Local dynamics and external drivers of agro-ecological change in Southwestern Ethiopia

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Hedtjärn Swaling, Julia (2012) *Local dynamics and external drivers of agro-ecological change in Southwestern Ethiopia*
Human Geography, advanced level, Master thesis for master exam in Geography, 30 ETCS credits.
Supervisors: Börjeson, Lowe and Kinlund, Peter
Language: English

**Abstract**

While previous research on African smallholder agriculture has been criticized of focusing on the sole factor of population pressure as driver of agricultural degradation or intensification, the present study tries to nuance this debate by providing empirically grounded research, exploring the dynamics behind local agro-ecological change. The thesis specifically studies the dynamics behind small-scale farmers’ crop choices in relation to their management of trees in cropland in Gera District, Ethiopia. Drawing on situated landscape interviews and focus group discussions with farmers combined with observations and interviews with agriculture officials, a contextual understanding of local agro-ecological processes emerged. While political ecology was used as an overarching framework, the concept of landesque capital served as an analytical tool to explore how external and local forces interact at the point of the land management decision. It was found that external factors sometimes have a reinforcing effect at the local scale, but when top-down interventions are incoherent with bottom-up priorities, a conflict occurs. In this way, local dynamics and external drivers constitute an interacting dialectic, with a set of unintentional synergies and trade-offs eventually forming agro-ecological landscape change.

Key words: Ethiopia, agricultural change, agroecology, top-down, bottom-up, political ecology, landesque capital, participatory rural appraisal.
Acknowledgements

First of all I want to thank the farmers in Gera, who dedicated much of their valuable time to participate in interviews and group discussions, for their grand contribution to this thesis. By sharing their experiences, thoughts, knowledge and warm hospitality they made my fieldwork an unforgettable and thrilling learning-experience. *Isin hin irraanfadhu!*

I am also grateful to the development agents and agriculture officials in Gera District who participated in interviews, provided information and facilitated the course of the fieldwork in many ways.

Asfaw Bariso Tolera, my interpreter and friend, was indispensible for this thesis; without his assistance and our fruitful discussions in the field, the progress of the data collection and analysis would certainly not have advanced as smoothly.

Additionally, I want to thank my supervisors for offering me their support, ideas and encouragement, Lowe Börjeson for his inspiring enthusiasm and Peter Kinlund for his sound and constructive advice.

This study was carried out as a part of the project *Examining mismatches between management and the supply of ecosystem services in Ethiopian agroecosystems across scales in space and time*, conducted by the Department of Human Geography and the Department of Botany at Stockholm University together with Addis Ababa University. I want to thank all of those involved in the project in Sweden and Ethiopia, for your continuous support and feedback during and after the fieldwork, especially to Kristoffer Hylander for coordinating it all. I also want to give a special thanks to Tola Gemechu Ango, for offering such good support and inspiration in the field.

The fieldwork was made possible by a Minor Field Study grant, funded by the Swedish international development cooperation agency (Sida) and distributed by the Department of Human Geography at Stockholm University.

Closer to home, I want to thank my fellow student Manuel Fischer for his company those endless days of writing, making it enjoyable even in times of stress. Jakob Lundberg, for his good advice and encouragement, and for offering me to write in his office for some weeks. Last but not least, I want to thank my parents, always supportive and truly interested in what I do.

*Julia Hedtjärn Swaling, Sjöhaga - Dalarna, Sweden, September 2012*
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Glossary

**Birr**: The Ethiopian currency. 1 Birr was equivalent of 0.06 USD in 2012.

**Derg**: The Derg, literally translated ‘the Committee’, was the communist military regime, under the lead of Mengistu Haile Mariam, that ruled Ethiopia after overthrowing the emperor Haile Selassie from power, in 1974. The Derg regime officially came to an end in 1987, many of its members however remained in power until 1991.

**Farazula**: Local unit of weight, the equivalent of 17 kg.

**Injera**: A sourdough pancake characteristic of the Ethiopian cuisine, preferably made with teff as main ingredient, but also at times made with other cereals like wheat, barley or maize.

