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Climate Change Impact and Traditional Coping Mechanisms of Borana Pastoralists in Southern Ethiopia

Building Adaptive Capacity and Resilience from an Indigenous People's Perspective

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Abstract

This thesis focuses on Borana pastoralists in southern Ethiopia and their experiences with environmental challenges caused by climate change. Recent debates about climate change and its impacts on global bio-diversities are shifting focus to the role of indigenous people in climate mitigation and adaptation. This thesis builds on those debates and focuses on the traditional adaptation and resilience strategies of Borana pastoralists, who draw from their traditional ecological knowledge systems.

The thesis is based on two months of ethnographic fieldwork among Borana pastoral communities, where empirical data was gathered using unstructured qualitative interviews, field observations, and focus group discussions. Concepts such as ‘the tragedy of the commons’, ‘social-ecological resilience’, and ‘sustainable livelihood framework’ guides the analysis and discussion of the empirical data.

The thesis argues that while the traditional pastoral livelihood of Borana pastoralists is threatened by persistent droughts, they are relying on their traditional natural resource management strategies to adapt to the drought problem. The traditional arrangement for pasture and water resource use is maintained by their customary *Gadaa* institutions, which have eroded over the years due to the government’s interference in their traditional pastoral system. While this development affects the adaptive capacity and resilience of Borana pastoralists to climatic extremes, there are aspects of the traditional knowledge systems that can be harnessed for long term adaptation and resilience.

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Introduction

“Pasture and water are our blessings. If there are no cattle, then there is no culture, and if there is no culture, we believe that there will be no Borana”

(interview with Borana elder in Yabello; July 2019. Translated from Afan-Oromo)

In summer 2019, I traveled to Ethiopia to conduct a study with one of Ethiopia's pastoralist communities called *Borana*. Although it was my first time in the country, I had heard stories about the Borana pastoralist community and their *Gadaa* institution from a classmate who is a member of the Borana community. During a class session, my classmate made a presentation about the pastoralist way of life of his Borana community and he recounted stories about the *Gadaa* institution as the main indigenous governance body of the Borana peoples. From there, I became interested in knowing more about the *Gadaa* institution of *Borana*; especially how this traditional institution governs *Borana* pastoralism in the midst of growing threats of climate change.

When I arrived in the Borana town of Yabello, *Gadaa* ceremonies¹ were on-going and I had the opportunity to witness some of the events that were taking place. During my observations in Yabello, I was bewildered by the sheer number of livestock that sprawled the empty fields. The previous raining season had come with very little rainfall and the people had been grappling with a drought problem since then. The opening quoted statement above is taken from my conversation with a Borana community leader in Yabello. We were discussing the drought problem and he made this profound statement, which I interpret as an implicit expression of the Borana peoples' resolve to protect their pastoralist culture and the natural environment they depend on.

Borana landscapes are generally arid, with a heavy livestock presence. There are few grazing areas and other natural resources that are community-owned and thus considered as a ‘common property’ (Belayneh, 2016). Generally, pastoralism is the primary subsistence activity for the various ethnic groups of people in the southern areas of Ethiopia. For centuries, ethnic groups such as the *Somali*, *Afar*, *Karrayu*, and the *Borana* people have engaged in pastoralism, with distinct strategies for natural resource management (Eyasu, 2008). What remains common among the

¹ *Gadaa* ceremonies are held every eight years during which a new ruling class is elected into power.

various groups of peoples is nomadic pastoralism. That said, I am focusing this thesis on the Borana pastoralists. This is because traditional Borana pastoralism is intrinsically connected to the indigenous *Gadaa* institution, which is the embodiment of the Borana peoples' traditional knowledge systems for natural resource management (Gufu, 1996). The second reason why I am focusing on the Borana is the fact that the Borana are the only people among the *Oromo* group who still maintain the *Gadaa* institution in its original state (Zelalem, 2012).

This thesis on the adaptive capacity and resilience of Borana pastoralists aligns with the aspect of indigenous studies that concern small scale economies of indigenous peoples and their traditional resource management practices. As a traditional subsistence strategy, Borana pastoralism is highly dependent on natural resources and thus remains vulnerable to climate change. In light of that, questions remain about their traditional approaches to the management of natural resources, as well as their adaptive capacity and resilience to ecological disturbances. The focus of this study is also informed by recent debates concerning the contribution of traditional knowledge systems in climate change adaptation and resilience. This study is, therefore, situated in the context of traditional knowledge, natural resource management, and climate change. Climate change and traditional knowledge debates will be discussed later in this chapter.

The thesis begins with a short introduction of the Borana people and their indigenous *Gadaa* institution. I find the introduction necessary because *Gadaa* is the main cultural institution of the Borana that is central in my discussions on the traditional ecological knowledge systems of the Borana pastoralists. In addition to that, the terms 'traditional' or 'indigenous' will be used interchangeably in different contexts, but my use of both words in the thesis is to refer to the traditional knowledge systems of Borana pastoralists.

1.1 The Borana People and Gadaa System – An Overview

In Ethiopia, the Oromia people remain the largest ethnic group in the country. It consists of many sub-groups of which the Borana peoples are part of (Ta'a, 2016). Historically, the Oromo are known for engaging in pastoralism, but recently, agro-pastoralism has become common among most of the Oromo groups. There are, however, a few Oromo groups in the south still practicing pastoralism as a sole livelihood system. They include Arusi, Gabre, Karayu, and Borana people (Ta'a, 2016). As a traditional livelihood system of the Oromo nation, pastoralism forms part of the

Oromo culture and it is intrinsically connected to the *Gadaa* system (Asmarom, 1973). According to Ta'a (2016), many aspects of *Gadaa* have disappeared among some of the various Oromo groups who transitioned to sedentary agriculture due to political and ecological factors, except the Borana peoples, who have retained the *Gadaa* institutions and continue to practice it. My introduction of the Borana peoples in this section will remain brief but I will elaborate more on who they are and how they fit into the 'indigenous' bracket in the literature review section.

Fundamentally, *Gadaa* is an Indigenous democratic socio-political system of the *Oromo* (Asmarom, 1973). Mulugeta Yoseph (2016) describes *Gadaa* more precisely by referring to it as a political philosophy of characterizing the rights and responsibilities of individual men in relation to every facet of the Oromo nations' life. *Gadaa* embodies the ways of knowing of all Oromos and it is adopted and developed as a method for explaining, understanding, and interpreting the changes that take place in the natural world (Yoseph, 2016). In the traditional administration setting, *Gadaa* is referred to as a system because it operates on an eighty-years long cycle that is sub-divided into ten transitioning grades (from 0 – 8 to 73 – 80 years). In this system, everyone has a role to play according to their age grade. Those who reach the 41 – 48 years-grade (*Gadaa/Ruling grade*) assume their leadership roles at this stage. The head of the *Gadaa* grade, called *Aba-Gadaa*, assumes responsibility for local governance through the various customary institutions and their underlying rules during his 8-years term in office (Asmarom, 1973).

While *Gadaa* continues to exist as an indigenous system of governance, it operates on a gamut of institutions that make its ontological characteristics more complex to define (Ta'a, 2016; Yoseph, 2016). However, it remains possible to explore the customary characteristics of *Gadaa* that relate to natural resource management and environmental conservation practices. According to Arjjumend & Beaulieu-Boon: "various human philosophies and belief systems have contributed significantly to the conservation of forests, biodiversity, and landscapes, and that these ideologies were concretized in customary norms, practices, and systems" (Arjjumend & Beaulieu-Boon, 2018, pp. 6-7). I will discuss further in the literature review section the nature of *Gadaa* as a customary institution; as supported by some pieces of literature. In this research, I am emphasizing the traditional knowledge systems of the Borana and how such knowledge systems are driving environmental conservation and sustainable resource management.

1.2 Problem Statement and Research Objectives

Currently, climate change is understood by the global community as a global problem that is leading to a decline in biodiversity and it continues to dominate major international conversations in the last decade. Anthropogenic factors are exacerbating the loss of native resources and thereby affecting the survival of these traditional livelihoods. In arid environments, many communities dread the loss of their traditional livelihoods and are confronted by environmental challenges brought about by the global problem of climate change (Ayana, Gufu, & Stenseth, 2012).

A 2019 report published by the International Work Group for Indigenous Affairs (IWGIA) indicates that about 15% of Ethiopia's total populations are pastoralists and sedentary farmers (Berger, 2019). Out of that percentage, the Oromo-Boraana group owns about 40% of the total livestock population in Ethiopia (Boku, 2008; Tolera & Senbeta, 2019). In response to the current climate situation, the Ethiopian government had, in 2014, implemented certain pastoralism transformation policies that, to a large extent, did not recognize the agency and knowledge systems of pastoral communities (Belayneh, 2016). Neither have subsequent policy frameworks on climate change given fair consideration to the contribution of traditional knowledge to sustainable biodiversity conservation.

Before this research, I assumed traditional knowledge as being a static problem-solving concept that cannot deal with the adverse environmental realities of climate change. By considering the rising rate at which climatic crises are occurring, I could not assume how a set of traditional methods that had worked in the past could be useful in addressing the current environmental crisis. My perceptions, however, changed after observing and learning about how the Borana pastoralists in southern Ethiopia are using their traditional knowledge to navigate the adverse climatic extremes of current times. According to Menzies (2006), indigenous peoples' traditional ecological knowledge is the knowledge that is proven by the communities that have used it for many generations to live with, thrive on, and to cultivate the natural world. Senanayake (2006) describes traditional knowledge as indigenous science because it is generated through a systematic process of observing the local conditions of a particular area over many generations by the indigenous community. In conducting this research, my underlying objectives are:

- a) to understand the inherent cultural values and beliefs that make up the traditional ecological knowledge of the Borana,
- b) to explore the roles of cultural institutions in environmental conservation and sustainable management practices,
- c) to understand the adaptive capacity and resilience of Borana pastoralism to ecological stresses
- d) to explore the various ways in which the adaptive capacity and resilience of the Borana can be strengthened.

At the country level, I acknowledge the issue of climate change as being a general problem that is affecting all pastoral communities in Ethiopia. Therefore, my research does not assume that the traditional knowledge systems of the Borana pastoralists apply to all contexts. I am conducting this research to emphasize the traditional knowledge and technologies of Borana pastoralists, and the need to develop community-based adaptation and resilience policies for climate change adaptation and mitigation. By shedding light on the traditional knowledge systems of the Borana pastoralist, the thesis aims to showcase the creative ways in which the Borana pastoralists manage scarce natural resources and the aspects of the traditional knowledge systems that can be supported for long-term adaptation and resilience.

1.3 Research Questions

Senanayake (2006) asserts that traditional knowledge is confined to a particular culture or society and thus to understand the dynamics, researchers ought to engage the local perspectives and agents. In keeping with that, I am drawing upon the emic approach to conduct this study with the following questions:

1. How vulnerable are Borana pastoralists to the effects of climate change?
2. What traditional knowledge and value systems influence the natural resource management practices of Borana pastoralists?
3. What are the challenges affecting the traditional systems of natural resource management?
4. How can the adaptive capacity and resilience of Borana pastoralists be improved for long term adaptation and resilience to the effects of climate change?

In this thesis, the term ‘traditional institutions’ is used to refer to the range of rules, norms, and local governance framework within which natural resource mediation is carried out at the community level. The research questions set forth draw from study objectives and will lead to the discussion on how the traditional knowledge systems and institutions of the Borana pastoralists can be strengthened and integrated into mainstream policies on climate adaption and resilience.

1.4 The National Adaptation Plan of Ethiopia (NAP)

The national adaptation plan of Ethiopia was developed in 2019 and it builds on the country’s ongoing efforts towards reducing the vulnerability of traditional communities to the impacts of climate change. As the country’s overarching climate change strategy, the 2019 adaption plan aims at building local communities’ adaptive capacity and resilience. The plan is modeled on a *Climate Resilient Green Economy* (CRGE) framework that is being implemented through government developed guidelines, and it is focused on mainstreaming ‘green economy’ strategies² in all regional districts of the country. While this adaptation plan remains important for dealing with the effects of climate change in the country, the aspect of it that is of interest to this research is its ‘green economy’ component. This is because of the emphasis it places on livelihood transformation and the promotion of agriculture among pastoralist communities in the country.

According to Belayneh (2016), the ‘tragedy of the commons’ considerations has always featured in the history of Ethiopia’s climate change adaption and resilience policies. Thus, the green economy component derives from the tragedy of the commons considerations (Paul & Weinthal, 2019). McGahey et al (2014) have noted that most of the countries that base their climate policies on ‘green development’ frameworks in pastoralist areas do so while neglecting the traditional knowledge systems of pastoralist communities that contribute to environmental sustainability (McGahey, Davies, Hagelberg, & Ouedraogo, 2014). Some researchers have described the NAP of Ethiopia as largely synonymous with the African policy agenda on climate change, which is generally biased towards sedentary agriculture (Atinkut & Mebrat, 2016).

² The Green economy aims at improving crop and livestock production, re-establishing forests and eco-systems, among others. However, it does not allow for mobile grazing in pastoralist community, but rather opts for sedentary pastoralism. See https://www.preventionweb.net/files/61504_ethiopiacrge.pdf.

Due to the agriculturalist orientation of the current NAP of Ethiopia, several of the pastoralist communities in Ethiopia are losing access to their traditional lands (Asebe, 2016). The NAP document outlines eighteen climate mitigation and adaptation options that are currently under consideration for vulnerable groups, communities, and ecosystems to improve adaptive capacity and resilience. From the traditional livelihood perspective, adaptive capacity refers to “the critical aspect of resource management that reflects learning and the ability to experiment and foster innovative solutions in complex social and ecological circumstances” (Armitage, 2005, p. 703). Based on numerous studies on pastoralism in Ethiopia, it is conceivable that most pastoralist communities in Ethiopia are experiencing increasing shortcomings in their traditional resource management practices (See: Gemedo-Dalle, Isselstein, & Maass, 2006; McGahey et al., 2014; Naess, Sullivan, Khinmaung, Crahay, & Otzelberger, 2010; Sabine, 2004). Those shortcomings have largely overshadowed the potential of traditional natural resource management practices and institutions in strengthening local capacity to adapt.

This describes the current situation of the Borana pastoralists. The 2019 report of the International Work Group for Indigenous Affairs (IWGIA), for instance, reveals a rise in cases of land-grabbing and communal land privatization within the Borana landscape (Berger, 2019). This report gives credence to the assertion that the adaptive capacity and resilience of the Borana pastoralist, vis-a-vis their traditional pastoral livelihood, have not been recognized enough: even when the country’s National Adaptation and Plan of 2019 promise to combine best available science with traditional knowledge systems in ongoing efforts towards reducing community vulnerability to the impacts of climate change.

