of feeding children and the whole family. More to the point, widows, and divorced women are more vulnerable to climate change. In the agricultural sector, women did not take part to plow the land and to sow the harvest. In this context, women who lead their family without men face the challenge of feeding their children through farming (Mukuna 2013:204-205).

Moreover, poor and land less farmers, and children are vulnerable social groups to climate change. Children from the poor families drop out of school during famine seasons. In this regard, climate change forced these vulnerable social groups employ different survival strategies such as daily labor, by selling basic assets like livestock, by taking credit from the government, and by leasing their farmlands for some time (Mukuna 2013:204).

2.1.4. Building Climate Change Resilience

Climate change resilience is “the ability of a community or ecosystem to resist, absorb, and recover from the [vulnerabilities of climate change] in a timely and efficient manner, preserving or restoring

its essential basic structures, functions, and identity” (Belay 2012:612). A resilient society has the capacity to perceive and survive from the impacts of climate change. At the time of serious environmental risks, they can recover as quickly as possible. The society is resilient when the long-term and long-generational strategies are implemented. The local communities have different experiences towards environmental uncertainties as well as they have the ability to know how to mitigate through diverse livelihood mechanisms, social institutions and cultural values (Nakashima et al, 2012:63).

The strategy of building climate change resilience is locally derived and socially approved forms of climate change adaptation and mitigation strategies within territorially distinguished communities. In order to understand humans’ behavior and their interaction to the natural environment, the socio-cultural setting of the society and their inter-personal relationships should be explored (Rapport & Overing 2000:58).

2.1.5. Climate Change Adaptation Strategies

It is true that climate change is one of the precarious incidents of our planet. As a result, living things especially humans have their own mechanisms to adapt and resist these changes for long. Even if this is the case, it is not to mean that these barriers of adaptation have less impact on humans. For instance, if we see their types, maladaptive factors are divided in to three main parts. The first one is the opportunities of humans to live in the state of natural uncertainty. These natural uncertainties are non-predictable ecological disturbances such as earthquake, rapid increasing of sea level, rising of temperature and other sudden catastrophic events. The second barriers of adaptation are due to human actions like technological factors and limited knowledge about environmental conservation mechanisms. The third barriers of adaptation are socially constructed norms that limit community’s

response to climate change resilience. Groups of humans construct these social barriers of adaptation, and they might be institutions like belief systems, norms, values and others, which are called “normative restrictions that prevent individuals or groups from seeking the most appropriate forms of adaptation” (Jones 2010:2).

Adapting to climate change is the system of adjusting oneself to enhance and survive from the impacts of climate change. It also includes the accommodation of extreme climate change risks and long-term resistance to it (Amelung 2007:11). According to United Nations International Strategy for Disaster Reduction (2011:3), climate change adaptation is a long-term strategy that humans adjust their systems of living in response to the actual rate of climate change. The reason why adaptation is necessary since climate change is an inevitable process, and we are not fully able to mitigate its adverse effects.

Moreover, adaptation is not only coping up or being able to resist climate change risks. In this context, in order to be environmentally adaptive, different communities use the changing environment as an opportunity to achieve development, and by taking the experience of formerly happened climate change risks, they acquire measures through formulating reliable decisions on building process on climate change resilience (Jones 2010:1).

2.1.6. Local Farmer’s Adaptive Strategies to Climate Change

Governments and other responsible institutions designed different types of adaptive strategies for climate change in Ethiopia. According to policy makers and international environmental agencies, the current climate change risks are revealed from financial constraints of the country. Obviously,

high-income nations are most likely to adapt the possibility of climate change risks (Badege 2013:21).

In addition, as different social science studies explored, due to climate change factors, the problem of commodity price fluctuation is getting a challenge for the rural and urban family members of the country. However, the rural smallholder farmers have their own indigenous mechanisms to cope up with environmental risks. They have different mechanisms of alternative livelihood strategies, and adequate institutional supports. If the season is expected to be bad, Ethiopian farmers accumulate and use their agricultural products wisely. Besides, they have value based decision-making processes on how to farm, which type of crop they harvest and when they could collect the agricultural products. For instance, in order to survive from persistent drought, the farmers diversify the type of livestock and crop production (Ibid.: 22).

2.1.8. Climate Change Mitigation Strategies

Climate change mitigation is an action implemented to reduce the impacts of climate change. These actions are mainly targeted on reducing the factors of climate change. For instance, through regulation of technological shifts and institutional changes, it is possible to achieve climate change mitigation (Agrawal 2008:6).

In order to mitigate the progressive climate change and its impacts, locally organized rural institutions should work on restructuring and reducing of risks of climate change by facilitating individual and collective measures. In addition, the others are functioned through mediating the risks of climate change and its advantages. These institutions are always working in collaboration with external interventions. On the other hand, in the household level, individuals have diverse and

significant systems of climate change adaptation. This is to mean that even if locally organized local institutions have great role in minimizing the risks of climate change, adaptation is understood under the household level. For instance, mobility might be a periodic societal solution with clearly settled period for a given climate change risk, which might be facilitated by local institutions by planning where to go, when to go and how to go. However, the amount of grain or numbers of cattle stored for the hard season differs from one household to the other (Agrawal 2008:23).

2.2. Theoretical Frameworks

2.2.1. Structural Arrangement Model

According to this model, farmers have explicitly enormous forms of climate change adaptation mechanisms. This model has been applied to study how African farmers respond to climate change vulnerability, especially through livestock production. Hence, it valued African farmers for their system of leading their life under the unpredictable environment by using different techniques. According to this model, the African farmers know what type of crop species they use or which kind of animal they prefer to domesticate. For instance, the farmers clearly understand that how many numbers of animals they prefer to have and what to feed them (Seoa & Mendelsohn 2008:151).

According to the structural arrangement model, the African farmers should not be blamed for their preference of diversifying the types of agricultural species and the number of livestock. The African farmers know that if they have the variety of animals and agricultural species, they have the better the better capacity to resist the bad harvesting seasons. According to this model, in order to build climate change resilience in a given agricultural area or country, the farmer's multiple kinds of adaptation and mitigation strategies should be valued (Ibid.:152).

2.2.2. David Ricardo's Model

For this model, farmers are conscious of climate change in whatever form it is manifested. For this model, the ability of farmers to choose proper crop items and knowing the type of soil has great value for climate change adaptation. Accordingly, adaptation should be understood based on the farmer's knowledge of choosing proper crops and their effort to cultivate them according to the type of environment (Arriagada 2005:3).

The main assumption of this model is that farmers can adapt to any changes of climate immediately and effortlessly. Since local farmers know the progressive changes of their surrounding, they can devotedly select crops that are most appropriate to the new climate. This assumption effectively lifts all constraints on the way farmers make their land-use decisions (Ibid.).

2.2.3. Mental Model

Mental model valued that within a community, every individual has his/her own mental images about environment. As a result, they respond to climate change risks according to their preexisted mental constructs. In case, if they want to react against climate change risks in-group, the ideas of every person should be united through communication, and if they agreed on it, they will form social institutions that respond to climate change uncertainties. As a result, mental models are abstract ideas of individuals about climate change and the cosmos, and this uses to every one of them as a basis for action. In other words, everyone has multiple ways of addressing climate change vulnerability. Therefore, studies that focus on climate change adaptation and mitigation strategies of a given area should focus on the mental images of individuals other than talking about groups and communities (Banaszak, et al 2010:3).

2.2.4. Community Readiness Model

Margaret Mead said that “never doubt that a small group of thoughtful committed citizens can change the world; indeed, it’s the only thing that ever has”. According to this model, climate change vulnerability and other societal problems could be confronted through well-integrated community through culture, social norms, and values. A well-integrated community is ready to cooperate in any kind of intervention programs. Therefore, it is possible to say that a community is ready to respond against climate change when there is unity among individuals, and when they are efficient enough to take measurable actions by themselves (Plested, et al 2006:3).

However, in this model, any kind of external intervention should be implemented according to the level of community’s readiness against climate change. This is because if the new intervention is out of the community’s understanding, it is likely to fail since it cannot be easily mixed with the local knowledge. Therefore, community readiness model is useful to bring results on climate change vulnerability since climate change measurements have culturally integrated strong community ownership (Ibid.:4).

I settle on the above four models because their fundamental arguments are valued in this study. In one or another way, the above models discuss the roles of local adaptive strategies, individual’s role to achieve climate change adaptation, and the values of society’s readiness to achieve climate change mitigation. In this regard, since the study was conducted in the local agricultural communities, the adaptive or mitigation strategies analyzed and presented in the study are results of individuals as well as the wider community.

2.3. Document Review on Climate Change Mitigation Strategies in Ethiopia

The environmental policy of Ethiopia, issued in 1997, developed the plan for Accelerated and Sustained Development to End Poverty (PASDEP), which states that,

[...] all regional states have established environmental agencies or have assigned environmental responsibilities to existing agencies. Amhara, Tigray and SNNP Regional States as well as the Dire Dawa City Administration have issued their respective environmental proclamations. The Ministry of Water Resources, the Ethiopian Road Authority and the Ethiopian Electric and Power Corporation have established their respective Environmental Units. The other sectors are also to follow suit as required by the Environmental Establishment Proclamation (Edwards 2010:51).

In order to mitigate climate change in Ethiopia, several measurements have been done. Among the measures taken by different regimes of the country, household level education about the use of natural resources, allocation of land ownership certificates, advocating the cash crop vegetable farming, using of improved seed varieties, changing the production season, water management, irrigation, a forestation, construction of deep water wells etc. were implemented to some extent. Nonetheless, these activities were not successful as planned since they were not symbiotic with the local views of the society in which latter, policy makers understood the roles of local community's participation on the project plan (Mintewab, et al 2013:11). In this regard, the government's role is significant to bring climate change. However, in the context of Ethiopia, integrated and collaborative approaches of climate change mitigation strategies are not accustomed. Due to lack of collaborative supports from stakeholders and the government, indigenous climate change mitigation strategies are also vanished (Alebachew& Aklilu 2012:28).

Practically, the service of formal environmental conservation mechanisms in Ethiopia is minimal. In such situation, local social networks have great contribution to enhance the risks of climate change. Beyond maximizing the numbers and varieties of livestock and mixing of crop productions, the culture of sharing of the agricultural products during harsh season through kinship and non-kinship mechanisms are some of the adaptive measures used by the rural society of Ethiopia. Moreover, as many studies argued, climate change has direct influence on the fertility of the soil. Accordingly, the farmers have their own different types of terracing mechanisms in order to preserve the fertility of the soil especially from water erosion (Ibid:9-10).

Despite their vulnerability to the extreme impacts of climate change, the local communities have their own mechanisms (responses) for climate change vulnerabilities. They have indigenous knowledge based practices to secure climate resilience in their surroundings. Among these strategies, diverse use of land, time, and direction of mobility, diversification of crop productions etc are some of the examples. Besides, the local system of governance and social networks play crucial role to built climate resilience in a given society. In this context, the climate resilience projects should not be implemented in isolation from the local community's social, political, and economic settings (Nakashima, et al 2012:38-39).

Climate change resilience is highly rooted in the local people's homegrown knowledge system. More than externally imposed climate change resilience projects, the local community's social networks, and the customary systems of governance have crucial roles. Under the variable and unpredictable nature of environment, indigenous communities have locally favored identification of diverse crop varieties and the use of short-term plants as a system of contingency during hardships (Ibid.:42-43). A resilient society is "the long-term ability of individuals or communities to 'bounce

back' from disaster impacts, and involves social and economic capital, community preparedness, and mitigation and adaptation planning.” In this regard, it is not easy to generalize that a given community is fully adaptive to climate change (Leighton et al 2011:52).

2.4. Review of Related Empirical Studies

2.4.1. The Prevalence of Climate Change in the Highlands of Blue Nile Basin

The highland of Blue Nile Basin is experiencing rapid climate change in terms of warming of temperature and soil erosion due to destabilized rate of precipitation. However, the vulnerability of the society towards climate change has varied based on the type of topography that people are settled, the type of crop they harvest, the availability of ground water, and the society's cultural adaptive strategies. As a result, some are physically and culturally adaptive to any kind of climate change risks and others are highly vulnerable (Belay, et al 2013:593).

Moreover, far from the natural environmental risks, locally induced climate change factors have potential impacts on the climate sustenance in the highlands of Blue Nile Basin. In this area, the largest share of soil erosion and degradation of natural resources is due to population growth and expanding of agricultural farmlands even up to the picks of the mountains, which aggravates land degradation through intense flood. As a result, scarcity of agricultural land has been taken as the major factor of climate change in the highlands of Blue Nile Basin (Shegaw 2011:38, 43).

2.4.2. Contributing Factors of Climate Change Vulnerabilities in the Highlands of Blue Nile Basin

The long-term living strategy of the society in the highlands of Blue Nile Basin shows subsistence economy. In addition, the scarcity of pasturelands and shortage of fuel wood are currently visible challenges. Besides, the uncertainty of the forecasted environmental conditions of the region is another challenge for designing environmental policies and other climate resilience strategies. The existence of abundance rainfall in the winter season is not a guarantee to have much agricultural harvesting for the next season due to unexpected frost, wind, or drought. The other major challenge of climate change adaptation is non-participatory land conservation programs induced by local or regional administrators without the involvement of local communities (Belay, et al 2012: 625, 628).

According to Temesgen (2007), the farmers in the highlands of Blue Nile Basin are facing the challenges of climate change risks. Over grazing of the natural resources due to population growth and shortage of farmlands are among the potential contributors of climate change vulnerabilities in the region. Besides, the habitual ways of farming, low irrigation capacity of the area, and lack of well-integrated agricultural initiative programs exacerbated the degree of local people's vulnerability to climate change risks. The annual report of FAO (1997 cited in Temesgen 2007:7-8) showed that the highlands of Blue Nile basin are very rich in ground water resources, and normally it is called "the water tower" of the region. However, the poor irrigation potential of farmers is a result of the limited agricultural technology of the area. For this reason, farmers are so poor to invest and cover the costs of technological materials, and due to this, their system of living is vulnerable to seasonal droughts.

In his study, Bewket (2010:79) listed out other barriers of climate change adaptation such as lack of productive agricultural inputs and high yield fertilizers, weak health care packages, less recognition for local institutions, lack of job opportunities and family based land distribution system. In this context, Mdewit (2006 cited in Bewket 2010:79) argued that lack of properly organized market system, and poor meteorological information on the periodic weather change and vulnerability of the area are other barriers of climate change adaptation. On the other hand, Temesgen et al (2008:9) summarized the potential barriers of adaptation to climate change risks in the highlands of Blue Nile Basin into five. “These are lack of information, lack of money, shortage of labour, shortage of farmland, and poor potential for irrigation.”

2.4.3. Local Climate Change Adaptation Strategies

The 2010 Ethiopian Environment Forum identified that the agricultural communities of Ethiopia have diverse forms of climate change adaptive strategies. Among these adaptive strategies, changes in cropping and planting practices, reduction of consumption levels, collection of wild foods, use of inter-household transfers and loans, minor commodity production, temporary and permanent migration, hidden secure grain storage, sale of assets such as livestock and agricultural tools are local adaptive strategies of climate change (Edwards 2010:223).

The system of production in Amhara region of Gojjam area is mainly based on rainfall agriculture. However, due to climate change factors, the seasons of the rainfall is varying from one time to another. The amount of the rain is also decreasing through time, and this has a significant impact on the type and amount of production on the area. This is because even if the region is rich in surface and ground water resources, rainfall fluctuation affects the forest, water shades, lakes, and rivers. In this regard, the failure of seasonal rainfall affects the agricultural production of the region that causes

for food insecurity and much starvation of the local people (Yitea 2012:1). Following the vulnerabilities of climate change, the local settlers in the highlands of Blue Nile Basin used different adaptive strategies to climate change. The local farmers adapt the environment through livestock production, mixed farming system, and engaging into non-farm activities. Among the non-farm activities, daily labor works and local trading are mostly implemented adaptive strategies of the local communities in the Blue Nile Basin (Woldeamlak 2009:114,12). Accordingly, in order to bring visible environmental conservation in the highlands of Blue Nile Basin, Belay, et al (2012:628) recommended that well integrated and deep development induced research projects should be conducted and the indigenous adaptive strategies should be incorporated in the green economy program of the region.

Chapter Three

Description of the Study Area and the People

3.1. Geographical Location, Climate, Population Size, and Household Structure

Geographically, the Blue Nile Basin is found in East Gojjam Zone of Amhara Region (Bewket 2010:36). Its topographical arrangement ranges from 3000m to 4413m above sea level. This area is divided into locally recognized agro-ecological zones namely lowland, midland, highland, and hail (Assefa 2011:24). The Blue Nile Basin has 17 Woredas in East Gojjam Zone, which are Bibugn, Hulet Eju Enese, Enebse Sar Midir, Enarj Enawga, Debay Tilatgen, Debre Elias, Machakel, Gozamin, Baso Liben, Awabel, Dejen, Shebel Berenta, Debre Markos, Senan and Aneded (CSA 2010).