**Kebele**: Lower administrative unit, below district level.

Abbreviations

CBD – Coffee berry disease
DAP – Diammonium phosphate
HYV – High yield variety
JAICA – Japanese International Cooperation Agency
PRA – Participatory Rural Appraisal
SWC – Soil and Water Conservation
1 Introduction

1.1 Background

The discourse on African agriculture, adhering either to a Malthusian degradation narrative, or a Boserupian intensification narrative, has historically focused on the single factor of population pressure as driver of change. Recent research has increasingly scrutinized this reductionist narrative (Brookfield, 2001a; Börjeson, 2007; Fisher & Feinman, 2005; Henley, 2005). Additionally, historical analyses of agricultural landscapes have been criticized for emphasizing large-scale top-down explanations for agricultural change, while ignoring local farmers’ agency and knowledge (Doolittle, 1984; Erickson, 2006).

In light of the increasingly heard critique of previous analyses of agricultural change, there is a need for empirically grounded research, which analyzes the dynamics driving the interaction between farmers and the local agro-ecological landscape. In this thesis, the focus will therefore be on how local dynamics interact with external drivers operating at various scales, when forming agro-ecological change. Using a political ecology approach, the interconnections and causality of these drivers have been analyzed drawing upon interviews, group discussions and observations, on the dynamics behind farmers’ crop choices for a set of key crops in Gera District, Southwestern Ethiopia.

The concept of landesque capital “refers to any investment in land with an anticipated life well beyond that of the present crop, or crop cycle” (Blaikie and Brookfield, 1987:9). Normally the term is used in research studying investments featuring physical structures in the agricultural landscape such as terraces, stonewalls, irrigation systems and drainage systems, the concept may however also include more ecological aspects of land management such as trees or whole field systems. While the ‘greener’ aspect of the concept has been alluded to in literature, it has seldom been empirically explored. Yet, the use of trees in agriculture, or the practice of agroforestry, has been highlighted as a way of conserving biodiversity while at the same time increasing agricultural yields by improving soil fertility (Perfecto et al. 2009; Scroth et al. 2004). But trees have also been found to compete with crops for light, water and nutrients, thus inhibiting agricultural productivity (Yin & Hyde, 2000). By exploring how the concept of landesque capital can relate to these more ecological aspects of the concept, the intention is to understand how the previously mentioned local dynamics and external drivers of agricultural change form and interact with the local agro-ecological landscape.

1.2 Purpose and research questions

This study analyzes ongoing agro-ecological change in Gera District, southwestern Ethiopia, by studying the dynamics behind small-scale farmers’ crop choices in relation to the agricultural management of trees with different crops. When farmers change their land-use system in response to driving forces operating at different scales “such interaction links changes in the
local environment to wider scale economic, policy and market forces” (Dessie & Kinlund, 2008:188). By using the framework of political ecology, the purpose is to explore how farmers interact with these external influences at various scales, as well as with the local agroecology, when changing their agricultural practices.

The purpose of this study of small-scale agriculture in Gera District, Ethiopia, can be summarized with the following research questions:

• What are the dynamics behind local farmers’ choice of crop? How do external factors interact with the local agro-ecological system in defining the parameters of choice shaping agricultural change?

• How are trees managed in different field types in relation to long-term agricultural productivity? How can the concept of landesque capital serve as an analytical tool when exploring agro-ecological change in Gera District?

1.3 Scope of the study

The geographical scope of the case study is confined to Gera District, Ethiopia. Although the fieldwork has mainly been carried out in the village of Kerebe, additional interviews have been carried out in Wanja and Dusta and market observations have been carried out in three of the major markets in Gera District and one in the neighboring Goma district. Any local society, however, also has linkages to the national and regional level as well as to the world system as a whole. These contextual interactions of geographical scale are also taken into account in order to understand their local implications for farmers in Gera. For this sake, a literature review covering wider processes as well as case studies with examples from other parts of the world, albeit mostly from Africa and Ethiopia, was carried out.