1.5 Climate Change Debates: The Case for Indigenous Peoples’ Traditional Knowledge

In global debates regarding climate change and sustainable development, traditional knowledge is often mentioned in the list of actions needed to mitigate the environmental impacts of climate change. Indeed, the discussions at the global arena have implications for the role of indigenous peoples in the climate change mitigation discourse. For example, the Sustainable Development Goals (SDG) of the United Nations (UN) provides context and special relevance for indigenous peoples. This is seen in SDG 13 on climate action that has since resulted in many countries adopting the Paris Agreement of 2016. The Paris Agreement pays special attention to

environmental protection by including provisions that directly refer to indigenous peoples and it urges countries to:

- a) Acknowledge and respect the rights of indigenous peoples to their land.
- b) Strengthen the knowledge, technologies, practices, and efforts of local communities and indigenous people related to addressing and responding to climate change.
- c) Follow adaptation actions that are based on and guided by the best available science and traditional knowledge of indigenous peoples where appropriate.³

In furtherance of that, several countries, including developing countries in Africa, have developed National Adaptation Plans (NAP) for responding to climate change, in which they outline mitigation measures that, in most cases, promise to create space for the inclusion indigenous peoples' knowledge systems.⁴ In the years before that, when the importance of indigenous/local knowledge systems on issues concerning climate change threats began to gain global attention, national governments' approach to indigenous peoples and their traditional knowledge systems had been piecemeal (Belayneh, 2016). Generally, "the institutions and practices necessary to maintain, develop, discard and disseminate indigenous/[traditional] knowledge are often overlooked or not fully understood in development strategies aimed at reducing risks" (Kronik & Hays, 2014, p. 251). In Ethiopia, for instance, the knowledge systems of pastoralist communities had long been ignored in the policy arena on climate change mitigation. Government intervention measures had rather focused on transforming nomadic pastoralist livelihood systems into sedentary farmers (Belayneh, 2016). In other words, the mainstream decision-making process on climate mitigation provides limited room for the inclusion of indigenous peoples' knowledge systems. Such mainstream policies contravene international agreements on climate mitigation and adaptation that emphasize the need to consult indigenous peoples' traditional knowledge systems when drafting climate policies. Therefore, while there seems to be an increased focus on indigenous people and traditional knowledge within the global discourse on climate change, indigenous peoples continue

³ Source: Paris Agreement: <https://unfccc.int/files/home/application/pdf/decision1cp21.pdf>

⁴ Under SDG Goal 13 on Climate Action. Source: <https://www.un.org/sustainabledevelopment/climate-change/>.

to grapple with the challenge of recognition, institutional support, and inclusion in such public policy decisions that have a direct impact on their traditional livelihood systems.

The United Nations Permanent Forum on Indigenous Issues (UNPFII) underscores the need for indigenous peoples to be made part of the solutions to climate change. During the UNPFII's 2019 forum, the representatives of indigenous communities highlighted traditional knowledge as a unique form of skill-set that blends culture with environmental sustainability and resilience. While acknowledging that no single entity has all the answers to the environmental issue of climate change, the UNPFII's 18th Session report on indigenous peoples, climate change and traditional livelihoods highlight the connection between traditional knowledge, environmental conservation, and climate change. In respect of that, the report reminds governments to listen to the traditional knowledge systems of the custodians of the land who have learned to survive for many generations with their ways of knowing and adaptation to climatic variations. Similarly, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) states that: “respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment”.

In light of these debates, my thesis explores the experiences of the Borana pastoralists with climate change, and their traditional ways of coping with climatic variations. Although numerous studies have been conducted on the pastoral production system of the Borana people in relation to climate change, this thesis contributes to the body of research by exploring the aspects of Borana's traditional natural resource management systems that can be used as information for autonomous adaptation. In line with the climate change debates, my thesis also explores the response of the Borana pastoralists to mainstream climate adaptation policies, and how their adaptive capacity and resilience to climate change can be strengthened with policies that build on the traditional adaptation strategies and work with traditional institutions.

1.6 Thesis Outline

This consists of five chapters. The first chapter provides context for the study and introduces the main issues that inform the objectives and questions that I seek to answer. The second chapter outlines the methodological framework for this study. The chapter describes the various methods I employed in the data gathering process, and the ethical considerations observed during the data

gathering process. The third chapter is divided into two parts. The first part reviews relevant literature concerning the term 'indigeneity' in the African context and introduces the *Gadaa* institution, and the pastoral production system of the Borana. The second part describes the theoretical framework of the thesis, which informs the discussion of the findings in chapter 5. The fourth chapter entails a presentation and analysis of my empirical data.

The fifth chapter, which is the last chapter, is a discussion of my findings, with emphasis on the key aspects of the traditional natural resource management system of Borana pastoralist that have ensured the stability of their livelihood system to climate change extremes, and, the enabling factors for autonomous adaptation and resilience of Borana pastoralists to climate extremes. The chapter ends with a conclusion of the thesis.

Methodology

I am conducting this research in the context of climate change, traditional knowledge, and natural resource management. In respect of that, I carried out this study on the adaptive capacity and resilience of Borana pastoralists to climate change by employing qualitative research methods, which were guided by the protocols and principles of indigenous research methodologies (Chilisa, 2012; Smith, 1999). These include reciprocity, respect, accountability, and ethics. I discuss indigenous research methodologies after a description of my field research methods, which include field observations, qualitative interviews, focus group discussions, and informal discussions. In addition, I used data from secondary sources to complement my field data.

2.1 Choice of Study Area

I carried out my fieldwork in the Borana Zone⁵ of the southern Ethiopian lowlands in the months of June and July 2019. I focused on the Borana pastoralists in key study areas such Yabello, Dubluk (Dire), Haro-Bake (livestock market), and Dharito; where a majority of Borana practice pastoralism as their main subsistence strategy. My arrival in Yabello coincided with the *Gadaa* transition ceremonies that were going on in the various Borana communities. Many Borana pastoralists had travelled from remote villages to the Gadaa center in Arero and this created an opportunity for me to meet with some of the traditional leaders in attendance.

The selected study areas are home to some of the sacred/ritual sites of the Borana peoples. Sacred sites (*Arda-Jila*) are significant aspect of the traditional ecological knowledge systems of the Borana people, and they hold a belief in the existence of a positive ecological interaction between sacred sites and the growth of forage and water resources (Marco & Boku, 2011).

Additionally, the traditional pasture management strategy (*Kalo*) is commonly used in the selected study areas, and this offered an opportunity to observe the traditional pasture resource management strategy of Borana pastoralists. Similar to that are the ancient deep well systems (*Tuula*), which

⁵ Administrative zone within the Oromia-Regional State.

offer insights into the traditional water resource management strategies of Borana pastoralist during long periods of long droughts.

2.2 Selection of Research Participants

I carried out the field work with the help of two Borana field assistants who are both residents of Yabello. They facilitated my access to the Borana community, as well as getting fieldwork permission from the Borana zone administration office in Yabello, and the Borana elders. I interviewed fourteen participants, out of which eight were key participants. The key participants include a former *Gadaa* leader (*Abba-Gadaa*) in Yabello, a person in charge of water points (*Abba-Herega*) in Dubluk, a Borana community advisor and traditional weather forecasting expert (*Waragu*) in Yabello, one retiring member of *Gadaa* (*Gadamoji*) in *Dharito*, two knowledgeable elders (*Jaasa Arga-Dhaageeti*) – one in Dubluk and the other one in *Dharito* ritual village -, an officer at the local Culture and Tourism office in Yabello, and a natural resource management officer at the local administration office in Yabello. Both officers are part-time Borana pastoralists working in the formal administration quarters. The other six participants were Borana pastoralist whom I interviewed while carrying out my field observations.

2.2.1 Field Observations

I arrived in the community as an outsider researcher. Having no detailed information about the community, I decided to begin my fieldwork with field observations in order to familiarize with the research context and to build relationships. According to Schensul, Schensul, and LeCompte (1999), field observation enables an outsider researcher to identify key research participants and it provides the researcher with sources of questions that are culturally relevant for research participants. Staying in Yabello for five weeks afforded me enough time to observe social relationships and the everyday practices of the Borana pastoralists.

Gadaa transition ceremonies were going on at the time of my field visit. Hence, the *Gadaa* ceremonies created an opportunity for me to observe some traditional transition rites, and interact with some of the Borana elders who were taking part in the ceremonies by performing ritual rites for pasture and water at the *Dharito* sacred site. Among the Borana, ritual rites are performed by spiritual priests (*Qaalluu*) who function as the protectors of the natural resource assets of Borana people (Dida, 2019). In addition, I observed other *Gadaa* rites at the *Gadaa* center in Arero district

and had conversations with some Borana knowledgeable persons (*Jaasa Arga-Dhaageeti*) during my visit. furthermore, I observed the *tuula* wells in Dubluk and the rangeland management practices within the Dirre grazing area.⁶ In line with the focus of this thesis - traditional natural resource management practices -, the practical aspect of my field observations concerned traditional rangeland enclosures (*Kalo*), traditional wells (*tuula*), and Sacred forests (*Baddhaa-Sadeen*).

2.2.2 Interviews and Focus Group Discussions

During the interviews with the research participants, I first asked general questions concerning climatic changes, adaptation strategies, traditional weather forecasting approaches, customary rules, the role of *Gadaa* institutions in natural resource management, and impressions about the mainstream climate adaptation policies.

I also used the semi-structured interviewing approach to ask specific questions concerning traditional knowledge in pasture management, water resources management, forest resources and sacred sites, traditional weather forecasting, livestock breed, and social support networks. I extended my interviews to the official circles by meeting with a Borana official at the culture and tourism office, and another Borana natural resource advisor at the local administration office in Yabello. Both officers offered their views regarding the challenges Borana face with mainstream policies, and how the challenges affect the adaptive capacity and resilience of Borana pastoralists. Furthermore, I engaged a group of five participants in a group discussion at the *Haro-Bake* livestock market. The discussions focused on general experiences with climate change and adaptation policies of the mainstream. The group participants comprised three full-time Borana pastoralists and two Borana farmers. The diversity in the composition of group participants allowed for diverse views on the livelihood transformation policies of the mainstream to be gathered.

⁶ Borana land (Borana Zone) is divided into two main grazing areas called Dirre and Liban. My fieldwork was conducted in Dirre.

2.3 Ethical Considerations and Reflexivity

I conducted this research within the framework of indigenous research and methodologies. Indigenous methodologies are the framework of principles guiding the methodological, theoretical, and ethical approaches employed by indigenous and non-researchers on issues concerning indigenous peoples (See: Chilisa, 2012; Kovach, 2010; Porsanger, 2004; Smith, 1999). This is important to emphasize in this thesis because mainstream western-oriented research approaches are “grounded in cultural world views which are either antagonistic to other belief systems or have no methodology for dealing with other knowledge systems” (Smith, 1999, p. 65).

I conducted the research with the approval of the Norwegian Centre for Research Data (NSD) and the permission of the Borana pastoralists I met with in Ethiopia. While in Ethiopia, I had the opportunity to discuss my thesis topic with the staff of the Department of Indigenous Studies at Dilla University for advice on the local protocols to adhere before and during the data gathering process.

Before data gathering, I applied for approval to conduct research with the Borana pastoralist; through the Borana zone administration office and the cultural and tourism office in Yabello. These approvals are part of the security requirements that are binding on outsiders conducting research within the Borana zone. I also ensured that all my research participants were adequately informed about the research objectives and how the information they provide was going to be processed and presented in the thesis. The research participants were all informed about their rights to withdraw their participation and consent at any time they wish to. Although my primary data do not contain sensitive details that might be deemed injurious or harmful to any of the research participants, their names do not appear in the findings and discussions.

With regards to reflexivity, I carried out the study as a researcher from Ghana pursuing a master's in Indigenous Studies in Norway. I am, therefore, an outsider researcher and have no direct relationship with Boraana peoples of southern Ethiopia; nor do I identify as a pastoralist. Within the framework of indigenous studies, I am writing from the position of a non-indigenous advocate researcher. I am conducting this research with the Borana pastoralist group in southern Ethiopia to advocate for their traditional knowledge systems to be considered in mainstream climate adaptation and resilience plans. While conducting this research, I acknowledged the unequal power

relations and potential biases inherent in my role as a non-indigenous researcher, and as a student in a Norwegian higher education institution. I am constantly reminded by my position at every aspect of the writing process. Therefore, any misrepresented information regarding the Borana pastoralists that appears in this thesis is not intended, and I bear full responsibility for any such errors.

The next chapter is a review of the relevant literature on the Borana pastoralists and their customary institutions, as well as the theoretical framework for my discussion of the empirical data.

Literature Review and Theoretical Framework

This thesis draws from a variety of secondary sources relating to the pastoral livelihood of the Borana people and the indigenous *Gadaa* institution. Hence, perspectives from related fields such as philosophy, anthropology, sociology, and ecology are included in the thesis. In this literature review chapter, I begin by discussing the indigeneity of Borana; by first exploring the various arguments on indigeneity in the African context, and how the arguments relate to the Borana people. Doing so explains my premise for using the term ‘indigenous people’ to describe the Borana in this thesis. Also, I will explore the literature on Borana pastoral livelihood, as well as the philosophical underpinning of the *Gadaa* as a customary institution for natural resource management. Following the literature review is the theoretical framework I will use for my data analysis and discussions. These include traditional knowledge, the tragedy of the commons, social-ecological systems, and the sustainable livelihood framework.

3.1 Indigeneity in Africa and Ethiopia – The Case of the Borana

The network of diverse ethnic groups in Africa, and the continent’s history of European colonization, makes indigeneity a complex concept to define. According to Saugestad (2001), the epistemological and political implications of the term ‘indigenous’ are more controversial when applied to the African context. Under Jose R. Martinez Cobo's⁷ 1981 working definition of indigenous peoples:

Indigenous communities, peoples, and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions, and legal system.⁸

⁷ 1981 Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities.

⁸ Source: (<https://www.un.org/development/desa/indigenouspeoples/about-us.html>).

Martin Cobo's definition above offers a strict distinction between indigenous and non-indigenous communities. However, the United Nations Declaration on the Rights of Indigenous Peoples has not committed to this strict definition. This is because the situation of indigenous peoples in different places around the world varies, and thus the UNDRIP promoted a definition that recognizes national and regional particularities and accommodates the variety of situations indigenous peoples face globally (Saugestad, 2001).

In the African context, the definition of 'indigenous people' is more complex when viewed beyond the simple colonizer/colonized dichotomy in Africa (Saugestad, 2001). She argues that the definition of indigenous people in Africa should focus on internal relationships between dominant and marginalized minority groups. Therefore, the majority of indigenous peoples in Africa are the distinct minority ethnic groups who may have historically occupied inaccessible geographical regions, are politically marginalized, and suffer various forms of exclusion, exploitation, and domination by dominant ethnic groups (Saugestad, 2001).

In contrast to Saugestad's position above, Jeffery Sissons (2005) projects his view on indigeneity in relation to Third World (African) countries. He argues that attempts at stretching the meaning of indigenous people to include Third World (African) struggles defeat the original definition of the term, which borders on the core issues of concern for the original indigenous movement. The original concerns are rooted in ongoing cultural marginalization and oppression by people whose cultures originate from Europe, while Third World (African) concerns are "rooted in cultural marginalization and oppression of less powerful indigenous peoples by more powerful ones" (Sissons, 2005, p. 16). A broadened definition of 'Indigenous' to include land resource based subsistence communities has become the dominant discourse for Third World (African) Indigenism, which relates to eco-ethnic claims concerning ecological threat and destruction (Sissons, 2005). This broadened definition of indigenous people relates to Third World (African) communities that portray themselves as "having an overriding moral responsibility to care for the threatened environment and to defend it against the destructive forces [climate change] of western progress and global capitalism" (Sissons, 2005, p. 23).

Although there is no officially recognized indigenous group of people in Ethiopia (Hindeya, 2019), the origins history of the Oromo people, and their experiences with centuries of Amhara dominance and suppression, make a case for Borana indigenesness (Asmarom, 1973). More so, self-definition is another criterion for the indigenesness of a group of people (Sissons, 2005). Therefore, the Borana people's expressed of indigenesness through the Oromo nations' years of struggle for self-determination, and UNESCO's subsequent recognition of *Gadaa* as an indigenous system of self-government, falls within the self-definition criteria.

3.2 Pastoralist Livelihood of Borana

There is a sense of urgency among Borana pastoralists to address factors affecting the resilience of their pastoral livelihood, and questions regarding their long-term resilience to the threats to climate change are yet to be addressed (Boru, 2017). The absence of appropriate resilience measures and weakening institutional environments have limited the Borana to short-term coping mechanisms, while strategies for enhancing the adaptive capacity and resilience of pastoral households are poorly designed and unplanned (Boru, 2017).