This study was conducted in Senan Woreda of East Gojjam Zone. This is because other than other Woredas of East Gojjam Zone, Senan Woreda has more than two agro-ecological zones. This Woreda consists of 17 kebelés with total population of 98,939. The topographical elevation of Senan Woreda ranges from 2600-4088m above sea level, and large part of the place has highland, some midland, and few hail climatic zones. The average annual rainfall of the area ranges from 1200mm up to 900mm (Shegaw 2011:18).

According to CSA (2010), Population and Housing Census of Ethiopia, the names of Kebelés in Senan Woreda, population size, number of households and housing units are presented in the following table.

Table 1: Number of Kebelés, Population Size, and Number of Households of Senan Woreda

No	Geographical Area (Kebelés)	Population Size			Number of Households
		Both Sexes	Male	Female	
1	Robgebya (urban) Kebelé	4562	2273	2289	1552
2	Telazam D/mitmak	5994	2957	3037	1289
3	Tegoderi Gudeyamie	6996	3519	3477	1525
4	Shewa Kidane Mihiret	4687	2336	2351	1026
5	Abazazh Weybeyiney	7279	3507	3772	1585
6	Dangle	6944	3412	3532	1487
7	Washa Michael	4457	2203	2254	970
8	Kaab	4682	2335	2347	1021
9	Zilan Amistiya	6808	3499	3309	1476
10	Senan Mariyam	5048	2575	2473	1064
11	Gedamawit Zuria	6983	3461	3522	1578
12	Tamawit Gedel Bet	6056	3013	3043	1331
13	Weleke	5132	2601	2531	1190
14	Tach Chabi	3850	1915	1935	858
15	Yeted	7691	3874	3817	1758
16	Debere Zeyit	7141	3575	3566	1605
17	Gidinbile	4629	2368	2261	1049
Total		98,939	49,423	49,516	22,364

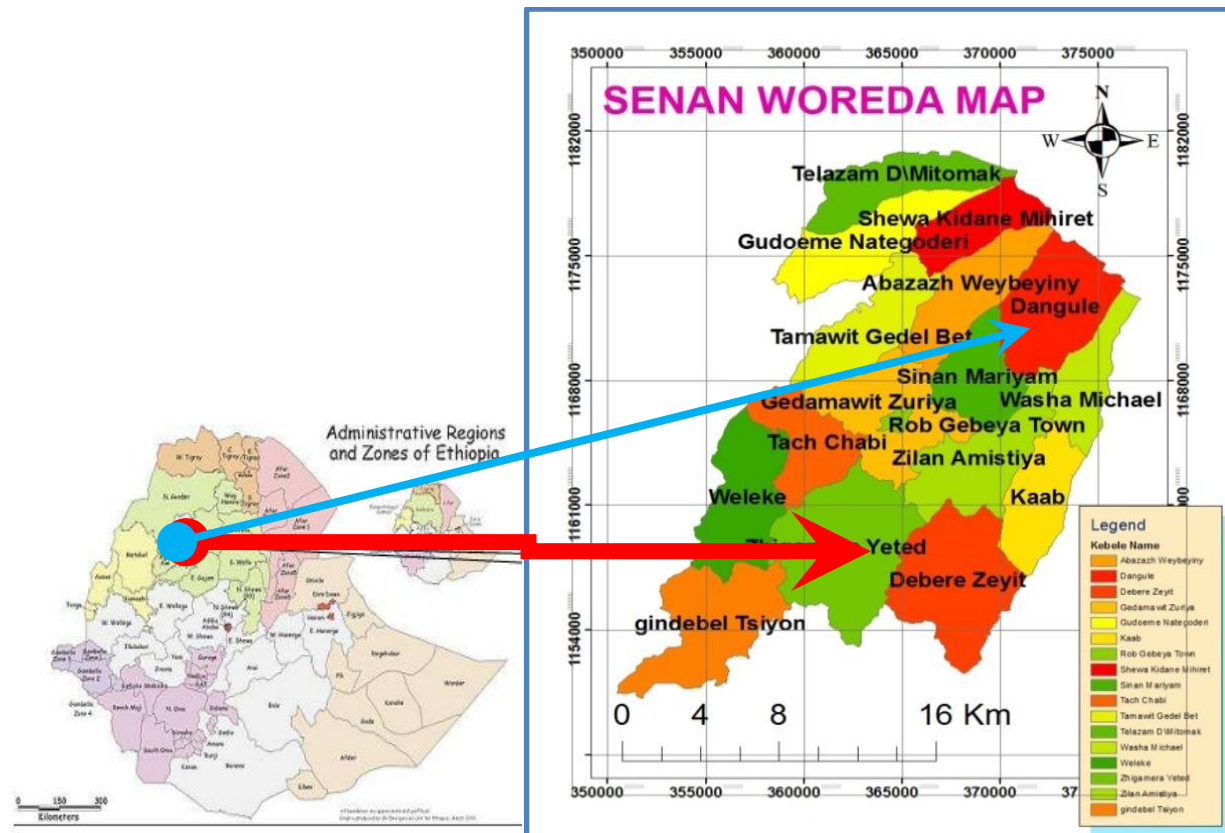
Source: CSA 2010 (Adopted from Amhara Region Kebele shape file by using Arc GIS 9.3 Software. Calculated (2013)

Table 2: Area Coverage Description of all Kebelés in Senan Woreda

No	Kebelé- Name	Area in m ²	Area in Km ²	Area in Hectare
1	Rob Gebeya Town	1495653.053	1.495653.053	149.5653053
2	Washa Michael	16705368.02	16.705368.02	1670.536802
3	Shewa Kidane Mihiret	18088510.06	18.088510.06	1808.851006
4	Senan Mariyam	19645496.99	19.645496.99	1964.549699
5	Tach Chabi	20387623.18	20.387623.18	2038.762318
6	Kaab	21390688.14	21.390688.14	2139.068814
7	Telazam D\Mitomak	22736174.81	22.73617481	2273.617481
8	Tamawit Gedel Bet	24286142.91	24.28614291	2428.614291
9	Abazazh Weybeyiny	25257447.53	25.25744753	2525.744753
10	Gudoeme tegoderi	25636809.88	25.63680988	2563.680988
11	Zilan Amistiya	28464873.42	28.46487342	2846.487342
12	Weleke	29205560.39	29.20556039	2920.556039
13	Gedamawit Zuriya	30988540.66	30.98854066	3098.854066
14	Dangulé	31875698.06	31.87569806	3187.569806
15	Gidenbel M/Tsiyon	34039409.29	34.03940929	3403.940929
16	Debere Zeyit	39588705.76	39.58870576	3958.870576
17	Yeted	46658492.77	46.65849277	4665.849277
18	Total Area	436451194.9	436.451195	43645.11949

Source: CSA 2010 (Adopted from Amhara Region Woreda shape file calculated by using Arc GIS 9.3 Software (2013))

Figure 1: Location Map of the Study Area



Source: (Adopted from Senan Woreda Land Administration Office, 2013)

NB: The two arrows show the selected Kebeles of Senan Woreda for this study

3.2. Socio-Demographic Characteristics of the Study Population

As described in table 3 below, the majority of the populations in Senan Woreda are followers of Orthodox Christianity. Moreover, out of the total population (98,939), of the Woreda, 55127 (55.71%) are economically productive and the rest 43812 (44.29%) are economically dependent. According to CSA (2010), the distribution of modern education in Senan Woreda showed that 15,961 (16.13%) are attending formal school and 8,744 (8.83%) attend formal education in the past.

The rest 60,964 (61.61%) of the population never attended formal education. In addition, out of the total (21, 877) housing units, most of them (21,589) (98.68%) are constructed from wood and mud.

Table 3: Religious Background, Economic Activity Status, Education, and Description of Housing Units by Construction Materials of Senan Woreda

1	Religious background	Total	Orthodox Christian		Protestant	Catholic		Islam	Traditional		
	Both Sexes	98939	98907 (99.96%)		7 (0.007%)	1 (0.001%)		23 (0.02%)	1 (0.001%)		
	Male	49423	49409 (99.97%)		3 (0.006%)	1 (0.002%)		9 (0.02)	1 (0.002%)		
	Female	49516	49498 (99.96%)		4(0.008%)	-		14 (0.03%)	-		
2	Economic Activity Status	Economically Active					Economically Inactive				
		Both sexes		Male	Female	Both sexes		Male	Female		
		55127		27379 (49.66%)	27748 (50.33%)	43812		16433 (47.50%)	27379 (16.65%)		
3	Education	Currently attending			Attended in the past			Never Attended			
		Both sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female	
		15961	9308	6653	8744	6641	2103	60964	26814	34150	
4	Housing units by construction materials	All housing units	Wood & mud	Stone & Cement	Wood only	Plastered Hollow Blocks		Unplastered hollow Blocks		Bamboo	
	Rural Urban	21877	21589 (98.68%)	5 (0.02%)	272 (1.24%)	-		6 (0.027%)		5 (0.02%)	
	Urban	614	609 (99.18%)	-	-	-		5 (0.81%)		-	
	Rural	20399	20117(98.6%)	5(0.02%)	272 (1.33%)	-		-		5 (0.02%)	

Source: CSA (2010 Part I: 58 & Part II: 97,118)

3.3. People and Economy

During the fieldwork, I noted that the people of Senan Woreda particularly those who live in Dangle Kebelé are locally called *dägäгна*¹⁹. These people are more interrelated to one another through kinship ties. On the other hand, the people who live in Yeted kebelé are locally known as *Qolläгна*²⁰. For them, their criteria are based on the type of crops cultivated on those areas. For instance, in

¹⁹ *Dägäгна refers highlanders*

²⁰ *Qolläгна refers lowlanders*

Dangulé Kebelé, the main type of production are potato, ãngido²¹, beans, chickpea, onions, barley, and different vegetables whereas the inhabitants of Yeted are producing téff and maize in addition to other crops produced in Dangulé Kebelé. Farming is the major livelihood strategies of the societies, which is supported by livestock production.

3.5. House Structure

During the fieldwork, I observed that farmers of the study communities construct their houses from wood and mud. The formerly cone shaped goğğō bēt²² are now replaced by rectangular shaped korkoro bēt²³. According to KI-14, in the study communities, the types of houses are taken as criteria to measure the farmer's economic status (rich, medium or poor).

According to KI-17, the settlement pattern of the study communities is based on blood relationship. Since land inheritance is based on rəst²⁴ system, children (especially sons) have the right to share the lands of their farmers. This helped relatives to settle together as neighborhood.

Moreover, the study communities' marriage residence is patrilocal. As KI-2 stated, always the man should welcome his wife in his father's rəst. Nonetheless, if he goes to her and starts to live there using her land, he will be called tākärchem²⁵, which is less respected in the society.

²¹ *Ãngido (avena sepp), is the type of crop grouped under barley family (Belay 2013:603)*

²² *goğğō bēt refers a traditional small round hut made of wood, mud and grass (Guday 2005:211)*

²³ *korkoro bēt is a house with iron-corrugated roof*

²⁴ *rəst is a form of land holding system based on hereditary rights to the use of land*

²⁵ *tākärchem represents a matrilocal marriage system that the husband goes to the house of his wife*

3.5. Social Value

During my fieldwork, I noted that land women and children are highly valued by the study communities. In this context, KI-17 further explained the local community's value for their lands wives and children by saying,

The **Dägäna** did not know any form of compromise regarding his wife and land. In our locality, wife and land are highly valued because the land gives harvest and the wife birth children. As a result, the rest land is expected to be inherited by the genealogical relatives of sons and grandsons, not any other person who has no blood relationship. That is why, in the family's settlement pattern, we see many relatives inhabited within a plot of land (Yeted 03 March 2014).

Chapter Four

Local Socio-Cultural Norms and Practices Contributing to Vulnerabilities of Different Social Groups to Climate Change

4.1 Social Groups Vulnerable to Climate Change

4.1.1 Women

According to KI-18, in the study communities, women, particularly female-headed households, are more vulnerable to climate change for different factors. Labor out-migration of men due to climate change created many female-headed households. More specifically, the absence of men's labor in farming households contributed to women's workloads and responsibilities. The case presented in the following box explains how much women are vulnerable to climate change due to lack of men's labor.

Case-1

The Life of a Woman whose Husband is Out-Migrated

W/ro Mulubrihan (35 years old) lives in Dangle **Kebelé**. She has four children. Since life was getting difficult due to the decline of production, her husband went to Wallaga to work with his uncle who live there for a long time. He went there since two years ago and due to this, his wife is the head of the family and responsible to take care of the children. Since she cannot plow the land, once a year, the brother of her husband used to come to harvest the plot of land; then after it is her duty to collect the harvest and fulfill all basic necessities of her children. As a result, the variety and amount of production is decreasing because of the absence of the husband's labor.

(Interview with a woman living in Dangle Kebele, 03 February 2014)

Women are also vulnerable to climate change due to food insecurity and local social norms. In this regard, KI-19 stated that their subsistence form of production made women more vulnerable to climate change. More specifically, since the amount of food production could not be enough to feed the family throughout the year, women are expected to use the food wisely. However, when the scarcity of food happened in the house, women are the first risk takers and this usually leads to divorce and other family problems.

The local social norms and gender-specific expectations are also making women more vulnerable to climate change. The following case illustrates the socially expected position of women and their decision-making power as factors contributing to their vulnerability to climate change.

Case-2

Men's Expectation of a Good Woman

Ato Mihirte (49 years old) lives in Yeted **Kebelé** has six children. Since he divorced his wife, he is living with one of his daughters. He believed that a woman who wants to participate in public affairs could not be a good wife for her husband. The wife has to be submissive to her husband. A good woman always performs her domestic activities and look for her children. Nurturing children and managing the domestic consumption of the family should be her prior responsibility. If there is a bad harvesting season, she has to take large shares of the problem in the family. No matter there is shortage of food in the house, the wife is expected to provide something for her children. However, the husband should be the ultimate decision maker in the family. For him, when the wife started to decide in the family, it is the sign of lacking respect for her husband and she needs to be divorced. He believed that the wife can propose ideas, but the ultimate decision has to be made by the husband.

(Interview with a man living in Yeted Kebelé, 09 March 2014)

Women's vulnerability to climate change is also related to their natural reproductive role. According to KI-21, naturally men have the capacity to go far and work for their subsistence during bad harvesting seasons. On the contrary, since women give birth, moving to far places and working there

is very difficult. Due to this, they prefer to stay in their homeland with their children even if they have economic problems.

4.1.2. The Poor

In the study communities, according to participants of FGD-1 & 2, people are categorized into three economic groups: (1) The rich (those who have two or more oxen and more than two hectares of farmland); (2) The middle (those who have two oxen and less than two hectares of farmland); and (3) The poor (those who have less than 0.5 hectares of farmland, and those who have an ox or have no ox to plow their farmlands). In addition, based on the type of houses they own: the rich have tin roofed big houses, the middle have medium sized tin roofed houses and the poor have only Goğğö bêt²⁶.

As to my field observation, the poor are the most vulnerable to climate change. Neither they have sufficient farmlands nor livestock production. According to KI-15, the poor are most vulnerable to climate change since they have less capacity to resist the impacts of climate change. For instance, when the bad harvesting season happened in the area, the poor have nothing to mitigate the problem, rather they suffer a lot, and in most cases, migration to other areas is their final option. Furthermore, the poor in the study communities did not have the capacity to change their traditional Goğğö bêt into thin-roofed houses. The following case shows that the poor are not only vulnerable to climate change but also they did not have the capacity to build climate resilience.

²⁶ *A traditional small round hut made of wood, mud and grass* (Guday 2005)

Case-3

The Vulnerability of the Poor Family to Climate Change in Dangulé Kebelé

The family of W/ro Yenesew (42 years old mother) consists of four children. The husband was died five years ago. Since their agricultural land is small (only 0.5 hectares), the amount of crop production is not enough to feed the family. The family is not able to use livestock production as a complementary means of building climate resilience since the open access communal land is restricted from collective usage. Due to this, the two elder sons of the family are obliged to look for daily labor in the town of Debre Markos. As the mother stated, 'the rich can sale some of their animals and they can buy crops during the drought season. However, for the poor, it is difficult to survive when the hardship comes'.

4.1.3. Elders

Elders are the other social groups vulnerable to climate change in the study communities. According to KI-4, in the previous times, elders had the opportunity to plow wide range of agricultural land. Through time, when the population size increased, the size of agricultural land also diminished, and elders who have no capacity to produce are now facing the challenges of climate change. KI-13 also noted that elders are dependent members of the society since they cannot move from one place to another to produce for their subsistence. As a result, they are direct vulnerable social groups to climate change.

