

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Faculty of Humanities, Social Sciences and Education

Traditional camel management as an adaptation strategy to ecological changes: the case of Karrayuu Oromo of Ethiopia

Debela Goshu Amante

Thesis submitted for the Degree of
Master of Philosophy in Indigenous Studies
May 2014



Traditional camel management as an adaptation strategy to ecological changes: the case of Karrayyuu Oromo of Ethiopia

By

Debela Goshu Amante

Master of Philosophy in Indigenous Studies

Faculty of Humanities, Social Sciences and Education UiT The Arctic University of Norway

Autumn 2014

Supervised by

Professor Bjørg Evjen, Center for Sami Studies, UiT

Abstract

This thesis is concerned primarily with Karrayyuu camel husbandry. Camel husbandry has flourished recently as an adaptation mechanism in response to ecological change. Karrayyuus have for centuries herded cattle, but recently, owing to ecological change, this has become unviable. Continued desertification, repeated drought and loss of land, has diminished the cattle herd size to a level that cannot support the herders and their families. One of the responses of the Karrayyuus to this process is the adoption of camel husbandry. Through camel husbandry, the Karrayyuus have managed to use pastures that were geographically marginal and nutritionally unpalatable for their cattle and small ruminants. Their knowledge of camels and their ecology, together with more effective management, has facilitated the recent growth of camel populations. However, camel husbandry still faces a problem with the sustainability of their current pastureland; this will determine whether Karrayyuu camel pastoralism continues to exist, or not.

Key terms: Karrayyuu, camel husbandry, ecological changes, ethno-ecology, adaptation.

Acknowledgment

I would like to start by thanking my supervisor, Bjorg Evjen, for all her wonderful support, patience and advice while I have been writing this thesis. I am also grateful to Ivar Bjorklund for reading drafts and giving helpful, constructive criticism. My colleagues on the Masters course, Ella Thora, Liudmila Nokanorova and Ane Hedvig Heidrunsdotter Lovold, have also contributed greatly with support and advice. I thank the Center for Sami Studies for essential funding for this research. The gathering of data would not have been possible without the invaluable technical support of Abomsa Jima, for which I am extremely grateful. Last but not least, I thank Helen Jennings for her support in the final production/presentation of this thesis.

List of figures and tables

No	Name	Page
1	Fig.1. Map of the study area	21
2	Table 1. Annual rainfall of Fantallee area	24
3	Table 2: Categories of camel	34
4	Table 3: camel herders and their roles	45
5	Table 4. Camel diseases and treatments	53

Contents

Abstract	ii
Acknowledgment	iii
List of figures and tables	iv
Chapter I Basement	1
1.1. Topic presentation and introduction.....	1
1.2. Research question.....	2
1.3. Previous research	2
1.4. Reflexivity	4
1.5. Ethical issues.....	6
1.6. Significance of the research.....	7
1.7. Thesis outline	8
Chapter II The roadmap	9
2.1. Introduction	9
2.2. Methods.....	9
2.3. Ethno-ecology: the theoretical framework	12
2.3.1. Belief system.....	13
2.3.2. Indigenous knowledge.....	15
2.3.3. Practice	17
2.3.4. Access, distribution and power	18
2.4. Conclusion.....	18
Chapter III Background of the research: the study area, ecology and pastoralism	20
3.1. Introduction	20
3.2. The people and the study area	20
3.3. Ecological situation of Fantallee district (the study area).....	23
3.4. Pastoralism.....	25
3.5. Pastoralism in Ethiopia.....	27
3.6. Pastoralism and Karrayyuu.....	27
3.7. Camel husbandry in the East Africa	28
3.8. Policies toward Karrayyuus and pastoralism.....	29
3.9. Conclusion.....	30
Chapter IV traditional camel management	31
4.1. Introduction	31
4.2. Introduction of camel husbandry to Karrayyuu	31
4.3. Categorization of Camels	33
4.4. Camel breeding	35
4.5. The browsing route of Karrayyuu camels	38
4.6. Herd management.....	41
4.7. Labor management.....	44
4.7.1. More about camel herders.....	46
4.7.2. Camel management and role of women	47
4.8. How do the Karrayyuu use their camels?	50
4.9. Camel disease and traditional treatment.....	52
4.10. Conclusion	53
Chapter V Karrayyuu camel management as adaptive strategy to the ecological change	55
5.1. Introduction	55

5.2. What makes camel husbandry so important and possible?	56
5.3. A shift from milk-based to cash-based economy as adaptive strategy	59
5.4. The case of <i>aannoo</i> - commercialization of camel milk.....	60
5.5. The ecological impacts of the development of camel husbandry	64
5.6. Conclusion.....	64
Chapter VI conclusion and future challenges of pastoralism	66
6. 1. Conclusion.....	66
6.2. What does the future hold for Karrayyuu pastoralism?	69
References.....	71
Appendices.....	78
List of informants	78
Pictures from the fieldwork.....	79

Chapter I Basement

1.1. Topic presentation and introduction

The main theme of this thesis is the development of camel husbandry as an adaptation mechanism to ecological changes. The ecological situation is used as a background to understand the socio-economic changes and continuities that have characterized the Karrayyuu people's livelihood over the last few decades. The changes that are taken as the background throughout this work are: (a) the loss of land in favor of development schemes and natural resource conservation, (b) the encroaching of the toxic lake called Beseka¹ on the Karrayyuu land which has claimed about thirty-five square kilometers, (c) the recurring failure of rain and degradation of rangeland (aridity) (see Edjeta 2001; Gabre 2007; Bekele & Amsalu 2012a). The Karrayyuus have reacted to these changes in different ways. Some of the measures taken were; diversification of income by starting small-scale farming, diversifying their livestock and by embracing a more mobile life style (Edjeta 2001). This research concentrates particularly on the shift from cattle to camel husbandry by the pastoralists, as an adaptation strategy. In doing so, a detailed description of the traditional camel husbandry, in addition to the opportunities and challenges of this new adaptive strategy, will be presented.

This chapter serves as an introduction to the thesis. The purpose of the research as well as the main questions of the thesis will be addressed in this section. On top of that, the ethical issues related to data collection and publicizing are some of the topics raised here. The relation of the researcher with the Karrayyuu people and the subject of the study will also be discussed.

¹ The water of the lake contains excessive fluorine, which makes it unusable. The Karrayyuus call the lake Nugoba and Beseka refers to the black volcanic rocks near the lake.

1.2. Research question

This thesis questions how Karrayyuu traditional camel management developed over the last few decades and focuses specifically on the following questions:

What are the peculiar features of Karrayyuu traditional camel husbandry?

How does ethno-ecological knowledge of the Karrayyuus contribute to the development of camel husbandry?

How did the political-ecological conditions facilitate the introduction and development of camel husbandry?

This research project, through the use of different techniques such as interviews, observation and text analysis, attempts to answer the above questions.

1.3. Previous research

In this section, I will review some research that has been conducted on the Karrayyuu people and on Karrayyuu pastoralism. The following discussion on the earlier works is believed to map the current research in the literature of the Karrayyuu and pastoralism as well as provides the relevant background knowledge for a better understanding of the camel husbandry.

Gebre (2001) in his doctoral dissertation titled 'pastoralism under pressure: Land alienation and pastoral transformation among the Karrayyuu of Eastern Ethiopia, from 1941 to present' discussed the current situation of the Karrayyuu people. Gebre focused on the challenges the Karrayyuu are facing in terms of land alienation, resource conflict and climate change. Gebre (2009), 'When pastoral commons are privatized: resource deprivation and changes in land tenure systems among the Karrayyuu in the upper awash valley region of Ethiopia'- an article based on his dissertation, discusses the privatization of the Karrayyuu common lands and its impact on the social fabric of the people. The privatized lands were used for small-scale irrigated and rain-fed agriculture. The article shows that the Karrayyuu embraced small-scale agriculture, without totally abandoning pastoralism, in order to cope with the ecological changes.

Edjeta (2001), 'The socio-economic dimensions of development-induced impoverishment: the case of the Karrayyuu Oromo of the upper Awash valley' is a master thesis which discusses the impact of the Awash National Park and Matahara Sugar Factory on the socio-economy of Karrayyuu people. He also discussed the negative impacts of the government's intervention in the life of the Karrayyuu people. He argues that the Karrayyuu have an effective traditional land management system based on the clans and cross clan structures. However, the continuous interference of the government weakens the traditional management and consequently led the Karrayyuu to abject poverty.

Tolera (2000), 'Problems of sustainable resources use among pastoralist societies: the influence of state intervention on the pastoral life of the Karrayyuu', is another article on Karrayyuu Oromo. The article discusses the economy of the Karrayyuus; factors affecting their economy and their responses. The Karrayyuu people, according to the article, were mainly pastoralists but some groups are shifting towards other economic activities other than pastoralism. In the old days, cattle were economically more important. But, recently camels and goats are gaining popularity among the Karrayyuu.

Bekele & Amsalu (2012a), 'Effect of drought on pastoral households in Fantallee Woreda of Oromia, regional state of Ethiopia', focused on the effect of drought on the Karrayyuu pastoral households in the district. In this article, the authors argue that drought has had a huge impact on the people, in terms of; availability of pastureland, water, herd size and productivity of livestock and the entire economy. They showed statistically, how the repeated drought is damaging the economic subsistence of the Karrayyuu of the Fantallee district. In another related article, Bekele & Amsalu (2012b) focused on how the households of Fantallee Karrayyuu pastoralists responded to the repeated droughts. Some of the most important responses are seasonal mobility and herd diversification, which includes the shift of focus from cattle to camel husbandry. These articles have provided me with the necessary information regarding the actual ecological changes that have occurred, and have provided me with a background to discuss the rise of camel husbandry in the area.

Beyene & Gudina (2009), 'reviving a traditional pasture management system in Fantallee, East Central Ethiopia', is about the traditional Karrayyuu pastureland management system. They argue that the *Kalo* traditional management system is a mechanism in which the individuals and communities leave aside a plot of land as a dry season grazing pasture. As a result of this management system, livestock of the Karrayyuu survive the long dry seasons more easily than that of the neighboring pastoralists, such as the Afar who live almost in the same environment. This article, however, presumes that overgrazing is the result of livestock overpopulation and is responsible for the degradation of the rangeland. Thus, they considered the use of *kalo* tradition could have impact on the general condition of the pasture. They, however, did not consider the loss of land and drought as possible factors for the degradation.

Through this review of previous research, the following topics have been explored; The impacts of ecological changes on the Karrayyuu people, the effects of the national park, Matahara Sugar Factory, lake Baseka and the drought on the economy of the Karrayyuu people (Gebre 2001; Edjeta 2001; Tolera 2000). In addition, the Karrayyuus' response mechanism to the ecological changes has been reviewed in the earlier works (Tolera 2000; Bekele & Amsalu 2012b). However, there is a clear research gap regarding the role the Karrayyuu traditional camel husbandry has played as a response to ecological changes. Even though some of the works (Tolera 2000) have mentioned the shift of focus to camel husbandry, its role in the livelihood of the Karrayyuu has been overlooked and the detailed discussion of the camel husbandry is missing. This current study, therefore, intends to fill that gap.

1.4. Reflexivity

The Karrayyuu are a community with a very strong clan structure (Edjeta 2001). The Karrayyuu categorize people around them as *gosa* 'fellow clan', *amba* 'non Karrayyuu' and *diina* 'enemy'. Some members² of the 'hostile' neighboring ethnic groups such as Afar, Argobba and other urban dwellers are categorized as *diina*

² During conflict the whole group may be considered as enemy. However, in peacetime, some members live together with Karrayyuus.

'enemy'. People from the Karrayyuu clans are categorized as *gosa* 'fellow clan'. Other Oromo³ clans such as Ittu and ethnic groups with whom the Karrayyuus coexisted peacefully are categorized as *amba* 'non Karrayyuu'. This category includes all the people in the surrounding area who are not Karrayyuu but are in a good relationship or are related to the Karrayyuu people. It is my feeling that I fall into the third category, *amba* 'non Karrayyuu' because I do not belong to one of the Karrayyuu clans but I speak the same language and belong to the Oromo as do the Karrayyuus. This position has helped me to gain their trust. I have to say that some interviewee told me, what they would have not told people of another category namely - *diina* 'enemy'. I presume that some of the interviewees have also hidden something from me because I am only *amba* 'non Karrayyuu' not *gosa* 'clan'. Having said this, they have also told me something because I am only *amba* 'non Karrayyuu' not *gosa* 'clan'. For example, some of my informants told me something about their economic status, in the absence of my assistant, who is a member of their clan. This is to say that my position as *amba* 'non Karrayyuu' has both helped and hindered me in my acquisition of data.

Commentators from all angles have different views about development and modernization. Some argue that pastoralists and other pre-industrial societies need to leave their old way of life behind and embrace modernity through education and urbanization. They recommend a cultural transformation for such people. This is a very common opinion among the urban public and elites in Ethiopia. They want for people like the Karrayyuu to completely abandon pastoralism, get educated and start life in manufacturing, mechanized farming and the service sectors. In contrast, others believe that pastoralism and all pre-industrial systems of production are of equal importance and thus, such people should be allowed to practice their own way of living with their given environment, despite this being different from the industrialized way of production. With this view in mind, it could be argued for example, that the pastoralists have their own ecological knowledge that is equally valid and has helped the people to use their environment optimally. They further argue that the pre-industrial societies live more sustainably and harmoniously with their

³ See section 3.2 for the relation between Oromo and Karrayyuu.

environment. I tend to agree with the second position; this stance thus might have affected my arguments presented in this thesis.

1.5. Ethical issues

Research is an undertaking that involves a number of stakeholders: the researcher, the individuals interviewed, the community observed and officials. Working alongside these different stakeholders makes it necessary for researchers to have clear ethical principles that guide their relation with the rest of their research participants.

One of the most important ethical principles that need to be followed is to have the informed consent of the stakeholders well before the inception of the project. However, whose consent the researcher needs is still debated. Chilisa (2012) claims that individual consent between the researcher and researched as in typical scientific research may be problematic in some other cultures. She suggests that the consent should come from the group (community) not only from the individual that is selected as a key informant. This is a legitimate concern because the stories told by the research participants are not only personal stories but communal. Thus, the community, through its officials and elders, needs to be informed about the possible impacts of the research, both negative and positive. A day after my arrival, I submitted my letter to the district office and explained to them the theme of my research along with a list of the areas that I wanted to visit. On the same day, I visited two very popular community elders. There was no formal paper that needed to be submitted but I had to explain the purpose of my visit. Following a long discussion on the theme of my research, the elders gave me their blessing, which I considered to be a traditional research permit. However, before every interview, I explained the purpose of my research and asked the individuals for their consent. All of the individuals that were approached agreed to the interview.

Research on indigenous knowledge deserves extra care, when it comes to publicizing the knowledge. A large portion of this thesis is about indigenous knowledge that they have gathered for over hundreds of years. Therefore, it was necessary to ask the elders and the individuals if they want their knowledge to

be published. The elders have given me their consent for the publication of the indigenous knowledge. However, one of my informants, during an interview, asked me to turn off the recorder because of the sensitivity of the information he was about to give. The information has helped me understand the situation but it has not been used directly in respect to the informant who did not want me to make that information public.

In addition to consent about giving interviews, disclosing identities of the interviewees is a matter of concern. Care should be taken when it comes to disclosing the identities of the informants (Chilisa 2012). The dilemma is that publicizing identities would connect the indigenous peoples with their knowledge that is made public through the research. On the other hand, publicizing identities, in some cases, may harm the participants of the research. I discussed this matter with my informants during and after the interviews. Most of my informants did not see any safety concern to worry about. However, it is sometimes difficult to predict the consequences that the interview may have on the informants in the future. On the other hand, the research is predominantly about the indigenous knowledge, which is not arguably very politically sensitive. Thus, most of my informants wanted their identities to be disclosed and I respected that. However, I have chosen not to name any informants who gave me information which I deemed sensitive.

1.6. Significance of the research

This research is believed to contribute to the knowledge of the study area and the ecological change. The Karrayyuu's traditional camel husbandry has not been studied before. Thus, this research, with its focus on camel management, is hoped to add to our knowledge of camels and to traditional management practices. This research will also show the resilience and vulnerability of the Karrayyuu community which may be used as an input for policy makers at state or international levels. The traditional knowledge and analysis given in this work may be useful for other communities going through similar situations. Thus, the research is believed to contribute both to academia and policy making processes in the region.