Homann Sabine (2004) studied the indigenous knowledge of Borana in natural resource management. In her findings, she indicates that the utilization of the Borana's indigenous knowledge is impeded by land fragmentation policies of mainstream structures, which constrain the Borana's traditional practice of observation and experimentation with the natural ecological process (Sabine, 2004). Also, the adaptive capacity and resilience of Borana pastoralists to climatic extremes are hindered by the increasing privatization of Borana grazing lands, which result from conflicts between indigenous institutions and formal administration structures within the Borana communities (Sabine, 2004). Therefore, development interventions for improving adaptation should focus on maintaining social cohesion and improving alternative income generation possibilities (Sabine, 2004).

According to Gemedo-Dalle et al. (2006), the indigenous knowledge of Borana pastoralists is closely related to survival, and it provides the basis for local-level decision making in natural resource management. Despite many development interventions in the communities, the Borana pastoralists are facing more challenges of survival. Despite the importance of Borana traditional

knowledge systems, development interventions have rather considered such knowledge systems as backward (Gemedo-Dalle et al., 2006). Gemedo-Dalle et al. (2006) further observe that some government intervention measures, such as pond construction, are positive adaptation interventions that were implemented without prior consultation with the Borana community. They also point to numerous development projects such as the establishment of ranches as factors affecting mobile pastoral practice, and thereby reducing the adaptive capacity and resilience Borana pastoralists.

In their study on the indigenous weather forecasting system of Borana pastoralists Iticha and Husen (2018), noted that life would be difficult in Borana pastoral communities in the absence of indigenous knowledge and wisdom of weather forecasting, which has shaped their response to the impacts of climate change. They refer to *Gadaa* as the fountain of this knowledge system. They also add that remote Borana pastoral communities rely on the indigenous weather forecasting system because: “contemporary forecasts are not specific to localities and there are difficulties in accessing [contemporary] forecasts on time... and not disseminated via appropriate media appreciating the culture of the local community” (Iticha & Husen, 2018, p. 2).

3.2.1 *Gadaa* – A Fountain of Borana Indigenous Knowledge

As an encompassing customary institution of the Oromo nation, *Gadaa* is seen as “a powerhouse of indigenous knowledge systems” (Iticha & Husen, 2018, p. 1). Raymond Pierotti (2010) notes that indigenous peoples’ knowledge systems emerge from philosophical traditions that are distinct from western-scientific traditions. Accordingly, the *Gadaa* institution exists as an embodiment of the Oromos’ cultural philosophy and it is perceived so by all Oromo groups of people (Asmarom, 1973).

Mulugeta Yoseph (2016), an Ethiopian philosopher, explored *Gadaa* as a philosophical mode of thought and inquiry. In his work, *The Oromo Concept of Reality: (Dhugaa Ganama)*, Yoseph (2016) demonstrates how the indigenous *Gadaa* institution serves as 'a philosophic method of inquiry' for identifying and overcoming contemporary challenges. He demonstrates this by locating the Oromo systems of thought in three broad concepts such as *Uumaa (Cosmology)*, *Waaqa (Supreme-Being)*, and *Saffu (Human Ontology)*. Customs and usages are underlying these

concepts, and the Oromos conceive the customs and usages as primordial-truths (Yoseph, 2016). In other words, the embodiment of the laws of nature must not be altered. Yoseph discerns Gadaa as an 'extremely complex' indigenous arrangement which comprises abstracted structural institutions that make up the 'philosophic-mode-of-thought' of the Oromo group of people. As an Oromo philosophy, the Gadaa serves as the agent for ensuring the survival of the Oromo culture (Yoseph, 2016).

Legesse Asmarom (1973) also offers his anthropological perspective to understanding the features of the Gadaa institution. In his work, *Gada: Three Approaches to the study of African Society*, Asmarom (1973) argues that the *Gadaa* institution comprises anomalous features that make it a living social system among the Borana people. He relates this concept of a living social institution to the ritual functions of the *Qaalluu* institution and describes *Qaalluu* as a spiritual approach to interacting with, and understanding of the natural environment.

Furthermore, Ketema Derera (2015), on the mediating role of the Gadaa system in commons' management of natural resources offers his justifications to why traditional institutions must be placed within the frame of governance to allocate resources and negotiate solutions. He points to the *Gadaa* institution as an embodiment of 'unique views and beliefs' of the Oromo and he adds that the institutional arrangements in the *Gadaa* system ensure a balance between the Oromo-Borana and their natural environment. Derera describes the indigenous *Gadaa* institution is a mediator for natural resources management that functions through decentralized customary institutions.

Moreover, in their study on the Borana conserved landscape, Bassi and Tache (2011) compared the decentralized system of *Gadaa* to the state-centric environmental conservation mechanisms. According to them, "the variety of specific rules and practices [under Gadaa] have historically ensured the sustainability and eco-compatible use of the communities' conserved landscapes" (Bassi & Tache, 2011, p. 182). However, they have skeptical of the capacity of the decentralized indigenous institutions and norms of the Borana to address rapid environmental challenges confronting Borana pastoralists in contemporary times.

3.2.2 Traditional Knowledge Systems

There are various terms used in describing the knowledge systems of indigenous people. Terms such as indigenous knowledge, traditional knowledge, traditional indigenous knowledge, and traditional ecological knowledge are commonly used interchangeably, depending on the context, in discourses relating to indigenous peoples' knowledge systems. In acknowledging the nuances of the concept, I use the terms 'traditional ecological knowledge' and 'traditional knowledge' interchangeably to refer to the traditional practices of natural resource management and coping systems.

Bruchac (2014) defines traditional ecological knowledge as a system that “encompasses sophisticated philosophies and practical measures that are intended to preserve cultural heritage and protect ancestral landscapes and lifeways” (p. 3). Traditional ecological knowledge derives from historical practices to skilled based traditions embodying community value systems, and found in the livelihood system of indigenous communities (Bruchac, 2014). In the context of indigenous peoples, traditional ecological knowledge refers to “indigenous peoples' legitimate systems of knowledge production that have empirically tested understandings of the relationship among living organisms and their environments” (Whyte, 2013, p. 2). It is a body of knowledge that guides human interactions in social-ecological environments (Nakashima, McLean, Thulstrup, Castillo, & Rubis, 2012).

Traditional ecological knowledge and western-science paradigms are both rooted in similar intellectual properties such as observations, interpretation, prediction, and adaptation, among others (Aikenhead & Michell, 2011). However, dismissive attitudes towards indigenous peoples' traditional ecological knowledge systems are still informed by the lack of appreciation and disrespect for indigenous paradigms (Ghosh, 2015). Whyte (2013) offers three explanations for such dismissive tendencies.

First, he identifies colonial and other discriminatory attitudes towards non-western knowledge systems as the reason why knowledge production systems of indigenous peoples are consistently overlooked and rejected by scientists and policymakers. Secondly, Whyte points to the challenges that result from scholars or professionals who, though not community members, are defining

traditional ecological knowledge and effectively imposing their outside views and agenda on indigenous knowledge holders. Thirdly, he argues that there is a division between indigenous expert and scientific expert authorities. The division, according to him, emerges from growing perceptions about traditional ecological knowledge as a competitor for authority with mainstream western-science based policies. Contrary to such perceptions, Whyte (2013) describes traditional ecological knowledge as a collaborative concept that brings different institutions together for management priorities.

Indeed, there are concerns regarding how indigenous peoples can construct legitimate arguments to back their ideas and practices within such colonizing controversies (Ormond, Cram, & Carter, 2006). In some western institutions, for example, African indigenous oriented-epistemologies on environmental conservation have been dismissed as ‘unscientific and delusory (Ani, 2013, p. 295). Contrary to that, however, researchers such as Schmidt and Stricker (2010) assert that there could hardly be any difference between the dominant western science and indigenous peoples’ epistemologies because, just like western-science, “TEK [traditional ecological knowledge] relies on qualitative observations collected by resource users from one place over long time periods” (p. 41). To Schmidt and Stricker, therefore, contemporary paradigms can use indigenous peoples’ traditional ecological knowledge to establish historical changes in remote regions where science-based monitoring systems lack information about.

Nicolas Houde (2007) observes that indigenous peoples’ traditional ecological knowledge emanates from six related aspects. The first aspect is factual observations. This aspect emanates from empirical observations of the components of the environment over long periods, and how environmental components interrelate. The second aspect is the management systems. It refers to the complex web of strategies for ensuring the sustainable use of local natural resources. The third aspect refers to the factual knowledge regarding past and current uses of the environment transmitted through oral history. The fourth form relates to indigenous epistemologies. It also refers to environmental ethics against exploitative behaviors and how things should be in terms of respect towards non-human entities, the environment, and between humans. The fifth aspect is the expression of traditional ecological knowledge as a vector of cultural identity. It refers to the expression of ownership of land as key to a peoples’ cultural survival. Thus, the rapid

transformation of the indigenous land can break historical connections with the past as well as eroding the peoples' sense of place. Indigenous peoples, therefore, express their traditional ecological knowledge as their way of strengthening their authority over their traditional land (Houde, 2007). The sixth aspect refers to indigenous peoples' cosmologies. It is about indigenous peoples' worldviews and how they understand human-nonhuman relationships and how that relationship affects social relationships, community obligations, and management practices. It also relates to indigenous peoples' philosophies about the natural world's spiritual dimensions (Houde, 2007, pp. 4-8).

On the spiritual or religions aspects of traditional ecological knowledge, Raymond Pierotti (2010) asserts that the spiritual aspects “emerge from attempts to comprehend the nature of a variable and somewhat predictable environment and efforts to establish covenants with the natural world that were designed to reduce the negative impact of human actions” (p. 17).

3.3 The Tragedy of the Commons

The beginning of the 1990s marks the rise in focus on the capacity of local communities to manage resources through their endogenous means (Singleton, 2000). The endogenous means are the variety of traditional institutional arrangements that pre-date state control and have functioned at the local level through customary rules on natural resource utilization (Singleton, 2000). Co-management, as a concept, is about working with indigenous communities. It is when management power and responsibility are shared between government agencies and indigenous/local communities (Diver, 2016). The concept first emerged as a response to dominant resource management practices in which assessments of environmental challenges in indigenous localities are carried out by government agencies, which are mostly based in the capital cities. Based on such assessments, plans are developed and implemented without consulting the local knowledge systems of indigenous communities. Sara Singleton traces the reasons for this colonizing management practice by policy makers to the influences of ‘the tragedy of the commons’ metaphor (Singleton, 2000). Garrett Hardin (1968) asserts that a tragedy occurs because:

Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom of a commons brings ruin to all (p. 4).

The ‘tragedy of the commons’ concept explains that individual resource users are driven by their short-term selfish interests to overconsume common resources to the disadvantage of other users and the destruction of common resources in the long run. The concept has been used to describe the nature of common resource use in various livelihood systems including fishing and pastoralist production systems. While the concept draws attention to problems with common resources, it proposes two remedies for avoiding this tragedy. Firstly, Garrett Hardin suggests the creation of a property rights regime that promotes individual responsibility for maintaining natural resources. Secondly, by imposing top-down regulations on the use-pattern of common resource areas. This is also known as a command and control remedy for the tragedy of the commons (Singleton, 2000).

While the concept of the tragedy of the commons helps in explaining the causes of ecological crisis, it overlooks the role of cultural norms of common resource sharing communities in regulating resource-use behaviors of common resource users. Elinor Ostrom (1990) acknowledges the inevitability of the tragedy of the commons in resource sharing environments but asserts that in conditions where social groups are relatively stable, norms tend to evolve to the point where social control mechanisms become efficient in enforcing rewards and punishments against destructive resource-use patterns that result in a tragedy of the commons.

3.4 Social-Ecological Systems and Resilience

A Social-ecological system is described as the web of human and non-human interactions within natural environments (Schlüter et al., 2019). The concept emphasizes a network of interdependence among different components of a social-ecological environment, and external shocks that affect this network of interdependence (Adger, 2003). As a category of people whose traditional livelihoods depend on land resources, indigenous people and their traditional livelihoods are both integral components of social ecological systems as adaptive systems (Nakashima et al., 2012). Under this social-ecological framework, therefore, adaptive systems are in constant state of interaction within their social-ecological environments (Berkes, 1999).

The concept of resilience relates to the capacity of adaptive systems to withstand external shocks and continue to engage in interactions within social-ecological environments (Adger, 2000). Adger (2003) notes that when hit with external shocks, adaptive systems either resist, adapt, or balance

resistance and adaptation. Resistance is the command and control approach of social groups (rules, policies, and regulations) to dealing with threats to their social-ecological environment, while adaptation is the process in which social groups accommodate threats and make adjustments (new technologies and flexible social institutions) to stabilize their social-ecological environment (Adger, 2003). Therefore, social groups that resist external shocks succeed in maintaining a stable social-ecological environment, but their livelihood system will be less resilient. On the other hand, social groups that accommodate external shocks, succeed in maintaining a more resilient livelihood system but will have an unstable social-ecological environment (Adger, 2003). In the face of climate shocks, social groups maintain themselves by having the ability to ensure a balance between stabilizing their social-ecological environment and maintaining their livelihood system (Adger, 2003). This balance is realized under the following necessary conditions:

- a) legitimate and resilient informal institutional structures such as traditional rules, trust norms, and networks that socialize behavior, as well as the legitimacy of formal governance structures such as state laws and institutions. Thus, the inclusion or exclusion of traditional institutions in policy decisions on sustainable use of natural resources determines their level of control over human-environment relations.
- b) Social group understanding of the nature of external shocks, and their ability to ensure that natural resource use frequency commensurate with the rate the environment recovers from external shocks.
- c) A stable social group. This refers to group homogeneity and population control (Adger, 2003).

Additionally, the nature of resilience needed for social groups in social-ecological systems is determined by the nature of climate change impact (Olsson, 2003). Thus, depending on the nature of climate shock, and the rate at which the environment recovers, strategies for building resilience must focus on strengthening either the absorptive coping capacity (maintaining livelihood system), adaptive capacity (adjusting livelihood system), or transformative capacity (changing livelihood system) of a social group (Olsson, Folke, & Berkes, 2004).

3.5 Sustainable Livelihoods Framework

The sustainable livelihoods framework derives from the social-ecological systems milieu, and it “facilitates the identification of practical priorities for actions that are based on the views and interests of those concerned” (Serrat, 2017, p. 22). This framework focuses on working with target groups of people to find long term livelihood options while building their resilience to environmental shocks. Put differently, it serves as a holistic people-centered framework that involves working with communities to help them identify the strengths they already have, and their existing assets they can build on in order to adapt and build resilience to climate change risks. Underlying the sustainable livelihood framework is the principle that sustainable elements exist in the components of an ecosystem (humans, institutions, and knowledge systems), which revolve around subsistence systems (Serrat, 2017).

As an analytical framework for understanding ‘what is’ and ‘what can be done’, the sustainable livelihood framework outlines five key areas that are important for identifying the sustainable elements needed for developing and maintaining the livelihoods of social groups (Morse, McNamara, & Acholo, 2009). These comprise:

- a) Human Capital: It refers to the physical skills, experience, and knowledge systems, which collectively enable a social group to adapt and maintain their livelihoods.
- b) Social Capital: It refers to a group’s social resources such as social network or social safety net systems which they rely on in times of shocks.
- c) Natural Capital: It refers to the natural resource base of groups that can be enhanced or improved, giving the right conditions. These include land, forest, water resources, among others.
- d) Physical Capital: It refers to enabling infrastructures such as roads, markets, traditional technology, and production inputs such as seeds, fertilizers, etc. needed for livelihood support.

- e) Financial Capital: It also relates to formal and informal financial resources, savings schemes, and insurance schemes that serve as buffer support systems against losses and poverty.

In nutshell, factors that affect the resilience of social groups to climate change risks include poor access to knowledge and information, inaccurate perceptions of risks and changes, static beliefs or cultures, weak social rules and norms, lack of social cohesion, conflicting power relations, and bad governance (Morse et al., 2009).