According to KI-20, formerly, elders were exchanging different market items or crops by going to different local markets. Most of the time, onion and potato were their main items of exchange with téff and maize from lowland markets. Now, since they are getting old, they are not able to go far for market exchange. In field observation, I further understood that old age by itself is not a problem, but the fading up of helping the elders in the culture of the study communities make them to be vulnerable to climate change.

Case-4

Why Elders are Vulnerable to Climate Change?

Ato Ademmu (82 years old) lives in Yeted **Kebele**. He has seven children (five sons and two daughters). One of the sons has studied formal education and he is working in Debre-Markos town. The other four sons are farmers and they live in Yeted with their own families. They built their own houses by sharing land from their father. The two daughters are married and live with their husbands. According to Ato Ademmu, in the local tradition of their community, children were expected and responsible to help their old parents. However, he argued that the current generation has lost the virtue of helping elders. For instance, since his children are not willing to help him, he gave his agricultural land to his neighbor for fixed time sharecropping.

(Interview with a man living in Yeted **kebele**, 12 March 2014)

4.1.4. Children

Children are the other social groups vulnerable to climate change in the study communities. Participants in FGD-2 noted that children in the study area have nutrition problems due to the decrease in food production. According to the local tradition, the newly born child used to drink cow milk with fresh butter. Now, due to prolonged lack of rainfall, there is no sufficient fodder for animals, and cows do not give sufficient milk. As a result, the newly born children do not have the opportunity to ‘grow-up with milk.’

KI-27 also argued that children are more vulnerable to climate change in their locality due to the need for child labor for cattle tending because of restrictions on open access communal lands. Since

Case-5

God knows the future Life of My Son: the Vulnerability of Children to Climate Change

Ato Brihanu (45 years old) is a farmer in Yeted **Kebele**. He has four children. Three of them are attending primary school, whereas the eldest son has dropped-out from formal education in order to help his father. Since the amount of production is not enough to feed the family members, the father and the eldest son are making basketry from bamboo in order to get additional income. The father said, "God knows the future life of my son." For him, even if formal education is good for children, it is not rational to send them without having something to eat in the house. As a result, he preferred his eldest son to help his parents, and 'God knows his future destination.'

(Interview with a man living in Yeted **kebele**, 14 March 2014)

the farmers are obliged to keep their livestock in their plots of land, they need children to follow them. Formerly, since the farmers were sending their animals to the open access communal lands, it was possible for children to attend formal education. Furthermore, due to family poverty, children are dropping-out from formal schools. The following story in Dangulé Kebele is the case in point.

4.2. Local Socio-Cultural Norms and Practices Contributing to Climate Change Vulnerability

Belay (2003 [2012]:59), in his sustainability survey on Choqué mountains, identified shortage of farmlands, lack of additional source of income, traditional and non-productive agricultural technology, lack of irrigation, poor infrastructural and institutional services such as providing loans,

etc., as potential contributing factors to climate change vulnerability in the highlands of Blue Nile Basin (including the present study area).

This study, which focuses on socio-cultural aspects of climate change among agricultural communities in the Blue Nile Basin, identified different socio-cultural norms and practices as contributing factors to climate change vulnerability. The major ones include local belief systems, feasts, work habits, blood feuds, gender norms, population growth, dependence on rain-fed agriculture, and eucalyptus tree, which are discussed below.

4.2.1. Local Belief Systems

In the study communities, local beliefs contributing to vulnerability to climate change are related to beliefs about/in *sāmāntāgnaw āshī*, *away-qollé*, *dābtāras*, and *wuqabé/zar*, which are discussed as follows.

4.2.1.1. Beliefs about *sāmāntāgnaw āshī*²⁷

The local people in the study communities relate their vulnerability to climate change with beliefs about *sāmāntāgnaw āshī* referring to the belief about the end of the world. According to the beliefs systems of the local people, the entire universe including the environment is under the control of God. In this connection, KI-18 argued that,

The government claims that the current climate change is due to deforestation. However, it is better to learn from our experiences. The time has getting worse after the coming of this regime. The earth refused to be cultivated, and the sky is being dried. Even the roots of onions are decaying. In the past, the rain was moderate, but now since the rain is too much, the flood could take the house and degrade

²⁷ *sāmāntāgnaw āshī* represents the 8th millennium that the local people consider it as the end of the world

the cultivated land. So, do you think that it is because of deforestation? No, it is not. Rather, it is the sign of the coming of the eighth millennium. God has already said that it is enough, but the people could not understand it. Even those harvests which were not able to stop growing without any additional manure are now bending their necks even if there is modern fertilizer. However, the government considers us as if we knew nothing. First, it [the local government] is destroying our open access lands in the name of natural resource program. Second, by forcing all men and women to dig for the whole day, it makes us not to be able to feed ourselves. It might be good if they construct dams for the cultivable lands. Instead, by digging the open access non-cultivable land, they make us to lose our livestock on one hand and they let the land vulnerable for soil erosion on the other hand (Yeted 06 March 2014).

KI- 23 also stated that the study community's vulnerability to climate change is the result of their sins committed against the will of God. More specifically, frequent droughts, decreasing of the harvest and the loss of livestock production are penances given from God to the study communities. Participants of FGD-1 & 2 further argued that the local people's vulnerability to climate change is related to "modernization" and "individualism" as opposed to the cultural traditions of the local communities where "truthfulness" and "communal life" were highly valued. However, in this generation (the eighth millennium generation), the people who speak the truth are very few in number, and everyone wants to be rich at the expense of others. The communal way of life as well as the mutual support among relatives and neighbors is diminishing from time to time. Due to this, in the study communities, the poor and the elderly people are more vulnerable to climate change.

4.2.1.2. Beliefs in Away-Qollé²⁸

In the field, I noted that away-qollé is the local ‘protective female spirit’ in the study communities. KI-19 believed that deviation from this benevolent spirit is one of the contributing factors to climate change vulnerability. KI-5 further described the case in point as follows:

[...] even if this church [Orthodox Christian Church] is our final burial place, this county [speaking of Dangulé kebelé] is protected by the local guardian female spirit know as **Away Qollé**. However, the time is getting worse because of our sins. The rain is not coming through our religious prayers. The harvest has no charm. Formerly, for the sake of the local guardian spirit, there was the ceremony of rounding the country with one cock used to be burned after blessing the good and cursing the bad spirit. Then, after the ceremony the country was peaceful, there were no diseases and drought. However, since everybody started to say, “I am modernized”, there is no more such kind of ceremony. As a result, as you see now, it becomes such a wilderness place (Dangle 01 February 2014).

As KI-6 stated, in the cultural traditions of the local community, the first day of September (the Ethiopian New Year) every year was the time of offering respect and thanks giving to the away qollé for her protection of the family and the harvest. In that day, every family used to slaughter sheep, and the away qollé was faithful to protect the local people and the harvest from any harm. However, according to KI-3, since some members of the local community did not follow this tradition, the away qollé is not happy to protect the area. Provoking evil spirits through sorcery against neighbors, working during holidays, and lack of mutual respect are some of the factors that make the away qollé unhappy. As a result, the current problems of drought and decrease in production prevailed in the study communities.

²⁸ Away-Qôllé is the local benevolent spirit which protects from possible climate change risks

4.2.1.3. Beliefs in Däbtäras²⁹

According to participants of FGD-1 & 2, the däbtäras are members of the study communities who have special ability to control the environment. In their religious education, the Däbtäras received basic lessons about serving the Ethiopian Orthodox Church through priesthood. In order to achieve this, they took long-term studies on St. Yaréd's vocal chanting. As to KI-2, in order to learn the special kind of wisdom, some of the youths went far from their parents and took special lessons about controlling the cosmos. Then, since they can do whatever they want through their studies, the local people have high respect to them and believe in their wisdom.

Participants of FGD-2 argued that, the däbtäras are contributing to climate change vulnerabilities in their locality. Because if the local people did not give due respect for them, they could provoke strong rainfall with hailstone and destroy their harvests. In order not to lose their harvests, local community members used to contribute grains and money for the däbtäras. According to KI-17, only the community members of Dangle Kebelé are offering contributions for the däbtäras. Participants of FGD-1 also noted that since there are different däbtäras in Dangulé Kebelé, they are confronting one another. One participant of FGD-2 described his experiences about the point under discussion as follows,

The rainfall from the sky is highly controlled by the **däbtära**. I believed in **däbtäras** since I have seen once in my life. There was one **däbtära** in our locality. One day, in the feast of **sänbäté**³⁰, one man was drunk and said to him that 'you cannot do anything'. Again, the man continued and said to the **däbtära** 'you took our money without doing anything'. Being annoyed the **däbtära** said, 'ok let me choose one place among the surrounding areas, and let me destroy it with hailstone, even the place

²⁹ *Däbtära is a church-educated person who could deal in magic and medicine as well as controlling the environment*

³⁰ *sänbäté is voluntary weekly (on Sundays) religious as well*

which you think of protected by another **däbtära**, then you can believe'. Then the **däbtära** started praying. He took dried roots from his pocket, hewed and spit out. Then immediately, strong rain and wind came. The other **däbtära** was pushing the rain towards us, whereas this **däbtära** was pushing to the opposite side. Then after, the strong rain left half of the village out of harvest. Thus, I believe that the livelihood of this locality is controlled by the **däbtäras** (30 March 2014).

According to KI-16, the **däbtäras** are not only provoking strong rainfall with hailstone, but they also have the capacity to provoke drought. In this context, KI-10 narrated his experience as follows,

In 1989 (E.C), there was one **däbtära** who controlled rainfall and provoked drought in Dangulé, Abazazh, and Washa Michael areas. Since he was hiding himself from the surrounding area, all members of the community searched and found him. Then after the **däbtära** rounded Rob Gäbya town, where he was stoned and killed. Two days after his death, the rain came. So, if he wishes, the **däbtära** could protect the locality, but if hates, he could destroy it (Dangulé 12 March 2014).

During my fieldwork, farmers in Yeted kebelé were accusing the highlanders, especially those who live in Dangulé kebelé, for their being vulnerability to climate change. In this regard, KI-19 forwarded that,

The main reason for the vulnerabilities of Yeted and other surrounding lowland kebelés to climate change is related to the malicious actions Dangulé people and the surrounding highlanders. The **däbtära** brought the hailstone from Dangle and Abazazhe through winds and attacked Yeted. This **däbtära** from the highland areas, used to attack us with hailstone sometimes, and another times through drought (08 March 2014).

4.2.1.4. Beliefs in Wuqabé³¹/Zar³²

Wuqabé is a benevolent spirit, which is possessed for the good of the family or to the person who possesses it. According to KI-10, women mostly exercise the spirit of wuqabé. According to the local belief system, the person who is the possessor of this spirit is known as bale-zar. Since it is believed that wuqabé is the protective spirit of the family, the family members are expected to offer presents to the spirit bearer. As to KI-8, if one of the family members is the possessor of wuqabé, there must be regular offering of presents for the spirit in order to protect the family from any possible harm/attack. These offerings differ from one family to another. Slaughtering of white/black sheep/chicken, buying white/red colored locally made cotton clothes, preparing coffee ceremony, and so on are common presents offered to the Bale-Zar.

Moreover, KI-26 believed that the family failed to offer presents to the wuqabé regularly, the bale-zar could get sick and there would be misfortunes to the whole members of the family. Then the benevolent wuqabé (protective spirit) of the family could be transformed into malevolent zar (evil spirit). If there were some mistreatments to the bale-zar in the family, the malevolent zar would persecute its victims even if gifts were presented to the spirit.

In short, according to KI-7, wuqabé is one of the belief system related factors contributing to climate change vulnerability in his locality. This informant further noted that,

Wuqabé exists in reality. However, since the current generations do not believe in it, there are no blessings in the family. If you go to every one's house, you can observe at least one sick person. Our wives are sick. They cannot work. Formerly, they were able to work throughout the day, but now they lose energy, and they stayed at home. Since' today's people' stopped to treat them, the **wuqabé** made

³¹ *Wuqabé/ is benevolent (protective) spirit of the family members*

³² *When Wuqabé (the benevolent spirit) changed into malevolent (evil)spirit, it is called Zar*

our wives his dwelling place. Besides, after collecting our harvest, we do not know where it went. At the beginning, it was plenty, but within two and three months, the harvest store becomes empty. We could not have agreement with **wuqabé** unless the times of our ancestors come back (04 February 2014).

4.2.2. Feasts

In the local tradition of the study communities, feasts such **mahābärs**,³³ annual religious celebrations dedicated for the local parish's Saint's day, wedding and funeral ceremonies are highly valued social as well as religious activities. KI-6 explained the local value of feasts in the face of climate change vulnerability as follows,

It is true that one locality could be known through feasts and liturgical services. However, in this difficult century, if the poor man prepares feasts by looking his neighbors, in September³⁴, he could be unable to feed his children. However, this is commonly practiced in our locality. As a result, the poor who used to prepare feasting by using all the cereals from store become vulnerable to food insecurity during the bad harvesting seasons (Dangle 02 February 2014).

In the study communities, there are also feasts dedicated for local parishes Saints' days. During the fieldwork, I noted that the annual feasts of the parishes have cultural values. When the parish's tabôt³⁵ is going out, the priests chant the psalms and praise hymen in Geez language, which is one of the treasures of the Ethiopian Orthodox Church. Adult males have also special dances and songs that express masculinity.

The majority of the local people used to prepare feasts dedicated for the local parish's Saint's day. After the tabôt went back to its place (the parish church), those who prepared the feast are expected

³³ *Mahābär is voluntary monthly religious (EOC) association (Guday 2005:212)*

³⁴ *September is the food insecure month in the study agricultural communities.*

³⁵ *tabôt is the replica of arch of the covenant*

to invite priests who came from another parish or place to give religious serve (such as chanting) for the local parish's tabôt. According to my field observation in Dangle Kebelé, one farmer should take at least one guest priest to his house. In the fieldwork, I also observed that people used to go to the feast house without invitation. KI-10 explained the reason why people used to go to the feast house without being invited as follows,

In annual religious feast days, organizing feasts and inviting people for eating and drinking is descended from our ancestors. Even though there is no milk and meat due to the wickedness of the century, it is our tradition to serve guests by using what we have in the house. However, many people used to prepare elaborated feasts by using all what they have in the house. Sometimes, the poor used to prepare better feasts than the rich did. Nonetheless, no one shares their problem during bad harvesting seasons (Dangle 12 February 2014).

Case-6

How Feasts Contribute to Climate Change Vulnerability?

Ato Simegnaw (about 62 years old) is a farmer in Dangulé **kebelé**. He has seven children. According to the local wealth ranking mechanism (see 4.1.2 above), he is in the 'middle' because he has tin roofed house, two oxen, and 2.25 hectares of farmland. He is also the member of four different **mahābärs** (St. Michael, St. Mary, St. George and Medihanialem). His wife can participate in only St. Mary's **mahābär**, whereas others are only for men. He stated in his words that, “ማህበር ሲበሉት እንጂ ሲያወጡት ወገብ ይቆርጣል” (literally meaning, “**mahābär** is good to take part when others organize it, but it is hard to do it”). Even if the cost is boundless, they used to continue participating in **mahābärs** due to social pressure from their neighbors. However, nowadays, since the fertility of the land is deteriorated, there is no enough crop production, which could cover the overall expenses of feasts and the domestic consumption. As a result, most families are vulnerable to food insecurity and sometimes they face great challenges of feeding family members. In short, since all what they produce during the harvesting season could be used for monthly and annual feasts, the livelihood of the majority of the local people depends on the next harvesting season.

(Interview with a man living in Dangulé **kebelé**, 12 March 2014)

In the study communities, there are also elaborated feasts for funeral and wedding ceremonies. The local people are, according to KI-21, over-spending their harvests during such feasts.

In general, local feasts prepared for social as well as religious purposes are contributing to climate change vulnerability in the study communities. In this context, participants of FGD-1 noted that, “the less the one feasts, the better resilient he/she is in the bad harvesting season. However, the local people preferred to feast due to social pressure and fear supernatural sanctions.”

4.2.3. Work Habits

In traditional farming communities, labor is one of the major means of production and hard work is required to sustain a farmer’s livelihood. However, during my fieldwork in the two farming communities, I observed that the local farmers used to stay idly for the coming of the rainy season to produce their harvests. As to the work habits of the study communities, KI-9 noted that,

The people from the highland area do not work hard except farming twice per year. Those who have cattle follow them, whereas those who do not have cattle make basketry from bamboo. However, the current vulnerability related to climate change is the result of the intervention of the local government, which orders the local people to make trenches even during locally respected religious holidays such as St. Mary and St. Michael. Of course, we [the local people] refused to farm during such holidays. However, the government has continued to dig our farmlands in those monthly religious holidays, and this has aggravated our vulnerability to climate change (Danglé 09 February 2014).