When it comes to the thematic delimitation, the study of crop choices has been confined to seven key crops. These are namely, three cereals; maize, sorghum, teff, and four other crops; coffee, khat, avocado and eucalyptus. These crops were chosen based on their relative importance in terms of productivity as well as their complementary contribution to farmers’ livelihoods (as food crops, cash crops, annuals, perennials). The focus of this thesis is confined to agricultural practices related to these seven crops and the tree management in cropland, but it does not include other aspects of the smallholders’ livelihoods of major importance in Gera, such as livestock farming and bee keeping. In addition, the focus is on small-scale farming, even though commercial large-scale agriculture, especially coffee investors, makes up a crucial part of the full picture of land use changes progress in Gera.

This thesis analyses ongoing change in agriculture, but for the sake of analyzing the present, it needs to be understood in a historical context. For this reason, my empirical material (focus groups and interviews) to some extent also covers the time back to the rise of the Derg (1974). In addition, literature sources have been used to gain an understanding of more far-reached historical processes.
1.4 Outline of the paper

This thesis is structured in five chapters. This introductory chapter will continue by providing a geographical background to Gera district, after which the methodology and methods used during the fieldwork will be discussed. Chapter 2 provides a theoretical background to the study, where the overarching theoretical approach of political ecology will be presented together with a background to the concept of landesque capital. Additionally, literature covering the debate on agricultural change in general, and particularly in Africa, will be reviewed in order to achieve a critical understanding of the research on the present topic. Thereafter, the scope will be narrowed down to provide a review of specific processes of agricultural change in Ethiopia, on a national scale as well as with local examples from case studies. In chapter 3 and 4 the empirical results will be presented. In the former, the dynamics of farmers’ crop choices will be thoroughly explored, based on data gathered during the fieldwork. The latter will analyze farmers’ tree management practices and explore how these can be related to the concept of landesque capital. This chapter is also based on data gathered during the fieldwork, although some of it will already have been presented in the previous chapter, here however, it will be analyzed in connection to the concept of landesque capital. To increase readability and avoid being repetitive, part of the analysis is carried out in connection to the presentation of empirical results, in chapter 5 however, the analysis will be taken one step further in a concluding discussion.

1.5 Geographical background to the study area: Gera District

This case study took place in Gera district, which is part of Jimma Zone in the Oromia region, in Southwestern Ethiopia (Figure 1). The areal extent of the district is 1.330 km² and the population reached around 115,000 inhabitants in the 2007 national census (Gera Woreda Profile, 2012 website; CSA, 2008). Being in a mountainous region, elevations in the district range between 1.390 and 2.980 meters (Gera Woreda Profile, 2012 website). The altitudes are classified into lowland <1.500 meters, mid-highland 1.500-2.000 meters, and highland >2.000 meters. Mean temperatures vary little over the year, but around 80 percent of the average annual rainfall, which is 1.525 millimeters, falls during the main rainy season, from March to September (McCann, 1995:150).

Gera is located in the Eastern Afromontane biodiversity hotspot¹, one out of 34 hotspots in the world. The Eastern Afromontane biodiversity hotspot is scattered in the mountains stretching along the eastern edge of Africa and part of the Arabian Peninsula; from Saudi Arabia in the north to Zimbabwe in the south (Conservation International, 2012a, website). According to Gera District Agriculture Office, forest is estimated to cover around half of the total district area (Gera District Agriculture Office, 3 April 2012). The soils (eutric nitosols) have a high level of

¹ Biodiversity hotspots are areas classified to be top priority for biodiversity conservation. The criteria to qualify as a biodiversity hotspot is that the area must contain at least 1.500 endemic species, and at least 70 percent of their original habitat should already have been degraded (Conservation International 2012b, website).
nitrogen, but low level of phosphorous (McCann, 1995:150). *Coffee Arabica* is a coffee variety endemic to this part of Ethiopia and accordingly, it is the main cash crop in the district. Because of the high nitrogen levels of the soil, coffee grown here shows little response to fertilizers and cereal fields require a comparatively short fallow period of two to three years, after five years of cereal crop rotation (McCann: 150). Other than coffee, important crops are teff, maize, sorghum, wheat, barely, horse bean, field pea, enset (false banana), khat, sugarcane, avocado and eucalyptus. Other important sources of livelihood are honey and beef production.