1.7. Thesis outline

The thesis has seven chapters: The first chapter introduces the current research, it presents the topic of the research and the questions that will be addressed in the thesis. In addition, the ethical issues and the position of the researcher will be presented in this chapter. The second chapter introduces the methodological direction taken in this work. It includes the methods used to obtain the data and the theoretical framework used to analyze the collected data. The third chapter introduces the readers, with some historical and ecological background, to the district under consideration. Certain points about pastoralism in the region will also be discussed in this section. The fourth chapter focuses on the traditional camel husbandry, in this chapter, the traditional Karrayyuu knowledge of the camel husbandry, such as, the use of human resources, categorization of camels for the sake of management and optimal use of their areas will be described in detail. Thus, the role of indigenous knowledge in the development of camel husbandry will be explored in this chapter. The fifth chapter focuses on how and why the Karrayyuus shifted their focus to camel husbandry. The role the ecological and political changes played in the development of camel husbandry is the main issue of this chapter. The sixth chapter offers some conclusive remarks.

Chapter II The roadmap

2.1. Introduction

This section shows the direction the current research will follow - the methods that are used to obtain the data needed for the analysis along with the theories used to analyze the data. The reflections on the methods, such as interview, observation and textual analysis that are used to collect data will be addressed here. The theory section, reviews the theoretical discussions relevant for the analysis of ecological change and pastoralism. The ethno-ecological approach is the major theoretical framework that is used to analyze the data. Therefore, the basic assumptions and discussions of ethno-ecology will briefly be presented in this section.

2.2. Methods

In order to acquire the necessary quality and quantity of data one may need to use different data collection techniques. Interviews and group discussions were mostly used to obtain the necessary data. Additionally, I have joined camel herds to observe the situation on the ground. In addition, songs and proverbs related to camel husbandry and ecological change have been gathered from informants during the interviews and group discussions.

During my stay in the field, I interviewed about twelve Karrayyuu individuals from different walks of life. The interviews took place between July and August of 2013 in Matahara town. My interviews focused on the changes that have recently been confronting the Karrayyuu people. The ecological changes and the effects these changes have had on the lives of the people were of key concern in the interviews. The indigenous knowledge related to camel husbandry was also collected through these long interviews. In addition, the interviews gave me access to some basic information about the communal and personal experiences of the Karrayyuus.

In addition to the one on one interview, I organized some group discussions. In fact, all my interviews can be seen as group discussions because my research assistant, Abomsa Jima took part in most of the interviews. My assistant assumed different roles during the interviews and group discussions. He acted as both researcher and informant depending on the situation. He gave me his views as a Karrayyuu man and also helped me in reformulating my questions that were addressed to other informants. Reflecting back on the ever presence of my research assistant, I would say that it had both pros and cons. It would have been impossible to get the people I contacted without him. My assistant, as a person who grew up in Karrayyuu community knows a lot about the life of his people and understands the language⁴ that they speak. As a person who has a college certificate and some years of experience with researchers and development workers, he also understands the language of the researchers. But on the other hand, some informants sometimes showed reservation expressing their emotions because of his presence.

The group discussions, in particular were useful in bringing different perspectives into the stage. Kitziinger (1995) argues that focus group discussions allow participants to interact among themselves to produce a better quality data. The participants all complement each other's stories. It is a very good tool to get access to the communal stories or communal memories. It seems to me that communal stories and indigenous knowledge are not only stored in an individual's mind but also in the collective mind of the community. There may be an abstract communal box where these stories are stored. These boxes may be wide open when there are more people in the discussion. However, one may need to be careful when handling data from interviews or group discussions. Silverman (2010:191) warns that such data should be treated with care because they can be seen as direct feelings of the interviewee or as constructed narrative that demand further analysis.

However, interviews and group discussions alone may not be able to give a clearer picture of the situation. In addition, there are sometimes discrepancies

⁴ In this case, language is not used literally but to refer to the thought of the people.

between what we say and what we do (Silverman 2010). Therefore, participant observation was used to further enrich the data. Participant observation is useful in better understanding rituals, some social activities and social structures. During fieldwork, I often visited the camel herds to conduct interviews and make observations. These regular visits gave me some insight about the ecology of the pastureland as well as the social activities and various roles played by the herders. My regular visit to the Matahara market, on Thursdays, also helped me understand the commercialization of the Karrayyuu camels: the price of camels, what kinds of camel are sold, and who buys and sells the camels. One of the challenges of participant observation is that researchers may be overwhelmed with data and so absorbed in other interesting information (Silverman 2010). This can be addressed by having both clear and precise research questions that guides the researcher through the ocean of interesting information.

The Karrayyuus often begin a discussion on a topic with proverbs and stories. In Oromo, proverbs are compared with salt as we can see with this proverb: *dubbiin mammaaksa hinqabne, nyaata soogida hinqabne*, which can roughly be translated as ‘ a talk without a proverb is like food without salt’. It is believed that as salt makes food delicious proverb makes a speech attractive. However, proverbs have a larger role than this, they also frame the discussion and in addition, proverbs and stories also carry collective experiences of the community. Schipper (2003:2) quoted in Chilisa (2012:132) states that ‘proverbs, the world’s smallest literary genre, are a most telling part of that serial narrative about human kind.’ Proverbs also live longer, even in oral societies than any other linguistic/literary forms. Thus, they tell a lot about the history of the people who created them.

Ecological changes and the historical development of camel husbandry, which evolves over long periods of time, can be found encoded in the proverbs and stories. I, therefore, decided to collect and analyze different proverbs and stories related to the ecological changes and camel husbandry, hoping to discover more about these historical and ecological changes. In addition, the proverbs and stories were a useful tool in uncovering deep-rooted ideologies and worldviews,

which could not have been accessed as easily with traditional data collection techniques, such as interviews (see Chilisa 2012:134).

The collected data was organized and analyzed in such a way that it answers the research question; 'how Indigenous camel husbandry developed'. In this data analysis, such questions as 'why and how the karrayyuus diversify their herds has been investigated in the light of assumptions made about ethno-ecology. The role played by the ecological and political conditions in the development of camel husbandry has been addressed in the data analysis. The different conditions across time been compared in order to find out how and why things are changing the way they are. The division of Karrayyuu history as the period before and after the land loss in the 1950's is meaningful for the people and for this research.

2.3. Ethno-ecology: the theoretical framework

In this section, I am going to discuss the theoretical foundations of the research. The current research, which focuses on Karrayyuu and their use of the environment through camel husbandry, can best be handled with the assumptions and methods of ethno-ecology. In the following paragraphs, issues in ethno-ecology such as; the belief systems of ethnic groups, the indigenous knowledge⁵ of the groups, and the applications of that indigenous knowledge for their survival, will be discussed.

Ethno-ecologists have different views regarding the scope and meaning of the subject. However, Nazarea's (1999) and Barrera-Bassols & Toledo's (2005) definition and discussions seem to be more developed and useful for this analysis on the Karrayyuus and their use of the environment. Nazarea's (1999) discussion of ethno-ecology, in particular is very comprehensive in the sense that it encompasses the internal creativity of the ethnic groups and their relation with the outside world.

Nazarea (1999:8) defines ethno-ecology as follows:

⁵ Throughout this thesis, indigenous knowledge and traditional knowledge are used interchangeably.

Ethno-ecology as investigation of systems of perception, cognition and use of natural environment can no longer ignore the historical and political underpinnings of the representational and directive aspects of culture, nor turn away from issues of distribution, access, and power that shape knowledge system and resulting practices.

According to Nazarea (1999), ethno-ecology's main focus is the study of how the ethnic groups view, understand, and use the world around them. Yet, that is not all about the ethno-ecology for Nazarea (1999). An ethno-ecologist needs to understand the bigger socio-political contexts in which the groups interact with their environment. The interaction between the groups and their environment is itself connected to how other peoples are connected to their environment. In other words, the interaction of a group with its environment is part of a network of interactions on different levels between peoples and their environment.

Barrera-Bassols & Toledo (2005), on the other hand, give a detailed discussion of an ethno-ecological conceptual framework. Accordingly, they defined Ethno-ecology 'as an interdisciplinary study of how nature is perceived by humans through a screen of beliefs and knowledge, and how humans, through their symbolic meanings and representations, use and/or manage landscapes and natural resources' (Barrera-Bassols & Toledo 2005:11). In this definition of ethno-ecology, they want to put the emphasis on three important concepts; belief systems or worldview, knowledge systems, and the practical use of their environment. Nazarea (1999), in her definition above, has a similar focus, but used different terms: perception, cognition and use of nature respectively. Let us now look at the research agendas of ethno-ecology more closely.

2.3.1. Belief system

The belief system - also called cosmos, mindscape (Barrera-Bassols 2005) and perception (Nazarea 1999) - will be discussed in brief here. The belief system of a certain group, among other things includes a theory of origin and existence of the ethnic group. It is also about the interconnection between everything that people have in their surrounding. Toledo (2001) claims that 'nature (which has a sacred quality) is.. not only a productive source but the center of the universe, the core of culture and the origin of ethnic identity'. According to Toledo (2001),

unlike the 'Western' perspective, in an indigenous peoples' worldview nature has more than a productive (economic utility) role. Nature is the center for spirituality, culture, social prestige, and source of identity. Thus, people construct a theory of origin from the natural surroundings in which they see themselves (connected with). The theories regarding peoples' past, present and future is incorporated in the cosmology of the people (see also Reichel-Dolmatoff 1976 for *Cosmology and Ecology*).

In a relational worldview, one that is held by many indigenous groups, everything in the cosmos is related to one another - there is no domination and subordination. All the things in the cosmos make it what it is. Museka and Madondo (2012: 259) state that the 'Unhu/Ubuntu philosophy is thus a life force that helps to uphold and maintain the equilibrium of natural, spiritual and human forces in the cosmos. As such, it is a way of living that contributes positively to the welfare of all members that make up the universe'. Toledo (2001:458) also says that 'at the heart of this deep bond is the perception that all living and non-living things and the natural and social worlds are intrinsically linked (reciprocity principle)'. Thus, ethno-ecologists need to consider the cosmology of people in order to understand the ecological situation in general. This belief system greatly affects the relationship of the people with their environment.

Anthropocentric and ecocentric categorizations can to some extent show how different people view themselves in relation to their environment. In the anthropocentric view there is a clear dichotomy between man and nature. Man is the controller of nature, which is believed to be out there for man to exploit. In the ecocentric view, there are no boundaries between man and nature. Human beings are seen as a part of the environment itself (see Kalland 2003; Pederson 1995). Worldviews have an impact on how people are related to and use their environment. Thus, in order to understand how the Karrayyuus use their mountains, forests, rivers and livestock, one needs to know how they relate themselves to nature. This belief system is also related to the mass of knowledge,

which is discussed in the following section that the people have gathered over years in order to survive in their ecosystem.

2.3.2. Indigenous knowledge

This section focuses on the second point in the study of ethno-ecology – Indigenous knowledge/corpus (Barrera-Bassols & Toledo 2005) or cognition (Nazarea 1999). The phrase indigenous knowledge is used here as it is so often used in literature (Berkes 1993; Lugeye 1994). But, what is indigenous knowledge? Scholars and institutions define indigenous knowledge differently, I have chosen to take Lugeye's definition (1994:2) as I believe it to be a more comprehensive one.

Indigenous knowledge is the sum of experiences and knowledge of a given ethnic group that forms the basis for decision-making in the face of solving familiar problems. It is a mixture of knowledge created endogenously within the society and that which comes from outside but is then integrated within the society, and this knowledge is continuously changing and has an inherent capacity for absorbing relevant new knowledge from outside.

In the above definition given by Lugeye (1994), we can see that indigenous knowledge is a cumulative experience and knowledge of an ethnic group. But, how is this knowledge generated and transmitted? Toledo (2001) says that communities and individuals themselves can be a source of indigenous knowledge. The following quote from (Ibid:458).

...the corpus (indigenous knowledge) contained in a single producer's mind expresses a repertoire that is a synthesis of information from at least four sources: (a) the experience accumulated over historical time and transmitted from generation to generation by a certain cultural group; (b) the experiences socially shared by the members of a same time's generation or cohort; (c) the experience shared into the household or the domestic group to which the individual belongs; and (d) the personal experience, particular to each individual, achieved through the repetition of the annual cycles (natural and productive), enriched by the perceived variations and unpredictable conditions associated with them.

It (indigenous knowledge) is generated diachronically over a long period of time through both trial and error and observation (Berkes 1993:4). The knowledge created socially, are also transmitted to the next generation in the same way. Children sit with their parents and grandparents to learn the knowledge of their forefathers. In the Karrayyuu community, children aged between four and eight also known as *ijoollee xixiqqoo* follow the camel and cattle herds, in order to gain the herding knowledge from the elders⁶. They do not have a practical job description other than learning how to manage the herds. The adults also share their experiences that they have gathered through life. There is a very popular saying in Oromo – *lubbu dheeroon miti miilla dheeroon gaafadhu!!!* This Oromo proverb can be translated as – ‘do not ask a person who lived long but who traveled a lot’. It is believed in this community that a person who traveled a lot is a more knowledgeable than a person who has lived longer. According to the Oromos, people collect knowledge by going around and observing the environment and by meeting people who have had a different experience. Thus, knowledge is gathered not by simply sitting in one place but through observation and sharing (see also Toledo 2001).

It is also to be noted that indigenous knowledge is context dependent (Toledo 2001). Indigenous knowledge is created in a given ecological context to address the reality in that context. Therefore, the knowledge should be seen in relation to the context in which it is generated. The implication of this argument is, that knowledge like culture loses its purpose when it is moved out of the culture in which it is generated. Thus, there is no point in taking the indigenous knowledge out of its context; this is in contrast to scientific knowledge, which is believed to be applied universally (see Berkes 1993 for the distinction between indigenous knowledge and scientific knowledge). This, however, does not mean that indigenous knowledge produced by one group cannot be shared with other groups. Though indigenous knowledge is generated in one context, it may be applied in similar areas. Knowledge generated in one pastoral community may be applicable, at least to another pastoral group in a similar ecological situation. Karrayyuu elders, sometimes travel to pastoralist communities in other parts of

⁶ See section 4.6.

the country to share their experiences. However, the application of indigenous knowledge in another context can only be done after harmonization with the new environment.

Another important aspect of indigenous knowledge is its analytic nature. Toledo (2001) argues against the general understanding of indigenous knowledge as only of structure of nature and classification. Much of the work under the banner of ethno-ecology is occupied with the classification of natural objects and the creation of indigenous semantic categories (see Lampman 2010). Indigenous knowledge (ethno-ecology) is also concerned with dynamics and relations between things out in the universe, not only categorization. Indigenous knowledge, like 'Western' science, is concerned with finding pattern in the world. It also tries to find explanations, within its paradigm for why things behave the way they do (Toledo 2001:459). The Karrayyuus make decisions when it comes to trekking based on the analysis of the relation between the livestock, humans and the ecosystem. Karrayyuu herders can predict the amount of rainfall based on wind direction and color of the clouds; this illustrates the analytic nature of their indigenous knowledge.

2.3.3. Practice

Ethno-ecology is not only concerned about the belief systems and the knowledge of the people but also how the knowledge is put to practice for the benefit of the people. There is interconnection between knowledge system and practice. Indigenous knowledge is generated while the people hunt, gather, farm and herd etc. Such knowledge is needed in order to use nature with the different practices. Thus, indigenous knowledge and ecological use are interconnected. The indigenous peoples, as people, living in the margins - such as the arid and arctic - need to have a detailed insight of the nature that surrounds them in order to survive. Karrayyuu herders use indigenous ecological knowledge to predict drought in order to avert its effects such as starvation of humans and death of livestock (Bekele & Amsalu 2012b). Based on their ethno zoological knowledge, the Karrayyuu, classify their livestock according to age, sex and productivity in order to enhance reproduction, which is very important for their survival. It is

possible to say that the knowledge generated is very much connected with a practical use, which is basically subsistence. Thus, ethno-ecology also deals with how the indigenous peoples use their knowledge in order to interact with the ecology.

2.3.4. Access, distribution and power

Nazarea (1999) argues that ethno-ecology, in its analytical approach, cannot ignore issues such as; access to resources, distribution of resources and the power relation between the indigenous peoples and the external world. Thus, while the belief system, Indigenous knowledge and practice reflect the processes among the indigenous peoples, the access, distribution and power reflects on the relation between the indigenous peoples and the outer world. Thus, when dealing with indigenous peoples and their challenges, it is also important to consider the bigger context in which they live. Changes that come to indigenous people, may come from the inside but it also may not. Today, most indigenous people are exposed to the world market system, which has a huge impact on their environment and the use of nature. The indigenous people will have to somehow adapt in order to meet the needs of the world market, state and interstate relations (see Bryant 1992 for political ecology of third world). In the case of the Karrayyuu, the commercialization of camel milk which was once considered as a taboo (Edjeta 2001) is one example of how they have adapted to these new conditions.

2.4. Conclusion

The roadmap presented in the chapter shows the general direction the research takes. The primary methods used to obtain data are interviews and observations coupled with collection of proverbs. The use of the different techniques is important for obtaining a better quality corpus. The data that is mainly about the indigenous knowledge and practice of the Karrayyuu people can be best analyzed within the theoretical framework of Ethno-ecology as used in such scholarly works as Barrera-Bassols & Toledo (2005) and Nazarea (1999). The ethno-ecology, which focuses on worldview, knowledge and nature use of ethnic

groups can be of high value in analyzing the camel husbandry of the Karrayyuu people, a pastoralist group, in a changing ecological situation (see Nazarea 1999).