3.6 Summary

In this chapter, I reviewed the literature that are relevant to the focus of my thesis, as well as the analytical frame for discussing my findings. In doing so, I defined my premise for referring to the Borana pastoralists as an indigenous group of peoples in this thesis. Using arguments from Saugestad (2001) and Sissons (2005) on how groups of people in Africa can be located in definitions of indigenous people, I showed how the definitions apply to the Borana pastoralists. Also reviewed is the literature on the traditional pastoral practice of the Borana, and the indigenous *Gadaa* institutions as the fountain of indigenous knowledge of the Oromo nation in general, and the Borana pastoralists in particular.

In the conceptual framework section, I explored the various dimensions of traditional ecological knowledge and the context each dimension relates to. The remaining sections of this chapter focused on the analytical framework of this thesis. In respect of that, I discussed the concept of social-ecological systems and resilience as a framework for understanding the response strategies of social groups to climate shocks. Following that, I explored the sustainable livelihood framework and its underlying components that provide pathways to strengthening the adaptive capacity and resilience of social groups in social-ecological systems.

In the next chapter, I will be presenting and analyzing my field data. The presentation is done under different themes in order to allow for an understanding of how the dimensions of Borana pastoralists' traditional ecological knowledge are connected with the management of natural resources.

Findings: Traditional Institutions and Knowledge Systems of the Borana

“...there is the sharing of responsibilities among the institutions. The Gadaa [takes] control as the general institution that makes the rules and regulations, and it gives the responsibilities to the next institutions in order to manage the natural resources”

(Interview with Borana elder in Dubluk, 2019; translated from Afan-Oromo)

4.1 *Gadaa* – Fountain of Borana Indigenous Knowledge

In the literature review chapter, *Gadaa* was introduced as the powerhouse of Borana peoples’ indigenous knowledge system (Iticha & Husen, 2018). While *Gadaa* remains the overarching indigenous institution of the Borana, its role in natural resource management can be understood from the functions of the various sub-institutions. At the time of my field visits, many *Gadaa* ceremonies were ongoing, and Borana pastoralists were observing the rites of passage (*Balli*) under the *Gadaa* system. In the rites of passage, a retiring *Gadaa* class (*Luba*) hands over the military, legislative, and ritual responsibilities, among other social and economic responsibilities, to the next class (*Luba*). At the same time, the *Luba* is expected to be abreast of existing knowledge and customary rules that guide pastoralism within the Borana communities. As mentioned earlier, this new group of *Gadaa* administrators is led by the Abba-*Gadaa* and they will perform their respective roles for up to eight years. All forms of knowledge about the Borana people are passed on to the *Luba*, including the knowledge about how to govern natural resources use among the Borana people.

Taking Berkes’ definition of traditional ecological knowledge as: “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living things (including humans) with one another and with their environment” (Berkes, 1999, p. 8), the *Bali* ceremonies, and all the rites connected with the transfer of power, were precursors to my understanding of Borana’s cultural transfer of traditional knowledge.

4.1.1 Traditional Institutional Structure for Natural Resource Management

Administratively, the *Gadaa* practiced by the Borana people operates at two levels. The highest level relates to the responsibilities of Gadaa over the revision and enforcement of customary laws (*Aadaa-seera*) and the composition of the general assembly (*Gumi-Gayo*). As will be seen in subsequent paragraphs, the general assembly is responsible for reviewing old laws to meet current situations as well as promulgating new laws. Owing to the aesthetic value of nature and “the centrality of greenery in the Oromo worldviews” customary laws are intrinsically connected to environmental issues and natural resource protection, (Asebe, 2016, p. 100).

The second level of Gadaa relates to the internal affairs of the Borana administered through the clan laws (*Aadaa-gosa*). Clan laws are applied to regulate resource use among the clans and implementing pastoral security systems such as the *Buusaa Gonofaa* (mutual assistance). Although *Gadaa* is the highest administrative institution of the Borana (Asmarom, 1973), the clan system allows for autonomy in internal decision-making on the socio-economic life of the Borana people. For example, at the clan level, there is a distinction between patrilineal and residential groups. Wagner and Sherwin (2014) have explained that the patrilineal descent groups are concerned with the ownership of natural resources and its use as well as the composition of livestock for clan members, while the residential groups are concerned with the use of natural resources and the herding of livestock.⁹

Much as the various levels of administration under the Gadaa share resource management responsibilities, there are moral customs under the Gadaa system that place moral responsibilities on every member of the Borana community to protect the environment for the benefit of humans and wildlife. The concept of moral customs (*Safuu*), the Borana ethics and norms for sustainable resource management and environmental conservation, will be presented in the next section. The

⁹ In the pastoral social system of the Borana, Patrilineal descent groups are dispersed in different territories while Residential groups are less mobile.

See Marco, B. (2005). *Decisions in the Shade: Political and Juridical Processes Among the Oromo-Borana*. Bologna, Italy, Segretariato Europeo Per Le Pubblicazioni Scientifiche (SEPS).

traditional structure of resource management under Gadaa is summarized in the words of a research participant below:

There is a *Gadaa* council headed by the *Abba-Gadaa* and his *Hayuus* (Gadaa councilors). The *Hayuu* is sub-divided into *Hayuu-Yuuba* (councilors on social security) and *Hayuu-Garbaa* (rituals councilors). As head of the *Gadaa* council, the *Abba-Gadaa* assumes the ritual functions and he also intercedes in disputes among Borana pastoralists concerning access to natural resource use and access. He is also responsible for performing ceremonies in all the Borana villages at any point time during his eight-years leadership. Next to the *Gadaa* council are the *Meeda* (cluster of villages). The *Medda* is made up of representatives of Borana pastoralists from the various grazing areas or villages (*Reera*). Each of the *Reeras* (villages) are constituted by clusters of households known as *Olla* (households), headed by the *Abba-Reera* (heads of the village). By this form of social organization, the clusters of households share common grazing areas and *Ardaa* (land-use arrangements). This customary arrangement for the utilization of land and water resources is incorporated into the Borana moral custom called *Seera-fokko*. (Interview with Borana elder, 2019; translated from Afan-Oromo)

When I asked about the specific responsibilities of the various bodies, his response was that:

The *Ola* constructs the well, pond, enclosure and whatever in this area must be protected. When different villages settle in one area, this *Ola* is the rule of *Ardaa* is the same as the rule of *Ola*. Different *Ollas* come together. The *Ola* and the *Reera* [share] common problems in this area. *Reera* rules at the level of the district. So according to this, *Reera*, *Medda*, *Dedda*, and all resources are under the rule of *Gadaa*. All people understand the rules of natural resources, well, water. Depending on this, all the community must protect and conserve natural resources. (Interview with Borana elder, 2019; translated from Afan-Oromo)

The information above, demonstrates the traditional management structure of the Borana people, especially at the institutional level of *Gadaa*. In the subsequent sections, I present the cultural institutions and norms that regulate natural resource use and environmental conservation.

4.1.2 Oromo Moral Custom – ‘*Safuu*’

The Oromo moral custom of *Safuu* relates to the concept of taboo and moral values. Among the Borana, taboos are also referred to as *Seera-fokko*. The *Safuu* serves as a check against unacceptable practices in the everyday life of the Borana. It also refers to the misuse of pasture or water resources, as well as the abuse of livestock and wild animals. Similarly, it is a taboo for pastoralists to graze their livestock during certain times of the year when the grazing fields are left for pasture regrowth. Also, *Safuu* encourages individual members of the Borana community to be

of high moral standard and to respect nature. When asked about the significance of *Safuu* in protecting the natural environment, research participants explained *Safuu* as follows:

“With the Seera-fokko [Safuu], we are telling people to not engage in wasteful behavior. You can see that our water is drying up. We share water with the animals and even the ones in the forest. It is a taboo to deny life to people and animals. When you live by the traditional values, we respect each other and everything that has life. Waqaa [God] created us and he gifted us the nature to protect. When we destroy it [nature], we do not survive. That is why it is ethical to make sure that what is taken from nature should not deny the others” (Interview with Borana elder in Yabello, 2019; translated from Afan-Oromo)

The data shows that *Safuu* is the foundation upon which the ethical basis and responsibilities of the various indigenous institutions and practices of the Borana peoples are founded. One of such practices, which is presented later in this chapter, is the concept of *Arda-Jila* (Sacred Sites). Considering that moral customs underpin the responsibilities of Borana institutions in resource management, it is important to find the connection between *Safuu* and *Gadaa* to understand *Gadaa* as a traditional resource management system. This connection is found in the age-set system of *Gadaa* and the general assembly (*Guumi-Gayo*).

In managing common resources, the local system of monitoring the behavior of resource users helps to ensure the responsible use of common resources (Ostrom, 1990). In the field data, it is observed that the Borana moral custom of *Safuu* is integrated into the customary rules for resource management. This engenders responsible grazing behavior in the interest of the collective. In the group discussions, for instance, one of the participants stated that:

It is morally wrong for households or clan to own large numbers of livestock at the expense of others. It makes some herders gain an unfair advantage over others to use more pasture and water and this destabilizes the agreed resource sharing arrangement in the communal grazing areas. All of us here can own more livestock if we want to but for respect, we have for the guiding moral codes. (Interview with focus group, 2019; translated from Afan-Oromo)

This statement draws also attention to Elinor Ostrom’s view on the use of cultural norms as remedies for the tragedy of the commons. Therefore, as a natural resource management tool, *Safuu* expresses the Borana peoples’ environmental ethics and it defines the moral rights and

responsibilities of Borana pastoralists in their inter-personal relationships and with the natural environment (Kelbessa, 2013).

4.1.3 The *Gadaa* Age-Set System – *Hariyaa*

In the first chapter of this thesis, I mentioned that *Gadaa* is organized in an age-grade system that runs for 80 years. The age grades are categorized in ‘sets’ of ten age groups in ascending order from 1-8 years to 73-80 years. The system runs an eighty years cycle in which the various age sets are tasked with economic, social, and governance responsibilities. The customary governance structure also relates to the management of natural resources in the Borana landscape. A research participant explains further how *Gadaa* performs natural resource management functions:

The *Gadaa* and Age set focus on natural resource management. In *Gadaa* System, the Age set institution is not only working in resource management. When it comes to how to preserve the natural resources, they engage in different work for the communities like the constructing pond, and wells. The construction of ponds and wells are the responsibility of the age set. (Interview with culture and tourism officer in Yabello, 2019).

The response above describes the structure and responsibilities of the various age-sets. The first age-sets are called *Daaballi*. They are a group of young boys between 0 to 8 years. At this age, they are free and do not have any responsibilities. The second set, 9 to 16 years, are called *Gamme-Siisikaa* (juniors). At this second stage, the juniors attain their first rank in the Borana society as the ‘sons of *Guyyo*’ (sons of Borana). With this new status, the juniors are conferred with the responsibility for looking after calves, sheep, and goats, in addition to other minor roles. By assuming this responsibility, the juniors are trained to know the pattern of grazing, under established customs, from that young age until they reach the third stage of *Gadaa*. In the third stage, 17 to 24 years, the transition of the junior to the senior *gamme* stage (*Gamme-Gorguuda*) and it is at this stage that they learn about the customary rules of the Borana society, the environment, as well as the practical skills for hunting and defending their economic resources. The fourth grade is *Kuusa*, 25 to 32 years. At this stage, the *Kuusa* group begin to prepare themselves for leadership by assuming social responsibilities, taking part in *Gadaa* council meetings, and contesting for elections as future *Gadaa* councilors. The *Kuusaa* are expected to profess a sound understanding of Borana customary values and be of high moral standing. In the fifth stage called *Raaba*, age sets from 32 to 40 years are mostly concerned with fatherhood and

family duties until they assume power at the *Gadaa* grade from 40 to 48 years. The *Gadaa* grade is the highest political authority where a new *Abaa-Gadaa* and his councilors (*Hayuu*) perform overall leadership responsibilities under the Borana customary rules. In discussing the *Gadaa* grades, Zelalem (2012) draws a distinction between the various age-sets by describing the first five grades as the ‘active’ grade and the last six grades as passively providing advisory roles. It is found that the remaining six ‘passive’ grades are a generation of past *Gadaa* leaders (*Yuuba*) who serve in the advisory council of the *Gadaa* class in power, as well as other advisory roles in the general assembly called *Guumi-Gayo*.

4.1.4 *Guumi-Gayo* (General Assembly)

Guumi-Gayo functions as the legislative arm of *Gadaa* responsible for discussing and reviewing customary rules on every aspect of Borana life. Asmarom (1973) has described the general assembly as the highest and most important social organization of the Borana people. The word *Guumi* stands for assembly and *Gayo* means a location. The institution plays oversight responsibilities of the *Gadaa* class in power. The *Gummi-Gayo* is composed of persons with extensive wisdom in the Borana community. They engage in meetings at least once every four years to review existing rules, make new rules, or to discard old rules that are no longer relevant. During general assembly deliberations, members of other *Gadaa* grade such as the *Kuusa* age-set, retired *Abba-Gadaas* (*Gadaa-Moji*), clan elders, and the spiritual heads (*Qaluu*) are invited to offer their views on pertinent issues (Zelalem, 2012). Everyone is allowed to express their opinion on any issue of social, economic, and political concern to the people. The *Gummi-Gayo* institution is, therefore, built on a framework of consensus in decision making. Among the general assembly are traditional leaders who are custodians of Borana customary rules and regulations (Asmarom, 1973). In a *Guumi-Gayo* meeting I observed during my fieldwork, a large section of the Borana people from the various villages converged at the *Gadaa* center in Arero to deliberate on a water pipeline project of the government that runs through the grazing areas between *Dubluk* and *Arero* district. Some of the Borana pastoralists expressed concerns about the impact of the water pipeline project on the conserved rangelands while others saw the pipeline project as a prospect for ending the periodic drought problems facing the communities. Here, the general assembly was seen to be playing a judicial role, through the custodians of customary rules, in finding a balance between competing community interests under the customary institutional procedures. Also, the

general assembly takes decisions on the behavior of individual community members based on the norms on good behavior (*Safuu*) of the Borana. Some research participants mentioned that *Aadaa-Seera* is built upon the Borana moral customs (*Seera-Fokko*), which underpin the responsibilities of Borana institutions in resource management. According to Marco (2005), the *Guumi-Gayo* institution has the competence to formulate new laws, drawn from customary laws (*Aadaa-Seera*), to strictly regulate certain concerns of the community such as the utilization of natural resources, clan assistance, and ceremonies. In the interview with the knowledgeable elder in Dubluk, he describes the customary laws of the Borana (*Borana-Aadaa-Seera*) in the following terms:

We know about the laws of the government but any Borana person from here behaves according to *Aadaa-Seera* because we observe what it says. The customs are ours and what makes us survive as pastoralists. When you take *Aadaa-Seera* of Borana, some of the regulations under it are based on what we know about the water points, the pasture, the livestock, and even the spring. So if someone breaks the customs, *Gummi-Gayo* will decide on how to punish them. (interview, 2019; translated from Afan-Oromo)

The Knowledgeable elder's statement above shows that the *Gumi-Gayo* is a social institution of the Borana that contributes to sustainable resource management by making knowledge-based customary laws to set regulations for resource use.

4.2 Traditional Natural Resource Management Strategies

According to Bjørklund (1990), pastoral management systems do not necessarily imply periods of ecological breakdown or famine. He uses the case of the Sami to argue that pastoral management systems in indigenous communities are based on common ownership of land arrangement. This arrangement allows people to act collectively to protect common resources. It, therefore, stands against the tragedy-of-the-commons discourse that stresses individual ownership of herds and common ownership of land as the situation that leads to competition among individual herders for access to land resources and a consequential overgrazing problem.

From my observation of the grazing fields and water points in the Borana pastoral areas, my first impression of Borana pastoralism was that it is practiced in a harsh environment that cannot sustain the peoples' pastoral livelihood. As mentioned in previous chapters, the main ecological challenges within the Borana landscapes include desertification of grasslands and erratic rainfall

patterns. Therefore, persistent droughts and land degradation are common in all the Borana communities where the fieldwork was carried out.