**Figure 1:** Map of Gera’s location in Ethiopia. *Source: Ango, unpublished* (modified by author).

The main urban center in Gera district is Chira, from where a gravel road leads to Agaro, the nearest urban trade center located in the neighboring district of Goma. Agaro has a tarmac road connection to the town of Jimma, the regional coffee trade center, which in turn has a relatively good connection with Addis Ababa.

The main part of my fieldwork took place in a village called Kerebe, located in the mid-highlands between Chira and Agaro, in Sadi Loya kebele. Additional interviews and focus group discussions were carried out in nearby Wanja (Wanja Kersa kebele), also in the mid-highlands. Wanja has a high population of people who were resettled to Gera from the northern regions of Ethiopia during the communist Derg regime (1974-1991). A bit further from these two sites, some additional interviews were carried out in the village of Dusta, which is located more remotely in the highlands. After Chira, it is reached by traveling on a sand road, which can be used by vehicles only in the dry season. Furthermore, market observations were carried out in four of the main markets along the road between Agaro and Chira. The market closest to Agaro, in Bashasha, is part of the neighboring Goma district. The other three are in Gera district: Kemise (near Kerebe and Wanja), Chira and Dusta markets.
1.6 Methods and methodology

The methodology of a study needs to be carefully designed based on the purpose and research questions. In the study of complex realities such as agro-ecological change in relation to farmers’ choices, and the wider context of political economy, a reductionist approach with the purpose of arriving at a universal hypothesis would be highly inappropriate. This is because, to use Chamber’s (2003:32) words, “the realities of life and conditions are elusive: they are local, complex, diverse, dynamic and unpredictable”. Accordingly, the aim should thus rather be to clarify complexity with conditional and multiple hypotheses (Blaikie and Brookfield, 1987:240). For this reason, conducting a qualitative case study was found to be the most suitable methodological approach for this study. McPherson et al. (2000:52) conceptualize qualitative case studies as “a research strategy designed to investigate the rich complexities of social phenomena and the social environments in which they are situated”.

While case studies can provide comprehensive understanding of the processes and context of a specific location, it is not possible to generalize case studies by applying them in a reductionist way (Repstad, 2007:23). They can, however, be related to their wider context arriving at a context-dependent knowledge where the advantage is depth rather than breadth. To use the words of Flyvbjerg (2006:235), “the advantage of the case study is that it can ‘close in’ on real-life situations and test views directly in relation to phenomena as they unfold in practice”. This will be done by using a range of methods of data collection, which will be described in detail in this subchapter.

1.6.1 Informants

In the study of land management and ongoing processes of change, especially in developing countries like Ethiopia, there are problems of data availability that have implications for research in terms of verification and proof. Blaikie and Brookfield (1987:26) argue that in the case of land management research, the way of responding to the problem of uncertainty is “by seeking a point of entry where uncertainty is least, at the point of the land manager”. Therefore farmers, or land managers, are the main informants of focus in this study, what now needs to be discussed is the sampling.