The other critical issue that KI-24 stated is the difference in local people’s attitude towards different types of work. Some works such as ‘farming’ are highly valued, whereas some others such as metal work, weaving, basketry, and pottery are less valued. In this regard, all participants of FGD-2 argued the people in their locality undermine artisans (ejäseri) since they believe that these people possess

evil spirit. Not only their works are devalued, but also they cannot have marriage alliance with other local farmers. Accordingly, KI-11 noted that:

Pottery is one of the undervalued works in our locality. Even the potters' place of residence is separated from the farming community members. No matter there is livelihood problem, one who does not belong to their genealogy cannot do this work, because he/she is afraid of being discriminated from the local farming community (Yeted 14 February 2014).

In short, the local people's negative attitude towards handicrafts/artisans can contribute to their vulnerability to climate change.

4.2.4. Blood Feuds

Blood feuds are very common among the study communities. According to KI-25, the trend of blood feuds can be traced back to their male ancestors. According to the local tradition, males used to perform blood feuds until the 7th generation. Accordingly, a man who did not kill in revenge of his deceased relatives was and still is considered as having a feminine character. In the local tradition, women and children could not be killed in blood revenges. KI-26 remarked that even if blood feuds have different causes, conflict over farmland is the main cause of blood feuding in their locality. Conflict over agricultural lands is common during the farming seasons that one farmer pushes the border of the nearby farmland owned by another farmer. The land, which is the cause for blood feuding is known as yädäm märét (literally meaning, 'the blood land') because after the death of someone, the feud never ends until the relatives of the deceased person take the revenge. Due to this, the feud continues from great grand-fathers to grand-sons.

KI-24 further noted that local men used to hold 'guns' as 'a symbol of masculinity.' Formerly, it was legal to exchange and own guns. However, currently, it is illegal to own or exchange guns for private purpose. As a result, other than giving their private gun to the local government, many farmers get it registered and they are doing security works in the community on behalf of the local government. However, since they spend much time to government meetings, working on local security and on other societal activities at the expense of their farming activities just to maintain their private gun possession for protecting their families from blood feuding. The following case shows to what extent the livelihood of the farming family is challenged by the cultural tradition of blood feuding.

Case-7

How Blood Feud and Gun Holding Contribute to Climate Change Vulnerability?

W/ro Yimegnushal (42 years old) lives in Dangulé **kebelé**. She has four children who are attending formal school. She was not educated. Her husband, Ato Eriku Biriha, is a 51 years old farmer. Formerly, one of her husband's relative killed someone and left the area. Then after, her husband bought a gun in order to protect his family from blood feuds. Since the government did not allow possession of private guns, Ato Eriku gets his gun registered by the local government and he has the legal permission to hold it. However, he required to get involved in the local public activities such as investigating crimes or facilitating societal services at the expense of his farming activities. Due to this, his family's livelihood is diminishing from time to time. Besides, the fertility of the land is decreasing and their production is low. However, his wife argued that even if it is possible for her husband to give the gun to the local government and to concentrate on his family work, it is impossible to protect the family from blood feuds without it.

(Interview with a woman living in Dangulé **Kebele**, 13 March 2014)

One male informant from Dangle Kebele further argued that whether they have blood feuds or not, holding guns and spending much time in public affairs just to protect the family from potential blood feud contributes to climate change vulnerability. According to the local culture, men are expected to be masculine, i.e., being powerful, aggressive, and responsible for any possible attacks on the family. Women also used to admire such kinds of men and even instigate their husbands to get involved in blood feuds. In this context, there is a local saying that, “ሴት የላከዉ ወንድ ጅብ አይፈራም” (literally meaning, “the man who is sent by a woman will not be afraid a hyena”). As a result, the cultural tradition of blood feuding which encourages local men to hold guns and spend much of their time for public works without any payment made the farming households more vulnerable to climate change.

4.2.5. Gender Norms

In the study communities, gender norms refer to socially expected gender roles and responsibilities. According to KI-4, men and women have different roles in their locality. According to the local tradition, farming is males' activity, whereas doing all domestic activities, collecting firewood, and collecting animal dung for fertilizer are females' duties. This gender-based division of labor makes women/girls more vulnerable to climate change. During my fieldwork, I have observed that currently there is no forest and open access land to collect firewood and animal dung. As a result, women especially in Yeted Kebelé are obliged to use eucalyptus tree for fuel. One female informant in Yeted Kebelé pointed out that 'since the land of Yeted Kebelé is degraded, the local people preferred to use chemical fertilizer.' However, women/girls in Dangulé Kebelé have still the duty to collect animal dung for organic fertilizer since the use of chemical fertilizer is not practical in their locality.

The other local gender norm is related to gender difference in the power to make decisions in the family. According to a male informant in Dangle Kebelé, men are major decision makers in the family. For instance, a man decides about the number of children in the family and which animal has to be sold, and the money is kept with him. However, women can sell grains and animal products like butter, and they are free to keep the money with them because they spend it for household consumption. According to one participant of FGD-1, in most cases, if men want to sell grains or potato to the market, they use horses or mules to transport them. Contrary to this, women used to take market items by carrying on their back. If want to engage in different climate change adaptive strategies, they need to get permission from their husbands. The following story explains the case in point.

Case-8

Societal Expectation of Women's Appropriate Role in the Community and Its Contribution to Women's Vulnerability to Climate Change

W/ro Sewalem (38 years old) lives in Yeted **Kebelé**. She has four children. Since the agricultural production is not enough to feed all the family members, she started trading **gësho** as a supplementary means of survival/household livelihood strategy. However, her husband is not happy because the local community members undermine women involved in such kind of trade. She further stated that in order to get respect from the local community, women should sell butter and other agricultural products in the market, but not **gësho**. As a result, her husband ordered her to stop trading **gësho** because he does not want to be called by the society as 'the husband of a **gësho** trader woman.'

(Interview with a woman living in Yeted kebelé, 20 March 2014)

4.2.6. Population Growth

According to participants of FGD-1, population growth is one of the socio-cultural factors contributing to climate change vulnerability in their locality. The fast population growth requires more agricultural lands. However, the farmlands are very small and fragmented due to population pressure. In order to produce sufficient amount of harvests for their family, farmers used to plow virgin lands, which leads to soil erosion. In my fieldwork, I have observed that some farmers started farming in mountain areas due to shortage of farmland.

However, the local people are not in favor of limiting their family size by using modern contraceptives. In this connection, one informant in Yeted Kebelé stated that children are considered as assets or wealth in farming families. Due to this, local farmers preferred to have many children even if they did not have enough economic resource to feed them. According to participants of FGD-2, parents want to have many children beyond their economic capacity for nurturing them for three

reasons: First, children are considered as old age security for their parents. Second, children are means of securing bonds between spouses since, according to the local tradition, spouses without children is most likely get divorced. Third, the local farmers are well aware of the difficulty of having many children beyond their economic capacity. However, they prefer to have many children to respect God's order since the local people believe that children are gifts of God and limiting their number by using contraceptives is considered as an act against the will of God.

In the field, I have also observed that farming households are densely populated, which contributes to overgrazing, deforestation, flooding, and resource degradation. According to local informants from the two study communities, population growth leads to further climate change vulnerabilities such as conflict over natural resources and lack of solidarity. The following case gives further description about the contribution of population growth to climate change vulnerability.

Case-9

There are new houses but the land is fixed...Population Growth as a Socio-Cultural Factor Contributing to Climate Change Vulnerability

Ato Lake (68 years old) is a farmer living in Dangulé Kebele. He has six children. Two of them have formed their own families by constructing their own houses around his homestead. He also shared his agricultural land with them. Formerly, it was possible to use his agricultural land through rotation (fallowing), but currently, since it has been divided into three family farmlands, it is not possible to fallow the land for some time to recover. As he stated, there are new houses in every family but the land is fixed. The farmers preferred to have sufficient child labor for farming households without anticipating the consequences of population growth, but the problem comes when the children get adult. Formerly, it was possible to expand settlements towards the nearby open access communal lands, but now it is forbidden. As a result, the amount of production is decreasing due to shortage of farmlands and soil degradation.

(Interview with a man living in Dangulé kebele, 27 March 2014)

4.2.7. Dependence on Rain-Fed Agriculture

During my fieldwork, I have observed that the production system of the two study communities is highly dependent of rain-fed agriculture. During the rainy season, they produce potato, and when the dry season comes, they produce cereals. Due to this, the study agricultural communities have only two harvesting seasons per year.

According to participants of FGD-1&2, nowadays, the rain is coming late. Sometimes, the non-predictable nature of the rainfall affected the production system of the local communities. In the field, I have also noted that the local farmers produce agricultural harvests based on their former experiences of the environment. According to their previous experience, since the rain that comes during the summer season was not too much, it was helpful to plow the land and make it ready to harvest in the coming winter season. However, as one participant of FGD-1 stated, nowadays, the coming of the rain is not predictable, and the amount of production is decreasing from time to time.

4.2.8. Eucalyptus Tree

Eucalyptus tree has become a source of livelihood among the agricultural communities of Dangulé and Yeted. However, according to KI-22, the eucalyptus tree is one of the factors contributing to the vulnerability of different social groups to climate change. In his words, he stated that, “**ጁኝን ሀገር ያጠፋት ባህርዛፍ እና ምቀኛ ነፊሥ።**” (literally meaning, “this country [locality] is flawed by eucalyptus tree and jealous people”.) From my field observation, it would not be judgmental if I said that the two study communities are producers of eucalyptus trees. As one informant from Yeted Kebelé expressed, “even if the eucalyptus tree is useful for domestic fuel as well as source of income by

selling it in the nearby towns, it is drying the under-ground water and consuming the fertility of the soil.”

Of course, participants of this study did not deny the temporary benefits of the eucalyptus tree. However, the majority of FGD participants and key informants argued that eucalyptus tree is the main cause of climate change vulnerability in their localities. In this context, KI-4 forward that, “formerly local women and girls were able to fetch water nearby their houses, and the water was clean. However, due to the eucalyptus tree, many streams are dried, and the local people are obliged to contribute money for the government in order to dig the ground and to get under-ground water.” One female informant in Yeted Kebelé also mentioned that, formerly, the area was known as “water tower”. However, due to the impacts of eucalyptus tree, now the proverb has been changed to “የአባይን ልጅ ውሃ ጠግዋል” (literally meaning, “the son of Blue Nile is thirsted”).

Chapter Five

Local Socio-Cultural Values and Institutions Used as Adaptive Strategies to Climate Change

5.1. Socio-Cultural Values and Indigenous Knowledge System as Adaptive Strategies to Climate Change

5.1.1. The Culture of Sharing Experiences and Resources

5.1.1.1. The Culture of Sharing Experiences

In the fieldwork, I have observed that the local people share their ideas, knowledge and resources. In this regard, according to an informant from Dangle Kebelé, local elderly men share their experiences such as the design how to construct their houses, the day when the house would be constructed, all the human labor, and its estimated costs to young men.

In the study communities, according to FGD-1&2, in order to buy one cow, sheep, goats, ox, horses, etc. in a given market, experienced people are asked to see animals and to propose negotiable price for them. Locally experienced individuals can also identify the ages of animals by looking their teeth, and if the experienced persons found animals are old, they advise the person not to buy them. The local people also share their experiences about farming strategies and in choosing of proper crop items, which corresponds to the nature and types of soils.

5.1.1.2 The Culture of Sharing Resources

In the field, I observed that the people in the study area exchange material resources and agricultural equipments to one another. In this context, one participant in FGDs-2 argued that the customs of material sharing is another means of adaptive strategies to climate change. When there is shortage of harvest in one family, they can ask for help to their neighbors. If the husband of the family is dead, the neighboring people help the children and his wife by harvesting their agricultural land turn by turn. When a farmer faced accidental loss of his property due to different factors, or if his animals are dead, the neighbors could share him. A participant of FGD-1 also stated that,

The society has the culture of helping the poor and receiving guests. In this locality, the haves shared to the have-nots, the sick are treated, and women when they give birth are visited. Even if the current time is awful, formerly, when the person was sick of headache, his neighbors were able to heal by letting the blood out through blade. In this area, construction of a house did not take more than one day. To construct the house, there is no payment and expense. The neighbors help the person and make him free from troubles by contributing for the expenses of the feast, and through their labor. The same is true during wedding and funeral times (*Dangulé 23 March 2014*).

In the field, I further noted that in the tradition of the study communities, there are different types of sharing. Some are generalized sharing in which the person is expected to return the received economic and labor support from his neighbors after some time. In this context, sharing of labor during house construction, contributing of food and drinks during funeral and weeding feasts are generalized sharing that needs to be returned after some months or years. On the other hand, there are negative sharing that could not be necessarily returned. For instance, helping the poor farmer by plowing his farmland and visiting a woman during delivery are some of the distributions of the study communities, which should not be necessarily returned. In those reciprocities, the service of plowing

the poor farmer's land or the gifts offered to the woman who gave birth could not be necessarily returned, or if it could be returned, it is not expected with the same quality and amount.

KI-29 also argued that these trends of economic sharing and service exchanging are not negotiable arguments. Rather they are done through friendship, neighborhood and based on kinship relations. Since people of the study communities have trust to one another, there is no need of formal agreement in order to share something. Participants of FGD-1 & 2 further noted that resource sharing are important adaptive strategies to climate change for the study communities.

5.1.2. Indigenous Knowledge System

5.1.2.1 Indigenous Farming System

During the fieldwork, I observed that the people in Dangulé and Yeted areas have different indigenous farming techniques. Of course, the farmers in both areas use pair of oxen for farming. However, the season and intensity of farming as well as the types of crops harvested are quite different. According to participants of FGD-1 & 2, in order to harvest crops, farmers in Dangulé plow one plot of land from two to three times, and then they cultivate potato or barley. Conversely, the farmers in Yeted plow one plot of land many times; it could be from five to six times since the soil type is different.

Moreover, according to KI-2 & 13, farmers of both communities (Yeted and Dangulé) have also the knowledge of horizontal farming in order to protect the soil from erosion. When the rainy season comes, the farmers plow the land and they let it for some time in order to absorb rainwater. As KI-13 stated, if the rainwater did not inter deep to the farmland, the roots of the harvest could be dried and it could not give yield. So in order to make the water to reach down to the interior of the soil, they

plow it horizontally and they prepare curved trenches for the runoff. On the other hand, the farmers of the study area know that which type of land is more vulnerable for weeds and which are not vulnerable. In this regard, for the lands, which are more susceptible for weeds, they plow them during the dry season and they make the roots of the weeds to be dried, or sometimes they burn the farmland with fire before harvesting. Then by plowing it continually, they make the land fertile and productive.

5.1.2.2. Diversification of Crops and Animals

As KI-15 explained, cultivation of varied crops and diversification as well as rearing of cattle with the large number have immense role for the adaptation of farmers to climate change. Similarly, since they are not sure of what would happen on the harvests of the coming winter season, the farmers cultivate some specious of barley on some plot of land before the entrance of the rainy season. As to the local knowledge of the study communities, KI-35 stated that,

[...] the farmers know the suitable crops for the cultivable land and they discern how it could be cultivated. For example, when the land is less comfortable for barley due to climate change, we harvest it with beans. For the uncultivable land due to land degradation, we can recover its fertility by sowing **gibto**³⁶. Likewise, beans and peas are important for soil fertility. Using varieties of crops have two benefits. First, if one type of crop has damaged due to climate change risks, we can use the other crop. If barley could be destroyed due to hailstone or the frost, the farmers who sow potato and beans, and they can feed their family without any problem. On the other hand, the fertility of the land could be preserved either by sowing varied crops together or through fallowing (*Yeted 24 March 2014*).

³⁶ gibto: local crop item, which is used by the local communities to recover soil fertility

In the field, I also observed that the farmers used to raise cattle, sheep, horse, mule, and donkey in addition to crop cultivation. According to participants of FGD-1 & 2, these animals are their insurances during the bad harvest seasons. If the harvest could be destroyed due to strong rainfall or drought, the farmers can overcome the hardship by selling their cattle, sheep, or horses and purchase crops from the market. In the study communities, livestock is also a criteria used to evaluate whether the farmer is rich or not. In this regard, having many cattle (eg. oxen and cows, horses) is being wealthy. In this regard, the following case also shows the roles of livestock to the adaptive strategies of the study communities.