Figure 1 Dharito pastoral area. (Fieldwork, 2019)

Droughts and land degradation remain the major ecological challenges confronting Borana pastoral areas. Figure 1 above is an example of the degraded nature of the grazing areas, and it shows. The rate of degradation also explains why conventional ideas of the mainstream perceive Borana pastoralism as a predatory livelihood activity on land resources (Boku, 2008). The traditional ideas with which the Borana pastoralists depended upon for many years to stay resilient to ecological stresses continue to exist within the institutional arrangements and norms for governing natural resource use and environmental conservation. My research respondent at the cultural and tourism office explained that the traditional ideas have been rendered dormant by formal institutions such as the peasant association (*Kebele*).¹⁰ Most of the research participants

¹⁰ Government administrative structure that is set-up the indigenous structure. Also known as the (PA).

expressed their confidence in the traditional methods over that of the formal institutions, which, according to the cultural and tourism officer, largely promote range privatization. When asked whether the Kebele would have been established if the traditional resource management strategies were producing positive results in terms of dealing with the drought issues, a participant in the group discussion said that:

The Kebeles are made up of people who prefer farming to livestock herding. How will they see anything good in the traditional ways? Borana land belongs to every Borana and so our way of pastoralism is to care about conserving pasture and water for everyone. We know that the weather pattern is changing and that is why we graze according to laws on pasture and water (*Seera-marra-bisanii*) to keep the Kalo closed off during the raining seasons. When the rain fails us, we just sell off the old and dry cattle and keep the calves and lactating herds inside the Kalos without going out into the main grazing fields that are reserved for the dry seasons. (interview, 2019; translated from Afan-Oromo)

The response above indicates that the traditional resources management arrangement of the Borana focuses on a use pattern in relation to the seasonal rainfall. The Kalo system allows for limited grazing while customary laws are set in place to ensure compliance with the communal agreement on resource use patterns in the interest of the collective. In what follows below, I present and describe the various resources management practices of the Borana pastoralists that are based on the peoples' understanding of their natural environment and traditional knowledge systems.

4.2.1 Seasonal Grazing - *Liban* and *Dirre* Pasture Management

In the previous section, I described Borana pastoralism as a system in the interest of the collective. Although Borana pastoralism considers pasture in the Borana land as a free resource, Borana pastoralism practically serves as a mechanism for checking against overgrazing and destruction of the environment. As can be inferred from the Dharito pastoral area (See Figure 1, *p.35*), persistent drought is a real challenge to Borana pastoralists. Invariably, this situation informs the government's pessimism of the traditional management systems of the Borana people. The Borana officer at the local administration office in Yabello emphasized this problem of neglect in his statement below:

...so far, indigenous structures are not considered in policy design and plan for natural resource management. If there must be a local acceptance of mainstream measures, it has to

be in a collaborative manner because they people have confidence in their local strategies that have been working for them for several decades” (Interview, 2019).

There is a suggestion in this statement that pasture management under Borana pastoralism is constantly changing to adapt to new ecological situations. The data indicate that due to several years of experience with varying climatic conditions, the Borana pastoralists have been able to identify several ecological zones within the entire Borana land. With this traditional knowledge in place, they have divided the Borana land into two grazing areas namely *Liban* and *Dirre*. These two broad grazing areas of the Borana land are each sub-divided into districts depending on factors such as seasonal variations, type of pasture and water sources, and livestock breed. Also, the land division is to control livestock numbers and limit herd movement. With regards to how these divisions help in pasture management, a participant in the focus group discussion briefly explained that:

Dire and Liban have their grazing areas in which Dire has 5 grazing fields (*Dhedas*) and Liban has 2. Dire is a total Borana zone, even including the areas in Kenya. Liban is around the East-Guji zone. The various grazing lands have their period of grazing. For example, when you are down there in Northern-Kenya and the land is very hot, you must visit that area during the rainy season only to graze, and when it is dry, you have to make to another place that is favorable to the dry season. The grazing areas are preserved for the dry season. Dire is very broad but the Dubluk is the center of Dire. Around Yabello is the Gomole grazing area. We migrate to the Gomole fields to graze during the periods after the raining season when the land is still green. But when it is raining, we either go to the Wayaama areas to graze, which is next to Somali, and in order to go there, we select among the livestock those whose nutrition is favorable to the special kind of pasture there which are only available during the raining season. And the others will be taken to the Golbo fields for grazing during the raining season only. During the dry season, we only concentrate on Dire here. Dire is therefore the center for survival of the livestock. (interview with focus group, 2019; translated from Afan-Oromo)

The response above provides information about the various grazing areas within Dire and Liban. Within Dire, there are 5 grazing areas namely Gomole, Baddomabaasa (*Dirre*), Wayaama, Malbe, and Golbo. On the other hand, Liban has 2 grazing areas namely Golbo-Liban (near river banks) and Dida-Liban (plain grasslands). Given the current ecological challenges, Borana pastoralists normally limit their grazing activities to Liban, during both the wet and dry seasons, while Dire is reserved for use in time of extreme drought in Liban or special kind of cattle breeds. Therefore,

grazing activities in Dire follow a resource rotation system and in Liban, a seasonal rotation pattern. These divisions are necessary because the Liban grazing areas have temporal water sources such as small river bodies and temporal rain pools while the Dire areas have somewhat permanent water sources such as the ancient deep wells (*tula*), springs (*Adaadi*), and some special type of grasslands. When asked about the reason behind the Dire and Liban grazing arrangement, a key participant's response was that:

We cannot use the same water sources for both animal and human consumption. The rivers and ponds in Liban areas can be used for the animals even in dry seasons. That is why in Dire, we keep the deep wells (*tula*) for the animals and the springs for human use. Also, there is more pasture here in Dire but we have to keep this for the milking cows and calves and to keep the environment for the rituals and ceremonies. But during the rainy seasons, the herds can move from Liban and come here to feed so that the grassland in Liban can grow back (Interview with former Abba-Gadda, 2019; translated from Afan-Oromo).

The response above indicates that the Liban and Dirre resource management system is remotely a sustainable system of traditional pastoral land management. The pattern of land use is such that the Dire area is used as a buffer grazing zone for only a few milk-producing cows and calves in the entire year while Liban caters for mobile herd foraging. In applying the Liban and Dire systems of pasture resource management systems, for example, the Borana have differentiated the seasons into dry and wet seasons to control the number and movement of cattle herds from place to place.

In dry seasons, the Borana move their herds to areas around the river banks in *Golbo-Liban* to graze while reserving the grasslands in *Dida-Liban* for grazing during the rainy seasons. It is only when there is drought in the two Liban grazing areas that the pastoralists are permitted by the customary rules to move their herds to Dire, where a resource rotation system is implemented.

4.2.2 Warra, Forra and, *Kalo* – Selective Grazing and Enclosures



Figure 2 Indigenous communal range enclosure system (*Kalo*) (fieldwork, 2019)

The rangeland arrangement is a limited grazing system in which enclosures are constructed in areas around deep well systems (*tuula*). I have observed more than ten different rangeland systems in the Dire grazing area. All the rangelands are constructed through the combined efforts of members of the Borana community. The traditional authorities allow the community to discuss and agree on how the rangelands will be allocated. The authorities step in when disputes arise over rangeland allocation. During the focus group discussion on the system of rangeland allocation, a participant stated as follows:

It follows the Gadaa system. The *Medda*, *Olla*, and *Ardaa* are all involved. Our representatives (*Medda*) divided the rangelands into *Kalo*, *Wora*, and *Foora*. All *Kalos* are for the calves and the cows that are weak or old. We use that only when the drought is severe and there is no pasture. The *Warras* are also for calves and weak cows but they are reserved for *Ardaas*. The *Forras* are reserved for grazing male cows and the cows that do not lactate. *Wora* and *Fooras* can be used by everyone in Borana during the dry seasons but the *Kalos* is

reserved for only households (*Ollas*). (Interview with focus group, 2019; translated from Afan-Oromo)

The data gathered also shows that the rangelands are placed under different categories according to the natural vegetation at a given location. In Borana pastoralism, therefore, grazing fields classified into bushlands, agriculture lands, and pasture lands. These classifications are informed by the pastoralists' ecological knowledge about the ideal places for the growth of specific pasture types and the category of livestock to graze in such places. For example, an elderly Borana pastoralist in Dharito mentioned that:

... not all the vegetation here is good for the cattle. When I look at the grass, I can tell the ones that are good for the goats or sheep but not for the cattle. So some of the rangelands are not for all the livestock. Also, the pasture in the Kalos can withstand the drought. So, the rangelands here near the settlements are all Kalos for calves and the lactating cattle. However, the vegetation in Warra and Forra areas also have medicinal use. That is why they come from far away from here (Dharito). (Interview, 2019; translated from Afan-Oromo)

In addition to that, the bushland vegetation is conserved to protect certain tree species like the Acacia tree (*Daddacha*), which, according to a pastoralist, promotes the growth of pasture. It is, therefore, against the conservation ethos of Borana people for acacia trees to be cut down in the bushlands. His response below highlights this point:

As we are grazing our livestock, we care about conserving pasture, water, and the land itself by not cutting the trees. Some plants in the Yabello grazing fields are good for the sheep and some cattle. Those plants grow well around the Dhachach (Acacia) so it is not our advantage if we allow those trees over there to be cut. [translated from Afan-Oromo]



Figure 3 *Acacia (Daddacha) Bushland conservation in Yabello (fieldwork, 2019)*

With regards to the names of the various vegetation, Gemedo-Dalle et al. (2006) have provided details on that in their study on the indigenous knowledge of plants and their uses among the Borana. They mention *Gurbii-hoolaa* (*Indigofera volkensii*)¹¹ as forage plants preferred by sheep, *Qilxiphee-gaala* (*Indigofera spinosa*) preferred by camels, the *Daboobessa-baddaa* as a general pasture for cattle and other livestock including donkeys.

A selective grazing system in Dirre is implemented during the dry seasons by way of herd splitting (*Muura*). Livestock are split into *warra* and *forra* herds. The *warra* herds are sent out into far away *warra* fields to graze while a few *forra* herds graze in *forra* fields, which are reserved as rainy-season pasture. There are five demarcated grazing areas in *Dirre* for *Warra* grazing. These are *Gomole*, *Baddomabaasa* (*Dirre*), *Wayaama*, *Malbe*, and *Golbo* are the framework of the rotational grazing system. These five grazing locations are subdivided into permanent and temporal

¹¹ They used the taxonomic names (all in parenthesis) to describe the various vegetation types.

rangelands. The permanent rangelands are established in *Baddomabaasa* (Dire), where all year grazing activities are carried out.

The temporal rangelands, on the other hand, are located in *Gomole*, *Wayaama*, *Malbe*, and *Golbo*. The rangelands in these places are clustered near deep wells and grazing is done from cluster to cluster, according to the number of livestock, over a specified number of days set by the overseer of rangelands (*Abuuro, Abaaheda*). When asked about the systems in place to avoid overgrazing within the clusters, an elderly Borana pastoralist responded by stating that:

In Dire, we know that the pasture here re-grow quickly even when there is very little rainfall. So we monitor the livestock when they graze and make sure they don't eat beyond the last layer of grass above the soil. As soon as we observe the pasture reaching that level, we move the animals to the next encampment. But as for the donkeys and horses, we keep them at home during this time [dry season] to feed on the extra pasture harvested during the rainy season and the ones that grow outside of the Kalo fence. (Interview, 2019; translated from Afan-Oromo)

The experiences of the Borana pastoralists with droughts in previous years have led them to develop this rotational grazing system as a strategy against the effects of the perennial droughts on the Borana lands. According to Homann Sabine (2004), the traditional practice of herd splitting between lactating cattle herds and calves from the non-lactating and male cattle herds, as well as sending herds into remote rangelands in the *Forra Warra* grazing areas, helps the Borana pastoralists to “manage the needs of the herds with available forage and water resources” (p. 164). This traditional practice of *Muura* (herd splitting) is implemented to conserve and protect pasture resources from overgrazing and land degradation. When the drought situation intensifies, the livestock in the *forra* rangelands are maintained in the enclosures while the *warra* herds are de-stocked by selling and replacing them with drought resistant livestock such as camels and goats to minimize the pressure on the *forra* grazing lands and avoid ecological catastrophe.

4.2.3 Traditional Bush Burning Practices

Traditionally, the Borana pastoralists engage in controlled bush burning in the dry seasons as a way of preparing the land for pasture re-growth in the raining seasons. Bush fires are avoided by limiting the burning to the grazing areas within the rangelands. With their knowledge about the ecology, they can differentiate between vegetation species in the various grazing areas. This has

helped them in identifying and burning vegetation species that inhibit forage growth within the rangelands. For instance, a herder I met at rangeland in Dharito stated that: “there is extreme drought in every 3 to 4 years in Dirre and Liban and that is the time when we burn down some of the unwanted plants in the grazing fields”. When asked why they burn those plants, his response was that:

... those woody plants harbor ticks in them, they consume more groundwater and prevent grass that use to grow even in the dry season from growing. The animals don't eat them and we lose more grass when we try weeding them out. That is why we burn the field sometimes so that the good grass we know will grow and last longer for the animals in the dry season. (Interview with herder, 2019; translated from Afan-Oromo)

With regards to the specific vegetation species, Gemedo-Dalle et al. (2006) have stated that the traditional ecological knowledge of the Borana pastoralists informs their knowledge about the quality of grass species such as *Pennisetum mezianum*, *Chrysopogon aucheri* and *Digitaria milanjianafar* which, according to them, are drought resistant grass species found in the Borana landscape.

4.2.4 *Ella, Tuula, and Adaadi* – Borana Water Management Systems

Generally, the traditional institutional structure for water resource management among the Borana follow the same pattern of usage as pasture resource management. According to the person in charge of water points in Dubluk (*Abba-Herega*), the traditional *tuula* wells in Borana land were originally dug by the *Warda people*¹² who were the first inhabitants of the present-day Borana land. Considering that the wells have existed long before the Borana people came into contact with the *Warda* (Sabine, 2004), it may be said that the Borana pastoralists were not responsible for the construction of the *tuula* wells, although Asmarom (1973) affirms that the *tuula* wells were dug by the Borana people.

¹² The Warda people are the present day Orma pastoralists in Kenya.

There are up to nine tuula well sites in Borana land spread across various districts. During the site visit in *Dubluk*, I observe some of the ancient *tuula* wells and the management practices associated with the wells.



Figure 4 Tuula well depression in Dubluk (fieldwork, 2019)



Figure 5 Image of an Ancient Tuula aquifer (deep well) showing the indigenous water harvesting technology of Borana pastoralists. (Image was originally taken by Carsten ten Brink in 2019. Downloaded from <https://www.nmbu.no/en/faculty/landsam/departement/noragric/publications/publications-2019/node/38282> in April 2020)

The images above show the two main types of tula wells – depression wells and aquifers (Figure 4 and Figure 5). These wells are both referred to as ancient *tuula* because the wells predate the

history of Borana people and the traditional technology for digging the wells seems to be a forgotten art (Helland, 1980). The wells continue to serve the water needs of the Borana pastoralist from all surrounding areas, especially during erratic rainfall periods.

There are up to three traditional institutions responsible for managing *tuula* wells – *Konfi* (general overseer), *Koora-Ella* (management council), *Abba-Herega* (supervisor). *Konfis* assume their oversight roles by virtue of being descendants of *Abba-Ellas* (*head of Wells*). The *Koora-Ella* is made up of clan elders whose responsibilities include making water rationing plans for the herds during the dry seasons, granting permission to neighboring pastoralist communities to the well sites, and regulating the herd ratio to each well site at a time. The *Abba-Heregas* are stationed at each well site to supervise the daily use of the wells, as per regulations of the *Koora-Ella*.