In quantitative studies, where the aim is to achieve objectivity and replicability; random or representative samples are often used. The aim of qualitative studies, on the other hand, is not to be representative, but rather to “understand how individual people experience and make sense of their own lives” (Longhurst, 2003:123). Therefore, it is more suitable to use purposeful sampling, based on the informants’ experience and knowledge in relation to the research topic. Moreover, the aspiration should be to widen the results by finding informants with different experiences related to the research topic (Repstad, 2007:89). To start with, since my study is part of a larger research project, I had some initial contacts that were mediated through project colleagues. Through these people I could get in contact with more people using the snowball technique, by asking for people who had certain experiences, thus through purposeful sampling. The risk of getting a biased sample inherent in the use of the snowball technique was countered by the fact that with the extensive time spent in one village, I got the opportunity to know additional people to snowball through as time went by.
1.6.2 Methods of data collection

Going more into detail, a range of methods was used to collect data for this case study. A fieldwork was carried out in Gera District from the 20th of February until the 5th of April 2012. The methods used included: semi-structured interviews with farmers, local traders, development agents and district administration representatives; market observations; and PRA techniques such as transects walks together with farmers in the agricultural landscape and a number of focus group discussions with farmers. The interviews were conducted with the use of an interpreter. The interpreter is a very important person in the fieldwork who in addition to good language skills, needs to have an insight into the more philosophical aspects of research, as well as a detailed understanding of the purpose of the study. The contact and communication between the interpreter and researcher is essential in this aspect. The process of finding a suitable interpreter is thus very important, in my case I initially tried having interviews with different interpreters, in order to chose the one with whom communication worked better, both in relation to the farmers as well as in relation to me. Subsequently, through continuous evaluations and discussions about the research, both on a more philosophical level as well as concretely about different ways of translating; a mutual understanding evolved during the course of the fieldwork.

By using a variety of methods, the validity of the study could be increased by triangulation. Triangulation is defined to be “a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study” (Golafshani, 2003:604). The use of triangulation is thus a way of ensuring quality of the research. The relevance of concepts like reliability and validity in qualitative research is a highly debated topic. While some consider their use still valuable (Repsstad, 2007), reliability and validity are in qualitative research instead often conceptualized as trustworthyness, rigor and quality (Golafshani, 2003). The critical point of trustworthyness in qualitative research is “that research findings are trusted as fair and not negatively burdened by the investigator’s subjectivity, imagination and impulses” (Årlin et al. forthcoming). According to Årlin et al. (forthcoming), trustworthyness and rigor can be achieved by participatory checking. These are issues that will be further discussed in the following sections, where the methods will be described in detail.

**Situated landscape interviews**

To gain initial insight into the theme of research and redefine the research questions, I started by conducting semi-structured crop-choice interviews, abbreviated ‘CC interviews’ when referred to, with individual or groups of farmers, in their fields (See Appendix I for detailed contextual information of each interview). Here, the thematic focus was on historical and current changes in land use. In order to later explore how trees are managed in agriculture, semi-structured ‘tree interviews’ were conducted by ‘interviewing the trees’ i.e. portraying biographies of trees in agricultural fields together with farmers. The tree interviews and most of the crop-choice interviews (when possible) were carried out during transect walks together with the farmers in their fields (See Appendix I).

This kind of situated landscape interviews is a way of using the landscape as a ‘taskscape’ to use Ingold’s terminology (referred to in Årlin et al. forthcoming). As Börjeson (2007:251) notes, “a landscape may not only be considered as a study object, but also as a tool (or toolbox)
for the study of human–environment interactions”. As mentioned earlier, participatory checking is a way to improve “rigour, relevance and trustworthiness of qualitative research on landscape change” (Årlin et al. forthcoming). Participatory checking can be facilitated by the use of artefacts such as familiar landscape features among other things (ibid.). In this thesis, the situated landscape interviews (crop-choice interviews and tree interviews) have been conducted as a means of participatory checking, by using concrete reference points in the landscape (crops, trees, fences). The artefacts serve as memory triggers for informants, a means of avoiding misunderstandings, as well as a way of investigating incremental processes that are not necessarily a part of the farmers’ rationale and therefore seldom mentioned spontaneously in interviews. As put forth by Årlin et al. (forthcoming), “artefacts help researchers and informants to find common ground, avoid abstract reasoning and thus reduce the risks of misinterpretation (in all aspects of the word)”.