Case-10

Livestock as an Adaptive Strategy

Ato Zeleke (58 years old) who lives in Dangle Kebelé is married. Both the husband and the wife are uneducated, and they have six children. Since he had power during Därg régime, the current government took all of his lands by letting only four hectares. As a result, he was in problem to feed his family. After some years, he decided to rear horses and mule. Since his house was near to the communal open access land (**amaga**), it was a good opportunity for him. Then he bought two female horses and more than ten sheep. After one year, the horses gave birth of mules and the sheep multiplied themselves. After three years, he sold the mules in Debre Markos. Then after by the money, he constructed a house in the town of Rob Gäbya, and he gave it to his two children for café house and shopping.

(Interview with a man living in Dangulé kebelé, 28 March 2014)

5.1.2.3 Indigenous Weather Forecasting

As I have noted in the field, the study communities have their own mechanisms of predicting the weather of the coming seasons. They already accustomed the time of the rainy and dry seasons. In this regard, if the rain comes late, they can predict the time of the harvesting season.

According to KI-7 and participants of FGD-1& 2 explained, the farmers of the study area knew at what season they plow the farmland and which type of crop could be harvested. The farmers of the study communities also have the knowledge to predict at what time the harvest could be ready for collection. For instance, if they believe that the coming winter season is not favorable for the harvest, they cultivate some cereals, which can reach before or after the summer. One participant in FGD-1 pointed out that Dangulé Kebelé is only able to cultivate some types of barley, potato, and beans, but all of these harvests are vulnerable to the frost of December or for the unexpected rainfall. In this regard, the farmers are trying to propagate their yield by predicting the possible accidental risks of the harvest. Likewise, since the highland barley in Dangulé could be late for collection, it is vulnerable to the unexpected loss due to strong rain or frost. Due to this, the farmers are trying to substitute it with fast growing crop species like *āngido* and wheat.

According to KI-30, the study communities are further attentive to the exact dates of sowing crops. For instance, the informant noted that,

In our locality, we finish to sow barley from the end of August up to half of September even though, there are lands that could be sowed early or late. Likewise, my farmland could not give harvest if it is sowed after **Mäskäräm**³⁷ 4 and 6. Since it could be late, the frost of **Tahīsase**³⁸ makes it dry before it gives harvest (*Yeted 26 March 2014*).

According to participants of FGD-1& 2, the study communities also know the time when crops could be expensive in the local market following the harvesting seasons. According to their local market analysis, from July up to the end of September, it is the season of potato harvest. In this season, since they know that the price of potato could be reduced in the market, farmers keep it at home until it

³⁷ *Mäskäräm represents for September*

³⁸ *Tahīsase represents for December*

gets expensive. In this context, local farmers of the study area are rational choosers of harvesting time and situation of market transaction, which help them to be adaptive to the local climate change.

5.2. Socio-Cultural Institutions as Adaptive Strategies to Climate Change

In this sub section, an attempt is made to discuss some of the major institutions used as adaptive strategies to climate change. In this regard, the study communities employ marriage institution, consanguinal kinship, fictive kinship, and community-based institutions as adaptive strategies to climate change.

5.2.1. Marriage Institution

In this study, marriage refers to conjugal relationship between a man and a woman. According to KI-11, marriage residence in the study communities is patrilocal. In this context, the wife goes to her husband's house and starts to form one family. Participants of FGD-1 & 2 argued that in most cases marriage alliance is formed between those who have similar statuses. The rich prefers the rich. KI-37 stated that marriage is one way of forming an economic alliance between two different families. Even if, marriage alliance between the poor and the rich is not much visible in the study areas, betrothal is common between the two groups, and sometimes it becomes successful. Accordingly, KI-5 noted that even if the rich prefers the rich and the poor with the poor, when the couples engage into conjugal marriage, economically the two families are responsible to sustain the lives of the newly married couples together. For that reason, in order not to be divorced, the parents of the bride are expected to study if the families of the bridegroom have enough land and livestock.

According to KI-29, after the two families united through marriage alliance, they become relatives to each other. They share their labor force, and sometimes the harvest. If one of the families is economically rich, it is an advantage for the other family because they can share land, harvest, and livestock from the rich family. In this regard, in the tradition of the study communities, marriage alliance is one of the adaptive strategies to climate change vulnerability.

According to participants of FGD-1 & 2, in the study communities, marriage alliance has another social advantage. In this context, the two families engage into marriage alliance in order to get power assistance. The powerless wants to be united with the powerful because the powerful makes the powerless to be respected in the community. Likewise, KI-5 also stated,

In our locality, people engage into marriage alliance in order to share socio-economic problems together. Formerly, people were engaging into marriage alliance by going far. Now, it is done within the neighbors. Formerly, the girl was asked her genealogy, but now it is asked, what she has? What is the political status of her father? Sometimes, the quarreled neighbors bring peace in the course of marriage alliance (*Dangulé 01 February 2014*).

5.2.2. Consanguinal Kinship

Consanguinity is a kinship system in which closely related families help to one another through decent (Guday 2005:84). In the tradition of the study communities, people count their consanguinity up to the seventh generation. This genealogical count includes vertical ties of the families such as great grandparent, grand parent, father, mother, son, daughter, grandchild, and other horizontal consanguinities both to the father's and the mother's side.

Participants of FGD-1&2 discussed that Consanguinal kinship is one of the local adaptive strategies of the study communities. They share labor and economic production. Even if the social ties among

all the members of the consanguinal kinship is all right, sharing of the harvest and labor force is more practical among the vertical genealogical families such as the father and the son and the mother and the daughter.

In the field, I further observed that consanguinal families are settled tighter. Sons have houses near to their fathers' and grand fathers' houses. In this regard, KI-30 explained that the settlement pattern of relatives has multi purposes. Since they live together, it is easy to help one another when problems happen to the families. During this time, since the trend of "individualism" is high in the study communities, consanguinal kinship is used as an optional adaptive strategy to climate change. When there are difficulties among the members of the families, it might be sickness, lack of food, labor and the like, consanguinal members can respond soon than others.

KI-31 also argued that when consanguinal families settle together, it is a defensive mechanism against their enemies. In the tradition of the study communities, brothers are the first close blood relatives who can share hardships. In order to show the value of the brother, the local people commonly use the following “ወንድም እና ቀይ ወጥ ማንነራገሪያ ነው” (literally means brother and papered meat sausage are useful to terrify). This saying indicates that when brothers live together in the same village, the people respect them, and no one could attack from their family members. KI-6 also further noted that that if one of the family members kills a person in the area, members of consanguinal families could settle in the same village in order to defend themselves from feuding.

5.2.3. Fictive Kinships

This type of kinship is more of ceremonial in which the two parties have no blood relationship. In the field, I have observed that Abä Läj and Yätut Läj are the fictive kinship systems which are commonly existed among the study communities.

5.2.3.1. Abä Läj³⁹

According to KI-6, 19, 20 and participants of FGD-1& 2, this kind of kinship system is formulated during the baptismal ceremony of the child in the Ethiopian Orthodox Church on the 40th (for male) or 80th (for female) day after the child is born. Immediately after the child received the first sacrament of baptism, priests give the child to someone who wants to be parented for common interest. The one who will be the god-parent of the child should be an intimate friend of the family, and there should not have blood relationship between them. For male child, the god-parent should be a man and for female child, the god-parent should be a woman. In this regard, the god-parent swears an oath in the church by saying, I received this child from God. He/she is my son/daughter; I will not consider him/her differently from my children. Then until the child get grown, the god-parent used to come and offer mulmule (locally made bread) and different gifts every year at least during Nähasse⁴⁰ 13 E.C (during the feast of Däbre Tabor). Besides, the god-parent takes responsibility of helping the child if the need arose.

Participants of FGD-1 & 2 were asked about the role of Abä Läj relationship in the local communities. They argued that if the two families have already good neighborhood, they need to

³⁹ *Abä Läj is a fictive-kinship relationship established through god-parenthood and childhood (Guday 2005:210)*

⁴⁰ *Nähasse represents the month of August*

strengthen their relation through the ties of Abä Lāj. The people in the study communities use Abä Lāj as one of the adaptive strategies to climate change by exchanging labor, agricultural equipments, farmlands, and pasturelands. Since Abä Lāj can create strong affiliation between the two families, there is trust to one another. This helped them to borrow money to each other. Similarly, KI-33 expressed that Abä Lāj made the neighbors to be one family in which one solves the economic and social problem of the other.

5.2.3.2. Tût Mätbät⁴¹

This is another kind of fictive kinship, which is commonly practiced by the study communities. According to KI-2, this social union is done in order to get economic and social benefit. Most of the time, the one who is expected to be Yätut Abat (or Yätut ānat), is rich in cattle or land. When this fictive kinship has done, an ox or a sheep could be slaughtered with the presence of all family members. The one who wants to be Yätut Lāj (breast child) should not have blood relationship with his would be Yätut Abat (breast father) or Yätut ānat (breast mother).

As KI-5 stated, feast could be organized in the house of the would be Yätut Abat (or Yätut ānat). Then, the would-be Yätut Lāj sucks the thumb of the would be Yätut Abat (or Yätut ānat). Accordingly, the ritual father is named Yätut Abat as well as the ritual mother is named by Yätut ānat. Since the ritual father and mother swear an oath, which confirms that the breast son gets equal acceptance with the biological children. However, in the tradition of the study communities, the custom of Tût Mätbät is only applicable for men. Women can be ritual mothers but it is not common to be breast daughters.

⁴¹ Tût Mätbät is the form of fictive relationship through Suckling from the Breast (*Assefa 1999:73*)

Participants of FGD-1& 2 further discussed that in most cases the social ties of Tût Mätbät is practiced between rich and poor families. According to the tradition of the study communities, the breast son has the chance to get land and livestock from his ritual father and mother. In this regard, poor farmers of the study communities use Tût Mätbät as an adaptive strategy to climate change since it is one of the best strategies that poor farmers could get land and livestock from their rich neighbors.

KI-23&36 further noted that the breast son is also responsible to help his social parents through his labor or in anything that is expected from one family member. Sometimes, the old and rich farmers make request the poor farmer to be their breast son in order to share their workloads. In this context, the relationship between the breast son and the breast parents become cooperative. The breast son does all works for his ritual parents and the breast parents give land, livestock, and sometimes grains to their breast son.

5.2.4. Local Community Based Organizations as Adaptive Strategies to Climate Change

5.2.4.1. Mahābārs⁴²

This is the combination of people coming together and shares what they have on the name of the specific angels and saints. According to KI-1, there are different forms of mahābārs such as yāzāmād mahābār, yātsāwa mahābār, yāfārāsāgnoch mahābār and sānbätē. The members of these mahābārs are also different. For example, in the case of Yāzāmād Mahābār, the members are blood relatives,

⁴² *Mahābārs are voluntary monthly religious (EOC) associations organized around a parish church in honor of a chosen Saint and members take turns providing food and drinks* Guday (2005: 212)

fictive families, and inter-marital families. However, in other mahābārs, every member of the community can take part.

Participants of FGD-1 & 2 argued that mahābārs are useful to create good interaction among the members. In the field, I observed that the members of mahābārs have regular meetings in each month (on the day of the monthly commemorative local Saints), and they discuss about their social, and economic problems. In this regard, if one member of the mahābārs needs help, other members have the responsibility to assist the person. According to KI-8, when one of the members of yāzāmād mahābār does not have an ox, the other members cultivate the land in teamwork. They also help one another to construct their houses. During the weddings and funeral ceremonies, members of mahābārs also take part and help to one another.

Mahābārs have also crucial role to sustain peace and security among the people in the study communities. In the field, I observed that all the issues raised and resolved outside the house where the feast has prepared. In order to be unbiased in solving conflicts, members of the mahābār discussed their problems before they drank alcohol. As to my observation, all members of the mahābār should contribute some amount of money monthly. The one who provides the feast takes it and in the next month, he/she gives the money including its interest to the person who could prepare the next feast. In the case of St. Michael Yätsäwa mahābār that I attended, every member of the mahābār contributes five birr each month. Then after they collect the money, they added it to their previous balance, and gave it to the one who has the turn to prepare the next feast.

KI-19 also noted that mahābārs are occasions to resolve severe conflicts, which have the flavor of grouping. More to the point, members of the study communities used Mahābārs as means of social cohesion and solidarity. This helps them to develop social security among the members and in order

to help one another. KI-34 further reflected that, since he is one of the members of Yäzämäd Mahābär and Yäfäräsägnoch Mahābär, he felt socially secured. When there is the need of labor help, it could be constructing of the house he can ask their help.

5.2.4.2. Iddir⁴³

The people in the study communities have other alternative name for Iddir. I.e. is Izzin⁴⁴ in which some sort of food items are contributed to the funeral ceremony. The main purpose of Izzin is to accompany the family of the deceased person and to accomplish the funeral ceremony successfully. In the field, I have observed that when someone is dead in the study communities, the society did not farm and work outside the field until the corps has buried. Rather, everyone goes to the deceased person's house and stay with the family sharing the grief.

According to KI-13, if the dead person is an adult or elderly person, the funeral ceremony will be extended by one or two days because his/her relatives and friends could attend the funeral ceremony. In this context, participants of FGD-1 & 2 further explained that Iddir is much wider than Izzin in its scope. Iddir incorporates the members of local communities, the activity which they perform during the funeral ceremony and their permanent equipment like tents, seats, and others. However, Izzin is offering of food for people who attend the funeral ceremony. Every members of the local communities contribute food in order to accompany the family of the dead person. Since it is not proper to eat before the corpse has buried, their neighbors visit them with food after the funeral ceremony is completed.

⁴³ *Iddir is a self help association during death (Assefa 1999:iv)*

⁴⁴ *Izzin is presenting food to the deceased person's house*

KI-6 also stated that since death is an inevitable phenomenon to everyone, no one deviates to accompany the family when someone dies. Even if the neighbors are in conflict for different reasons, they share the grief together when someone among them dies.

According to KI-32, Iddir is an important adaptive strategy for every members of the study communities. No matter the person is rich or poor, when death comes, everyone could be terrified. For this reason, when some members of the communities deviate against the whole society, they afraid not to be excluded from Iddir.

According to participants of FGD-1 & 2, Iddir has also economic advantage to the members. If the families of the deceased person are economically poor, members of the local Iddir, help them by covering the costs of commemorative funeral feasts. If the Iddir members would not help the poor family of the deceased person, they could have nothing after the end of the commemorative funeral feasts. In this regard, Iddir is a common adaptive strategy for every member of the study communities.

5.2.4.3. Eqqub⁴⁵

Eqqub is a rotating saving system that members get the money through lottery method (Assefa 1999:83). In the field, I observed that some farmers of the study communities have indigenous mechanisms of saving. According to KI-16, the farmers who own money by selling eucalyptus tree and those who have better amount of crop production are Eqqub members. Besides, as participants of FGD-2 noted, even if they have some plot of agricultural land in their village, there are farmers who trade honey, butter, skin, charcoal, different crops, and livestock to the nearby urban areas, joined the local Eqqub institutions through the money they gained from such off-farm activities.

⁴⁵ *Eqqub is a rotating saving association (Assefa 1999:iv)*

In the field, the type of Eqqub that I observed in Yeted Kebelé was somehow different. After all the members contributed the money which was expected from every person, the total amount of money was counted and then by using the lottery method, they gave the money to the winner of the members. Then, the one who was received the money started to provoke an open bidding to sell the money for those who need it for different purpose. The total amount of the Eqqub money that I observed was 50,000 birr. Then the farmer who received this amount of money sold it with 55,000 birr to another member. In this regard, the one who bought the Eqqub money did not have the chance to compete for the lottery of the next month, rather the one who sold the money could take the chances of the one who bought the money. KI-33 further explained that in the study area, Eqqub is taken as an important strategy to accumulate money and to transfer from rural to urban life, and the farmers who already started Eqqub have the capacity to adapt the impacts of climate change.

5.2.4.4. Känja⁴⁶

Känja is an informal mutual assistance of two farmers in order to cultivate their farmlands by pairing oxen (Mamo 2013:23). In the field, I observed that Känja is done based on the mutual interest of the two farmers. Especially, in Dangle Kebelé, the farmers plow their land by pairing their oxen and horses. The farmers who paired their oxen and horses are advantageous during the harvest season since they can farm in all working days without waiting for oxen. On the other hand, those who only paired oxen, they also share human labor since they found the oxen one working day after the other. This helped them to finish their works efficiently.

According to participants of FGD-1 & 2, in the study communities, Känja is one of the adaptive strategies to climate change. Since there is shortage of pasturelands in the area, farmers are supposed

⁴⁶ *Känja* is a farming system through oxen sharing (Mamo 2013:23)

to minimize the numbers of livestock. One discussant in FGD-1 also further explained that most of the farmers in Dangulé kebelé have an ox because of the shortages of pasturelands. Unlike having two oxen, they preferred to have one horse since due to population growth; there is no much farmland to plow. Therefore, in the context of the study communities, Känja is an efficient adaptive strategy to climate change through paring of oxen or horse labor.