The depression wells are designed for self-use by the herds while the aquifer wells are designed for water harvesting. Apart from the *tuula* wells, springs (*Adaadi*), and two main river bodies – *Daawwa* and *Saagan* rivers are also part of the traditional water management strategies of Borana pastoralists (Marco & Boku, 2011). *Adaadis* are the springs that flow at the foot of mountains in places such as Yabello. They provide temporal water supply during the raining seasons and are mainly for household use and the milking cattle, weaker livestock, and calves in Kalos. Furthermore, the *Daawwa* and *Saagan* rivers serve as main water sources for the pastoralists during the raining seasons. Therefore, there is less pressure on the traditional well sites during the rainy season.

Although the *tuula* wells provide permanent water supply during the dry seasons, the supervisor I spoke with at the *tuula* well site in *Dubluk* stated that current climatic factors threaten the survival of the wells. According to him:

The *tuula* wells do run out sometimes if we do not allow it to ‘rest’. In these times (dry seasons) we do not allow the herds to come here every day to drink from the wells. They only come here once every three or four days because the cattle can stay for 3 days without drinking water. The wells take about two to three days to refill and so I make sure that the herds will only return here after three days. (interview with Abba-Herega, 2019; translated from Afan-Oromo)

In addition to that, the traditional *tuula* wells are constantly exposed to flash floods, dusty winds, and evaporation. In my conversation with the *Abba-Herega*, he stated that apart from the excessive livestock herd thronging the *tuula* well sites during long drought dust carrying winds and excessive heat create difficulties for efficient management of the wells *tuula* wells. In his words:

The water level reduces when there is heat, and the dusty winds also deposit a large amount of sand into the wells. This eventually make the wells unusable until we re-dig them again. (interview with *Abba-Herega*, 2019; translated from *Afan-Oromo*)

In *Dubluk*, I have personally observed numerous relics of old wells that had dried up, and were abandoned because the piles of sand washed into them have rendered them unusable. During the site visit, I observed the practical aspect of the management process of the *tuula* wells. As many as six people (*gogessa*) work together to scoop water from the base to the surface, where the water is then channeled to a drinking area designed for the herds. Herds are divided into groups to avoid overcrowding in the drinking area.



Figure 6 *Naanniga* - Traditional watering trough technology (*fieldwork*, 2019)

The pastoralists were experiencing water shortage at the time of my field visit and there was a watering plan implemented by the *Abba-Herega* at the well site. The plan involved a reduction in

the drinking frequency for cattle, sheep, goats, and camels from a daily frequency to a three-days use frequency. This was part of the water conservation practices in periods of extreme ecological stress.

Helland (1980) observes that the water management strategies of Borana pastoralists are “a sophisticated system for the utilization and control of water which has several important implications for the ecological balances involved in their adaptation to their environment” (p. 23). The field data shows that the traditional pastoral livelihood system among Borana people thrives on a balance between the scarcity of natural resources and accumulated years of knowledge about ecological disturbances, and appropriate adaptation options.

4.3 Arda-Jila – Sacred Sites

The concept of sacred sites (*Arda-Jila*) among the Borana is traditionally conceived as an environmental conservation framework. Marco and Boku (2011) emphasize that the conservation ethos of Borana people is not always expressed in explicit terms and thus, “indigenous conservation is often indirectly achieved following culturally-specific values, beliefs, and ritual practices” (p. 177). In Borana land, there are many sacred sites reserved as natural areas and linked to *Gadaa* ritual ceremonies and Borana pastoralism. There are vast stretches of pastoral lands *Liban* and *Dirre* grazing areas that are conserved as sacred sites. The sacred sites are placed under the trusteeship of the Borana spiritual institution called *Qaalluu*. In my interview with a key participant about the reasons why the Borana people have sacred sites inside the grazing areas, he stated that:

They are for spiritual purposes that are carried out by the *Qaalluu*. *Qaalluu* is part of *Gadaa*. *Qaalluu* embodies the religious customs of the Borana and it serves as the wisdom of *Gadaa*. *Qaalluu* keeps the harmony between Borana people and nature through ritual pacification in the sacred sites. Due to that, certain areas within all the grazing areas in Borana are left untouched in their natural state for ritual functions. (Interview, 2019; translated from Afan-Oromo)

In the Borana landscapes, the *Oda* (sycomorus) is a sacred tree associated with the *Qaalluu*. According to a research participant, any place within the landscape where an *Oda* stands or sprouts is considered religious or spiritual center (*Arda-jila*) for connecting with God (*Waqaa*). In addition to that, the acacia tree (*Dhaddacha*) is equally used for ritual purposes.

Although there is a high demand for pastoral resources in the grazing areas, the Borana people continue to keep sacred sites as protected areas for the conservation of native plants and tree species that help in maintaining the ecological balance within the Borana landscape. For example, when a Borana elder was asked whether livestock are allowed to graze in the sacred areas in periods of severe droughts, his response was that:

It is customary for us to separate sacred spaces from human settlement and grazing areas. As the custodians of Borana land, we must protect the sacred areas for our spiritual rites. We are not concerned about our livelihood alone. The sacred spaces are left untouched because they are a part of us. But when the droughts are severe, only the important breeds (Boran breed) are taken there [sacred spaces] to graze. Otherwise, it will be a taboo if someone sends their herds there. (Interview, 2019; translated from Afan-Oromo)

During my field visit in Dharito, I observed a ritual rite (*Dhibayyuu-Ella*) at the Dharito sacred-site where the Qaalluu high priest slaughtered a male goat (*korma-korbeessa*) under a *Dhaddacha* as a religious practice of calling on God (*Waqaa*) to heal the land of droughts. After that, the priest emptied a jar of fresh milk into a stream flowing in the sacred site. The symbolic meaning of this ritual rite was explained by a participant in the following words:

The rituals are part of our culture and we are here to grace *Waqaa* (God). We performed *Dhawha-dhibayu* (prayers) at a stream to ask God to bless our water sources... we take off our shoes and go nearer to the water and pour the milk and grass into the water and ask the gods to bless the water and pasture. Even during periods of extreme drought, the Borana people understand that grazing activities are not carried out in areas reserved as sacred sites of commune with *Waqaa* for his 'blessings' of rain and pasture. (Interview, 2019; translated from Afan-Oromo)

I also observed that most of the sacred sites of the Borana people in places like Dubluk are surrounded by vast stretches of open woodlands of *Dhaddacha* trees and near some special *tuula* wells that reserved for only ritual purposes. Therefore, access to *Arda-Jila* is restricted by taboos and other management codes that place a temporal or permanent ban on the establishment or extension of human settlements into sacred areas. Another research participant I spoke with in Dharito mentioned that in the past years, forest areas in all of Borana land were regarded as sacred sites due to the respect they had for the wildlife in Borana land. According to him:

The lions, hyena, the birds, and the many other forest animals were here before we arrived. We have lived with these animals as neighbor but we are visitors here and they were here before us. The trees, and plants, and water ponds in the forests are for their survival and so for us, it is a taboo to take away what belongs to nature. Gadaa is a system of equality for everyone, not only humans. That is why *Badhaa-Sadeen* [forests] remained sacred for the wildlife. Sadly, we don't see the animals around as we used to many years ago. It is because the wildlife has moved further away into the forests behind the mountains. Many of the forests that were sacred sites have disappeared, just like the way our Dhaddacha in the Arda-Jilas are disappearing today. (Interview, 2019; translated from Afan-Oromo)

Also, tree cutting and hunting activities as well as hunting, grazing, or bush clearing for agricultural purposes are forbidden in forest areas (*Baddhaa-Sadeen*). The knowledgeable elder I interviewed at the ritual village in Dharito mentions that:

People are afraid to cut down trees in the forests because the Borana people believe that cutting down a forest tree whose branches are used in rituals will shorten the life of the individual. The trees represent the retired *Gadaa* elders in Borana (*Jaasa-Borana*) and the Borana society as a whole is represented by the forest. The wisdom of knowing that Borana society will fall apart without its elders is the same wisdom applied to the forests in knowing that the forest will not survive without trees. In the past, the forest produced spring water (*Adaadi*) because the trees keep rainwater in their roots but when people began to cut down some of the trees for building houses, the springs have disappeared. It means that when there is further destruction of the trees and the forests are gone, we cannot survive here because we need water for everything. The various sanctuaries in the forest (*arda*) serve as our way of keeping the forest as the abodes of God (*Waqaa*). We go there to worship and offer prayers to God during *Gadaamoji* ceremonies for more rain and forage. [translated from Afan-Oromo]

As seen in the picture below, forest areas that were previously kept as sacred sites are eroding rapidly because most of the native trees needed to retain rainwater in the site have been cut down by some community dwellers for other purposes such as charcoal making and for building houses.



Figure 7 Eroded sacred site terrain in Baddhaa-Yabello (fieldwork, 2019)

Traditionally, the Borana people practice the *Waaqeffataa* religion, although Islamic and Christian religions have become popular among the people. In the *Waaqeffataa* religion, an article of respect (*Salaa-Fokko*) for natural areas in the Borana landscape is found in their customary prayer rite that says, '*Tulaan sallan naga, Baddhaan-sadeen Naga*'. This translates to 'Peace to the nine Tuula wells and peace to the three forest areas of Borana'. This value of respect for the natural environment continues to impact the resource management practices of the Borana people. A Borana elder said that this conservation custom is gradually losing its essence to the influences of Christianity and Islam. According to him:

A lot of the forest cover in some of the sacred sites have been damaged by people in the Borana community who do not value the traditional *Waaqeffataa* religion. What I fear is the expansion of Christian and Islamic religions and how they are affecting the Gadaa traditions. The *Qalluu* and sacred sites are traditional values that are part of Gadaa. (Borana elder in Yabello) [Translated from Afan-Oromo]

Much as the concept of *Arda-Jila* expresses the indigenous conservation ethos of the Borana peoples, the Borana conception of sacred sites is rooted in their traditional ecological knowledge of the relationship between natural areas and water resources, plants, and animal species and how this intrinsic relationship influences the ecological balance in Borana land. However, this

conception of sacred sites among the Borana does not mean an outright restriction on the resources inside the sacred areas. As pastoralists, the benefits that the Borana people gain from keeping sacred natural sites are emphasized in Marco and Boku's study on the Borana conserved landscapes in which they mentioned that:

The forests have an important function as the last refuge for grazing in case of drought and are a reserve for medical and ritual plants. They were not subjected to special management provisions, apart from the very strict prohibition against starting fires in the forest. (Marco & Boku, 2011, p. 178)

4.4 Borana Perceptions on Climate Change

I gathered data on local perceptions of climate change through informal discussions with the *Jaasa Arga-Dhaageeti* (knowledgeable elders), a weather forecasting expert, and the focus group participants. For instance, during the group discussion, I asked about the environmental changes they have observed in the past ten years and they responded that the temperature in the landscape has become warmer and due to that, there has been an increase in livestock diseases and pasture eating pests. According to one them:

Since about twenty years ago, the incidences of bushfires have become more frequent than they use to be. Sometimes, we burn the bush areas by ourselves to get rid of some unwanted weeds that are growing in the *Dhedas* (grazing area). But a lot of the bush fires these days are not from us. They come from the heat from the sun. Our families in Moyale used to move up here with their livestock to avoid the heat there but they don't come here anymore because the heat here has also become unbearable. (Interview with focus group, 2019; translated from Afan-Oromo)

When asked what they thought were the reasons for the rising temperatures, another said that:

It is because the rainy seasons are getting shorter. Sometimes the drought lasts the whole year without even a drop of rain. We have been a little lucky this time because the rains came last year and the year before but we haven't seen it this year. (Interview with focus group, 2019; translated from Afan-Oromo)

When the traditional weather forecasting expert in *Ayantuu* was asked the same question about why he thinks the weather patterns are changing, his response was:

... it could be from the clouds because it is becoming difficult to read the direction of the winds these days. Sometimes the clouds look strange to me. I could see dark clouds that are

supposed to bring rains but they quickly disappear. (Interview, 2019; translated from Afan-Oromo)

Also, when asked whether human actions could be causing the climatic changes, his response was:

We as humans cannot control the wind or decide whether to have warm and cold temperatures or to make the rainfall. That is the power of *Waqaa* (God). Maybe people do bad things that affect the environment because the rains use to fall a lot in the forests where we have the *Adaadi* (springs). But because people are cutting the trees and using them to build their houses, the trees that are supposed to hold the clouds are all gone. That could also be the reason why the rains don't fall that much in the forest in recent times. (Interview, 2019; translated from Afan-Oromo)

One of the *Jaasa Arga-Dhageti* (knowledgeable elders), speaking about the changing weather patterns, said:

The grazing lands have been rapidly reduced. Large portions of the traditional grazing lands have been washed away by floods and some parts of the grazing fields are even buried under mud. It has become difficult for us to understand how the rainfalls these days. We were told that the sky is troubled by the smoke from the 'big countries' and the smoke from bush burning are causing all the heat and bad rains to happen. (Interview, 2019; translated from Afan-Oromo)

The responses above show that the Borana pastoralists acknowledge the changing climatic conditions. It also shows the various ways in which the Borana pastoralists interpret the causes of climatic changes. The perspectives the research participants shared here relate to their weather forecasting practices.

4.4.1 Traditional Weather Forecasting System

As part of their traditional knowledge systems, the Borana pastoralists also have a set of traditional indicators for predicting weather patterns. The traditional system of land use of the Borana relies on traditional weather forecasting systems for information about seasonal changes, livestock behavior, and vegetation growth. The knowledgeable elder in Dubluk explained the Borana seasonal variations as follows:

Through information from the *Hayyantu* (calendrical experts), each year is divided into 4 main climatic seasons. These are *Bonna-haagayya*/period of severe dry season (December, January, February), *Ganna*/ heavy rainy season (March, April, May), *Adoolessa*/mild dry

season (June, July, August), and *Haagayya*/mild rainy season (September, October, November). The traditional weather forecasting system also helps us to predict whether the coming year will be good or bad so we can decide if we should sell away the cattle or keep them if the year is expected to be a good one. (Interview, 2019; translated from Afan-Oromo)

Data from a related study on the indigenous weather forecasting system of the Borana, conducted by Iticha and Husen (2018), indicate four types of indigenous weather forecasting systems namely *Waragu*, *Arga-Dhageti*, *Uchu*, and *Ayanttu*. The *Waragu* system uses animal indicators through the observation of livestock behavior. In this traditional method, drought is forecasted when cattle are observed to be sleeping close to each other or when bulls are constantly isolating themselves from the herd and showing symptoms of low libido. On the other hand, rain is predicted when the cattle are grooming unusually by lick each other's bodies (Iticha & Husen, 2018).

Secondly, The *Arga-Dhageti* system involves the observation of natural occurrences in the past to draw a correlation with future occurrences. According to a research participant in Dharito, the Borana keep a record of every past *Gadaa* generation by linking them with specific ecological disasters such as periods of bushfires, flooding, livestock epidemic, etc. that occurred during a generation's eight-years tenure. Therefore, the *Arga-Dhageti* gathers information for weather forecasting by observing and finding correlations in the signs of past ecological stresses that occurred during the tenure of previous *Gadaa* leaders as indicators for predicting the future. Iticha and Husen (2018) refer to the Borana forecasters who use this traditional weather forecasting approach as the 'time experts' who can recall drought events in retrospect.

Thirdly, the traditional *Uchu* weather forecasting system involves intestinal reading by local experts called *Usaa* to predict future epidemics and droughts. Lastly, the *Ayanttu* is used by traditional astrologists (*Urgii-Elaltuu*) to forecast weather through observations of star movement, forecast seasonal changes by observing the alignment of the stars with the sun, and predicting droughts by observing wind direction and cloud movement (Iticha & Husen, 2018).