**Focus group discussions**

After the introductory crop-choice interviews, focus group discussions were carried out with two male and two female groups of farmers who were asked to rank crops based on different parameters using a pairwise matrix (Figure 2). These are abbreviated as CR focus groups when referred to further on. The participants were asked to rank crop in order of their importance for cash and consumption, as well as their respective labor intensity and degree of pest damage. Since the theme was related to the crop-choice interviews the focus groups served as a form of triangulation, in order to check the preliminary results of the individual interviews. The focus groups were carried out in Kerebe, which was the main site for field research and in Wanja and has a population of farmers that migrated to the area from the northern regions of Ethiopia during a government resettlement program in the 1980s.

Subsequently, focus groups covering other themes were carried out: two groups (one male and one female), referred to as Timelines, had a more historical focus where the participants were asked to make timelines of crop prices; finally one group, abbreviated as TR (tree ranking) in references, was asked to rank the use of trees in a matrix similar to the crop ranking one.

Writing about focus groups as a method, Longhurst (2003) explains that the discussion between focus group participants is often facilitated by engaging the group in an assignment focusing on the subject of the discussion. In my case such assignments included making timelines of crop prices and matrix rankings (for trees and crops) as previously mentioned. These are methods frequently used in PRA research (Chambers, 2003). By using visual representations, sitting on the ground and ranking with beans instead of a pen, the participatory character of the group discussion was enhanced, especially in this case where many of the participants were illiterate (Figure 2). Besides the actual results of the assignments, the discussions that arose among participants when accomplishing them provided valuable information.

Through the use of the PRA activities, my role as a researcher became much less dominant and the discussions were rather a spontaneous result of the activities. Chambers (2003) highlights the importance of the researcher to ‘hand over the stick’ to the informants, by facilitating group discussions rather than dominating them. In this way PRA techniques enable participants to be involved and carry out part of the analysis themselves rather than just providing information. Seen in this way, “data is not collected by outsiders, but expressed and analysed by insiders” (ibid:153). Rather than simply extracting information from informants, the aim in PRA methodology is to build knowledge in a reciprocal process (Årlin et al. forthcoming). Thus
enabling the farmers’ active participation in the research, allowed them to raise issues that I as a researcher coming from outside, could never have foreseen. Participation by the informants in the research provides a “rich, detailed and muti-layered” material (Valentine, 2005:111). For the participants too, the research then becomes a process “of thinking through, learning and expressing what they know and want” (Chambers, 2003:153). This was experienced when a crop ranking discussion was brought to an end and a participant commented that, “this way of interviewing is good for us because it makes us aware of our priorities”, and the participants thereafter concluded, “we have learnt and become aware from what we did”.

The focus groups were in most cases separated by gender. This was done because early on in the fieldwork, it was noticed that it was harder to get in contact with women, and at times they were interviewed together with, or in the presence of men, most women tended to remain hesitant to talk. By separating the focus groups by gender, the women showed a lot more desire to talk. Probably they were strengthened by the fact that they were a group of women and in addition it seemed like the PRA techniques created a milieu where the women felt more at ease than in regular interview situations.

**Market observations**

In order to gain an insight from another perspective as well as to observe in what way market dynamics influence agricultural change, market observations were carried out in four of the major markets along the gravel road between Agaro, the nearest urban trade center, and Gera district (Figure 3). This quickly proved to be quite a challenging method, as in the crowded markets, it was hard to interview people without drawing virtually everyone’s attention. Therefore the emphasis was on observations, with quick questions asked to farmers and traders on the go. A way to make relaxed conversations possible, was to start and finish by more participatory observations, accompanying farmers on the way to and from the market. Only being in the markets and meeting some of the already interviewed farmers in a different context, added another perspective to their situation and facilitated the building of a rapport.