5.2.4.5. Wonfäl⁴⁷

In the works of Assefa (1999) and Mamo (2013), dāboo is used as an equivalent term to Wonfäl. In the tradition of the study communities, Wonfäl is done during house building, plowing and harvesting seasons. As participants of FGD-1&2 argued, the Wonfäl group is ready to take action during emergencies. When the rain comes during the harvest season, the Wonfäl group collects the harvest. According to KI-17, the Wonfäl group gives priority to help the poor farmers and female-headed households of the study communities.

Participants of FGD-1 & 2 further noted that the study communities used Wonfäl as one of the adaptive strategies to climate change. Since the Wonfäl group can respond to urgent social and environmental risks easily and timely, it serves as locally organized social security.

5.2.5. Craftwork

In the field, I observed that some social groups of the study communities are using craftwork as an alternative adaptive strategy to climate change. Among these, pottery, weaving, blacksmith, and basketry are practiced in the study communities.

⁴⁷ *Wonfäl* is a human labor exchange (Assefa 199:83)

According to the tradition of the study communities, pottery is given only for some groups of women. When women make pottery, their husbands do weaver. KI-36 also stated that some groups of women in the study communities are making pottery. For some poor members of the study communities, pottery and weaving are their basic sources of livelihood. Some farmers who have few farmlands, since they have nothing to do outside the house, they spend much of their time producing pottery and cloths. Then, by selling their products (women provide pots and men provide cloths) to the local markets, they can purchase food for domestic consumptions.

As to my field observation, the other adaptive strategy of the people in the study communities is basketry. Yegardu (2003 [2012]: 45) in his preliminary survey investigated that the highlands of Blue Nile Basin including the study area are rich in bamboo resources. He also noted that the local communities used bamboo tree to construct their houses and to produce domestic materials.

In this study, it is further noted that bamboo tree has diverse contributions to adapt climate change. According to KI-12 &14, basketry and selling of bamboo tree are additional adaptive strategies of the study communities. After they made different types of crafts from bamboo, they sell them to the nearby markets. In the field, I also observed that making crafts from bamboo tree is men's work. Especially, youths are making baskets and other crafts from bamboo. There are also farmers who have special kind of bamboo trees in their farmland. Since such species of bamboo trees are typically needed for basketry, the farmers earn additional income by selling them directly to the market.

5.2.6. Off-Farm Activities as Adaptive Strategies to Climate Change

5.2.6.1 Trade and Daily Labor

During my fieldwork, I noted that local trading and daily labor are off-farm adaptive strategies for some members of the study communities. In order to have additional source of income, both men and women switch off their farming for some time and engaged to trading and daily labor in the towns of Rob Gäbya and Debre Markos. According to KI-7, formerly it was not proper for women to work daily labor in the towns. Conversely, nowadays, due to economic problems, both poor men and women are engaged in daily labor as basic livelihood strategy.

KI-9 further discussed that in the families of the study communities, the father and the mother are in charge of taking care of their children. As a result, it is proper that they have to secure some source of income for their family by engaging themselves to daily labor works.

According to participants of FGD-1&2, in order to participate to the off-farm adaptive strategies, men and women of the study communities have different roles. Men are engaged in trading of animals, such as sheep cattle, horses, mules, etc. If they want to trade crops or agricultural products, men use horse or mule for transportation purpose, and their items of trading are onions, potato, barley, honey, and some vegetables. They buy these trade items from Wabir⁴⁸ and they sale them to Rob Gäbya and Debre Markos Towns. On the other hand, women do trading by carrying with their backs. In this regard, spices, gësho⁴⁹, onion and other agricultural products are women's' trading items.

⁴⁸ Wabir is the upper highland part of choqué mountains

⁴⁹ gësho is a plant particularly its leaves are used to make local beers

5.2.6.2. Local Migration and Remittance

According to participants of FGD-1 & 2, young men of the study communities are moving to Debre Markos, Addis Ababa and other towns for daily labor. After young men go to the towns, they sustain the lives of their families through remittances. KI-10 also stated that after they go to the towns, men work daily labor and women do housekeeping. The informant further explained that shortage of farmlands in the area is the main reason for youth's migration to the towns. Sometimes, the remittances are used not only to fulfill the needs of their families, but also migrants work for themselves for some time, and they invest it when they return to their local villages. For instance, the following story is the case in point,

Case-11

Local Remittance as an Adaptive Strategy

Ato Aynalem (51 years old) lives in Yeted **Kebelé**. After his first son (Tafere) has completed his study from grade 10, he left to Addis Ababa since he had no job. Then after, he started to work daily labor in Addis Ababa starting from 2001 E.C up to now. In this regard, for the last four years, he was sending money to his parents during annual feast days. However, from last year (2005 E.C) up to now, he did not send money to his father since he needs to save it and to construct a house in Rob Gäbya town. After looking the elder brother, the younger brother (Mihiretu) also went to Addis Ababa. Since he has the skill climb on trees, he is earning good income by cutting trees in Addis Ababa. Accordingly, he replaced his elder brother by helping their parents through remittance.

(Interview with the father in Yeted Kebele, 29 March 2014)

According to participants of FGD-1 & 2, young men of the study area are moving to Wallaga in order to earn money. Those who found permanent living places in Wallaga, they took their family members, where as others are going to earn money through daily labor during the harvesting seasons. After they work for one or two years, either they send the money or they return to their

families with their income. In this regard, young men's migration to other places is one of the adaptive strategies for some people of the study communities.

5.2.7. Eucalyptus Tree

During my fieldwork, I noted that by tolerating its negative impacts, the study communities used eucalyptus tree as an adaptive strategy to climate change. In this context, KI-16 further explained that,

Even if it made the land dry, eucalyptus tree is useful for us. Currently, chemical fertilizer is very expensive. Planting eucalyptus tree is better than spending money for chemical fertilizer, searching for seed crops and tempting about what could happen to the harvest. After five years, by selling the young eucalyptus tree with the price of 15 birr each, it is possible to start trading. Any ways, it is not fair to get starved by thinking for the next generation. When one is getting much money, the other will not stay silent by fear of losing the fertility of the soil (*Yeted 02 March 2014*).

According to Participants of FGD-1 & 2 people in the study communities, especially those whose lands are near by the main road of Debre Markos to Bebugn Woreda are getting rich by selling eucalyptus trees. I also observed that eucalyptus tree is the main source of fuel wood in the study communities. For instance, the following case shows the roles of eucalyptus tree in the study

Case-12 Eucalyptus Tree as Source of Income

Ato Gizachew (46 years old) lives in Yeted Kebelé. He has four children. Since the farmland was small, he had the problem of feeding his family. However, ten years ago, he planted eucalyptus tree on a plot of land that was found nearby the main road. After five years, he cut all the young eucalyptus trees and sold them in Debre Markos. In this regard, from one round vending, he obtained 70, 000 *Birr*. Now, he is constructing a house for living in the town of Debre Markos. As he stated, the best quality of the eucalyptus tree is its nature of becoming many in number after being cut. In this context, he could, obtain much more income in the second round vending of the eucalyptus tree.

(Interview with the father in Yeted, 01 March 2014)

Chapter Six

Climate Change Mitigation Strategies and their Effectiveness in Addressing the Needs and Interests of Different Social Groups

6.1. Restriction on the Utilization of Open Access Lands and Farmers’ Complain

Open access lands have immense value to the people of the study communities. In the field, I observed that the local government restricted open access communal lands from usage in order to conserve from degradation. In relation to this, the people in the study communities are obliged to keep animals in their farmlands. Intensive trenches are being constructed on the open access lands through organizing the powers of the local communities. Following this, KI-10 noted that,

[...] formerly our communal open access lands were respected, and our usage was not casual. When the agricultural lands were covered with crops, our cattle, sheep, and horses were staying in the communally owned open access lands. Then after the harvests are collected, since farmers keep their livestock to their meadow, the communal open access lands were able to recover. If it was protected from animals for some time, the pasture was grown soon and the cattle were not able to finish it easily. As a result, the open access lands were pillars of our life. Since we were able to rear and sale mules and sheep, our life was better. However, now, by restricting the open access lands from usage, government make us poor, and by digging it, they make the soil prone to water erosion (*Dangulé 12 February 2014*).

According to participants of FGD-1&2, in the past, it was not easy to use the open access communal lands for private agricultural production. Even for the government bodies it was not allowed to use it for other purpose because people in the study communities have special value for the use of the communal open access lands to raise livestock to supplement crop production.

KI-28 also further noted that there was serious conflict between the local government officials and the people of the study communities. In the past two and three years ago, the people were rejecting any type of restriction over the open access communal lands. Nevertheless, through time, they reach to mutual consensus that the farmers accept the ideas of the government to recover the open access communal lands through a forestation.

As to my field observation, currently, the farmers are digging trenches on the open access communal lands in order to preserve rainwater and to decrease the runoff, which emanates from the highland of Choqué to the farmlands. Even if this is the case, according to participants of FGD-1 & 2, the restriction of not to send any livestock to the open access communal lands is the problem for the local people of the study communities. Since the local people lead their life by integrating livestock production with agriculture, the restriction of open access communal lands challenged their livelihood strategies. In this context, KI-9, stated that,

We would be happy if the Choqué land is recovered. However, the intention of the current government is not truly to preserve the Choqué open access communal lands, rather it is to insist on the farmers to migrate. The government is forcing us to abandon livestock production knowing that our livelihood is based up on it. Truly speaking, what they are doing is oppressing farmers living on livestock production, but not developing the area. May God show you my son, starting from the above Wabir up to Yeted area they made restriction on the open access communal lands that we were using it for

raising horses and sheep. As a result, farmers who were leading their livelihood by selling animals (since they have small plot of agricultural lands) are forced to migrate (*Dangulé 09 February 2014*).

Participants of FGD-1 & 2 also argued that constructing trenches on the open access communal lands is not suitable for the study communities. The local people are pleased about if government had given them the opportunity to make trenches on the degraded farmlands. However, they are required to construct trenches on the open access communal lands, which have never been cultivated. For the participants of FGD-1& 2, it is not logical to force the farmers to construct trenches on the open access communal lands having that there are other degraded farmlands. One participant in FGD-2 point out the following idea shared by all participants of the discussion,

When they [the local government] left us out of livestock by restricting the open access communal lands, we keep silent since we had no “power”. Now, again they are forcing us to dig this land since they do not want us to lead our family life even through daily labor. If we get absent one day, they used to punish us to pay 10 Birr, and if we do not pay it, they arrest us. We told them that, ‘if we dig this Choqué land, it makes us more vulnerable to runoff. Therefore, it would be better if we care for the already degraded agricultural lands’. Nonetheless, they did not listen to us. Formerly, even if we did not know the reason, we were considered as bureaucrats⁵⁰. Then after, they distributed our farmlands, which were not the case in other places, and now after they took our open access communal lands, they are ordering us to dig them again (*Danglé 30 March 2014*).

According to KI-34&35 and participants of FGD-1 & 2, restrictions on the open access communal lands and the forceful construction of trenches are not done in consultation with the local people. These informants also noted that there is a sort of misunderstanding between the government bodies and the local people. As a result, the local people are not happy with the government activities, which have been done to mitigate the climate change in the study area and to bring climate change

⁵⁰ *Bureaucrats in the context of the study communities referred former local officials of Därg regime*

mitigation in the highlands of Blue Nile Basin because, for them, the government actions to climate change mitigation strategies did not incorporate the interests of the local communities.

6.2. Local People's Attitude towards the Construction of Trenches on Farmlands

According to KI-26 (an expert of natural resource management in Senan Woreda, who is delegated for Dangulé and Yeted kebelés), trenches are widely constructed in agricultural lands in order to control soil erosion. Unlike the currently intervened actions of constructing trenches on non-arable open access communal lands, the farmers did different kinds of trenches on the farmlands since the past ten years. Nevertheless, due to lack of regular follow up of trenches, the farmers destroyed them after some days of construction. Currently, the local government gives special attention for natural resource conservation and climate change mitigation activities. As a result, after the trenches have been done in consultation, the owners of the land have the responsibility to follow-up and preserve it from soil from erosion. In this way, in some Kebelés like Yeted, the degraded farmlands are recovering from degradation and maintaining the fertility of the soil through constructing trenches and by planting trees.

In the field, I have also observed that some villages of Yeted kebelé are better preserved through trenches and plantation of some indigenous trees that have double purposes (soil conservation and animal fodder). According KI-12, farmers are happy with the trenches because these lands were degraded and they were not used for any kind of crop cultivation. KI-18 further explained that their farmlands are becoming green and their fertility have been recovered and can give better production than before through the use chemical fertilizer.

According to participants of FGD-1 & 2, the trench with the shape of half moon causes for strong runoff on the farmlands since it collects much rainwater. These participants further noted that “modern” trenches that are brought by the government did not incorporate the local knowledge of constructing trenches, which have better qualities of preserving soil erosion. In this context, KI-12 argued that the trenches are consuming wide area of farmlands since they have been constructed densely and widely within a given plot of the local people’s farmland. Due to this reason, farmers are destroying the trenches through time in order to have wide agricultural lands.

6.3. Land Registration and Certification

Land registration is the mechanism of formalization of farmers’ property rights through land titling and registration guarantees. It is the support of the state for landholders for their claims of landownership (Wubit 2012:18). According to participants of FGD-1 & 2, in the study communities, since land is the property of the state, it is forbidden to sale or exchange farmlands. This restriction on not to sale or exchange the land was contributing to the miss use of the farmlands. KI-13 also noted that since the people of the study communities have experienced when the government redistributed the agricultural lands of bureaucrats in the past ten years ago, they did not have confidence on their farmlands.

According to FGD-1 & 2, currently the government is registering the agricultural lands of the people in the study communities and formalizing land titles through certification. Even if farmlands are registered in the names of the local people, it is not legal to sale or exchange farmlands. As participants of FGD-1 & 2 further noted, the registration and certification of lands in the study communities encourage individual farmers to utilize farmlands in proper manner. KI-7 also

remarked that when farmers receive “ownership” certification, it is with the responsibility of proper usage.

According to participants of FGD-1 & 2, the land registration and certification process in the study communities has application problems. Since the registration and certification process of the land lacks clarity, farmers are exposed to extra expenses in order to get fair service by going to zonal and regional courts. KI-31 also explained that the local farmers have the trend of selling and exchanging of agricultural lands in the form of collateral agreement for borrowing money. In this context, during the time of the land registration two farmers complain property right on one plot of farmland. Then after, in order to investigate the right ownership to whom it deserves, the registration and certification process could be late for some time.

6.4. Maintaining of Spring Waters

In the field, I observed that spring waters are getting dry due to the existing climate change. Rivers are drying especially in the winter season. Due to this, the farmers are facing serious problems to get clean drinking water. As KI-14 stated, the formerly clean spring water areas, nowadays are getting polluted and contaminated by dangerous worms that attack animals. I have also observed that this problem is getting worse in Yeted than Dangle because Yeted is located in lowland areas than Dangulé, which is located in the highland part of the study area.

During the fieldwork, I further noted that the local government is taking measures to maintain spring water resource through construction of deep-water halls. According to participants of FGD-1 & 2, in order to get clean water in their villages, the local people of the study communities are supposed to

contribute some amount of cash money, and then they ask the local government to help them to recover local springs from drying and making them safe for drinking purpose.

KI-17 also revealed that in order to preserve some spring waters, the people of the study communities are cutting eucalyptus trees, which are planted nearby the springs, and some of them are replacing them with indigenous plants which are useful to maintain spring water.

6.5. Ground Water Harvesting and Utilization

In the field, I observed that the people of the study communities are digging deep-water halls around their houses in order to harvest ground water. According to KI-18, sometimes when they dig the ground until five meters down, they get underground water, which is useful for small-scale cultivation such as compound fruits, and vegetables. This helps the farmers during the dry season-the time when river waters lost from the area. As participants of FGD-1& 2 noted, currently, the local people of the study communities have the responsibility to dig deep-water halls nearby their residential area, which was not the case in the past. Now the farmers are preserving ground water being obliged to do it by the government.

According to KI-13, in the past, the local people of the study communities were not active participants in the developmental activities. Sometimes, the government was giving incentives for farmers who accept the intervention strategies of the government and practically implementing them. Nevertheless, through time when the problem of climate change gets severe, the farmers get flexible to accept the rules and regulations of the government and they started to harvest ground water to use it during the dry seasons for their animals and for some agricultural production.