Chapter III Background of the research: the study area, ecology and pastoralism

3.1. Introduction

It is quite important, here, to give a brief background on which the arguments of the thesis are grounded. Section (3.2), gives a brief introduction to the area of research, the Fantallee⁷ district and the Karrayyuu, residents of the district. Section (3.3) gives some introductory points about the ecological situation of the Fantallee district such as the rainfall, vegetation type, and the landscape as well as the ecological changes that have taken place over the last few decades. Sections (3.4-3.7) give some background information on pastoralism and camel husbandry as practiced by the Karrayyuus and in the entire region. Government policy towards the Karrayyuus and other pastoralist groups that have directly or indirectly had an impact on camel husbandry has been discussed briefly in section (3.8).

3.2. The people and the study area

The Karrayyuu, indigenous inhabitants of Fantallee district, are one of the clans of the Oromo (Gebre 2009). Oromos⁸ are the largest linguistic group of East Africa who reside in Ethiopia, Kenya and Somalia (Heine 1981, Griefenow-Mewis 2001). Karrayyuus have two major clans- Baso and Dullacha. The Baso inhabit the Eastern part of the district while the Dullacha live in the Western part. The district of Fantallee where Karrayyuus live is located about two hundred kilometers East of Ethiopia's capital, Addis Ababa. The road and railway⁹ that connect the capital to the port of Djibouti¹⁰ pass through the district. Oromiya Livelihood Zone Reports (OLZR) (2008), referring to Central Statistics

⁷ Fantallee and Karrayyuu land are used interchangeably in this thesis.

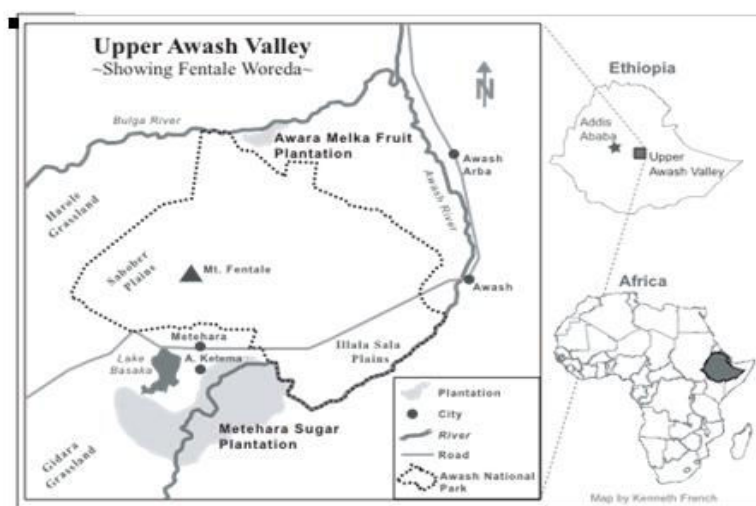
⁸ Oromos are one of the Lowland East Cushitic groups of Afro-asiatic super family.

⁹ My informants told me that trains hit hundreds of livestock every year creating conflict between the Karrayyuu and the Ethiopian railway corporation.

¹⁰ Ethiopia as a landlocked country uses primarily this port for import and export.

Authority's 2006 estimation, reported that the total population of the district is 70,049. The district of Fantallee has 18 pastoralists/agropastoralist associations and two urban centers called Matahara and Haroo Adii¹¹ which are about five kilometers apart. Most of the Karrayyuus live in the pastoral and agropastoral associations in the rural areas. However, some Karrayyuus have started to settle in the urban areas. The following map shows the location of Fantallee district in relation to the whole country and region.

Fig.1. Map of the study area taken from (Beyene & Gudina 2009)¹²



The main economic activities of the Karrayyuu are; pastoralism, small-scale farming, daily labor on Matahara sugar cane plantation and petty trade such as the selling of firewood and charcoal (Edjeta 2001, Tolera 2000, Bekele & Amsalu 2012b). Karrayyuus are known for herding camel, cattle and goats. In old days, cattle were economically the most important livestock. Traditionally their staple food, were dairy products from cattle, such as; milk and butter. They did, however, used to barter grains in exchange of dairy products with the surrounding farmers. However, recently, camels and goats are becoming more

¹¹ Haroo adii is renamed by the urban dwellers as 'Addis Ketema' which means new town in Amharic- working language of the Federal Government of Ethiopia.

¹² They got the map from Care Ethiopia.

important due to the loss of land to development schemes¹³ and the desertification (Edjeta 2001). Karrayyuus who lost their herds in this process have settled and started small-scale farming (Edjeta 2001). There is a significant number of Karrayyuus, particularly those who settled near the sugar factory, working as daily laborers (Edjeta 2001). The selling of firewood and charcoal to the urban settlers has been another source of income for the Karrayyuu (Bekele and Amsalu 2012b).

Karrayyuu Oromo practice at least three different religions –Islam, Christianity and the Oromo traditional religion. Karrayyuus have until recently exclusively practiced the Oromo traditional religion. However, recently they have been converting into Islam and Christianity (Edjeta 2001). Thus a significant number of the Karrayyuus, particularly the Baso clan, became Muslims as a result of contact with Muslim Ittu Oromo who settled in the Eastern part of Fantallee. More recently, some Karrayyuus converted to Christianity due to the influence of a very popular protestant NGO called Gudina Tumsa Foundation (GTF)¹⁴. Some of the Karrayyuus who are especially close to the development projects became protestant Christians. During the last few years, some Karrayyuus, particularly the Dullachaa clan, have converted to Orthodox Christianity. It is to be noted that the Dullacha Karrayyuu are neighbored by Orthodox Christian Tulama Oromo and Amharas. According to my informants¹⁵, there are still a significant number of Karrayyuus, mostly from the Dullacha clan, who practice Oromo traditional religion.

3.3. Ecological situation of Fantallee district (the study area)

This section provides ecological information about the district of Fantallee, which is inhabited by Karrayyuu Oromo pastoralists and agro-pastoralists. The

¹³ See chapter V.

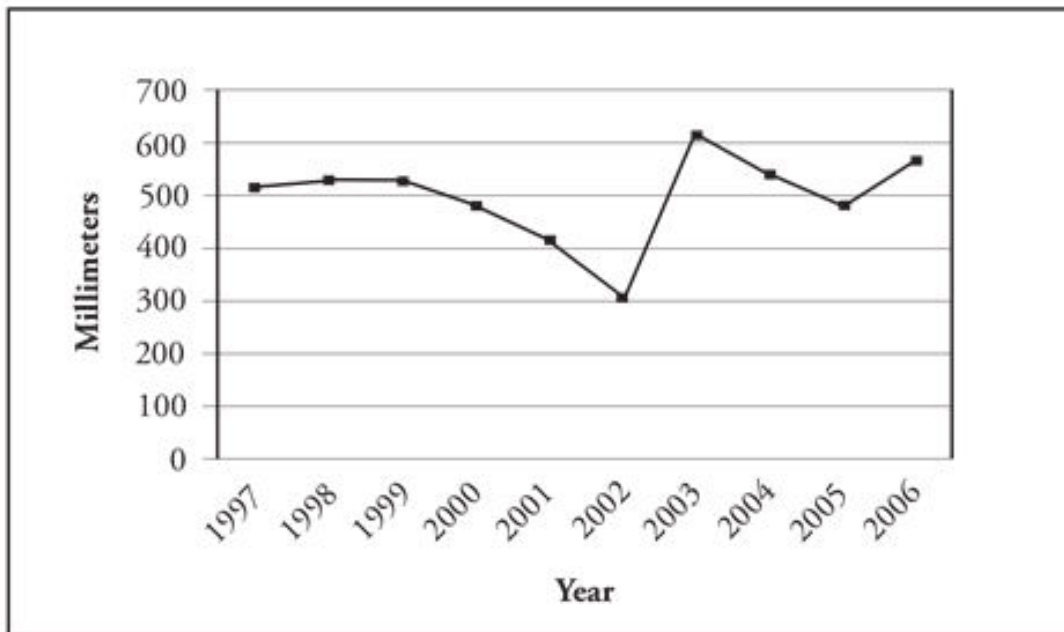
¹⁴ The foundation has engaged in several development projects including schools and water ponds.

¹⁵ Abomsa Jima and Roobaa Fantallee.

ecological information among others includes the type of climate, the amount of rainfall and the landscape.

Fantallee is one of the districts in Ethiopia with very low annual rainfall and high annual temperatures (see the fig. 2 below). The average annual rainfall is about 500 mm (see Beyene and Gudina 2009:61). There are two wet seasons *Arfassa* which is from February to April and *ganna*, main rainy season, between July and September (Edjeta 2001:20). According to my informants, in former times, there was a shorter rainy period in December called *furmaata* which means 'solution' in Oromo. The rain comes for two or three days in the midst of the long dry season and gives a short break from the harsh sunny dry season. The district of Fantallee as a semi-arid environment is known for its unpredictable rainfall (Edjeta 2001). The wet season sometimes starts late and ends early. The temperature varies from place to place and from season to season. The temperature is higher in the plains and lower in the hills and the mountains. The temperature reaches about 42'centigrade during the dry months of December, January and May and gets milder (about 10 degree centigrade) during the wet months of July and August (See also Edjeta 2001; Beyene and Gudina 2009).

Table 1. Annual rainfall of Fantallee area (taken from Beyene and Bekele 2009).



The vegetation of the district is characterized by ‘riverine forests, wooded savanna thorn bush, and grassland’ (Beyene and Gudina 2009:60). The Awash river valley, before confiscation by Matahara Sugar Factory, was covered by riverine forests which were dominated by fig and acacia trees (Beyene and Gudina 2009:60f). Savanna and grassland dominated the rest of the Karrayyuu plain until recently. There are still some small-scale forest reserves in the Awash River basin. However, currently, much of the plains are naked with shrubs only in some areas of the district. In addition to the shrubs, acacia trees make up a significant part of the vegetation. These trees are common around the Arroollee village, which is located between the Karrayyuu land and Argobbaa. Karrayyuu camels browse these trees during the wet months of July and August. However, recently, thorny plant *prosopis Juliflora* which is locally called Wayyane¹⁶ has infested the plains of the Fantallee district. None of the livestock feed on the wayyane tree because it is thorny and unpalatable. The plant, apparently, flourished- suppressing the other plants in the area because of its ability to grow on a small amount of water, unlike other plants that died away due to drought.

¹⁶ Wayyane tree is named as such because it came first to the area when the rebel groups called Hizbawi Wayyane Harinet Tigray “Tigray people liberation front’ overthrew the former government of Mengistu Hailemariam in 1990.

Awash is the only river that passes through the Karrayyuu land. River Bulga only bounds the district from the North (see map on page 21). The Karrayyuu use the Bulga river basin, on their side, as dry season grazing area (see Edjeta 2001 for grazing zones). These two rivers are the only perennial source of water in the district. However, there are wet season ponds and water points dug by NGOs and government institutions in collaboration with the local communities. The Fantallee district is also the home of a toxic lake called Beseka, the largest water body in the area. The water of the lake contains high sodium and fluorine and can therefore not be used for drinking or farming (Edjeta 2001:69). According to the Karrayyuu elders, the lake was very small thirty years ago and has since expanded¹⁷ to claim, its now, thirty-five square kilometers of land.

3.4. Pastoralism

Pastoralism is an economic system in which human beings manage the relation between pasture, livestock and the humans who depend on them. 'The viability of this pastoral ecosystem therefore depends upon the relations between the three factors of production: personnel, herd and pasture (Bjorklund 1990:77). Pastoralism is also associated not only with the production of livestock but also movement. Pastoralists usually occupy arid and semi arid areas which cannot support agriculture (Linseele 2010; FAO 2001). The very arid regions, which receive less than 250-300 are usually conducive for camel husbandry. Semi-arid areas receiving about 250-500mm of rainfall a year can support cattle, while humid areas, with around 1000mm, are not conducive for animal husbandry due to the infestation of the tsetse fly and the shortage of palatable forage in such areas (Bonte and Galaty 1991:12f; Linseele 2010:46). 'Pastoralism generally sustains population densities greater than those of foraging but less than those of cultivation' (Galaty and Bonte 1991). This implies that the excess population created in the pastoral community migrates to farming areas or converts the humid pastoral land into farms. This process pushes the pastoralists from humid areas to more unpredictable arid areas. The pastoralists then embraced mobility

¹⁷ One of my informants told me that one Qaalu 'Prophet of Oromos' has foretold that the lake will continue to expand because the Karrayyuus failed to comply to the demands of the mother nature.

as an adaptation mechanism to such arid areas (Linseele 2010). The marginality and aridity of the land implies the need to move from one ecological zone to the other in search of pasture and water, which varies seasonally across the zones.

Pastoralism can be categorized based on the degree of dependence on the pastoral product and mobility. Based on movement it can be categorized as nomadism, transhumance and agropastoralism. Nomadism refers to the exclusive production of livestock. Nomadic pastoralists are in a constant movement in search of better pasture and environment. Unlike, transhumance, in nomadism the movement is irregular as their route varies from year to year (FAO 2001). The entire family moves with the herds in nomadic pastoralism. The second category is transhumance. It refers to a system of pastoral production in which the pastoralists move through fixed ecological zones across the years. 'A characteristic feature of transhumance is herd splitting; the herders take most of the animals to search for grazing, but leave the resident community with a nucleus of lactating females' FAO (2001: 1). Transhumant pastoralists have some permanent areas where the old and young settle. This part of the community may practice small-scale agriculture, which is limited to producing for domestic consumption (FAO 2001).

The third category is an agropastoralism, which refers to the practice of pastoralism, which is supplemented by food cultivation. 'Agropastoralists can be described as settled pastoralists who cultivate sufficient areas to feed their families from their own crop production. Agropastoralists hold land rights and use their own or hired labor to cultivate land and grow staples' (FAO 2001:1). Unlike, the nomads and transhumants, agropastoralists are settled and graze their livestock in the surroundings of their settlements. They are more integrated into the market system than the other pastoralist groups (Jacobs 1965). Based on their dependence on livestock products, Jacobs (1965) categorized pastoralists as pure-pastoralists and semi-pastoralists. Accordingly, pure pastoralists are those pastoralists that exclusively produce livestock and depend almost exclusively on the energy that comes from the pastoral product such as the dairy products and meat. The Semi-pastoralists, on the other hand, use produced or exchanged agricultural products (see Jacobs 1965).

3.5. Pastoralism in Ethiopia

Pastoralism is practiced mainly in arid and semi-arid remote parts of Ethiopia where rain-fed agriculture is impossible. Ethiopia is home for about 10 million pastoralists which makes up about 14 % of the total population (PDE,IIRR and DF 2010). About 29 of the 80 ethnic groups of Ethiopia practice pastoralism. This, however, does not mean that all the 29 ethnic groups exclusively practice pastoralism. The major pastoralist groups are Oromo, Somali and Afar contributing about 87% of the total pastoralist population. Ethiopian pastoralists mainly rear cattle, goats, sheep, equines and camels (PFE,IIRR and DF 2010). According to the data from Gebru et al. (2004), the Ethiopian pastoralist groups contribute about 40% of cattle, 75% of goats, 25% of sheep, 20% of equine and 100% of camel to the national livestock population. These numbers show the significant contribution of pastoralism to the national economy.

3.6. Pastoralism and Karrayyuu

The karrayyuu are pastoralists who rear camel, cattle, goat and sheep. The livestock are owned and managed at family level while the pastoral land is owned communally and is managed by the traditional leaders. The Karrayyuus can be categorized as semi-pastoralists based on Jacobs' (1965) typology due to the fact that they have recently started to cultivate crops and use agro-industrial products. They grow maize during the wet season for domestic consumption. However, they buy food and other stuff from the market in Matahara and the surrounding towns. The Karrayyuus moved, up until the forced alienation from their land (Edjeta 2001), between the three ecological zones: Summer, Winter and Autumn grazing areas for the optimal use of their environment. However, recently, as an adaptation mechanism to the ecological changes, they split the herds and exploit the different zones using diverse livestock. The camels, cattle and small ruminants use different ecological zones owing to the differences in the forage they consume.