Traditionally, the Borana pastoralists rely on information from local experts in the various weather forecasting models to take adaptive measures such as when to migrate their livestock, how much pasture to reserve in *Kalos* (enclosures or rangelands), and whether to maintain or reduce the

number of their livestock. When a Borana pastoralist in *Dubluk* was asked about the reliability of such traditional weather forecasting approaches, his response was that:

The way our parents trusted them in the past is not the same way we can trust them these days because sometimes they are right but they also get it wrong most of the time. There are not many of them [traditional weather forecasters] left in Borana because the younger ones are not showing interest in learning the skill. (Interview, 2019; translated from Afan-Oromo)

When asked about the reliability of the traditional weather forecasting system in helping the pastoralists respond adequately to changing climatic conditions, the traditional weather forecasting expert in Yabello said that:

The weather patterns use to be repetitive in the past so it was easy to predict the seasons when the bulls stop mating or when the winds are blowing in a particular direction. But these days, it takes a long time to be able to predict the weather because some people have introduced other breeds of cattle that behave differently from the ones that we use to observe. Also, the forests are not here anymore so it has become challenging to observe the direction of the wind appropriately. The changes in the topography of Borana land are the main reasons why the predictions do fail sometimes. If not for that, I have never doubted the signs. (Interview with traditional weather forecaster, 2019; translated from Afan-Oromo)

4.4.2 Borana Perspective on Climate Change Adaptation and Resilience

This part of the field data sought to find out how the traditional knowledge systems can contribute to the adaptive capacity and resilience of Borana pastoralists to the effects of climate change. In the data under sub-heading 4.2, it is seen that the Borana pastoralists deal with recurrent droughts by relying upon the various traditional knowledge-based pasture and water resource management strategies outlined. When asked whether such traditional management practices were adequate to help them confront growing ecological stresses of climatic changes, a pastoralist at the *tuula* well in *Dubluk* remarked:

I am sure the people who dug these wells faced the same challenges that we also are facing today. I am not worried because these wells have never dried up and I don't think they ever will if people will abide by the watering arrangements of Abba-Herega and reduce the number of their livestock. (Interview, 2019; translated from Afan-Oromo)

Figure 4 and Figure 5 are the *tuula* wells that were dug centuries ago by the pastoralists at the time, and the wells continue to serve the water needs of the Borana pastoralists. With regards to the

rising temperatures and degradation of grazing lands, the group participants shared varied views on how the traditional resource management strategies can be useful:

Pasture grows very well from Yabello up to Bule-Hora (100km distance) even with little rain. But it is good that we have to stop the migration and it is time we change the grazing laws that allow the Borana communities in the south (Kenya and Moyale) to move up here for pasture. (Interview with focus group, 2019; translated from Afan-Oromo)

We can continue to restrict grazing to only the Kalos for the drought-resistant livestock breeds and use the degraded parts of the land for other purposes that can benefit the community. That is why I am in support of the initiative to introduce the agrarian way of life. (Interview with focus group, 2019; translated from Afan-Oromo)

We need more assistance from the government and the NGOs. When they are here and we tell them how we have been managing things here, they can advise us on how to improve the land to make it productive. But we also need the government to help us protect the sacred sites from the expanding population. (Interview with focus group, 2019; translated from Afan-Oromo)

On the question regarding how the traditional resource management practices contribute to their adaptive capacity and resilience to the environmental impacts of climate change, the research participants have all mentioned that external supportive mechanisms are crucial for the survival of their pastoralist livelihood. At the same time, they mentioned certain factors that threaten the effective functioning of their traditional institutions for natural resource management.

4.5 Challenges to the Traditional Management System

Despite the ingenious ways in which the Borana pastoralists negotiate natural resource use at the community level, the findings reveal numerous challenges that hinder the traditional resource management systems. So far in the data presented, it is seen that the Borana peoples' key adaptation and resilient strategies rest upon the *Liban* and *Dirre* seasonal grazing pattern while relying on the traditional wells for water needs. That notwithstanding, still, there are inadequacies in all the aforementioned traditional natural resource management systems, which inhibit the adaptive capacity and resilience of the Borana pastoralists to adverse effects of climate change. The adequacies result from the following challenges in the findings.

4.5.1 Population Expansion

All the research participants I met with have indicated that the main threat to their adaptive capacity is population expansion. During the group discussions, for instance, one of the participants stated that:

Mostly, our livelihood is not affected by environmental changes. We have been dealing with that problem for a long time now. But what challenges the livelihood is urbanization and the population pressure that increases the settlements and shorten the grazing land. We use to move from place to place to find water and pasture, but we are no longer able to do so. (Interview with focus group, 2019; translated from Afan-Oromo)

During an informal discussion, a Borana pastoralist in *Yabello* expressed his concern for the shrinkage of communal grazing lands by stating that:

Many people are getting attracted by the increasing number of urban settlements here. Some of them are Borana from Kenya but the majority of them are farmers from the neighboring tribes. They are those buying the productive grazing lands for crop farming. Because of that, those of us keeping large herds of livestock were left with no other option beyond pulling our resources together and bought some plots of land, which we have been using as private enclosures for our herds. Now, the problem is that not every Borana household has the financial resources to own a private enclosure. (Discussion with Borana man, 2019; translated from Afan-Oromo)

During the fieldwork, it was observed that numerous permanent settlements are springing up within the *Dirre* grazing area as a result of the rising population. The permanent settlements in places like Dubluk and Yabello have constricted the grazing lands reserved in *Dirre* for dry season grazing areas. The situation further reduces the carrying capacity of the *Dirre* grazing fields, as well as the adaptive capacity of the Borana pastoralists to ecological disturbances.

4.5.2 The Peasant Association (*Kebele*) and Erosion of Traditional Institutions

Secondly, a majority of the pastoralists have pointed to the new peasant association (PA) as a challenge to the traditional roles of *Gadaa* institutions in terms of natural resource management. The peasant association, locally called *Kebele*, was established in the 1970s by the government and it has since been functioning in parallel to the indigenous institutions (Sabine, 2004). A research participant explained that members of the *Kebele* are ‘young’ government appointees who

have little practical experience in pastoralism and they make decisions on pastoral affairs without consulting the traditional elders. The former *Abba-Gadaa* described the Kebele in the statement below:

The *Kebele* is a foreign power structure that undermines the authority of the Gadaa institutions in our pastoral affairs. Now there are dual regulations here. We have government regulations that are being implemented by the Kebele and our traditional regulations. When a person is punished according to the Gadaa tradition, the person goes to the Kebele for such traditional rulings to be disqualified. This weakens the power of the indigenous institutions. Our traditional regulations on herding are based on our knowledge about the nature of the various grazing areas. Before they (*Kebele*) came here, we knew where to go when there is drought and we also knew the appropriate time to reduce the herd stock. But now, the seasonal grazing system has changed because of the Kebele policies. (Interview, 2019; translated from Afan-Oromo)

Similar to the above, findings from previous studies have shown that the *Kebeles* have implemented numerous land reforms that have impacted the Borana pastoral system such as fragmentation of Borana land for agriculture, while little is done to improve rangeland conditions (Belayneh, 2016; Boku, 2008; Degen, 2011; Sabine, 2004). A research participant in the group discussions mentioned that although the *Ollas* (villages) are against the use of grazing lands for crop cultivation, the *Kebele* is now in charge of making decisions concerning land access and procurement for farming purposes. Due to that, regulations made by the traditional institutions are, in most cases, subject to review by the *Kebele*.

In presenting the challenges confronting the traditional pastoral system of the Borana, it is also important to emphasize that although a majority of the participants in the interviews acknowledged the link between climate change and the ecological stresses within the Borana landscape, they claimed that such ecological stresses are situations they have learned to adapt in the past; but are now being deprived of that adaptive capacity by mainstream policies and actions. According to the natural resource management officer in Yabello: “the government has failed to recognize the knowledge of the community because policy designs reflect country needs rather than local needs” (Interview, 2019; in English language).

4.6 Summary of Data

In this chapter, I have presented and analyzed the traditional natural resource management strategies of Borana pastoralists. I have described the institutional structure for natural resource management and how the various institutions perform their various roles in that regard. I have used the data to show that Borana pastoralism is sustained by a network of knowledge systems that emanate from the community's experiences with changing climatic conditions.

Furthermore, the field data shows that Borana pastoralism is based on a common land ownership arrangement around which customary rules and norms are set to protect common resources. Giving their long years of experience with varying climatic conditions, the Borana pastoralists have traditional knowledge of varying ecological zones such as the *Liban* and *Dirre* grazing areas, which is implemented in a rotational seasonal grazing arrangement to avoid a tragedy of the commons.

I have also presented the data on the traditional bush burning practice of Borana pastoralists, which is done to enhance the re-growth of pasture in the rangelands. The data on the *tuula* wells offer insight into the traditional water management practices during periods of climate extremes. Also in the data, I have shown how the Borana concept of sacred sites contributes to environmental conservation and how it plays a central role in the religious life of Borana people.

The later part of the data presentation shows Borana perspectives of climate change, and the current challenges confronting the traditional natural resource management systems

In the next chapter, I will discuss the field data presented by focusing on the aspects of the traditional natural resource management system of Borana pastoralist that have ensured the stability of Borana pastoralism to climate change extremes, and, the enabling factors for autonomous adaptation and resilience of Borana pastoralists to climate extremes

Discussion

5.1 Conditions for Livelihood Stability

In the previous chapter, I presented my findings on the traditional resource management institutions, customary rules and norms, and adaptation strategies that collectively define the traditional ecological knowledge of the Borana pastoralists. The findings reveal the various roles of *Gadaa* institutions and how *Gadaa* legislates customary rules for sustainable resource management and conservation. Although this study emphasizes the traditional coping mechanisms of Borana pastoralists, it is important to note that the current pastoral system of the Borana does not strictly follow the traditional pastoral production pattern. Due to the increasing climatic extremes in southern Ethiopia, the Borana continue to grapple with the negative effects of climate change on their traditional pastoralist livelihood.

In this chapter, I will discuss the adaptive capacity and resilience of Borana pastoralists; in light of the aspects of their traditional knowledge systems that are still visible in their practice of pastoralism. Given that Borana pastoralism is a natural resource-dependent livelihood system, this thesis acknowledges that the Borana pastoralists cannot solely rely on their traditional norms and strategies to adapt and stay resilient to current climatic extremes. Therefore, through the lens of the social-ecological resilience and sustainable livelihood framework, I draw on the findings to first discuss the aspects of the traditional knowledge system and conditions that ensure stability in Borana pastoralism. Secondly, I elaborate on how the Borana can strengthen their adaptive capacity and resilience in the face of accelerating environmental changes resulting from climate change.

5.1.1 *Gadaa* and Customary Rules for Community-Based Management

Traditionally, the Borana landscape has been managed through customary rules and regulations that have ensured sustainable natural resources use by the pastoralists (Borrini, Kothari, & Oviedo, 2004). In the findings on the customary institutions under *Gadaa*, it is seen that natural resources are traditionally managed by macro and micro-level institutions. The macro institutions such as the *Gadaa* and *Gummi-Gayo* perform customary law-making functions relating to natural resource

use at the village and household level. Formal government (*Kebeles*) involvement in the pastoral system has seen Borana pastoralists gradually losing control over their communal land, and their traditional institutions and knowledge systems becoming redundant (Fenetahun & XU-Xinwen, 2018; Gemedo-Dalle et al., 2006; Sabine, 2004).

In my engagements with the Borana pastoralists, I have observed and understood that they relate strongly with the natural resource management functions of *Gadaa*. Most of the research participants mentioned that they find community-based resource management approaches of *Gadaa* institutions more equitable and accountable than the agriculturalist-centric policies of the *Kebeles*, which threaten the survival of their pastoralist livelihood.

Although most of the grazing fields are degrading, there are coping options available to the pastoralists under the community-based management system of *Gadaa*. An elderly Borana pastoralist who was not impressed by the adaptation and resilience measures implemented by the *Kebele* made this remark:

...with our traditional wisdom, we have learned the hard way of coping with drought for many years. There is no reason why we should abandon herding and switch to farming because farming also requires more land areas and water supply. Our main problem here is the growing population that is reducing the size of the rangelands. If the authorities will allow the *Gadaa* institutions to be in charge, the traditional systems will work. (Interview, 2019; translated from Afan-Oromo)

5.1.2 Herd Diversification as a Resilience Strategy

As an alternative to livelihood diversification, Borana pastoralist practice herd diversification during periods of climatic extremes. They diversify their livestock from cattle and sheep herding to camel and goat herding as a viable adaptive and resilience measure. The importance of herd diversification comes from the traditional knowledge of dietary selection among the various livestock. For instance, livestock such as cattle and sheep are highly dependent on grass resources for their dietary needs and thus, highly affected by droughts. On the other hand, goats and camels are highly adaptive to droughts because they feed on bushes and twigs (Sabine, 2004). Therefore, diversifying their livestock to goats and camels allow Borana pastoralists the problem of livestock death, which is often associated with extreme climate events. In addition, the traditional knowledge

of native vegetation accounts for the ability of Borana pastoralists to practice herd diversification as a viable adaptation and resilience option.

5.1.3 Communal Ownership and Property Rights

For most of the Borana pastoralists I spoke with, the traditional approaches to natural resource management guarantee their common property rights and ownership of communal grazing lands. Most of the research participants have pointed to the disregard for their common property rights in the intervention approaches of state agencies. A group discussant's response below highlights this concern:

We are not against the assistance from the government. The environment is changing and we welcome development projects here. Some of the organizations were helping us to improve the conditions of the wells and the land for pasture growth but we do have problems with the *Kebele*. It is not a problem for them to work with us if it will not result in us losing our land. But we are not happy with what is happening these days because some people are buying the lands in the grazing areas and we don't have any good pasture lands left. (Interview, 2019; translated from Afan-Oromo)

From the statement above, it is clear that mainstream interventions are legislated top-down and it has generated mistrust for mainstream adaptation and resilience plans among the Borana. This also points to two contrasting management regimes operating simultaneously in the Borana pastoral areas, government-imposed adaptation and resilience plan, and an adaptive co-management approach of the NGOs. In the conversation with the natural resource management officer in Yabello, he stated that:

The government-sanctioned adaptation and resilience plans overemphasize the promotion of agriculture in the Borana lands. Rather, the *Kebeles* should be entering into co-management partnerships with the pastoralists to offer assistance in rehabilitating the degraded lands. This will signal recognition of Borana pastoralists as custodians of their traditional land while introducing improved resource management approaches and alternative livelihood options to the people. (Interview, 2019; in English language)

Furthermore, the officer at the culture and tourism office in Yabello mentioned that the traditional institutions of the Borana are becoming 'powerless' in the Borana community because existing land policies of the government do not recognize common property systems. Therefore, under the

current natural resource management regime, Borana land is treated as a state property with little recognition of the group user rights of Borana pastoralists.

5.1.4 Conservation Value in Borana Sacred Sites

The concept of sacred site has been used as a traditional measure for conserving much of the forest areas in Borana communities. Sacred sites are connected with the traditional belief system of the Borana people. Underlying the Borana sacred sites are sets of rules codified into taboos, which serve the dual role of protecting sacred areas, and as ‘invisible’ natural resource management tool with which threatened vegetation and animal species are protected by the traditional institutions (Kassam, 1999). According to Dickson Adom (2016), taboos and sacredness of natural areas are the main indigenous knowledge systems that have helped in averting the depletion of biodiversity resources in many African environments.

Furthermore, the findings have shown that the Borana sacred sites serve dual functions as sources of supplementary pasture for special cattle breeds (Boran breed), and as traditional ritual centers. This makes it imperative for the Borana pastoralists to ensure judiciousness in their use of biodiversity resources in sacred spaces such as the *Arero* and *Yabello* forests. Borana pastoralists’ sacred knowledge about their natural environment relates to what Gerald May (2006) refers to as ‘the wisdom of wilderness’. The word ‘wilderness’ refers to the deepest belief of a person or a group of people in the healing power of nature (May, 2006). In the field data, it is seen that the management and conservation practices under *Arda-Jila* draw upon the Borana peoples’ ‘wisdom of the wilderness’, which manifests in the ways that forest trees in the sacred sites are ascribed human characteristics and regarded as ancestral abodes. Therefore, to the extent that *Gadaa* embodies the Borana peoples’ traditional knowledge of the natural and spiritual world, there is awe in their wisdom of interaction with the natural environment that must neither be overlooked.