6.6. Planting Indigenous Trees

The other Climate change mitigation measure is recovering the degraded land through planting indigenous trees. As the officer of rural land use management in Senan Woreda (KI-28), stated the government's plan is to cover the entirely open access lands with indigenous trees that are useful to sustain the environment and to maintain the fertility of the soil.

I also observed that men and women associations are planting indigenous trees both in Dangle and Yeted areas and the local government is helping them by providing raw materials like the small plastic bags, fertilizer, and seeds. For their labor work, these groups are paid 30 Birr per day by the government.

As participants of FGD-1&2 argued, the current effort of recovering the lands through indigenous trees is not satisfactory because in relation to its immediate function, the farmers prefer to plant eucalyptus tree even if it has negative impact on the fertility of the land. In this regard, KI-15 gave details that,

It is encouraging that currently the local government is trying to recover the indigenous plant species. However, it was good if the seeds had given to every farmer to be cultivated. If they have real commitment of recovering the area, they had not destroyed the forests that we cultivated during the Därg regime. On the one hand, they say, 'we are preserving', but on the other hand, they are destroying the already cultivated forest. Besides, neither they gave us agricultural materials nor the seed, by receiving money from the project named "Choqué project" they use it for themselves. So my son, knowing that the local government is not there to develop the area but looking for opportunities of money, we keep silent by saying 'we know too much, but we will be destroyed if we speak all' (Yeted 28 February 2014).

The critical forward given by the above informant shows that climate change mitigation projects have implementation problems. On the other hand, the application of these projects did not incorporate the local knowledge and interests of the study communities.

6.7. Adoption of Improved Animal Breeds

According to the land administration officer of Senan Woreda (KI-21), the government is working hard to distribute productive species of cattle and sheep for the people of the study communities. He stated that for some kebelés including Dangulé and Yeted, the Woreda government has distributed some improved animal breeds such as chicken, sheep, and oxen for some youth farmers. Though, participants of FGD-1&2 argued that practically nothing has been distributed for individual farmers. Only for the youths who were organized in groups, the Woreda government gave improved breeds of chicken and “modern” beehives. KI-4 also noted that even if the government was promised, still improved animal breeds are not distributed for local farmers.

Participants of FGD-1 & 2 argued out that the people of the study communities are rational to accept or reject the adoption of improved animal breeds. If some species of sheep or chicken are proposed for the farmers, before receiving them, they analyze the possibilities. They look whether the improved animal breeds have resistance to some disease, or they would not be adaptive to the cold environment of Choqué. In this context, according to KI-8, local people of the communities do not like to receive such kinds of animal species from the local government because of the responsibilities following that come after receiving them. People of the study communities have the experience of borrowing money from Amhara Credit and Saving Institute in which the local farmers are still encouraged to borrow. Since they did not know how to utilize it to be effective, some of them spend the money to change their gojjo-bet to korkoro-bet (iron-corrugated roof). Then after one

and two years, the farmers could not return the credit for the government, and due to this reason local farmers are getting poorer than before by selling what they have in order to return the credit. From the field, I also further noted that the people of the study communities are rational decision makers. In order to accept improved animal breeds, they analyze possible risks, the environment, and their premiere experiences. In order to accept or reject the improved animal breeds, they also look their risks and responsibilities behind their advantages.

6.8. Adopting Improved Crop Species and Chemical Fertilizer

According to participants of FGD-1 & 2, the local people of the communities found improved crop species and chemical fertilizer important. Some crop items were not giving any product due to their incompatibility with the fertility of the soil. For instance, among the species of barley, *ångido* is the currently used species, which is more adaptive and useful for the fertility of the soil. As to KI-19, red potato is an important improved species of potato to recover the fertility of the degraded farmland. After the red potato has been collected, the land could be implanted through barley or wheat without any need of chemical fertilizer.

As participants of FGD-1 argued, in Dangulé kebelé, farmers have received special species of barley, which gives much yield than the one that already existed before. Nonetheless, except some farmers saw its productivity, it is not yet accustomed by the larger community members. Some others used it in few amount in order to evaluate its compatibility with the fertility of the soil.

In the field, I also observed that the farmers in Dangulé Kebelé are not using chemical fertilizer since they did not want to make the farmland to be fertilizer dependent. Belay (2003 [2012]:61) in his sustainability survey also remarked that farmers in Dangle Kebelé did not have the experience of

using chemical fertilizer. However, the case in Yeted is different that the farmland already adapted chemical fertilizer, and it is difficult to cultivate crops without it. In this regard, the farmers in Yeted are complaining on insufficient provision of chemical fertilizer and its cost.

6.9. Crop Mixing

Crop mixing is the other climate change mitigation strategy that is highly adopted by the people of the study communities. As participants of FGD-1&2 noted when the fertility of the farmland has declined, the farmers use mixed cultivation system. Most of the time, they mix potato with cabbage or with beans.

In the field, I noted that some degraded and infertile lands are cultivated with gibto⁵¹, which is practically important to recover the fertility of the land. According to KI-7, gibto does not need farming or any kind of fertilizer. The seed is sowed on the ground, and it starts to grow up without the need of human labor. Then after the harvesting season, since the roots of gibto are useful for the fertility of the land, the farmers leave them until they are fully fermented. When the land is needed for harvesting another crop, or for livestock grazing, it will be fertile enough. Participants of FGD-1 & 2 also argued that this system of recovering the fertility of the soil is locally recognized technique for the long period in the study communities.

As participants of FGD-2 discussed, the people in Yeted area mix maize with beans or with cabbage. Sometimes, they sow one crop over the other even if it is ready for harvesting. The local people of the study area also sow barley before they collect potato. During this time, they did not farm the

⁵¹ gibto is the type of crop item, which is used by local communities to recover soil fertility

land; rather they simply sow crops even if the potato is under ground. According to KI-35, this type of farming has triple roles. Firstly, it can maximize the fertility of the farmland land. Secondly, it can provide much more crops due to the mutual sharing of nutrients between the two plants. Thirdly, it can preserve the types of crops or any other production safely in which it is might be used to sow or cultivate for the next productive season. In this context, when wheat or barley has sowed over potato, even if the potato is ready for collection, farmers can keep it underground until the new harvest season comes.

Therefore, this method of recovering soil fertility through crop mixing is the study communities' indigenous knowledge of climate change mitigation. KI-7 also noted that, knowing that crop mixing is adapted for long period by the people of the study communities, the government bodies are always asking them to mix crops. Crop mixing is locally recognized strategy of recovering soil fertility and producing better yield. The people in the study communities also have the knowledge of recovering soil fertility through fallowing the agricultural land for a year or more.

6.10. Production of Organic Fertilizer

According to participants of FGD-1&2, production of organic fertilizer from animal dung was the long last experience of the people in the study communities. This fertilizer is prepared in two ways. The first one is by collecting animal dung from the open access communal land that animals spend the day over there. Women and girls wake up early in the morning to collect their share, since everyone needs the animals dung for fertilizer and fuel. The other way of preparing organic fertilizer is collecting and reserving dung from animal's house and mixing with easily decomposable leaves. One participant of FGD-2 mentioned that the compost prepared by mixing animal dung and leaves is useful for potato and other types of cultivation.

According to KI-36, in the past, women of the study communities used to produce organic fertilizer when the fertility of the farmland was declined. In this context, the informant further explained that,

During my childhood, we used to collect organic fertilizer from Choqué and we were harvesting crops. We used to wake up before the birds started to sing, then before the mead day; we were able to collect animal's dung that could harvest wide area of agricultural land. When I was child, I remember that in our community, the girl was proposed for marriage based on her ability of collecting animal's dung. However, after the time of formal education, not only girls refused to collect animal dung from the field but also they do nothing in the house. Nowadays, the land is getting infertile, that cannot give any harvest. Since the communal open access land is controlled, we cannot collect animals' dung any more, and in the future, it is inevitable that people could live in hunger (*Dangulé 25 March 2014*).

In the field, I further observed that the people of the study communities store animal dung in a rectangular cavern; sometimes they made it circular, near to their houses. Then, for long time, they leave it and sometimes they mix it with burned ashes and leaves of some plants that can be easily decomposed. Then, by putting the organic fertilizer inside or outside the farmland or sometimes together with the crops, the people of the study communities preserve the fertility of the farmland. In this regard, production of organic fertilizer is one of the local climate change mitigation strategies of the study communities.

6.11. Local Institutions Working on Climate Change Mitigation

6.11.1. One-to-Five Arrangements

As to my fieldwork observation, one-to-five arrangement is the recently organized group in the study communities, which is initiated by the local government. In this developmental team, all men and women have their own members. Each group has its own leader (both in men and in women) that

leaders are responsible to follow-up each member's participation in the activities. The main purpose of this group is taking part in the local "developmental activities". In the field, I also observed that members of one-to-five arrangements were constructing trenches on the open access communal lands of the study area.

According to KI-22, the main objective of organizing farmers through one-to-five arrangement is to rebuild the already degraded land and to recover dried water streams. KI-31 also stated that, the local government has distributed agricultural equipments for the members of one-to-five arrangements who had better implementation in natural resource conservation. According to participants of FGD-1 & 2, currently the local farmers are losing initiatives to take part in the activities of one-to-five arrangements due to time constraints. However, the sample works done by members of these groups are found productive and they would like to continue to achieve climate change mitigation in the area.

6.11.2. Women and Youth Association

This is the newly formed organization of women and youths aimed at maximizing their participation in the local socio-economic and political activities. As the administrative leader of Dangle Kebele (KI-37) stated, the participation of women and youths has great role to achieve locally sustainable development. Accordingly, women and youths who organized in the league are giving their contribution to achieve climate change mitigation in the study communities.

Case -13

Women as Ecologists

These are groups of poor women selected from women and youths association in Dangle **Kebelé**. They are working in-group to rehabilitate the surrounding open access communal land by planting indigenous trees. The local government provides them with equipments and seeds of indigenous tress. One informant from the group noted that each member is paid 30 **Birr** per day. In this context, these women are contributing their part to rehabilitate the deforested area as well as they are leading their life by the payment received from the local government.

(Interview with a woman living in Dangulé kebelé, 05 March 2014)

During the fieldwork, I further observed that jobless and landless youths in the study communities are also organized different microfinance institutions. Some groups engaged to commercial animal fostering, and others are producing honey for trading. According to KI-11, organizing of youths into different microfinance institutions help to minimize land degradation. When youths engaged to such kinds of microfinance institutions, it helps to reduce land fragmentation.

6.11.3. Local Ethiopian Orthodox Church

In the field, I noted that most of the populations in the study area are followers of Orthodox Christianity. Accordingly, the church is highly valued by the local people. In the field, I also noted that the local Orthodox Church is working on building climate change mitigation in the study communities. According to KI-5, the local church of the study area is working on climate change mitigation through her teachings. In addition, since the compounds of the church are sacred places, no one can cut trees from inside. In this regard, different indigenous trees are found surrounding the churches of the study communities. Though the species of many plants are extinct due to deforestation, some of these plant species are preserved in the compounds of the church.

KI-27 further expressed that the church teaches every members of the community to live in peace and to preserve the surrounding environment from pollution. Formerly, it was difficult to preserve the open access communal lands for any purpose, but due the contribution from the local priests of the church, currently the people of the study communities tend to understand the importance of conservation programs, and they accept to protect it from any type of inappropriate utilization. According to participants of FGD-1 & 2, the farmers used to accept the advices and teachings of the priests regarding climate change mitigation activities, and it is because of the local priests that the farmers are constructing trenches willingly on the open access communal and farmlands.

Chapter Seven

Summary and Conclusion

7.1. Summary of Major Findings

This study attempted to explore and analyze the socio-cultural aspects of building climate resilience in the face of changing environment among agricultural communities in the Blue Nile Basin of Ethiopia. More specifically, the study was focused on identifying and analyzing the socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change; investigating the socio-cultural values and institutions employed by the local communities as adaptive strategies to climate change; and examining to what extent climate change mitigation strategies address the needs and interests of different social groups in the local communities. Based on the ethnographic data obtained through a combination of qualitative methods involving in-depth interviews, focus group discussions (FGDs), systematic observations, case studies, and informal conversations, the study identified the following key findings based on specific research objectives.

The first specific objective of the study was to identify and analyze socio-cultural norms and practices contributing to vulnerabilities of different social groups to climate change in two agricultural communities (Yeted and Dangulé). Accordingly, the study identified women, elders, children, and the poor as social groups vulnerable to climate change in the study communities. The study also identified local belief systems, feasts, work habits, blood feuds, gender norms, population growth, dependence on rain-fed agriculture and eucalyptus tree as factors contributing to vulnerabilities of different social groups to climate change in the study communities.

The second specific objective of the study was to investigate the socio-cultural values and institutions employed by the local communities as adaptive strategies to climate change. Accordingly, the study found that the culture of sharing experiences and resources, indigenous knowledge systems (such as indigenous farming system, diversification of crops and animals, and indigenous weather forecasting) as socio-cultural values used by the local people as adaptive strategies to climate change. The study also identified marriage institution, consanguinal as well as fictive kinship systems, community-based organizations, craftwork, off-farm activities (such as trade, daily labor and local migration and remittance) as socio-cultural institutions used by the local people as adaptive strategies to climate change.

The third specific objective of the study was to examine to what extent climate change mitigation strategies address the needs and interests of the local people in the study communities. In line with this objective, the study found that restriction on utilizations of open access communal lands, construction of trenches on farmlands, land registration and certification, maintaining of spring waters, ground water harvesting and utilization, planting indigenous trees, adopting improved crop species and chemical fertilizer, crop mixing, adoption of improved animal breeds, and production of organic fertilizer are implemented by the local government and the local people as climate change mitigation strategies. Among these climate change mitigation strategies, restriction on open access communal lands, which is initiated by the local government, was found to be inappropriate by the local people since it does not address their needs and interests.

7.2. Concluding Remarks

Based on the key findings of the study, the following concluding remarks are forwarded:

- ❖ The local socio-cultural norms and practices (such as local belief systems, feasts, work habits, blood feuds, gender norms, population growth, dependence on rain-fed agriculture and eucalyptus tree) are found to be major factors contributing to the vulnerabilities of women, elders, children and the poor to climate change in the study communities. This implies the need for properly addressing why the local people adhere to these norms and practices.
- ❖ The local people employed the culture of sharing experiences and resources, and indigenous knowledge systems as adaptive strategies to climate change. The local people also used marriage institution, kinship systems, community-based organizations, craftwork, and off-farm activities as adaptive strategies to climate change. These local socio-cultural values and institutions need to be nurtured and recognized by the local government when it attempts to mitigate climate change vulnerabilities.
- ❖ In order to mitigate climate change vulnerabilities in the study area, the local government implemented restriction on utilizations of open access communal lands among others (such construction of trenches on farmlands, land registration and certification, maintaining of spring waters, ground water harvesting and utilization, planting indigenous trees, adopting improved crop species and chemical fertilizer, crop mixing, adoption of improved animal breeds, and production of organic fertilizer). However, the local people are not happy with the restriction on open access communal lands because it does not properly address their need for communal

grazing land. This implies the need to revisit this mitigation strategy in accordance with the actual needs of the community members.

- ❖ In the final analysis, the key findings of this study call for further studies on issues related to socio-cultural norms and practices contributing to vulnerabilities of women, elders, children and the poor in the study area.