3.7. Camel husbandry in the East Africa

Research has been done on how camel husbandry was introduced to East Africa. According to Bulliet (1975), dromedary camel could have been domesticated in Arabia and entered the horn of Africa through Socotra island as early as 2nd millennium B.C. Another competing theory as the source of camel to the Horn of Africa is from North Africa through Sudan. However, Bulliet (1975) contends that the Sudan theory is less likely for different reasons. First, the focus of the Somali on camel milk is similar to that of the South Arabia. Second, unlike the Sudanese pastoralists, Somali camel herders are not familiar with camel riding. There are also similarities between saddles of the Socotra island pastoralists and the Somalis. The other plausible argument for the Socotra island theory is the similarity in climate regime between the island and Somalia (see Bulliet 1975:60ff). It is then believed that the camel husbandry spread from the Somali to the rest of the pastoralists of East Africa such as the Afar, Rendille, and Oromo, among others (Bulliet 1975; Köhler-Rollefson 1993 for domestication and spread of camel husbandry).

There are about 19 million camels in the world, out of which 17 million are the one-humped dromedary camels. About 60% of these live in East African countries such as Somali, Sudan, Ethiopia and Kenya (FAO 2004, quoted in Farah et al. 2007:187). The camels can feed on different type of plants and can survive for a long time without water (Coppock et al. 1986). The camels have been very important for the pastoralists of the arid and semi-arid areas of the region (Keskes et al. 2013a:16). Some of the main roles that camels play in the economy of the pastoralists are: the building of assets, insurance against unexpected events, traction and movement of goods, food supply and income generation, they also have spiritual and social values (Keskes et al. 2013: 16). According to Farah et al. (2007), camels could give 3 to 10kgs of milk during the 12 to 18 months of lactation. The adaptation of camels to arid areas and high productivity with little input makes them the best candidate for East African arid areas.

3.8. Policies toward Karrayyuus and pastoralism

The government of Ethiopia follows a policy of exclusion and marginalization on the pastoralist groups of Ethiopia. 'If at all the (pastoralists) were recognized, it was as a deterrent to the development and their land was sought for development as mechanized commercial farms owned by private sectors' (Tolera 2000¹⁸). The Karrayyuu elders that I interviewed also told me that higher government officials come to their area when they need a piece of their land for development purposes. As the result of such policies, the pastoralists in general and the Karrayyuus in particular, have lost their key grazing areas (Tolera 2000; Edjeta 2001). Regardless of claims by officials, that the government has put 'good' policies (Gebru et al. 2004) in place, to guide its relation with the pastoralists, expropriation of land without prior consent of the pastoralists has taken place affecting among others, the Karrayyuus¹⁹. There is a continued privatization of land directly affecting the mobility of the livestock which is the most important adaptation mechanism in arid pastoral areas²⁰. Gebru et al. (2004:9), argues, on the other hand, that the fruit of the current government's policies has not yet been seen. This issue, of the continued loss of land in favor of agricultural development in the pastoralists' area is a concern that the Ethiopian government has not yet addressed.

The non-governmental organizations such as 'Gudina Tumsa Foundation' (GTF) and 'Children's Fund' have very similar policies. Most of their projects are geared towards changing the Karrayyuus into settled farmers. Their projects, predominantly, have nothing to do with pastoralism. They focus on how the pastoralists start agriculture and settled life. During my fieldwork, I had the privilege of interviewing some officials of the Pastoralist Community Development Project (PCDP) - a project funded by the World Bank. The officials told me that they renovate schools, irrigate rivers and build health centers and veterinary clinics. The only thing that can make these projects pastoral, is that they have few veterinary clinics. The projects and the policies of the NGOs, as I

¹⁸ The copy of this text that I got has no page number.

¹⁹ From an interview with Abomsa Jima.

²⁰ From an interview with Abomsa Jima.

understood, is aimed at sedentaraizing the pastoralists which is not supported by most of the pastoralists that I have spoken to.

3.9. Conclusion

The chapter attempts to give readers the relevant background for understanding the arguments of the thesis. The Karayyuu camel husbandry can be understood in the context of the ecological and political situation of the region. The camel husbandry developed (see chapter V) as the result of the ecology, which includes the landscape, vegetation, and the climate of the area as well as the state policies towards the Karrayyuu and pastoralism. The aridity of the Fantallee district and the recurring drought, which affected the vegetation has facilitated the introduction of camel husbandry. On the other hand, the dialectics of the centralization of the state and the decentralization of the pastoralists has also contributed to the rise of a new way of using nature, i.e camel husbandry. In general, political and ecological situations discussed in this chapter have contributed to the development of camel husbandry.

Chapter IV traditional camel management

4.1. Introduction

During one of my group discussions, I asked my informants about the rearing of camels. One of my informants, Ali Ware, began answering by reciting a proverb, *horsiisi gaalaa akka hojjaa isaa dheerata*²¹ which can be freely translated as 'rearing of camel is a very difficult undertaking'. All the former herders that I talked to also agreed that camel husbandry is not an easy job. They all mention the difficulty in traveling for several hundred kilometers with their camels in the search of pasture and mineral water (see section 4.5). Camel husbandry is a demanding task that requires a considerable human labor input. Human beings even facilitate mating and engage in other management practices (see section 4.4 & 4.6). However, in order to do this task they share responsibilities to the individual herders based on age-grades (see section 4.7). On top of that, in order to efficiently manage the herds, the Karrayyuu categorize their camels based on age, sex and productivity, amongst others (see section 4.3).

4.2. Introduction of camel husbandry to Karrayyuu

Scholarly works on the history of the introduction of camel husbandry to the Karrayyuu community have not come to my attention so far. This discussion, thus, will only be based on the data obtained through interviews but is triangulated with some sociocultural arguments. Most of the Karrayyuu elders I interviewed agreed that the introduction of camels to their community is very recent. My informant Roobaa Fantallee said that the Oromo were pastoralists from time immemorial. Camels originally belonged to the Arabs and were later introduced to the Oromos, through the Afar²². According to him, the Afar reared camels for a very long time. It seems that the Oromos, which includes the Karrayyuu, who were traditional cattle herders had resisted the adoption of camels for such a long time, until the recent desertification which pushed them

²¹ The literal translation of the proverb would be 'rearing of camel is as tall as the camel itself'. *Tall* in this case means 'difficult'.

²² Afar is one of the ethnic groups in eastern part of Ethiopia known for camel husbandry.

in to take the option. According to Roobaa Fantalle, Karrayyuu exchanged their first camel with ten goats. My informant and camel owner, Jimaa Fantallee who is in his 30s said that his grandfather brought the first camel to their family around 60 years ago from the Afar people. Another former camel herder Arda Jilo, who is in his 70s, said that his grandfather got camel for the first time from the Afar probably around 100 years ago²³.

The fact that camels were introduced recently into the community can also be supported by their position within the community. Camels have lower cultural and ritual values than cattle in this community. Cattle and goat are slaughtered during cultural and political ceremonies such as the nomination of new leaders and marriage. Only cattle are given as a dowry in this culture. During my fieldwork, I asked what kind of cultural or ritual relevance the camels have, my informants struggled to provide any. In addition to this, while I was collecting proverbs related to their domestic animals, my informants found it considerably easier to produce examples related to cattle than for camels. These are further indications that the camels are historically a recent phenomenon in this culture. Based on the information from the informants and current role of camels in the community, it is possible to estimate that camels were introduced to Karrayyuu no earlier than a hundred years ago. However, a detailed account of the introduction of camels, which needs triangulation with historical and archeological evidences, is beyond the scope of this work.

Another important point worth discussing is the manner in which the Karrayyuu acquired their camels. There are two theories to explain the acquisition of camels: raiding and exchanging. Roobaa Fantallee and Jimaa Fantallee both argue that Karrayyuu elders exchanged the first camels with goats from the Afar. However, Damusee²⁴ and Arda Jillo argued that the first camels were raided from the Afar. However, everyone agrees that both raiding and exchanging are

²³ We arrived at this number by considering his age and the age of his grandfather at the time he died. This is the only way to estimate because he did not have the exact date for introduction of camels to his family.

²⁴ Last name is missing.

common ways of building camel herds, until recently²⁵ (Edjeta 2001). If buying and raiding existed until recently, there is no reason not to believe that it existed hundred years ago. In addition the naming of camels also holds some clue as to how they are acquired. One of the common names of Karrayyuu camels is Oriyaa meaning ‘threaten’. Such names are given to the camels that have been raided from other groups. This illustrates that raiding is a common means for acquiring camels. It seems therefore that camel herd building took place by this very process of raiding and exchanging.

4.3. Categorization of Camels

The Karrayyuu know their camels well, through living alongside them for a long period of time. They categorize the livestock based on different features such as age, sex, function, color, physical appearance²⁶, and manner of acquisition, to name but a few. Such thorough classification reflects the knowledge of their livestock and the relevance of the categorization for management. However, in this section, the focus of categorization will be on parameters that are more relevant for management that is; age, sex and purpose. The following table shows the different categories of camel and the different terms used for the categories.

²⁵ The Afar and Karrayyuus have recently agreed not to engage in raiding livestock. Thus, raiding is not that popular currently.

²⁶ Camels, which happen to have hair on their neck, are called ‘gaala qaalluu’ which means highly respected. It is believed that such camel is very productive.

Table 2: Categories of camel based on data collected from my informants²⁷.

	Karrayyuu name	Age	Sex	Description
1	<i>nyarqoo xixiqqo korma/dhaltu</i>	0-1	M/F	calf, not for sale
2	<i>nyarqoo guguddoo</i>	1-2	M/F	older than the first category, may or may not suckle, not sold at this age
5	<i>soosa kan hinleenji'in soosaa leenjite</i>	2-4	M	stopped suckling, can be sold or slaughtered. At this level, they get trained to carry load.
6	<i>karabittii (geejjiba),</i>	4-	M	male camel usually used for transportation of load. They are kept at home away from the rest of the herd.
7	<i>karabicha</i>	4-22	M	bull for reproduction, trained to carry mainly calves
9	<i>bufana gorba</i>	2-3	F	weaned but is not yet ready for calving
10	<i>goromsa</i>	4-6	F	that is ready for calving, one that has calved only one or two is also <i>goromsa</i>
11	<i>gur'oo</i>	4-	F	a dam which has calved twice or more
12	<i>gur'oo Dullacha???</i>	15-	F	a dam that has calved several calves
13	<i>karabicha dullacha</i>	12-	M	an old bull that is already replaced by a young one
14	<i>maseena</i>	4	F	a camel that has stopped calving
15	<i>dhankaka</i>		F	a female camel that has never calved for biological reasons
16	<i>baakkuu</i>		F	a lactating camel with little milk
17	<i>mirgisa</i>		F	a lactating camel with a lot of milk

As we can see from the description in the right column, all the different categories have different roles. The different categories are also treated according to their roles. If we take two categories *soosa* 'male young camel' and *bafana gorba* 'female young camel' they are equally old but different in sex. The difference in sex is extremely important in management. The *bafana gorba* are considered the future dam camel and are treated accordingly. The *soosa* are usually sold off to generate income for the family and to minimize the pressure on pasture and herders. The distinction between *gur'oo* 'dam camel' and *karabitti* 'male adult camel' is also important for pastoralists, such as the Karrayyuu, who focus on the production of milk and camels for the market. It is also important, for the Karrayyuu camel herders to make a clear distinction

²⁷ Abomsa Jima, Roobaa Fantallee, Alii Waare, Jireen Waday

between *baakkuu* 'camel with little milk' and *mirgisa* 'camel with a lot of milk' for the choice of future bull and production of milk. Karrayyuu, at least, in the old days, had dairy products as their main source of food. The production of milk is pivotal in such economic system. Therefore, they need to know the milk offtake of their livestock and categorize their livestock accordingly. This knowledge and categorization will contribute to the production of more *mirgisa* 'camel with a lot of milk' in the herd. The knowledge of milk offtake and the subsequent categorization of dams, will also help them avoid choosing a bull that has been calved by a dam with little milk offtake. It is believed that such a bull produces herd with less milk offtake. Therefore, a deep knowledge of livestock and subsequent categorizations is a very important part of camel management and use of nature, in general (see Nazarea 1999). The Somali have about 46 different terms for the different categories of camel. They even have a term for a camel that gives birth to male calf and for a camel that gives milk depending on her mood (<http://itre.cis.upenn.edu/~myl/language/ archives/ 000457.html>).

4.4. Camel breeding

In this discussion, we can find the indigenous Karrayyuu knowledge of camel breeding, which emanated from the way they perceive their environment. This section is based on my interview with Roobaa Fantallee²⁸, Ali Ware and Damisse.

In order to get the 'best' breed of camels the herders choose the 'best' bull for the herd, this choice is usually made at birth. According to Adan (1995), breeding management is mainly about choice of bull based on the relevant criteria. In one herd there will be one bull. According to my informant Damisse, the would-be best bull is the one that can lift up its head right after birth. The size of the calf is also another criteria for the choice of a future bull. For a calf to be chosen as a bull it would have to be bigger than the rest. Sometimes the color of the calf can play a part in the choice. Usually, 'brownish' grey camels are preferred by the Karrayyuus. The calf that is chosen to be a bull will be fed with highly nutritious

²⁸ Roobaa Fantaallee is a spiritual leader in early 40s who learned about camel husbandry from the elders. Ali Ware and Damissie are former camel herders in their late 40s.

plants. In some cases, the bull will be trained to carry loads especially the calves. However, some choose not to use bulls for transportation. Their argument is that a trained load bull becomes weak and then produces weak and small calves. Somalis for the same reason do not usually use breeding bulls for transportation (Farah et al. 2004). This is all in effort to create the best herd, i.e., a herd that is made of; strong, big, and productive camels.

In a given herd there is only one bull. All the male adult camels that fail to qualify as the 'bull of the herd' will be sold or separated from the herd, as otherwise they may copulate with female camels and thus reproduce calves with unwanted traits. Having more than one bull in a herd may also have other consequences according to one informant. The bulls always fight over control of the herd and make the herd chaotic. In addition, my informants told me that the bulls have a special ability to identify the father of the fetus. If they find out that the fetus belongs to another bull, they then mate and damage the fetus which is thought to lead to an abortion. Therefore, it is considered mandatory to separate other male adult camels from the herd. The Somalis also separate such camels from the herd or castrate to avoid 'bad genes' (Farah et al. 2004:49). The herders' duty is, therefore, to make sure that there is only one 'good' bull in a herd for healthy reproduction.

The mating process, as the herders understand it, is an interesting point to discuss in this section. The bull that is ready for mating shows certain courtship behaviors such as displaying the soft palate²⁹ and roaring. The bull also gets closer to female camels and hits her with the front leg in an attempt to force her down. At that point the herders know that the bull wants to mate and start to facilitate by forcing the dam camel to lie-down for mating. The female camels respond differently to such behaviors. Camels that are pregnant lift their tails and urinate. The camels that are not pregnant cover their reproductive organ with their tails and run away. The bull knows that urinating is a symbol of pregnancy and thus does not attempt to mate. However, less experienced camels, *karabitti* (load camel) sometimes mate with pregnant camels and abort the fetus. Some experienced bulls can insert their penis into the vagina without any help

²⁹ The Karrayyuus call it *somba* 'lung'.

from the humans. However, most of the time after forcing the camel to lie-down, the bull turns around to the herders in a sign to ask for help. My informants argued that facilitating mating is as important as any other management activities such as the choice of bull. Herders control how often the bulls copulate, this is usually based on the availability of browse and mineral water. During the wet season, three times a day is the maximum they allow. The bulls, sometimes, run away from the herds during the dry season and drought to avoid copulation.

When a given bull gets old a strong and healthy bull will replace him. It is believed that a very old bull produces bad traits. However, there is no given specific time for a bull to serve. The time of service for a bull all depends on its strength and health. My informants said that a bull could serve up to 10 years. Farah et al. (2004) said that some Somali herders have used a bull for up to 18 years. Retirement of an old bull and the reign of the new one is done ritually. The two bulls will have to fight and the new one must win in order to be the bull (leader) of the herd. To this end the herders help the new bull during the fight. The old bull will be chased from the herd. He moves to a forest and browses alone to gain energy in order to return to the herd. It is common to kill and share the meat of such a bull before he returns to the herd. The owner of the culled bull gets goats in exchange. However, recently, it has become common to sell such unproductive camels, even before they grow too old.

Another important indigenous knowledge that is relevant for the herd management is pregnancy and facilitating mating. How do the herders know whether a camel is pregnant? How do they know that a young female camel is ready for calving? In order to test pregnancy, a herder gets closer to the camel and says 'ri-ri-ri'. If the pregnancy is a month old, then the camel raises its tail straight, waves it three times and start to urinate. If the pregnancy is two months old the camel curls up its tail and urinates. If the camel is not pregnant at all, it hides its tail between the back legs and runs away. The pregnancy test is important for the herders to avoid a possible abortion, which is likely if a pregnant camel mates again. If a camel has not got pregnant a month after mating, the herders will facilitate another round. A dam camel without a fetus is considered as a farm without crops. The herders register the day of mating for

every female camel for reasons of management. They also register the result of the pregnancy test in order to give the necessary care for the camel and predict the time of calving. Camels usually run away from the herd during calving, which may expose their calves to danger. Therefore, after the 12 months of pregnancy the herders give special attention to such camels.