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2 CR, male, Kerebe
3 In the villages of Bashasha, Kernise, Chira and Dusta
Additional interviews

So far, except for the market observations, the focus has been on farmers exclusively. But while farmers are the key focus of this thesis, other actors are crucial in creating the circumstances under which farmers act, additional interviews were therefore carried out with district administrators (at Gera District Agriculture Office and Gera District Forest Department), local traders (referred to as Village small trader and Visit to coffee factory), as well as with the local ‘development agents’ (referred to as DA interviews) who are responsible for agricultural advice to farmers at the lowest administrative level, kebele. Since interviews with officials were held in their offices, they had a more formal character.

Documentation and analysis of the results

Ideally, all interviews should have been tape-recorded. However, considering the extensive amount of in-depth interviews, it would have been an immense task to carry out the transcription and analysis in this way. Thus tape-recording was confined to the group interviews, where they were indispensible in order to make possible a detailed translation. When it came to the individual interviews, sufficient time for translation was however available during the interview itself, and documentation could therefore be carried out by taking notes. After each interview the notes and general impressions were discussed together with the interpreter as a way of crosschecking the documentation.

Analysis of qualitative data is a time consuming activity, involving continuous reading and rereading of notes. I have deliberately avoided quantifying the data, since it would not have been suitable considering how the data collection was designed. In order to enhance personal and detailed information to come through, the structure of the interviews was rather open, thus
topics were not always the same, therefore the interviews should not be compared in a quantitative way. Instead, a thematic analysis was carried out. To begin with, recurrent themes connected to the research questions were identified and the data was structured thereafter. The thematic structure facilitated a subsequent discerning of patterns in relation to the research questions (Repstad, 2007:139ff). When the data is presented in chapters 3 and 4, empirical sources will be referred to in footnotes by their above-mentioned abbreviations, in order not to let long lists in the body text disturb the reader.

1.6.3 Positionality

Since Ethiopia, as many other parts of the world, has a history of top-down rule not taking local peoples’ knowledge and experiences into account, ‘experts’ are often met with distrust. Therefore, the importance of being reflexive by recognizing positionality shapes the interaction with the informants is crucial (Longhurst, 2003:123). In my case, coming from Sweden with a higher education, to conduct research with Ethiopian farmers, involves several issues of unequal power relations. Not only do I, as a researcher, have the power of representation, to present the results of the information provided by the respondents, but the unequal power relations are further accentuated by colonial structures (Valentine, 2005). This relationship, was also continuously manifested materially e.g. with the use of camera, GPS, coming by car etcetera. The issue of positionality does not only concern the researcher, but also the interpreter. My interpreter was Oromo, thus of the same ethnical group as most of the informants (but not all), but he was however from a different part of the region, of a different religion and a university student, why the farmers probably considered him urban even though he had a rural background. Although the issues of positionality and power relations are unavoidable to some extent, it is crucial to be aware of them and how they affect the interaction with the informants. These issues make it essential that informants fully understand the purpose of the study. In my case, it was facilitated since my fieldwork was part of an already ongoing research project, which most people, to some extent, were already familiar with. Additionally, the building of a rapport, which will be dealt with in the next section, is crucial in dealing with these issues of positionality.

1.6.4 Ethical issues and the building of a rapport

Building a rapport is key for qualitative research to get deeper than only being consistent with the ruling discourse, or what people are supposed to say. Conducting interviews is in this way not only about asking questions, but also about being self-aware and recognizing the importance of listening, paying attention, being open and non-judgmental, creating a comfortable environment, and about being careful and systematic with the gathered data (Longhurst, 2003:118).

During the fieldwork, I noticed some crucial factors affecting the rapport. To start with, I chose to carry out most of my fieldwork in only one village, to be able to increase the time spent there. Moreover, much can be achieved by personal approach: by not rushing and spending time with

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4 Since Ethiopia was one of the few countries in Africa to escape European colonial rule (except for a short period by the Italians 1935-1941), the ‘colonial structure’ I refer to here is rather an aspect of historical and contemporary unequal power relations in the world system.
the villagers besides interviewing (this was however often when valuable interesting information popped-up); by sharing information about yourself (answering questions and showing pictures from home); by bringing something back (giving pictures of the informants and of their matrices, or by giving informants a ride in the car when they needed to). These approaches are inspired by the three pillars of PRA; behavior and attitudes, sharing, and methods (Chambers, 2003: 104f). The participatory character of the methods also showed to be important in the building of a rapport (see previous discussion on participatory checking and PRA).