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Appendices

Appendix I: List of Plates



Plate 1: Trenches in agricultural land of Dangle Kebele (13 February 2014)



Plate 2: Both men and women in digging trenches on the open access communal land (Dangle, 14 February 2014)



Plate 3: Mechanized highland stream water (Dangulé 15 February 2014)



Plate 4: Dried animal dung which is made for fuel (Dangulé 16 February 2014)



Plate 5: Dried animal dung used to heat the cold house temperature (Dangulé 16 February 2014)



Plate 6: The plantation site of young trees (Dangle, 20 February 2014)



Plate 7: Women/girls collecting animal dung from the open access communal land (Dangle, 21 February 2014)



Plate 8: Cattle scattered in the farmlands (Dangle, 21 February 2014)



Plate 9: A widow woman carrying the harvest from the field to her house (Yeted, 11 March 2014)



Plate 10: The conserved open access land in Dangle kebele (24 February 2014)



Plate 11: The small natural forestland in Dangle *kebelé* (25 February 20014)



Plate 13: A young boy looking for sheep and horses (Yeted, 13 March 2014)



Plate 12: The farmland rehabilitated through trenches and plantation in lines (Yeted 14 March 2014)



Plate 13: The feast of *Senbete* (Yeted, 23 March 2014)



Plate 14: Offering water for the cattle through fetching (Yeted, 16 March 2014)



Plate 15: The farmer going to market with his craft works made from bamboo (Rob Gäbaya, 22 March 2014)



Plate 16: Well rehabilitated village in Yeted Kebelé (20 March 2014)



Plate 17: The family spending the day together at home during the Sabbath (Dangulé, 23 February 2014)



Plate 18: The farmer eating together with his relatives during the annual feast of the parish in his house (Dangulé, 02 March 2014)



Plate 19: The interior site of the house of the rich farmer, decorated with the skins of sheep and women's basketry (Dangle, 16 February 2014)



Plate 20: “Kûraz”, the light of the farmer’s house, which is used during the night (Yeted, 25 March 2014)



Plate 21: A woman preparing coffee for the family while Brest feeding her child (Dangle, 26 February 2014)



Plate 22: The first Focus Group Discussion (FGD-1) (eight or more participants?) conducted in Dangle Kebele (23 March 2014)



Plate 23: The second Focus Group Discussion (six or eight participants?) conducted in Yeted Kebele (30 March 2014)



Plate 24: The researcher's in-depth interview with an expert in Environmental and Natural Resource Department, Senan Woreda (10 February 2014)

Appendix II: Fieldwork Guiding Questions

A. In-depth Interview Guiding Questions

A1. Interview Guide for Local Community Level Key Informants

General Introduction: The purpose of this interview is to collect data about the “**The Socio-Cultural Aspects of Building Climate Resilience in the Face of Changing Environment among Agricultural Communities in the Blue Nile Basin.**” This interview guide is prepared only for an academic purpose of writing M.A Thesis in Social Anthropology. Therefore, you are kindly requested to participate in the interview in which confidentiality of any information is protected and valued. I also kindly request you to record your voices/responses through a tape/voice recorder since it is difficult to write all your responses while interviewing.

Thank you in advance for your collaboration!

1. Personal Data of Key Informants

1. Age_____
2. Sex_____
3. Religion_____
4. Marital status_____
5. Occupation_____
6. Educational background_____
7. *Kebele* _____
8. Year of stay in the area_____
9. Source of income_____
10. What is your level of economic status in your community?
 - A. Better-off (Rich)
 - B. Medium (middle income)
 - C. Worse-off (Poor)
11. What is the level of measurement to determine the economic status of someone in your community?
12. Place of interview_____
13. Interviewer's Name _____
14. Date_____ Starting Time: _____ Finishing Time: _____

2. Questions related to the Socio-Cultural Norms and Practices Contributing to the Vulnerabilities of Different Social Groups to Climate Change

1. Are there social norms contributing to climate change in your locality? If so, would you describe them?
2. Are there social practices contributing to climate change in your locality? If so, would you describe them?
3. What are the reasons behind these social practices? Would you explain why the communities practice them?
4. Are there natural resources degraded or destructed due to the social practices of the community in your locality? If so, could you list them?
5. Do you think that the socio-economic and political setting of the community has contribution to climate change vulnerability for different social groups? If so, would you describe them?

6. Do you think that the inter-personal and inter-group relationships of the community are contributing to climate change vulnerability for different social groups? If so, could you explain them?
7. Are there activities performed by individual households that contribute for vulnerabilities for climate change?
8. Are there communal/societal works that are causes for climate change vulnerability? If so, what are they?
9. What are the social crises/instabilities within a family due to the existence of climate change vulnerability?
10. Which social groups are more prone to climate change vulnerability in your locality?

A. who is vulnerable to climate change based on economic status:

- ✓ The worse off (The poor) Why?
- ✓ The medium (The middle), Why?
- ✓ The better off (The rich), Why?

B. vulnerability to climate change based on Age:

- ✓ Children? Why?
- ✓ Adults? Why?
- ✓ Elderly people? Why?

C. vulnerability to climate change based on gender:

- ✓ Women? Why?
- ✓ Men? Why?

3. Questions related to the Socio-Cultural Values and Institutions employed by the local communities as adaptive strategies to climate change

1. How do the local communities understand and respond to climate change?
2. What are the measurements are taken to cope up with the problem of climate change in your locality?
3. Which local institutions are intensively working for climate change adaptation?
4. What are the activities of these local institutions in response to climate change?
5. How much these local institutions have gained recognition by the local community?
6. Which visible changes have been observed due to the works of local climate change adaptation institutions?
7. What are the local community's livelihood strategies in your locality? And how much they are efficient to adapt climate change?
8. What are the local adaptive mechanisms of individuals to climate change?
9. What are the local practices of women in response to climate change?
10. What are the local responses of men to climate change?
11. In general, how the local communities adjust themselves to adapt climate change?
12. Is there any change of production system in relation to climate change?
13. What are the new farming techniques, which are implemented to adapt climate change?
14. Do you have any additional information or views on the issue under discussion?.

4. Questions related to Climate Change Mitigation Strategies and the needs and interests of different social groups in the local communities

1. What are the actions of the local communities towards climate change mitigation?
2. How much these measurements are successful in bringing change on climate change mitigation?
3. How much the local communities are satisfied through the implementation of mitigation strategies?
4. How much these mitigation strategies are acceptable by the members of the local communities?
5. Did these climate change mitigation strategies fulfill the particular interests of women and men? How?
6. What are the current constraints of the local communities regarding the implementation of climate change mitigation strategies?
7. How do different social groups entertain climate change mitigation strategies in your locality?
8. Which types of natural resource conservation mechanisms are implemented in order to mitigate climate change?
9. What are the locally recognized social institutions, which are used for climate change mitigation?
10. How much these social institutions did satisfy the needs of the local community in bringing sustainable environment to the surrounding area?
11. Are there any climate change mitigation strategies implemented by the government in your surrounding? If so, could you describe them?
12. Based on Question number 11, how much these strategies are friendly with the local climate change mitigation strategies?
13. What is your view regarding the future directions of climate change mitigation strategies and the fulfillment of the local community's needs and interest?

5. Summary Questions about building climate change resilience

1. Which actions are taken currently to build climate resilience in your locality? If so, could you mention them?
2. What are the visible environmental changes after the implementations of these actions in your locality?
3. Are there capacity-building strategies provided to the local community members in order to secure climate resilient green economy? If so, would you explain them?
4. How do you compare the rate of climate change vis-a-vis the actions taken to build climate change resilience in your locality?
5. Do you have any additional ideas related to the issue under discussion?

Thank you very much for valuable information!

A 2. Interview Guide for Woreda Level Key Informants

General Introduction: The purpose of this interview is to collect data about the “*The Socio-Cultural Aspects of Building Climate Resilience in the Face of Changing Environment among Agricultural Communities in the Blue Nile Basin.*” This interview is prepared only for an academic purpose of writing M.A Thesis in Social Anthropology. Therefore, you are kindly requested to participate in the interview in which confidentiality of any information is protected and valued. I also kindly request you to record your voices/responses through a tape/voice recorder since it is difficult to write all your responses while interviewing.

Thank you in advance for your collaboration!

1.1. Personal Data of the Key informant

Age.....

Sex.....

Religion.....

Marital status

Educational Background

Occupation/ Responsibility.....

1.2. Questions related to climate change vulnerability of different social groups

1. In this *Woreda*, especially in Dangle and Yeted *kebeles*, what are the factors that lead the farmers to be vulnerable for climate change?
2. What are the local social norms and practices contributing to vulnerabilities of different social groups to climate change?
3. What are the hindrances for climate resilience in this *Woreda*?
4. How the farmers understood the current climate change vulnerability?
5. What is your practical information regarding climate change vulnerability and its risks in this *Woreda*?

1.3. Questions related to Climate Change Adaptation and Mitigation Strategies of the Community

1. What are the measurements of the government towards climate change adaptation and mitigation in this area?
2. How do you incorporate it with the local community's means of adaptation?
3. Are the socio-cultural values and norms of the society going hand in hand with your actions of building climate resilience?
4. What are the adaptation and mitigation strategies of different social groups that you appreciate?
5. What have done by the government in order to empower the capacity of farmers not to be vulnerable for climate change?

1.4. Questions related to the needs and interests of the local community towards the actions of climate change mitigation

1. How much the measurements of climate change mitigation address the needs and interests of the local community?
2. To what extent you protect the interests of different social groups in your actions of natural resource conservation.
3. What are the challenges that hinder not to perform actions of climate change mitigation in the area?
4. Which incentives you took to increase the interests of the local community towards building climate resilience?
5. What are your plans towards building climate change resilience in collaboration with the local community?

Thank you very much for valuable information!

B. Focus Group Discussion Guide

General Introduction: The purpose of this focus group discussion (FGD) guide is to collect data about the “**The Socio-Cultural Aspects of Building Climate Resilience in the Face of Changing Environment among Agricultural Communities in the Blue Nile Basin.**” This discussion guide is prepared only for an academic purpose of writing M.A Thesis in Social Anthropology. Therefore, you are kindly requested to participate in the discussion in which confidentiality of any information is protected and valued. I also kindly request you to record your voices/responses through a tape/voice recorder since it is difficult to write all your discussion points.

Thank you in advance for your collaboration!

1. Personal Data of FGD Participants

Age_____

Sex_____

Religion_____

Marital status_____

Educational background_____

Kebele _____

Year of stay in the area_____

Source of Income_____

Place of the focus group discussion_____

Facilitator's Name_____

Date of the focus group discussion: _____

2. Questions Related to what extent Climate Change Adaptive/Mitigation Strategies address the needs and interests of different social groups in the local communities.

1. Which social groups are more prone to climate change vulnerability in your locality?

A. who is vulnerable to climate change based on economic status:

- ✓ The worse off (The poor) Why?
- ✓ The medium (The middle), Why?
- ✓ The better-off (The rich), Why?

B. vulnerability to climate change based on Age:

- ✓ Children? Why?
- ✓ Adults? Why?
- ✓ Elderly people? Why?

C. vulnerability to climate change based on gender:

- ✓ Women? Why?
- ✓ Men? Why?

2. What are the socio-cultural values and institutions employed by the local community members as an adaptive strategies to climate change?

3. How do the local communities use these values and institutions to adapt to and mitigate the current situation of climate change in your locality?
4. What are the visible changes in the ways of living of different social groups due to the use of climate change adaptation and mitigation strategies/measures?
5. Which social institutions are working to mitigate climate change in your locality?
6. How are these institutions working to achieve climate change mitigation, and how much they are successful?
7. How much these climate change mitigation strategies address the local interests of different social groups in your locality?
8. What are the current interests of the local communities regarding climate change adaptation and mitigation strategies?
9. How do you evaluate the overall activities of building climate change resilience in your locality? Could you explain them?
10. Do you have any additional ideas related to the issue under discussion?

Thank you very much for valuable information!

Appendix III: Profiles of Research Participants

A. Profiles of Key Informants

No	Sex	Age	Kebele	Marital Status	Occupation/ Position	Level of Education	Date of Interview
KI-1	M	53	Dangulé	Married	Farming	Read and Write	26, Jan,2014
KI-2	F	38	Dangulé	Divorced	Farming	Illiterate	26, Jan,2014
KI-3	M	46	Dangulé	Married	>>	Illiterate	28, Jan, 2014
KI-4	F	42	Dangulé	Widowed	>>	Read and Write	30,Jan, 2014
KI-5	M	45	Dangulé	Married	>>	Read and Write	01, Feb, 2014
KI-6	M	56	Dangulé	Married	>>	Read and Write	02, Feb, 2014
KI-7	F	53	Dangulé	Married	>>	Read and Write	04, Feb, 2014
KI-8	M	35	Dangulé	Widowed	>>	Illiterate	06, Feb, 2014
KI-9	F	46	Dangulé	Married	>>	Read and Write	09,Feb, 2014
KI-10	F	43	Dangulé	Married	>>	Read and Write	12, Feb, 2014
KI-11	F	41	Yeted	Married	>>	Illiterate	14, Feb, 2014
KI-12	M	48	Yeted	Married	>>	Illiterate	19, Feb, 2014
KI-13	M	52	Yeted	Widowed	>>	Read and Write	23, Feb,2014
KI-14	F	51	Yeted	Married	>>	Illiterate	26, Feb, 2014
KI-15	F	55	Yeted	Married	>>	Read and Write	28, Feb, 2014
KI-16	M	67	Yeted	Married	>>	Read and Write	02,Mar, 2014
KI-17	F	47	Yeted	Married	>>	Read and Write	03, Mar,2014
KI-18	M	59	Yeted	Married	>>	Read and Write	06, Mar, 2014
KI-19	M	52	Yeted	Divorced	>>	Illiterate	08, Mar, 2014
KI-20	F	56	Yeted	Married	>>	Illiterate	08, Mar, 2014
KI-21	M	37	Rob Gäbya	Married	Land Administration Officer	Diploma	10, Mar, 2014
KI-22	M	45	Rob Gäbya	Married	Expert in Natural Resource Management	Degree	16, Mar, 2014
KI-23	M	52	Rob Gäbya	Married	Head of Environmental Extension	Degree	19, Mar, 2014
KI-24	M	41	Rob Gäbya	Married	Irrigation Officer	Degree	25, Mar, 2014
KI-25	M	39	Rob Gäbya	Single	Peace and Security Officer	Diploma	15, Mar, 2014
KI-26	F	32	Rob Gäbya	Married	Chair person of Youth and Women's League	Degree	17, Mar, 2014
KI-27	M	36	Rob Gäbya	Single	Irrigation and Utilization of Water Resources Officer	Degree	18, Mar, 2014
KI-28	M	58	Rob Gäbya	Married	Rural Land Use Management Officer	Diploma	19, Mar, 2014
KI-29	M	43	Yeted	Married	Farming	Read and Write	20, Mar, 2014
KI-30	M	37	Yeted	Married	>>	Illiterate	20, Mar, 2014
KI-31	M	48	Dangulé	Married	>>	Illiterate	21,Mar, 2014
KI-32	F	36	Yeted	Married	>>	Illiterate	22, Mar, 2014
KI-33	F	41	Dangulé	Married	>>	Illiterate	24,Mar, 2014
KI-34	M	43	Dangulé	Married	>>	Read and Write	24,Mar, 2014
KI-35	M	56	Yeted	Married	>>	Illiterate	24,Mar, 2014
KI-36	F	32	Dangulé	Married	>>	Read and Write	25, Feb, 2014
KI-37	M	45	Dangulé	Married	Administrative Leader of Dangulé Kebele	Grade 9	26, Mar, 2014

B. Profiles of Focus Group Discussion (FGD) Participants

	No	Sex	Age	Marital Status	Kebele	Role/Position	Level of Education	Religion	Date of FGD Session
FGD-1	1	M	65	Married	Dangulé	Local Community Elder	Illiterate	Orthodox	March 23, 2014
	2	F	26	Divorced	>>	Member of Women's Association	Read and Write	>>	
	3	M	23	Single	>>	Member of Youth's League	Grade 4	>>	
	4	M	42	Married	>>	Local Government Representative	Diploma	>>	
	5	M	56	Widowed	>>	Local Community Elder	Illiterate	>>	
	6	M	51	Married	>>	Religious leader	Read and Write	>>	
	7	F	31	Married	>>	Leader of Women's Association	Read and Write	>>	
	8	M	43	Married	>>	Religious Leader	Read and Write	>>	
FGD-2	1	M	61	Married	Yeted	Local Community Elder	Illiterate	Orthodox	March 30, 2014
	2	M	46	Married	>>	Local Government Representative	Diploma	>>	
	3	M	24	Single	>>	Member of Youth League	Grade 6	>>	
	4	F	54	Widowed	>>	Local Community Elder	Illiterate	>>	
	5	F	38	Married	>>	Member of Women's Association	Illiterate	>>	
	6	M	45	Married	>>	Religious Leader	Read and Write	>>	
	7	M	44	Married	>>	Local Community Elder	Read and Write	>>	
	8	M	37	Married	>>	Religious Leader	Read and Write	>>	

C. Profiles of Case Study Participants

No.	Sex	Age	Marital Status	<i>Kebele</i>	Date of Interview
1	F	35	Married	Dangulé	03/Feb/2014
2	M	49	Married	Yeted	09/Mar/2014
3	F	42	Widow	Dangulé	07/Feb/2014
4	M	82	Married	Yeted	12/Mar/2014
5	M	45	Married	Yeted	14/Mar/2014
6	M	62	Married	Dangulé	12/Mar/2014
7	F	42	Married	Dangulé	13/Mar/2014
8	F	38	Married	Yeted	20/Mar/2014
9	M	68	Married	Dangulé	27/Mar/2014
10	M	58	Married	Dangulé	28/Mar/2014
11	M	51	Married	Yeted	29/Mar/2014
12	M	46	Married	Yeted	01/Mar/2014
13	The case of one group			Dangulé	05/Mar/2014

Declaration

I, the undersigned, declare that this Thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the Thesis have been duly acknowledged

Name_____Signature _____Date_____

Confirmation

This Thesis is submitted for examination with my approval as a university advisor.

Name_____Signature _____Date_____