4.5. The browsing route of Karrayyuu camels

One of the most important management practice of pastoralist communities is the decision surrounding the pattern of movement. 'Periodic movement allows the adaptation of grazing pressure to the carrying capacity of pasturelands, mobile pastoralism has historically been the dominant type of livestock management strategy in semi-arid tropics, deserts, and highlands' (Oteros-Rozas et al. 2013:1). The movement of Somali camel herders is designed to cope with the harsh environment and unreliable rainfall (Farah et al. 2004:50). Such long distance trekking needs a detailed ecological knowledge such as climate and vegetation (See Oteros-Rozas et al. 2013). Thus, in the following paragraphs, the route of movement of the Karrayyuu camel herders and its justifications will be presented.

Until 1980's, the camels browsed in the Karrayyuu land and the surrounding areas such as Carcar³⁰. It was only at the beginning of 1980's that the Karrayyuu camels started to move to highlands, west and southwest of the Karrayyuu land. Karrayyuu informants remember that two famous camel herders called Boruu Yuugo and Wadaay Rooba, who for the first time moved further South and West into Arsi zone, East Shoa Zone and South Nation Nationalities and Peoples' region³¹. The rest of Karrayyuus herders followed the suit of the two famous men. The browsing pattern of camels has since changed. So, currently we have a dry season browsing and rainy season browsing ecological areas. The dry season ecological areas include the highland districts towards the West and the Southwest of the Fantallee district (Karrayyuu land). This is a large chunk of land

³⁰ Carcar is few kilometers West of the Fantallee district.

³¹ South Nations, Nationalities and Peoples is one of the nine regions of the Federal Democratic Republic of Ethiopia.

that extends over hundreds of square kilometers (see the map on page 21). The departure is the Fantallee district and the destination is Shiraaro (sidamo). They cross, Boosat, Adama, Mojo, Maqi, Zway, Adami Tulu, Shashamanne, Awasa and then Shiraaro. The *Ona ganna* (rainy season) browsing area includes the Harroollee and Carcar area (see the map on page 21). The rainy season browsing area is located in the Fantallee and the Boset district which is located to the west of Fantallee.

Why do the Karrayyuu camel herders follow the route that they are taking? It seems to me that the only safe exit both in terms of security and pasture is the West and South West. The Karrayyuu are surrounded by Argobba from the North, from North and North East by the Afar and from the East and South East by the Afar and Ittuu Oromo groups. The Karrayyuus had a very hostile relationship with the Afar and Argobbaa. Therefore, exit through the land of these people is considered unthinkable for security reasons. On the contrary, the Karraayyuus have been in relative peace with their neighbors in the West and in the Southwest. In addition to that, their neighbors in the West and Southwest, namely, the Tulama and Arsi Oromos inhabit a land with more trees than the rest of their neighbors. These neighbors are also farmers, unlike the neighbors from the East, who are pastoralists. This means that the farmers in the west and South West do not use their forest as much as the pastoralists. The farmers may see the forest as a source of rain, firewood and a potential farmland. The farmers' use of land does not contradict with the pastoralists' use of forest. The pastoralists only want to browse their camels for a short period of time and then move on. Thus, there is no strategic resource conflict in this regard. The farmers therefore can afford to tolerate the pastoralists. In addition, the good pasture, warm climate and availability of mineral water³² contribute to the choice of the route.

Why do they have this pattern of movement? Why do they move to the South West during the dry season and move back to their home area during the rainy season? They stay in Fantallee during the summer months for several reasons; (a) there will be enough browse in the Fantallee district for the camels during

³² Mineral water (salty water) is a very important for camel's health and reproduction.

the summer months. During the rainy season, trees in the Fantallee area turn green, particularly in the Harroollee area of the district. (b) Land will be covered by crops. The area South of the Fantallee district, which is also used as pasture land for the Karrayyuu camels, is inhabited by farmers who practice rain-fed agriculture. They usually cultivate barley and teff among others. These people cultivate their crops around June and harvest around September. Thus, the land will be covered with crops during these months. Therefore, it will be difficult for Karrayyuu herders to go from one forest to the other during this period. Thus, the herders will have to come back to their homeland where the land is not covered by crops. (c) Bad weather conditions. Some of my informants argue that a highland and rainy season is not a good combination for camels. The highland forests can be too humid for camels during the rainy season. (d) There are also social reasons for the return of the herds. The herders remain away from their home area and families from September to June. Therefore, coming back to their home area gives them an opportunity to meet their families. (e) Cultural reasons also play a part, for the move back to Karrayyuu land during the rainy season. Rituals such as gadaa (power transition), livestock blessing and wedding ceremonies take place during the Autumn season that starts from August (see Edjeta 2001). Thus, this can be another reason for the return of camels to their home area of Fantallee. (f) Marketing of camels is another incentive for moving back to the region. It is difficult to buy and sell camels except during the months from July to September. Both sellers and buyers converge at the Fantallee area during this period. Since the camels move hundreds of kilometers from home, it would be difficult to bring them to market at any other time. It is also not easy to sell where they browse during the dry season, because they are scattered over several hundred square kilometers. These factors all contribute to the pattern of movement of Karrayyuu camel herds. The traditional ecological knowledge that the Karrayyuus have gathered over centuries has enabled them to predict the challenges and opportunities. Based on their knowledge they make the decisions that are best for them and the husbandry.

The Karrayyuu herders use a large area to the west and southwest of their land. The question is why they use such a huge area? There may be two or more

reasons for that. The first is that concentrating on a smaller area would build pressure on the forests. Concentration of a number of herds will lead to over grazing which eventually leads to deforestation and subsequent desertification. It is also part of ecological adaptation in arid areas. In arid pastoralism, the ratio of land to livestock is huge because most of the pasture serves as insurance for the bad days³³. The same can be true for the movement of the Karrayyuus over large pastureland. The other reason is that their concentration could lead to conflict with the local population. Some of my informants told me that they sometimes hid themselves in forests for two or three weeks with their camels. Exposing themselves to the locals, in some cases, could create trouble for the herders³⁴.

Most of the camel herders I talked to agreed that the number of camels increased significantly after they had started to move out of their homeland. The conducive climate, abundant browse and mineral waters facilitated expansion of the herd. The herders could also move through this vast area with less security problems. Recently the herders have started to make money by selling camel milk to the local populations. The local peoples on the route consider camel milk to be a medicine. Therefore, there is some interdependence between the two groups. The Karrayyuu camel herders and owners are satisfied with the opportunity that they now have. Yet, they are concerned about the sustainability of the highland browsing area³⁵.

4.6. Herd management

Bjorklund (1990) challenges the conventional view that pastoralism is only about the relationship between animals and land. He argues that human intervention and management is also an important aspect of pastoralism. Interventions such as controlling the herd size and ecologically motivated movements across the pasturelands are some examples of this (Ibid: 1990:75).

³³ This less livestock density in the arid area is mistaken for misuse of land by the others.

³⁴ It is to be noted that there is no law that protects Karrayyuu herders in those areas they move in search of pasture.

³⁵ See chapter VI for the discussion on the future of camel husbandry.

Control over herd composition and size is an important element of herd management. The Karrayyuus, like the Sami of the Fenno-Scandinavia and other pastoralists, do not passively await the result of interactions between the animal and land. They play an active role in managing relations between the two. One example of management is the culling of unwanted animals such as adult males and unproductive females. The reduction of these categories of camels, in addition to generation of income, eases the pressure on environment and keeps the balance between animals and humans. The composition of Karrayyuu camel herds only strengthens this argument. According to my informants,³⁶ the great majority of Karrayyuu herds are composed of dam and young female camels. The second most populous category is calves up to 2 or 3 years. In a neighboring pastoralist community of Somali, dam and calves make up the majority (Seifu 2009). Such asymmetry in the number of males and females, shows the active management role, played by the herders.

In addition to herd composition control, formation of herds for efficient use of human resource and pasture is another management decision that needs to be addressed here. In the Karrayyuu Oromo, a herd of camel is called *bulcha*. The term *bulcha* is related with the verb *bulchuu* 'to administer'. *Bulcha tokko* 'one herd' refers to one camel administrative unit, which includes all the different camel categories. One *bulcha* 'herd' may have from 80 to 500 camels depending on the relation between human power and pasture. Camels are owned at the family level in the Karrayyuu community. The camel owners - usually more than two - come together to form one herd. However, my informants told me that there are some *bulcha* 'herds' that are owned by a single family. Very big families, with no shortage of human power, sometimes choose to form their own herds. People are free to form herds with whom ever they want, but generally herd formation takes clan lines. People of a clan or sub-clan usually form a herd together. Among the Sami of Fenno-scandinavia, herds and herding groups are usually formed based on kinship (Bjorklund 1990). The herd name *gaala warra abbaye daga* 'camels of the *Abbaye daga* clan' is a name given to the herd based

³⁶ It is difficult to get an accurate number of camels a person has. However, I managed to get some insight about the composition of the herds.

on the clan name *abbaye daga*. A herd can also be named after a person who owns the majority of camels in the herd. The herd *bulchaa Waday Qare* 'Waday kare's herd' is based on a person called Waday Kare who had a lot of camels. Herds are flexible in the sense that people can leave or join a herd as they wish. Families, sub-clans or clans that herd together, give the same mark called *sumuda* 'ear mark' to their camels. *Sumuda*³⁷ is a mark that is cut, in different designs, on the body of camels to differentiate them from camels of other herds. Marking is ritually conducted in Autumn before the camels start leaving the Fantallee district.

The size of *bulcha* may vary, depending on different factors such as pasture, security concerns and human power. The availability of pasture is one of the most important factors affecting size. Bjorklund (2003: 126) says that the Sami reindeer herders, by dividing and combining the herds based on the availability of pasture, 'attempt to achieve the optimum relation between animals, pasture and labor'. In the same way, in Karrayyuu, if the pasture and mineral water is abundant, people tend to put together a large number of camels. In such cases, relatively fewer herders manage a large number of camels, relieving some herders from duty. In the case of shortage of pasture, they will be forced to break the herds. It is easier for herders to move around with smaller herds in search of pasture. Splitting herds is also an attempt to distribute the pressure. Based on their analysis of the ecology, the Karrayyuu, modify their herds for the optimal use of the environment (see also Barrera-Bassols & Toledo 2005).

Security issues also affect herd size. During my fieldwork, I heard that one camel herder was shot dead while tending camels in the pastureland between Karrayyuu and Argobba. Whenever and wherever there are security problems, they combine several herds and graze together. One of my informants said that two years ago they put together 12 smaller herds of camel to graze together because the Argobba posed a security danger. They had about forty weapons to secure the region between Karrayyuu and Argobba for the camels to peacefully browse. The irony is, wherever there is a security issue, the pasture tends to be good because people from both sides avoid the area. One of my informants

³⁷ The term *sumuda* is also used with other livestock as well.

commented ruefully that peace is good for people, but not for pasture. When it is peaceful everyone can graze and browse resulting in degradation. Only the brave risk using pasture in conflict zones.

The shortage of human power has had a huge impact on pastoralism in general, and herd formation in particular. In earlier days, an entire family followed the cattle as they moved seasonally across the ecological zones³⁸. However, today ecological change has necessitated the diversification of income and economy. Today, pastoralism does not use all its productive force in Karrayyuu. Some family members have had to engage in farming, and others have had to follow cattle, which requires a different ecology to that for camels. Some family members still have to take care of small ruminants. This diversification of the economy has divided families. Only small proportion of the Karrayyuu labor force is available for camel husbandry. As the result, a large number of families are forced to herd their camels together. Other things being equal, this situation leads to the formation of big herds. How the Karrayyuus try to overcome the problem posed by such shortage will be addressed in the following section.

4.7. Labor management

In section (4.6), the role of labor on size of Karrayyuu camel herds has been discussed. Galty and Bonte (1991:7) argue, that unlike the myth of idle pastoralists, pastoralism is a labor-intensive system of production. An informant also commented that one of the challenges of Karrayyuu camel husbandry is the shortage of human power. Therefore, a very advanced human management system is put in place to cope with the shortage. The herders are classified based on their age and responsibilities.

³⁸ See chapter III.

Table 3: camel herders and their roles based on data from informants³⁹

No	Name of category	Age	Role
1	<i>ijoollee xixiqqoo</i> (male)	4-8	They go with their father or brother to learn about camel husbandry. They join in order to drink camel milk to grow faster and stronger. They do not have any work responsibility.
2	<i>ijoollee</i> (male)	8-13/14	They milk camels. They carry milk container. They count camels every evening and report to the elders if there are missing camels.
3	<i>koroodee</i> (male)	14-20/25	They take care of camels, build kraal, search for missing camels, assist camels during mating and calving. They are responsible for the safety of camels especially during the night. They go around in the area ahead of camel and search for good pasture.
4	<i>tissee gaalaa</i> (male)	25-40	People in this category have more management roles. They are the decision makers on every aspect of camel husbandry. They make decisions on their movement based on the information collected by <i>Koroodee</i> . They also administer the human power that follows the herd. They negotiate with the locales and also protect the herd from any kind of danger.
5	<i>jaarsa</i> (male)	Over 50	They do not follow camels all the way but join them when they get to the destination. They follow camels in order to drink milk and get stronger. As people with a lot of experience, they give advice to the herders on every pressing issue. They may engage in physically less demanding tasks.

As we can see in the table above, the responsibility is shared among the different categories. All the individuals who take part in the camel herding have their own clearly defined roles. During my visits to the camel herds at Harroollee rainy season browsing area, I witnessed a clear labor division among the herders. Actually, the herd that I visited on 25th of July 2013 is a very good example to

³⁹ Jireen Waday and Abomsa Jima

demonstrate the roles. When we⁴⁰ arrived at the herd of about 150 camels, I counted about six herders taking care of the camels. There were two *ijoollee* about 12 years of age, two *Koroode* in their early 20s and two *tissee gaala* in their 40s. We were welcomed by the *tissee gaala* 'adult herders'. One can clearly see that the *tissee gaala* are the ones to interact with strangers. After few minutes into our discussion one of the *tissee gaala* ordered a young boy (*ijoollee*) to milk camels and serve to the guests. The *ijoollee* did as he was ordered and we were served camel milk. After a short interview, I asked him if I could see the bull of the herd. The *tissee gaala* sent out orders to the *koroode* (a boy in his early 20s) to go and get the bull that was on few minutes walk from where we were. I also observed that the *tissee gaala* ordered a *koroode* to go ahead of the camels to see if there is good pasture further north. The information flow was swift and commands were executed without delay. This is my account of the labor division and execution of orders based on my short visit to the herds. The labor division and the relation between the different categories can be more complex than what is presented here.

4. 7.1. More about camel herders

The camel herders - composed of usually unmarried adult and young boys of different ages - stay away with their camels for most of the year. This way of life creates a kind of cohesion between the camel herders and with that a kind of divide between the herders and the rest of the Karrayyuu. Even the way the camel herders drink milk shows what kind of relationships exist between them. Drinking camel milk, especially when in the forests, has its own protocol. All the herders sit in a circle and drink from the same container taking turns. Drinking milk from the same container is like taking an oath not to desert each other during a challenge. My informants⁴¹ did tell me that camel herders never abandon each other during challenge. They help and support each other even though they are sometimes competing for pasture and mineral water.

⁴⁰ I went to the village with Abomsa Jima, my informant and assistant.

⁴¹ Abomsa Jima and Damusee.

The rest of Karrayyuu believe that the camel herders are physically strong, brave and behave arrogantly. The following Karrayyuu saying could illustrate the behavior of the camel herders, *safuu yaa tikee gaala akka fedhe nama dhaanu*. This can be translated as, 'oh camel herder who hits (one) as he wishes'. This saying shows how badly the adult camel herders, *tikee gaalaa*, treat the young boys. The physical strength and their behavior is believed to be due to their diet. It is to be noted that the camel herders depend purely on camel milk and meat. The study of behavior of herders and physical strength is beyond the scope of the current work.

Camel herders are one of the few social categories that maintained the Karrayyuu traditional dress and the Karrayyuu hairstyle called *gunfura*. The fact that the camel herders have relatively less contact with the urban centers may explain why their way of life is less affected by urbanity. Some of my informants commented that camel herders maintained the Karrayyuu hairstyle and other cultural practices because they have plenty of time to make it. For farmers making the *ganfura* is a daunting undertaking for they need to work on their field the whole day. The adult herders on the other hand have the responsibility for the general management of the herd, while young boys undertake the day-to-day activities such as tending to camel and milking. The adult camel herders are therefore free to get in some social activities including games (competitions with other herders) as well as music rituals, among others things. I have reservation on the analysis of my informants about the idleness of the camel herders. Given the shortage of labor, it is quite hard to believe that the adult herders are free for cultural and social events. However, the detailed analysis of the labor division is beyond the scope of this work.