5.1.5 No ‘Tragedy of the Commons’

In discussing the strengths of the Borana peoples’ traditional resource management system, in relation to Garrett Hardin’s concept of the tragedy of the commons, the findings reveal that the resource use pattern under Borana pastoralism serves as a model for safeguarding the natural environment from ecological catastrophe. The desire to protect their pastoralist livelihood has

made the management of natural resources an integral of the traditional *Gadaa* institutions. While acknowledging that natural resources within the Borana landscape have increasingly degraded over the years, a majority of the research participants indicated that the reasons for the ecological stresses have more to do with external intervention measures and less on their traditional ways of practicing pastoralism. In Borana communities, natural resources are communally owned and thus viewed as common property resources. This form of land ownership among Borana pastoralists has not led to a tragedy of the commons because of the selective grazing system - *Warra, Forra*, and *Kalo* – currently in place to avoid overgrazing. As Singleton (2000) notes, the selective grazing system is a necessary condition for the successful management of common property resources in pastoralist communities (Singleton, 2000).

5.2 Strengthening the Adaptive Capacity and Resilience of Borana Pastoralists

In the discussions above, I have highlighted the various adaptation and resilience strategies of the Borana pastoralists, which are entry points to understanding and working with the community to strengthen their adaptive capacity and resilience to climate extremes. As Ambelu et al. (2017) observed: “People and system resilience is best built through an understanding of context-specific resilience challenges and dimensions, vulnerability factors and adaptive and coping strategies” (Ambelu et al., 2017, p. 8)

As at the time of my fieldwork between June and July, there was a period of drought in the Borana lowlands, and many Borana pastoralists were in the process of selling their livestock to minimize losses. Some of the Borana pastoralists I met with at the Haro-Bake livestock market recounted how they had to sell some of their livestock at low prices to engage in other livelihood ventures. According to them, the population pressure and the privatization of communal lands by the formal land administrators are contributing to the shrinking of communal grazing lands, and effectively limiting their ability to move freely with their livestock.

At the mainstream level, the climate change adaption policy implementation efforts in Borana pastoralist communities have been constrained by numerous challenges arising out disregard for community needs, a fragile relationship between the traditional institutions and *Kebeles*, and rising poverty levels among Borana pastoralists (Birhanu, Ambelu, Berhanu, Tesfaye, & Woldemichael,

2017). These factors continue to erode the adaptive capacity and resilience of Borana pastoralists in diverse ways.

Despite the challenges, the findings show that the Borana pastoralist has a capacity for autonomous adaptation. In social-ecological systems, autonomous adaptation is a key ingredient for enabling the adaptive capacity and resilience of social groups (Rahman & Hickey, 2019). Therefore, through the lens of the sustainable livelihood framework, I argue that inherent sustainable elements exist in the traditional pastoral production system and institutions of the Borana, which can be built upon to strengthen their adaptive capacity and resilience to climate stresses. In the interviews and discussions with the research participants, I asked for suggestions on what they want to be done in order to improve their ability to cope with the effects of current climate extremes on their livelihoods. In the following subsections, I outline the key areas of concern expressed by the interviewed Borana pastoralists. Afterward, I discuss these areas within the sustainable livelihood framework.

5.2.1 Building on Traditional Knowledge Systems and Institutions

The *Gadaa* system is still an important cultural institution influencing the life of Borana pastoralists. Although the formal governance structures are in charge of general administration in the entire Borana zone, the customary institutional structures are still visible in remote Borana villages that are in distant locations from the center in Yabello. For instance, the traditional weather forecasting system is still functional and relied upon by many Borana pastoralists in villages around *Arero* and *Dharito*. The traditional weather information continues to influence their decisions regarding herd movement, destocking, or choosing an appropriate coping mechanism in advance. This suggests that the capacity of these communities to adequately cope with climatic stresses depends on the accuracy of the information they receive from local experts in weather forecasting. As my field data reveals, the unusual climate variabilities of current times are rendering the traditional weather forecast information less reliable. However, the traditional weather and seasonal indicators are important endogenous climate information that can be incorporated into mainstream meteorological systems to provide localized climate information to the various pastoral villages. In this way, and with the help of local knowledge, there will be

improved context-specific climate information that the pastoralists can rely upon when deciding on what to do in order to mitigate the impact of impending climatic shocks.

Furthermore, under the sustainable livelihood framework, the traditional ecological knowledge systems such as sacred sites, *tuula* wells, seasonal grazing, and enclosure (*Kalo*) systems are the key vulnerable elements in the Borana pastoral system. Therefore, these traditional natural resource management strategies are key drivers of the adaptive capacity of Borana pastoralists. Although these traditional strategies have functioned effectively for many generations (Gemedo-Dalle et al., 2006), the forms of climate change shock characterizing their social-ecological environment - extreme droughts, land degradation, flooding - demand some extra support for the traditional natural resource management strategies. As the Borana officer at the natural resource office in Yabello suggests: “new technologies that can build on existing traditional models that we [Borana] have as the framework for how to adapt and cope with bad weather events” (fieldwork interview, 2019). One of such traditional framework is the traditional *tuula* wells (See Figure 1, p. 35), which still serve the water needs of Borana pastoralists but are constantly exposed to extreme weather events such as flooding. A Borana pastoralist I spoke with at the *tuula* well site in Dubluk said that they have petitioned the formal authorities for the traditional wells to be rehabilitated, but their petitions have continuously been neglected. The only interventions they have seen in their communities are borehole projects of the government, which have been constructed in settlement areas and thus meant for human consumption, and not for livestock. Although the *Abba-Herega* still plays his role in the management of the traditional wells of Borana pastoralists, funds are needed to undertake major rehabilitation of the traditional wells. According to the *Abba-Herega*, Borana pastoralists are not able to raise large sums of money on their own without the assistance of government or non-government organizations. As at the time of my fieldwork, most of the traditional *tuula* wells in Dubluk are still in their old state, while others have already dried up due to many years of neglect by the mainstream.

With regards to pasture rehabilitation, most of the Borana pastoralists I interviewed acknowledged climate change as a contributing factor to rangeland degradation. However, they traced the cause of land degradation within the Borana grazing areas to the existing land tenure system, which, according to them, is promoting the privatization of communal lands, and thereby affecting the

traditional *Liban* and *Dirre* seasonal rotation grazing arrangement. To them, the first step towards rehabilitating the degraded land is by recognizing their communal land tenure, which will guarantee their right to freely move their livestock across different grazing areas to avoid overgrazing in permanent grazing locations. In support of this view, some studies have shown that pasture regeneration capacity is high in open rangeland pastoralism where mobile pastoralists seasonally move their herds (Fuller, 1999; as cited in Nassef, Anderson, & Hesse, 2009). Additionally, the recognition of the communal land tenure of Borana pastoralists necessitates strengthening the capacity of their traditional institutions to work with the mainstream in developing community-based land use and rehabilitation policies that are responsive to both mobile pastoralism and ecological stability.

Another challenge mentioned by the group participants is the absence of favorable market policies for their livestock in times of climatic difficulties. According to them, their capacity to build resilience to climate hazards also depends on the amount of money they can set aside for other livelihood ventures such as petty trading. At the moment, there is no direct link between Borana pastoralists and livestock buyers, and private brokers are rather taking advantage of the climate distress to make profits by offering prices that are below actual livestock prices. The group participants indicated that they had formed a livestock cooperative some time ago to improve their market bargaining power. However, the livestock cooperative did not receive the needed support of the *Kebeles*, and their market situation rather got worse. During my field visit at the Haro Bake livestock market, a Borana pastoralist I had informal discussions with about their market conditions said that they transport their livestock from remote villages to Haro-Bake and that the major challenge to their resilience is the poor state of the existing road network. Due to that, the high cost involved in transporting their livestock from the remote villages to the main market center has left many Borana pastoralists relying on brokers, who buy their livestock at prices below the actual market value. Acknowledging that: “the market is the most viable way through which pastoral households can bolster themselves and accumulate wealth as a form of insurance against hazards and stress” (Boru, 2017, p. 272), market conditions can be made favorable for Borana pastoralists in order to strengthen their capacity for long term adaptation and resilience.

5.2.2 Avenues for Livelihood Diversification

In the context of vulnerability and resilience, Nassef et al. (2009) have noted that in finding non-natural resource-dependent livelihood options for long term resilience of pastoralist communities, such livelihood options should allow people to “maintain or improve their conditions independent of livestock-keeping” (p. 15). At the beginning of this chapter, I stated that the current pastoral pattern of Borana can no longer follow the traditional pastoral system. This indicates that Borana pastoralists cannot solely rely on their traditional ideas and strategies to ensure sustained resilience to current climatic extremes. Their prospects for building long term resilience to adverse climatic conditions depend on the availability of avenues for engaging in other non-natural resource-dependent livelihood options. This is not to suggest a complete transformation of their pastoral livelihoods, but creating avenues for supplementing livestock keeping with alternative livelihood systems that are not affected by climatic extremes.

During my interviews with the Borana pastoralists, for instance, a common theme that runs through their suggestions was skills training and improved education. Much as they all agreed that education provides opportunities for employment in the formal sector, others were specific on the kind of skills training and education needed. For example, the Borana officer at the culture and tourism office stated that the traditional enclosure system can be developed into a haymaking livelihood option for the elderly pastoralist who may not have the chance of working in the formal sector. He also suggested a community-based education model that accommodates the traditional knowledge systems, and develops the human capital base of Borana pastoralist through vocational skills training; as there are few employment opportunities available in the formal sector. While pastoralism continues to remain the dominant livelihood activity in most of Borana communities, a small number of Borana people engage in informal livelihood options such as haymaking, petty trading, charcoal production, and milk trading, among other natural resource-dependent livelihood options. Giving these as the main alternative livelihood options, the mainstream policymaking environment can concentrate on developing these alternative livelihood options through education and skills training for long term adaption and resilience to climate change shocks.

Conclusion

Climate change has become the worst environmental crisis confronting the world today. The intensity of its impact on global biodiversity and the urgency for its mitigation have been reflected in the United Nation's sustainable development goals (SDG-13). As stakeholders, indigenous people have been engaging in the global efforts on the sustainable development goals (Berger, 2019), and due to the intrinsic connection between their culture, lifestyle, and land, they experience the adverse impact of climate change the most (Nakashima et al., 2012). Drawing on their traditional knowledge and technologies, indigenous peoples are engaging in the global climate mitigation efforts, both as protectors and dependents of bio-diversity resources (Berger, 2019).

Indigenous peoples' traditional knowledge emanates from their experiences with the natural world. While climate change continues to threaten their social-ecological environments and mode of survival, indigenous people react to the negative impacts of climate change in creative ways, using their traditional knowledge systems and technologies (Christina, 2018). In the African context, many indigenous communities inhabit fragile eco-systems; where the effects of climate change have been catastrophic. Since the livelihood of most indigenous peoples in Africa depends on natural resources, their capacity to adapt and build resilience to climatic shocks depends on the flexibility of their traditional knowledge systems and technologies, and formal policy regimes (Christina, 2018).

Indigenous pastoralist groups in Africa such as the Borana people of southern Ethiopia are bearing the cost of climate change on their social-ecological systems. Their traditional pastoralist livelihood is constantly threatened by the negative effects of climate change. This has generated some questions regarding their capacity to adapt and maintain resilience to climate change; drawing on their traditional knowledge systems and technologies, and under the current climate change policy regime of the Ethiopian government. In consideration of the history of their experiences with and successes in, navigating ecological stresses by using their traditional natural resource management strategies (Gemedo-Dalle et al., 2006; Marco & Boku, 2011), this thesis has

explored how Borana pastoralists interpret and react to the impacts of climate change to maintain a stable bio-cultural diversity and their traditional pastoralist livelihood.

In this thesis, I emphasized the role of traditional institutions in the natural resource management processes of Borana pastoralists. The point of my arguments was not necessarily based on the premise that solutions to climate change adaptation and resilience are solely within the confines of traditional knowledge and institutions. Rather, I acknowledged the intensity of current climatic extremes and argued that solutions to strengthening Borana pastoralists' capacity for long term adaption and resilience are partly in the scope of their traditional knowledge and institutions, as well as the climate change mitigation policies of the mainstream. Although Ethiopia's main climate mitigation policy – the National Adaptation Plan (NAP) – plans to integrate the traditional ecological knowledge systems of local communities into mainstream adaptive capacity and resilience-building initiatives, this thesis has shown that the Borana pastoralists' knowledge systems and institutions are given less attention and recognition in the policy implementation process.

There is no denying the fact that Borana pastoralism is still vulnerable to the impacts of climate change. That notwithstanding, this thesis has shown that the traditional natural resource management strategies of Borana pastoralists are still functional; albeit challenged by demographic factors and the strong influence of formal government structures in the Borana pastoral system. Still, the adaptive capacity and resilience of Borana pastoralists cannot be divorced from the history of their lived experiences with climate change, which has shaped their inherent capacity for autonomous adaptation.

Current mainstream adaptation and resilience policies are being implemented in many Borana communities to promote sustainable agriculture, and transforming the pastoralist livelihood of Borana communities in southern Ethiopia. Following this, I argued that the mainstream adaptation and resilience policies have not paid much attention to the internal drivers of Borana pastoralists' vulnerability to climate change. Drawing on the field data, I discussed these internal drivers under three major themes.

In the first theme, I referred to the declining role of traditional institutions in natural resource governance processes within Borana communities. I have shown that limited space is created for *Gadaa* institutions to apply the community-based approach to extensive range management, which allows for flexibility in pasture and water use during periods of climatic extremes. Thus, the potential for the traditional natural resource management strategies to develop into resilience oriented systems is undermined by the top-down approaches of formal administrative units such as the *Kebeles*. I argued that recognizing the authority of *Gadaa* is a first step towards building a trust-based adaptation and resilience framework that accommodate community choices while improving the traditional adaptive strategies.

The second, and closely related to the point above, is the issue of communal land tenure. This thesis has shown that communal land tenure is the cornerstone of Borana pastoralism. Yet, Borana grazing lands are being subjected to the phenomenon of land privatization without the consent of the community. As the thesis has shown, the land-grabbing menace is perpetuated by the tragedy of the commons considerations, which do not reflect in the traditional natural resource use pattern of Borana pastoralists. The shift in the land tenure regime has increased communal land insecurity and further limiting the adaptive capacity and resilience of Borana pastoralists to climatic extremes.

Under the third theme, I referred to the lack of adequate avenues for livelihood diversification. Drawing on the sustainable livelihood framework, I argued that Borana pastoralists have inherent characteristics for autonomous adaptation, which are significant for their capacity to adapt and stay resilient to extreme climatic events in the long term. Far from romanticizing the traditional adaptation and resilience strategies of the Borana pastoralists, some of the strategies are incentives for finding innovative ways of strengthening their adaptive capacity and resilience to ecological extremes.

In the context of climate change mitigation and natural resource management, adaptive co-management frameworks create a hybrid regime comprising traditional knowledge, as an incentive, and the institutional support systems of the mainstream for building context-specific adaptation and sustainable livelihood resilience plans. An observation I made in the course of

conducting this study is that the traditional adaptation and resilience strategies of Borana pastoralists revolve around the restorative capacity of rangelands and forest resources. Thus, practical land rehabilitation characteristics, which are critical to their capacity to maintain a stable social-ecological system, are lacking in the traditional adaptation strategies.

In nutshell, the customary *Gadaa* institutions are still central in the socio-economic and cultural lives of Borana people. However, what is obvious is the exclusion of the traditional institutions in climate policy implementation at the community level. Much as the effects of climate change are transforming the Borana pastoral communities and their traditional pastoral livelihood system, the customary institutions are also affected; in one way or the other. Therefore, how these traditional institutions are affected, and how the traditional knowledge systems of Borana pastoralists can be harnessed for eco-system rehabilitation are questions that remain for further research.

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