4.7.2. Camel management and role of women

One of my informants, Ali Ware, once said *gaalli horii dhiiraati* 'camel is a male livestock⁴²'. Only males from the age of eight and adult men up to age of sixty involve in camel herding including milking and tending. Girls sometimes milk

⁴² Cattle and goats on the contrary are considered as women's livestock. Only women can milk cattle. Yet both female and male herders can take care of them.

camels that are left behind for household milk consumption. However, girls and women do not travel far with camels. Women do not usually milk camels or clean the kraals. Even married men who had sexual intercourse with a woman are not allowed to milk or deal with camel before they 'clean' their body. Thus, adult camel herders usually take young boys with them. My informants said camel herding is enjoyable only when you have young boys. According to an informant, Wadaay Buuba, the main reason for building camel kraal behind the house and cattle and goat kraal in front of the house is to avoid woman getting closer to camels. Women go out directly into cattle and goat kraal and milk while 'clean' boys and girls go behind the house to milk the camels. They believe that camels that are milked by women become skinny and less productive. In the neighboring Somali and Afar pastoralists the role of women in camel management is very minimal. Women do not milk, feed, and market camels (Keskes et al. 2013a; Keskes et al. 2013b).

The odd relation between woman and camels starts at birth. In this culture, babies get gifts from their parent right after birth. They organize a ceremony called *arga*, which is derived from the verb *arguu* 'to see'. During this *arga* ceremony the father and mother give camel, cattle, and goat to the infants. The father gives a number of camels and other livestock to the infant, if it is a boy. If it is a girl, the mother gives a number of cattle and goats but never camels. This is to create a connection between the infants and the livestock. The baby boy grows up to be a camel or cattle herder while the baby girl grows up to become a cattle and goat herder. In addition, camels are not usually given as a dowry because they believe that a woman exchanged for camel will not be fertile.

Is the exclusion of women from camel husbandry a mismanagement of human power? Why do they exclude women from herding and management of camels? The Karrayyuus acquired camels about a century ago from the Afar. One can argue that they also got the culture, values and taboos related to camels from the Afar. Keskes et al. (2013a) and Keskes et al. (2013b) stated that women are excluded from Somali and Afar camel management because it is physically demanding. This analysis seems to be simplistic because women in all the

cultures of the region get involved in cattle herding which is equally demanding. The most plausible explanation is the economic control of resources by the male dominated clans. In the pastoralists of the region such as Afar, Somali and to some extent Karrayyuu, camels are the most valued livestock. The families and clans do not want to give away their camels by any means. If girls have equal access to such a valuable resource, they could take their camels with them to their husband's clans. Thus, the families and clans then lose their control on the camels.

Karrayyuu girls do not take all their livestock such as goat and sheep that they got at birth right after marriage. Her family only sends these small livestock after couple of years. They want to make sure the new home is comfortable enough for their daughter to live all her life, before sending the livestock. There are sometimes conflicts between the married woman and her clan/family because of their failure to send all the livestock she possessed. Women have some authority over their goats because they invest their labor while they are with their parents. Thus, if girls are allowed to invest on camels they may have a claim to them as well. Therefore, the clans should do every thing possible to distance women from camels. Thus, exclusion of women and girls is not mismanagement but a calculated decision by the family and clans to maintain control over their most valuable livestock.

The exclusion of women from camel husbandry could not have occurred in Karrayyuu but seems to have been acquired from the Afar together with the camels. The fact that women play a major role in the old Karrayyuu cattle and goat husbandry suggests that there is no cultural internal reason for the exclusion. In addition to that, the fact that women are excluded from Afar camel husbandry, the source of Karrayyuu camel husbandry, may suggest that the exclusion did not originate in Karrayyuu. The Karrayyuus did not challenge that because it favored the patriarchic families and clans. However, detailed discussion of a relation between gender asymmetry and pastoralism in the region is beyond the scope of this research.

4.8. How do the Karrayyuu use their camels?

Despite efforts to diversify the economy, pastoralism still plays a pivotal role in the economy of the Karrayyuu (Oromia Livelihood Zone Reports 2008). They also made clothes from the cattle's and goat's skin (Edjeta 2001). Livestock are a critical part of the lives of all pastoralists none more so than the Karrayyuus. In the following paragraphs, I shall discuss the economic importance of Karrayyuu camels based on information drawn from my interviews⁴³ and supporting literature.

Milk- The Karrayyuus have depended highly on milk for their protein needs until recently (see also Tolera 2000). My informant, Roobaa Fantallee, said that in earlier days people lived chiefly on milk and milk products. They ate cereal only on special occasions. Even today camel milk is a staple food for hundreds of camel herders. An informant and camel herder Mil'u⁴⁴, told me that he had not consumed solid food for more than a month; for a long time he had lived on camel milk alone. All the former camel herders I interviewed, told me that they only consumed milk and camel meat throughout the year, when away from their homeland, and ate other solid foods when they came back to their home area in July. In addition families leave behind two or more milk camels for their family's milk consumption. More recently, camel milk is being sold at the capital to generate more money for the camel owners (see section 5.4).

Camel milk is believed to be a super food. Men, who suffer from malnutrition or disease are typically sent to camel herds to drink milk and recover. They believe that children who drink camel milk grow faster and stronger. In support of this, Agrawal et al. (2007) reported about a community in India that consumed camel milk and as a result showed a low prevalence of diabetes in comparison to their neighboring communities. One of my Karrayyuu informants⁴⁵ told me that camel milk could cure many different kinds of sickness.

⁴³ Roobaa Fantallee, Abomsa Jimaa, Mil'uu and Ali Ware

⁴⁴ Last name is missing.

⁴⁵ Waday Buubaa

Meat - In addition to milk, camel meat is also considered by the Karrayyuus to be a superfood. It is not, however very common to slaughter a camel. Camel herders sometimes kill *soosa* 'young male camel' for their own consumption while they are away in the pastureland. The herders then report to the owners that 'beasts have eaten the camel'⁴⁶. In the earlier days, camels are killed when they get very old and have no other economic value. The traditional way of using the meat is by drying and mixing it with flour by doing so it can be preserved and used for over a year.

A Source of cash- Camels have become the major source of cash income in the Karrayyuu community. Tolera (2000:NP) says 'its (camel) economic significance is outstripping that of the cattle these days. There is a high demand (by foreigners) for camel milk, and also the sale of a big camel brings a large amount of money'. People who have a big herd of camels sell their *soosa* (male young camel) to buy foodstuff, clothes, *chat*⁴⁷ and weapons, for example. A young male camel, according to my informants, can be sold for up to 15,000 Ethiopian birr (approximately 789 USD). During my visit to the area, I regularly visited the camel market and observed that most camel owners come to the market to get information about the price of camels. Traders from different parts of the country come to Matahara market to buy camels. Some traders bought camels at the Matahara market and then exported to countries like Egypt and Jordan.

Load animal – Male camels may be trained to move loads such as; water, household stuff⁴⁸, and calves. In former times, pastoralist families move seasonally from one pastureland to the other with their herds. During such evacuation they load their belongings on strong male camels to move. My informant Ali Ware recited a proverb, *Yoo abbaan du'e maatiin ni godaana yoo karabichi du'e akkamiin godaana? Which can be translated as 'a family can evacuate without the head of the family but not without load camel. This proverb*

⁴⁶ The owners know from experience that the herders have slaughtered the camel but they do not complain because it is believed that herders have right to use the camels in some way.

⁴⁷ Chat is a stimulant leaf consumed in Ethiopian, Djibouti, Kenya, Somalia and Yemen.

⁴⁸ Such stuff include clothes, milk containers and other utensils.

shows how important a load camel is for the Karrayyuu. However, currently, due to the effects of ecological change and over grazing around the settlements, it has been difficult to leave load camels behind to use as load animal. Donkeys, for this same purpose are becoming more popular for the Karrayyuu. This is because the donkeys can survive on the small pastureland and food leftovers available around the settlements. The recent sedentarization of the Karrayyuus also made load camels less useful.

4.9. Camel disease and traditional treatment

One of the challenges facing camel husbandry in East Africa is the high mortality rate. The herders told me that they witness number camel deaths every year. Keskes et al. (2013) argues that camel disease is one of the main challenges of Afar camel husbandry. In order to reduce the death and unproductivity that arises from camel disease, the Karrayyuus and other camel pastoralists have devised a traditional healing that can be called ethnoveterinary (see Raziq et al. 2010). All the herders get training on the symptoms and medication of the diseases. The herders usually use plant leaves, fruits and mineral waters that they have in their area in order to treat the camels (Basheir et al. 2012; Raziq et al. 2010). The introduction of modern veterinary clinics has undermined the use of the indigenous medicines. Karrayyuu herders still rely on traditional medication, especially when they travel hundreds of kilometers from their home area, to places where more 'modern' camel medication does not exist. All camel herders therefore are required to have some basic knowledge about the different diseases, their symptoms and the possible medications for treatment. Karrayyuu herders, through experience, have identified different diseases that attack their camels and their possible treatments as can be seen in the following table:

Table 4. Camel diseases and treatments based on interviews with informants⁴⁹

No	Karrayyuu disease names	Symptoms	Treatment
1	<i>Jinni</i>	The neck bends to one side. Becomes thin and weak. Cannot keep balance while standing or walking.	They feed an indigenous plant called <i>dirriba</i> .
2	<i>Gobla</i>	Swelling on the shoulder and the hip. Swelling between the back legs and udder.	They grind leafs of indigenous plants, <i>adigga</i> and <i>dhaladuu</i> and feed the diseased livestock.
3	<i>Caccabsa</i>	Bleeding through the nose.	Cleaning the nasal cavity with a special stick to let out the infected blood.
4	<i>Cittoo</i>	Loss of fur and skin around the ribs.	Applying grease. Feeding salty soil called <i>haya</i> .
5	<i>Ciiffattoo</i>	Loss of fur on the ribs common on calves caused by drinking a lot of colostrum	There is no treatment. The camel overcomes naturally as it builds its antibodies.
6	<i>Waan awwaaraa</i>	An inflammation on the body of the camel.	They bury medicine ⁵⁰ on the gate of the kraal.

4.10. Conclusion

One focus of ethno-ecological studies is about how the ethnic groups perceive the world and how these perceptions shape the use of the environment (Barrera-Bassols & Toledo 2005; Nazarea 1999). This chapter discussed how the indigenous knowledge and experience such as; movement, herd management,

⁴⁹ The data in the table was obtained from my informants- Abomsa Jima, Waday Buubaa, Ali Ware and Damusee.

⁵⁰ My informant doesn't know or doesn't want to tell me what kind of medicine is used here.

biology of livestock, has been used for their use of nature. The movement with camel and the diversification of herds is informed by their traditional knowledge of the environment such as the type of pasture, landscape, climate and sociopolitical situation. According to Fernandez-Gimenez (2000:1320), 'herders classify pasture areas using a number of different criteria, including the season in which they are grazed, their nutritional quality and suitability for different types of livestock...' The introduction of goats and camels to the Karrayyu livestock is based on their knowledge of the livestock's biology and the suitability of the environment to the animals. In addition to that, their knowledge has helped them with the reproduction, management of the herds and treatment of camel diseases.

Chapter V Karrayyuu camel management as adaptive strategy to the ecological change

5.1. Introduction

There is a popular poem in Oromo, and the Karrayyuu in particular - *Surree jilbarraan citte abbatu waraannata* 'It is up to the individual to repair a pair of trousers torn at the knee⁵¹! *Deega ijoollummaan dhufte abbaatu tattaaffata!* 'It is the responsibility of the individual to fight poverty that came at childhood' this poem tries to convey that it is the duty of the individual to struggle out of poverty; one cannot wait for someone to solve his/her problems. People often recite this poem when they are confronted with problems that cannot be solved using old means. The poem stresses the need for action in order to move out of the problems. One can see that the people's belief is that with a struggle you can overcome any kind of challenge. Such popular poems like this one, I believe, reflect the deep attitudes and worldviews of the Karrayyuu people. The resilience of the Karrayyuu people, in the face of ecological challenges stems from such convictions.

The shift of focus to camel husbandry is one of the opportunistic moves taken by the Karrayyuus to survive in the new ecological condition (see section 1.1). Thus, in this chapter, the introduction and development of camel husbandry as the result of the new ecological conditions will be discussed (see section 5.2). The commercialization of camel husbandry will be given due consideration in sections (5.3) and (5.4). The discussion of possible impact of camel husbandry and conclusive points are presented in sections (5.5) and (5.6) respectively.

⁵¹ The translation is mine.

5.2. What makes camel husbandry so important and possible?

Different political-ecological reasons contributed to the development of camel husbandry in the Karrayyuu community. The Karrayyuu people, after carefully analyzing the challenges and opportunities embraced camel husbandry. In the following paragraphs, I will discuss some of these factors that facilitated the development of Karrayyuu camel husbandry.

As discussed in section (3.3), the ecology of Karrayyuu land got more arid and the annual rainfall substantially fell to the level that cannot support cattle husbandry. This condition triggered even more droughts, which make the area more unpredictable. The repeated droughts claimed a large number of Karrayyuu cattle, subsequently reducing the household size of cattle to a level that cannot support the livelihood of the pastoralists (see also Bekele & Amsalu 2012a). As a consequence, some Karrayyuus fall out of pastoralism and began a sedentary life, while others opted to diversify their herds by incorporating camels and goats. ‘...camels and goats can survive in harsher environments by browsing leaves and feeding off the pods and fruits of trees’ (Hesse & MacGreger 2006). The camels not only can live for a long time without water during drought or long dry seasons, but also could produce milk for their calves and humans. This quality of camels makes them a very important livestock for the Karrayyuus. To the contrary, cattle, even if they survive, are not productive during droughts and long dry seasons. Thus, it is due to ecological reasons that camels became more important in the Karrayyuu land.

The role of ecology in the choice of herd type is very apparent in pastoralism. Fraktin (1986:271ff) illustrates the impact of herd preference based on ecology amongst the North Kenyan pastoralists –Rendille, Ariaal and Samburu.

‘ ...Rendille exclusively keep camels and small stock in the desert lowlands, and Samburu keep cattle and small stock in the highlands. Several societies, such as Ariaal and Turkana, keep both cattle and camels as well as small stock, as they occupy a mixed herding

environment utilizing both the highlands for cattle herding and the lowlands for camel herding.

In the case of the North Kenyan pastoralists, we can see, that the nature of the ecology has had an impact on the selection of herds. This also seems to be true for Eastern Ethiopian pastoralists such as the Somali, Afar and Karrayyuu. The Somali, who mainly occupy the arid and desert areas of Ethiopia, rear camels while the Karrayyuus and the Afar, with arid and highlands and flood plains around the Awash River, rear both camels and cattle (see also Teka 1991; Farah et al. 2004). In general, the aridity of the Karrayyuu land is one of the main reasons for the shift to camel husbandry.

The expropriation of Karrayyuu land is another factor that has facilitated the shift to camel husbandry (see also Tolera 2000; Edjeta 2001 for Land expropriation). As stated in section (1.2), the Karrayyuus lost a large part of their fertile grazing grassland around the Awash river basin (see fig. 1 on page 21) and elsewhere during the 1960s (Edjeta 2001). Such land expropriation directly affected the Karrayyuu cattle herd size. Yet, there still remains a large chunk of Karrayyuu arid plains covered with acacia and other arid plants, which could only be used by camels (Coppock et al. 1986; McCabe 1984). The Karrayyuus thus, opportunistically considered using camels to convert such plants into useful protein. The introduction of camel husbandry is, thus, an opportunistic adaptation to loss of land. It is a wise and critically thought out decision to utilize the vegetation they have around them. The choice of camels for this purpose is based on their sharp knowledge of their environment and the biology of the livestock (see also Barrera-Bassols & Toledo 2005; Nazarea 1999). Thus, the state policy of land expropriation coupled with the repeated drought and ecological knowledge has played significant role in the introduction of camel husbandry at that particular time.

The recent drastic increment of Karrayyuu camels can largely be attributed to their Southward movement into the highlands in search of forage (see section 4.5 for the browsing route). It would have been impossible for the Karrayyuus to travel to the South highlands with their cattle or other smaller ruminants for different reasons. Firstly, only camels can travel for such a long distance and

especially without water and forage (see Tolera 2000). This ability makes camels the best candidates for exploitation of forage in the marginal Southern areas hundreds of kilometers away from Karrayyuu land.

Secondly, the type of nature use of the communities in the Southern highlands has also impact on the development of Karrayyuu camel husbandry. The communities in the Southern highlands are typically, farmers. Therefore, unlike in Karrayyuu, there are no big grasslands in farming areas. Any grassland to be found will be used by their own cattle and other small ruminants. Thus, they will not allow the Karrayyuus' cattle to use such small grazing lands. However, there are some forests that are not immediately used by the farmers. As mentioned earlier, camels, unlike cattle, feed on tall plants and short shrubs in forests (Coppock 1986). The farmers do not keep any livestock such as camels that could feed on tall trees. Consequently, there is not, in the short term, a conflict of interest between the farmers and the pastoralists. Therefore, the camel herders use forests in the ecology of the farming communities as the dry season browsing land (see section 4.5 for a detailed discussion of trekking route of camels).

In addition to the political-ecological reasons, narratives related to camels may have contributed to the development of Karrayyuu camel husbandry. While discussing the shift to camel husbandry my informant Ali Ware, remembered a story about the roles the camels are thought to have played during a severe drought that was named *abar* 'curse'. During the period of *abar* 'curse', a number herders except those who owned camels starved to death. Ali Ware told me a similar story that shows the strength of camels. The story goes like this: - 'a person tied eight cattle to a camel and let the camel move up a slope. The camel ran dragging the eight cattle with considerable ease. The man again tied 16 cattle to the camel which the camel dragged without difficulty. The person who wanted to find out the real value of camels again tied 28 cattle to the camel. This time the camel managed to hold the cattle but could not move forward. The point that the person wants to show, in this story, is the value of camels in relation to the

already familiar livestock –cattle. In the above stories, the camels are presented as strong and resilient livestock.

Such stories might have been inspired by the real strength or resilience of camels. However, the effect of such narratives, in shaping attitudes, seems stronger than the real economic and ecological benefits of the livestock. Chilisa (2012:139) says that ‘stories are also reflection of the values of a society and act as a teaching instruments as well as commentaries on society, family, or social relations’. In the same way, such stories about camels reflect what the Karrayyuus think about the livestock. And, the stories are narrated and disseminated socially to affect people’s behaviors towards the livestock.

The ecological condition and the recent trekking into marginal areas is partly responsible introduction and subsequent growth of the husbandry. In addition to the indigenous ecological knowledge and nature use practice (Barrera-Bassols & Toledo 2005; Nazarea 1999) of the Karrayyuu, the good social relation that the pastoralists maintained with the neighboring farmer communities has made the recent expansion of camel husbandry possible (see also Khazanov 1984:34 for the relation between pastoralists and farmers). The narratives that reveal the resilience of camels seem to have contributed positively to such development.

5.3. A shift from milk-based to cash-based economy as adaptive strategy

As discussed in section (4.9), the Karrayyuu, until recently, used cattle milk and meat as their main source of food. However, today only a portion of the Karrayyuu community, the camel herders, depends on milk and camel meat for their diet. In the settlement areas, Karrayyuus have little access to dairy products because the livestock move very far distances in search of pasture. Family members particularly the young and the old cannot follow the herds due to the long distances and security concerns. According to my informants, cattle herders go into boarder areas with Afar and Argobba in order to exploit grazing land usually left unused. Even if, the whole family could follow the herds; there is no good pasture for cows that's needed to provide enough milk for the consumption of the family. The milk is only enough to support the herders. As a result, the families shifted to selling the less productive livestock and buying foodstuffs for

the families' consumption (see also Galaty & Salzman 1981 for commercialization of pastoralism).

5.4. The case of *aannoo* - commercialization of camel milk⁵²

The term *aannoo* existed in Karrayyuu⁵³ for a long time. However, the recent semantic change is significant and shows how much the Karrayyuu people have changed over the years. The word *aannoo* is derived from *aannan* 'milk'. *Aannoo* referred only, to lactating cows and camels that remain around the home area when the rest of the herds travel long distance in search of pasture. The Karrayyuus leave behind some lactating cows for the consumption of the family. However, during the late 1990's, *aannoo* acquired a new meaning in a new condition. In this period, Karrayyuus started to separate some of the lactating camels and collect them in camps, with the intention of producing milk for markets. Thus, *aannoo* came to refer to the lactating camels that are sent to those camps for milk production targeting markets in the nearby towns and the capital. The beginning of the *aannoo* camps is also another adaptation mechanism to the loss of pastureland and growing effect of the world market.

Why don't they send lactating cows to this *aannoo* camps instead of camels? There are different reasons why cattle do not fit for the *aannoo* project. (a) The nature of forage and the strategic location of the camps is one of the many reasons for not using cattle. The camps are located west of the Karrayyuu land on the main road to Addis Ababa, the capital of Ethiopia (see fig. 1 on page 21). The locations of the camps are chosen for their easy access to the markets. The vegetation of the areas where the camps are located, are characterized by the shrubs and tall trees that could not be used by cattle (see section 5.2 of this thesis; Coppock et al. 1986; McCabe 1984 for nutrition of the livestock). There are no big grasslands in the areas for cattle to graze. Thus, it is not possible for the Karrayyuus to use cattle in the *aannoo* camps for ecological reasons. (b) Productivity is another reason why camels are used instead of cattle for the milk

⁵² I got the information about the *aannoo* camps from my field note and interview with Fantallee Shuguxee who works with the *aannoo* camps.

⁵³ My karrayyuu informant Abomsa Jima.

markets. Camels, in traditional herds in Eastern Ethiopia, can produce up to 6.5 liters of milk a day (Bekele et al. 2002:41). According to my informant, Fantallee Shugguxee, Karrayyuu camels give up to three times as much milk as did the Karrayyuu cattle. One would therefore need three times more cattle to produce the same amount of milk. This will require more labor, which is not currently available in the Karrayyuu. In a place like the camps, it is therefore much more economical to have camels than cattle.

The *aannoo* project is not a complete departure from the traditional camel husbandry as there is a big connection between the two. The camels stay at the ranches only during their lactation period. After weaning, the camels return to the herds and stay there until their next lactation. The herds are considered as a base for the *aannoo* camps. Another important aspect of the camps is, that the camels may return back to the herds during bad market. The *aannoo* camps are owned, by traditional camel herders, who send some lactating camels to generate extra money for the household. One can say that this new project is a temporary use of camel products without altering the general system of production. The number of dam camels involved in the *aannoo* project does not exceed two hundred out of the total population of 70,000 camels⁵⁴. It rather seems to be opening a new way of using the camels without yet making a big break from the traditional husbandry.

There are also some differences in the management practices in the two systems: The location of the grazing and camping of the *aannoo* camels is in response to the market while the constant movement of the herd is oriented towards good pasture and mineral water. The other difference in management decision concerns the relation between calves and dams. In the traditional herds, calves mingle with the herds and suckles several times a day, while *aannoo* calves suckle only twice a day during milking. As the result, calves in the camps are smaller and weaker than those in the herd. The lactation period is relatively shorter in both herds than in *aannoo* camps but for different reasons. In the case of ranches, they want to keep the dam with them, for no more than eight months,

⁵⁴ I got this estimate from Pastoral Community Development Program (PCDP) office in Fantallee district.

because the milk offtake reduces at a late stage of lactation. However, the herders want to have shorter lactation period because the dam can get pregnant only after weaning. This then shortens the time between gestations.

The other important difference between the two is their focus of production. The traditional herders' main focus is to build camel stocks, preferably bigger meat camels for market, while the *aannoo* camps focus on producing more milk for the markets. This has implications for management decisions made in these two domains. The traditional herds invest, strategically, on building a larger stock with bigger livestock. This can be seen from the fact that big calves are selected to be the herd bulls⁵⁵. The feed given to camels is also informed by the purpose of production. For example, the *aannoo*, in addition to the forage focus on giving salty water because it is believed to have a direct impact on the production of milk. Traditional herders on the other hand, take the camels to get mineral water once or twice a month.

Is there a space for the Karrayyuus tradition of sharing resources in the new form of milk production? Even though milk is not given for free in *aannoo* camps, people who do not have lactating camels could borrow and send to the *aannoo* camps. The camel, after weaning, returns to the herd of the owner. The person who borrowed the camel has total control over its milk offtake. The borrower invests his labor at the camps to have access to the milk of the borrowed camel. The borrower may help the lender with milking, cleaning milk containers and tending camels. Giving the use right to others is a continuation of the traditional exchange and sharing.

It seems irrational for a person to lend his camel to another for such commercial reasons. Why don't the owners collect, for themselves, the revenue generated from the milk market? There seems to be different mechanisms that control the dominance of those large camel owners. (a) The market for camel milk is quite small and this discourages camel owners from sending more camels into the *aannoo* camps. The question then remaining is why do they then lend it to another person who competes for the same small market? (b) The quota

⁵⁵ See section 4.3.

program implemented by the association of camel milk producers is another controlling mechanism. According to the quota program, there is a limit to the amount of milk a person sends to the market. Thus, it will be irrational to keep a large number of camels in the camps. However at some level, both reasons converge to market because the quota program by itself is a response to the lack of market. (c) The third but most important reason is the attraction of labor into the *aannoo* camps. My informant, Fantallee Shugguxee, told me that a small *aannoo* camp needs more labor than a big traditional herd. The camels are milked twice, the kraals need to be cleaned every day and milk containers need to be cleaned meticulously. All these activities demand a huge human labor force which camel owners cannot supply. Thus, in order to get more personnel into the camp, the owners lend camels to those ex-pastoralists who fell out as the result of the ecological change. Some poor pastoralists are happy for this incentive to move to the camps. (d) Cultural values may be one of the reasons for lending. The Karrayyuus, like many other pastoralists, have the culture of sharing wealth. Even though it is eroding recently; sharing is observed in all activities. The Karrayyuus, including those in urban areas, feel obliged to help their fellow clan members. Thus, lending of camels, which is a very important component of the *aannoo* camp, is both for economic and cultural reasons.

In the above paragraphs, one can see that there are similarities and differences between the traditional herds and the *aannoo* camp management. This is an evidence for change and continuity in Karrayyuu pastoralism. The introduction of the *aannoo* camps around the urban areas, the use of camels in stead of cattle in the camps, lending of camels in order to attract labor into camps, the specific management decisions such as the short lactation period, and provision of mineral water supplement shows how the Karrayyuu's camel husbandry is responding to the political-ecological changes. Thus, by introducing the *aannoo* camps the Karrayyuu instrumentally and opportunistically use their environment in a way that the conditions require and allow. Such opportunistic moves may have also contributed to the evolution of Karrayyuu traditional husbandry to *aannoo* camps.

5.5. The ecological impacts of the development of camel husbandry

Breulmann and Böer (2010) discussed that, in United Arab Emirates, camel husbandry has had a negative impact on the ecology and suggested camel farms as a solution to the rangeland degradation. In East African and in Karrayyuu, particularly, there is no doubt that the spread of camels put extra pressure on the ecology. But, the herders are conscious of the relation between the herd size and the pasture that is available. As we have seen in section (4.5), the herders spread the pressure over a very large chunk of land. They try to keep the balance between camels and pasture in order to use it in a way that is sustainable. However, the integration of the pastoralists into the world market is having a clear implication on the family's herd size. In the earlier days, according to my informants, having few dam camels is enough for a family to subsist. However, due to the high cost of living that probably is caused by their integration into world market, families need larger herds. Building larger herds will, eventually, affect the ecology.

The creation of the Karrayyuu *aannoo* camp, which is different from the traditional herd, has raised ecological concerns. As discussed in section (5.4), there is an increasing concentration of camels in the narrow corridor between the Karrayyuu land and the capital. The concentration of camels in small area close to the urban area is having impact on the environment. According to my informants, there is serious rangeland degradation in those areas. The market is increasing from time to time leading into absorption of more camels into the area. This will, eventually, lead to further degradation. However, the detailed discussion on the ecological impacts of Karrayyuu camel husbandry and the *aannoo* camps, in particular, needs further research.

5.6. Conclusion

In the recent decades, we have witnessed the ecological changes such as; rangeland degradation, desertification and transformation of land into monoculture farming in the Karrayyuu area. The Karrayyuus also designed

different adaptation mechanisms. One of the adaptation mechanisms to the changes is the introduction and development of camel husbandry. The camel husbandry grew out of the challenges and opportunities. The challenges that facilitated Karrayyuu camel husbandry are the desertification and expropriation of land (see section 5.2). The opportunities, on the other hand, are the encroaching of arid land plants that are palatable for camels and the opening up of the pasture in the South highlands to Karrayyuu camels. Such adaptations and opportunistic use of nature has contributed to the development of camel husbandry.

Chapter VI conclusion and future challenges of pastoralism

6. 1. Conclusion

The Karrayyuus are a pastoralist group going through a huge socio-economic transformation in the last four or five decades. The sedentarization and subsequent diversification of the economy, by embracing farming, daily labor, and petty trade, are examples of the transformation. Desertification and rangeland degradation, which are linked to the political-ecological conditions such as the land expropriation and policy of neglect, ultimately explains the socio-economic transformation of the Karrayyuu. Camel husbandry, which is an adaptation strategy to ecological change, has developed out of this dynamic.

In order to get the answer to my question, how the ecological and human factors contributed to the development of Karrayyuu camel husbandry, I conducted a two months field interview and observation. The data obtained through fieldwork was analyzed by the ethno-ecological theoretical perspective. The theoretical perspective gave me the tool to analyze how the people use their beliefs and knowledge systems in order to use the nature around them. This perspective also enabled me to connect practices of the local people to the regional and global situation, i.e., how the surrounding affects the nature use of the people, among others, through market. In order to address the nature use, the thesis explored the centuries old indigenous knowledge systems of the people which enabled them to use their environment in an efficient manner. The political-ecological situation, which to some extent shaped the practices of the people, has also contributed to the changes as in the following paragraphs.

One human factor that has facilitated the development of camel husbandry is greater knowledge and efficient use of livestock, the pastureland and human beings.

(a) Livestock: The Karrayyuus, have accumulated great knowledge about their livestock's biology, as seen from their detailed categorization (see sections 4.3 and 4.4). This is not just theoretical knowledge, but essentially practical wisdom

in the management of livestock. Reproduction, treatment of diseases, and provision of forage could not have been done without such knowledge. The effective use of livestock, as discussed in section (4.8), coupled with their knowledge of livestock biology, has contributed to the expansion of Karrayyuu camel husbandry.

(b) Ecology: Another important factor that has facilitated the development of karrayyuu camel husbandry concerns knowledge of ecology. In order to use nature, in this case through pastoralism, the people need to know every component of the ecology; the vegetation, rainfall patterns, and availability of mineral water, among other matters. Such knowledge can be useful for the diversification of herds and specific decisions regarding movement. The Karrayyuu have embraced camels on the basis of their ecological knowledge. They have found out that seemingly irreversible pastureland degradation and encroachment of arid plants, such as the acacia, requires a different species other than cattle. Hence, they have opted to turn to camels. The new browsing route (section 4.5), which has contributed to the recent expansion of this husbandry, is based on critical knowledge of these ecological elements.

(c) Human labor: Karayyuu camel husbandry would have crashed, or not developed, without complex and efficient human labor management. In order to cope up with the ecological changes, families have had to engage with different economic activities. To that end, only a fraction of a families' labor is invested in camel husbandry, just as only a fraction of the society at large depends economically on camel husbandry. Therefore, the Karrayyuus have devised a mechanism that employs available human labor efficiently. This factor has been critical to economic viability, success and recent expansion of camel husbandry.

In addition to the internal development based on traditional knowledge discussed above, the political-ecological changes, such as desertification, land expropriation, the opening up of marginal pasture lands south of the Karrayyuu land, has also contributed to the development of Karrayyuu camel husbandry. The Karrayyuus seem to have resisted camel husbandry for a long time, until the

desertification and encroachment of arid plants forced them to take that option. Given the current situation, the expansion and very existence of camel husbandry is dependent on pastureland in south highlands (see section 4.5). The existence of this pastureland is one of the main factors facilitating the development of camel husbandry.

Political-ecological changes have also contributed to the further integration of Karrayyuus into the world market. Such integration has entailed Karrayyuu camel husbandry shifting from being a subsistence economy, to becoming a market-oriented production. The current production of camel meat and commercialization of milk through the *aannoo* camps is a response to the pressure from world markets. All of this has entailed growing commercialization.

This thesis is believed to contribute to our knowledge of Karrayyuu and their pastoral production. The development workers engaged in Karrayyuu areas may also benefit from this work. Development projects are, in most of the cases, top-down. Projects are designed without prior knowledge of the people and their priorities. Such approaches may lead to failure of the development projects. Thus, ethnographic works, such as this one, can give the development workers some insight into the people's priorities.

Despite what has been done so far, there remains a research gap in the study of the Karrayyuu and their livelihood. The thesis has raised the gender asymmetry in relation to camel husbandry in Karrayyuu. However, further research may be needed on gender asymmetry in other economic sectors to get a clearer picture. In addition, there is a debate on the relation between camel husbandry and desertification. Some commentators say that camels are fathers of deserts and some others say camels are sons of deserts. In the former arguments, the camels exacerbate desertification. In the latter one, camel husbandry is seen as something that follows desertification. Thus, the relation of camel husbandry and ecology, in this region, needs further research. The impact of recent further privatization of land on the Karrayyuu camel husbandry, pastoralism and their ecology also needs further research.

6.2. What does the future hold for Karrayyuu pastoralism?

Karrayyuu land covers only two hundred kilometers east of the capital of Ethiopia. There is no other pastoralist group closer to the capital than the Karrayyus. Most of the ex-pastoralists around the capital have started life as farmers owing to the pressure from urban centers. However, owing to the aridity of the Karrayyuu land, and the resilience of Karrayyuu pastoralism, the practice has resisted several challenges. However, continued land confiscation and massive irrigation projects in the Fantallee area pose a great threat to Karrayyuu pastoralism.

Education poses another major threat in this traditional way of life. Before sedentarization, children from eight years old always followed the herds and helped the adults. Nowadays, however, some parents send their children to school, appreciating the value of a modern education. Children so educated, tend not to like the idea of returning to herding. The Gudina Tumsa Foundation, in one of their reports, said that English, mathematics and science are replacing sheep and goat herding as important topics to learn (GTF <http://www.gtf.org.et/>). This has all led to a degree of alienation of the young from their communities and traditional ways of life, even though most of the students do not go to universities or colleges. They find other work or remain unemployed in urban areas.

On the other hand, the flourishing of camel husbandry in recent decades is evidence of the resilience of Karrayyuu's pastoralism. Regardless of the fall out, a significant proportion of the Karrayyus still practice pastoralism and camel husbandry in particular. Settled farmers have also come to invest their surplus in pastoralism. The Karrayyuu camel owners sell less productive camels to restock cattle and goat herds after droughts. Camel husbandry is rightly regarded as the protector of Karrayyuu pastoralism. The Karrayyus, I think still value pastoralism more than any other economic way of life. Such a mentality, and subsequent practices, suggests that there is a future for pastoralism.

Camel husbandry faces many challenges, particularly in connection with pastureland. Environmental organizations and development schemes in the south highlands are denying herders access to the forests⁵⁶. Some herders have come into conflict with environmentalists who want to protect forests. If the Karrayyuus lose access to these pasture areas, which they use for about ten months of the year, then there may be no future for Karrayyuu camel husbandry and pastoralism. Only by providing legal protection for the camel herders who browse their camels in these forests - and facilitating inter-communal co-operation between the herders and the local communities - will camel husbandry be saved.

⁵⁶ See section 4.4.

References

Books

- Bulliet, R, (1975), *The Camel and the Wheel*. Cambridge and London, HUP.
- Galaty, J, & Salzman, P, (1981), *Change and development in nomadic and pastoral Societies*, Leiden, E, J, Brill.
- Chilisa, B,, (2012), *Indigenous research methodologies*. Los Angeles, Sage.
- Galaty, J & Bonte, P, (1991), *Herders, Warriors, and Traders: pastoralism in Africa*. Boulder: Westview Press.
- Griefenow-Mewis, C, (2001), *A grammatical Sketch of Written Oromo*. Köln: Köppe.
- Heine, B, (1981), *The Waata Dialect of Oromo: Grammatical Sketch and Vocabulary*. Berlin: Dietrich Reimer.
- Silverman, D, (2010), *Doing qualitative research*. London: Sage

Articles

- Adan, S, (1995), 'Indigenous camel management of the Gare tribe of Somali people in northern Kenya', Evans, J, O, Simpkin, S, P, & Atkins, D, J (Eds.): *Camel Keeping in Kenya. Range Management Handbook of Kenya*, Volume III, 8, Range Management Division, Ministry of Agriculture, Livestock Development and Marketing, Republic of Kenya, 5.13-5.15.
- Agrawal, R, Budania, S, Sharma, P, Rajeev Gupta, Kochar, D, Panwar, R, Sahani, M, (2007), 'Zero prevalence of diabetes in camel milk consuming Raica community of North-west Rajasthan, India', *Diabetes Research and Clinical Practice*, 76, 290–296.

- Barrera-Bassols, N. & Toledo, V, (2005), 'Ethnoecology of the Yucatec Maya: Symbolism, Knowledge and Management of Natural Resources'. *Journal of Latin American Geography*, 4(1), 9-41.
- Basheir, O, et al, (2012), 'Traditional and modern practices in the diagnosis, treatment and prevention of animal diseases in South Kordofan State, Sudan'. *Journal of Cell and Animal Biology*, 6, (15), 213-225.
- Bekele, A. & Amsalu, A, (2012), 'Effects of drought on pastoral household in Fantale woreda of Oromia Regional State, Ethiopia'. *Journal of Environmental Issues and Agriculture in Developing Countries*, 4(3), 5-19.
- Bekele, A. & Amsalu, A, (2012), 'Household responses to drought in Fantale pastoral woreda of Oromia Regional State, Ethiopia'. *International Journal of Economic Development Research and Investment*, 3, (2), 36-52.
- Bekele, T., Zeleke, M., & Baars, R, M, T, (2002). 'Milk production performance of the one humped camel (*Camelus dromedarius*) under pastoral management in semi-arid eastern Ethiopia'. *Livestock Production Science*, 76, 37-44.
- Berkes, F, (1993), 'Traditional ecological knowledge in perspective', Inglis, J (eds), *Traditional ecological knowledge: concepts and cases*, Ottawa: IDRC, 1-9.
- Beyene, S. & Gudina, D, (2009), 'Reviving a traditional pasture management system in Fantale, East Central Ethiopia'. *Journal of Ecological Anthropology*, 13(1), 57-72.
- Bjorklund, I, (1990), 'Sami Reindeer pastoralism as an indigenous resource management system in Northern Norway- A contribution to the common property debate'. *Development and Culture*, 21(1), 75-86.

Bjorklund, I, (2003), 'Sami pastoral society in Northern Norway- national integration of an indigenous management system'. Anderson, D & Nuttal, M. (eds), *Cultivating Arctic Landscapes: knowing and managing animals in circumpolar North*. Now York: Berghahn books, 124-135.

Breulman, M, and Boer, B, (2010), 'Camel farms: a new idea to help desert ecosystems recover'. *Rural*, 21, 1-2

Bryant, R, (1992), 'Political ecology: an emerging research agenda in third world. *Political Geography*, 11(1), 12-36.

Coppock, D, Ellis, J, Swift, D, (1986), 'Livestock feeding ecology and resource utilization in a nomadic pastoral ecosystem'. *Journal of Applied Ecology*, 23(2), 573-583.

Edjeta, B, (2001), 'The socioeconomic dimension of development induced impoverishment: The case of the Karrayuu Oromo of the Upper Awash Valley', *MA Thesis*: Addis Ababa University.

Farah, Z, Mollet, M, Younan, M, Dahir, R, (2007), 'Camel dairy in Somalia: Limiting factors and development potential.' *Livestock Science*, 110, 187-191.

Farah, K, Nyariki, D, Ngugi, R, Noor, I, Guliye, A, (2004), 'The Somali and the camel: Ecology, management and economics'. *Anthropologist*, 6, (1), 45-55.

Fernandez-Bimenez, M, (2000), The role of Mongolian nomadic pastoralists' ecological knowledge in rangeland management. *Ecological Applications*, 10, (5), 1318-1326.

Fratkin, E, (1986), Stability and resilience in East African pastoralism: The Rendille and the Areaal of Northern Kenya. *Human Ecology*, 14(3), 269-286.

Gebre, A, (2001), Pastoralism under pressure: Land alienation and pastoral transformations among the Karrayu of Eastern Ethiopia, 1941 to present. PhD dissertation: Institute of Social Studies, The Hague.

Gebre, A, (2009), 'When pastoral commons are privatized: resource deprivation and changes in land tenure systems among the Karrayu in the upper Awash valley region of Ethiopia'. *Proceedings of the 16th International Conference of Ethiopian Studies*, (eds), Svein, E, Harald A, Birhanu T, & Bekele, S, Trondheim.

Gebre, G, Desta, S, Coppock, D, (eds). (2004), 'Pastoralism in Ethiopia and the policy environment: Linking Research Actors, and decision-makers', *Summary of proceedings for a meeting held 15 August, 2003, at International Livestock Research Institute (ILRI)*, Addis Ababa, Ethiopia.

Hesse, C. & MacGregor, J, (2006), 'Pastoralism: dry lands invisible asset? Developing a framework for assessing the value of pastoralism in East Africa'. *Drylands Issue Paper*, 142. 1-30.

Jacobs, A, (1965), 'African pastoralists: Some general remarks', *Anthropological Quarterly*, 38, (3), 144- 154.

Kalland, A, (2003), 'Anthropology and the concept of 'sustainability''. Rooepstorff, A., N. Brubandt & Kull, K.(eds): *Imagining nature. Practices of Cosmology and Identity*. Aarhus: Aarhus University Press, 161-174.

Kitzinger, J, (1995), *Introducing focus group*. BMJ, 311,299-302

Keskes, S, Dejen, T, Tesfay, S, Fekadu, R, Tesfu, K, Fifa, D, (2013a) 'Characterization of camel production system in Afar pastoralists, Northeastern Ethiopia'. *Asian Journal of Agricultural Science*, 5(2): 16-24.

Keskes, S, Dejen, T, Tesfay, S, Fekadu, R, Tesfu, K, Fifa, D (2013b), 'Production systems and reproductive performances of *Camelus dromedarius* in Somali regional state, eastern Ethiopia'. *Journal of Agriculture and Environment for International Development*, 107 (2), 243 – 266

Köhler-Rollefson, I, (1993), 'Camels and camel pastoralism in Arabia. *The Biblical Archaeologist*', 56(4),180-188.

Lugeye, S, (1994), 'The role of farmers indigenous knowledge in natural resource management', *Sokoine University of agriculture, convocation workshop, Morogoro, Tanzania*.

Linseele, V, (2010), 'Did specialized pastoralism develop differently in Africa than in the Near East? An example from the West Africa Sahel.' *Journal of World prehistory*, 23, (2), 43-77.

Lampman, A, (2010), 'How folk classification interacts with ethnoecological knowledge: A case study from Chiapas, Mexico. *Journal of Ecological Anthropology*', 14, (1), 39-52.

McCabe, T, (1984), 'Livestock management among the Turkana: a social and ecological analysis of herding in an East African pastoral population'. *Ph.D. thesis*, State University of New York, Binghamto.

Museka, G. & Madondo, M, (2012), 'The quest for a relevant environmental pedagogy in the African context: Insights from Unhu/Ubuntu philosophy'. *Journal of Ecology and the Natural Environment*, 4, 258-265.

Nazarea, V.D, (1999), 'A view from a point: Ethnoecology as situated knowledge'. Nazarea, D. (ed), *Ethnoecology: Situated knowledge/located lives*. Tucson: University of Arizona Press, 3-20.

Oteros-Rozas, E, Ontillera-Sanchez, R, Sanosa, P, Gomez-Baggethun, E, Reyes-Garcia, V, Gonzalez, J, (2013), 'Traditional ecological knowledge among transhumant pastoralists in Mediterranean Spain'. *Ecology and society* 18(3),

PFE, IIRR and DF, (2010), *Pastoralism and land: Land tenure, administration and use in pastoral areas of Ethiopia*.

Raziq, A., Verdier, K, Younas, M, (2010), 'Ethnoveterinary treatments by dromedary camel herders in the Suleiman Mountainous Region in Pakistan: an observation and questionnaire study'. *Journal of Ethnobiology and Ethnomedicine*, 6, (16), 1-12.

Reichel-Dolmatoff, G, (1976), 'Cosmology as Ecological Analysis: A View from the Rainforest'. *Man, New Series*, 11(3), 307-318.

Schipper, M, (2003), 'Tree trunks and crocodiles in the ocean of reciprocal knowledge'. *Etudes malinnes*, 57, 48-65.

Seifu, E, (2009), 'Analysis on the contributions of and constraints to camel production in Shinile and Jijiga zones, eastern Ethiopia'. *Journal of Agriculture and Environment for International Development*, 103, (3), 213-224.

Toledo, V, (2001), 'Indigenous peoples and biodiversity'. Levin, S. et al (eds), *Encyclopedia of biodiversity*, 3: 451-463.

Tolera, A, (2000), 'Problems of sustainable resource use among pastoralist societies: the influence of state intervention in the pastoral life of the Karrayu'. Manger, L. and Ahmed, A.G. (eds), *Pastoralists and Environment: experience from the greater Horn of Africa*, Proceedings of the regional workshop on African dry lands, Addis Ababa Jinja.

Teka, T, (1991), 'Camel and household economy of the Afar'. *Nomadic Peoples*, 29, 31-41.

Internet sources

FAO, (2001), Pastoralism in the new millennium. *FAO Animal production and health paper* 150. <http://www.fao.org/docrep/005/y2647e/y2647e00.HTM> (accessed, 10/02/2014).

FAO, (2004), FAOSTAT DATA, Statistical Databases on the Internet. Address:
<http://earthtrends.wri.org/text/agriculture-food/variable-334.html> (accessed,
12/02/2014).

'Gudina Tumsa Foundation' <http://www.gtf.org.et/> (accessed 05/03/2014).
<http://itre.cis.upenn.edu/~myl/language-log/archives/000457.html> (accessed,
23/01/14).

Oromia Livelihood Zone Reports (2008:7) <http://www.feg-consulting.com/feg-shared-folder/liu/oromiya/woreda-profiles/east-shewa/Fentale.pdf> (visited
12/02/2014).

Appendices

List of informants

No.	Name	Age
1	Abomsa Jima	30s
2	Ali Ware	50s
3	Arda Jilo	70s
4	Damusee	30s
5	Fantallee Shugguxee	30s
6	Jireen Waday	50s
7	Jimaa Fantallee	30s
8	Mil'uu	30s
9	Rooba Fantallee	40s
10	Waday Buuba	50s
11	Qumbi Waaqayyoo	50s
12	Jiloo Buuba	

Pictures from the fieldwork



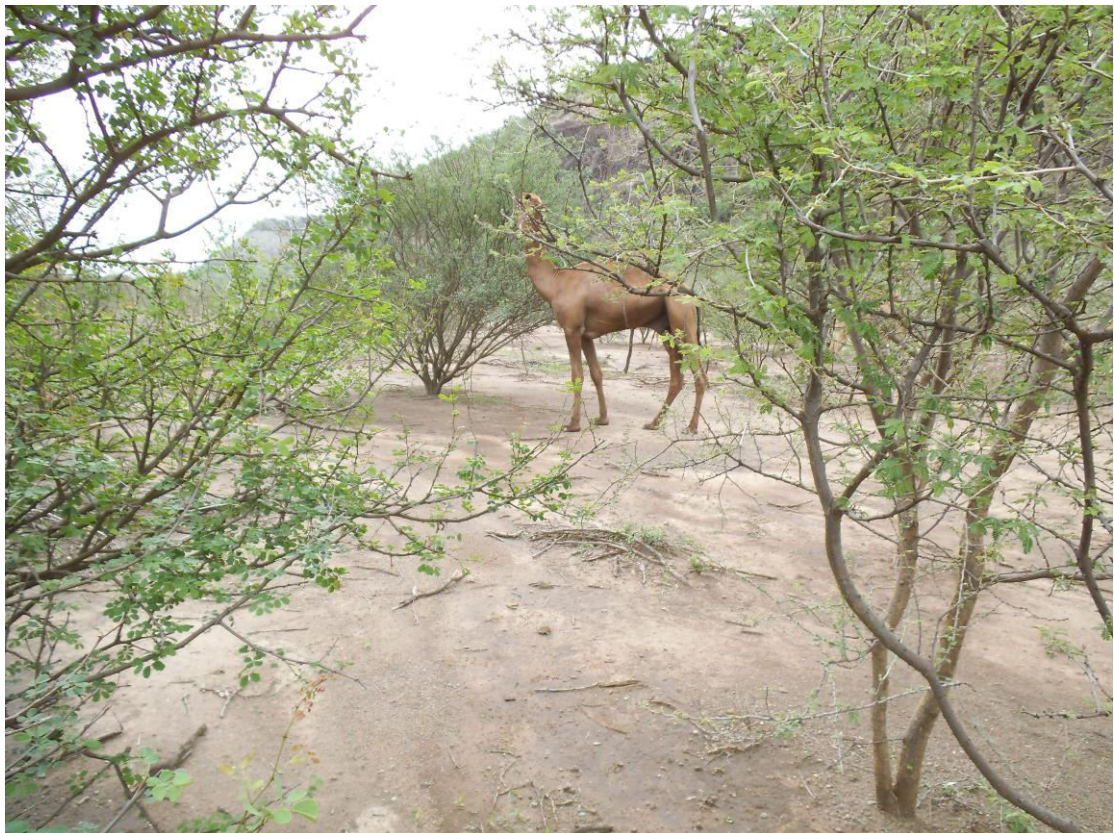
Karrayyayyu rangeland during the wet season



The researcher drinking camel milk for the first time



A camel herder and my informant drinking milk



A camel browsing around Harroolee village near Matahara town