Being trusted with information, sometimes sensitive such, also means that the trust has to be respected. Since the informants were encouraged speak freely, they were also ensured anonymity. Therefore, they are not mentioned by name in this thesis and the list, providing contextual information on the interviews in Appendix I, is written in a way ensuring that individuals cannot be discerned. These ethical considerations do not only concern the written material, but it is important not to mention what specific people have said also during the fieldwork, particularly when interviewing different actors.
2 Theoretical background

2.1 A political ecology framework

In order to analyze the dynamics behind agro-ecological change, a theory that allows for complexity and identifies the sources thereof is a prerequisite.

The term political ecology “combines the concerns of ecology and a broadly defined political economy” (Blaikie and Brookfield, 1987:17). The approach is multi-scalar, both in a temporal sense as well as geographically, considering not only local but also national, regional and international dimensions (Zimmerer & Basset, 2003). A political ecology framework thus in this case implies an analysis of the agro-ecological reality of the farmer, taking the wider historical, political and economic context into account. Moreover, the approach gives careful attention to causation rather than the list-making of factors (ibid.). Blaikie and Brookfield (1987:100) state, in their book on land degradation: “were we writing in terms of systems theory, we might consider degradation to be a ‘maladaptive’ response to historical change, a failure to adapt to changing social facts. In our ‘regional political ecology’ approach we take the opposite tack and place our first emphasis on social and economic causation” (ibid.). These aspects combined make the framework relevant for my study.

Erickson (2006) argues that previous historical analyses of agricultural landscapes have been biased towards large-scale top-down explanations for intensification attributed to outsiders’ engineering knowledge rather than the knowledge of local farmers. He states: “vast anthropogenic landscapes are all too often attributed to the agency of elites or corporate groups without critical examination” (ibid:352). Collaterally with the hierarchical structure often emphasized in research, are however heterarchical forms of organization, outside of state control and interference (Erickson, 2006:339; Davies, 2009). In a similar way, Doolittle (1984) distinguishes agricultural change that is systematic in character, from incremental agricultural change. While the former, which involves input intensive investments (knowledge, labor or technical), requiring engineering expertise and socially coordinated efforts, has received a much greater attention in research on agricultural change, Doolittle (1984) argues that in fact most small-scale agricultural change occurs incrementally. Incremental change consists of the accumulated results of individual farmers’ intentional or unintentional transformations “in conjunction with cultivation” (Doolittle, 1984:124). Thus local farmers’ agency, or the bottom-up perspective, has largely been ignored in literature and needs to be taken into account in the analysis of agricultural intensification.

Taking local agency into account also involves incorporating how gender relations are interacting with agricultural change. Hovorka (2006) uses a feminist political ecology approach to understand women’s renegotiation of their positionality in the process of agrarian restructuring and rural-urban transformation in Botswana. Feminist political ecology “aims at analyzing gendered experiences of and responses to environmental and political–economic change that brings with it changing livelihoods, landscapes, property regimes and social relations” (ibid:209). Here, the concept of ‘gender contract’ could be useful; it considers “the set
of power structures creating relations among men and women” (Caretta, personal communication). The concept explores the mutual roles, responsibilities, rights and obligations that define social gender relations by recognizing the dynamic character of these relations, emphasizing negotiability (ibid.).

Even though a bottom-up perspective is of key importance, as Erickson (2006) and Doolittle (1984) argue, this does not imply that external factors of political economy are irrelevant. Rather, as Blaikie and Brookfield (1987:69) note, “there is a distinction between direct decision-making (usually at the farm level) and the results of decisions at other scales (by landlords, corporate management, national governments etc.), which determine the parameters of choice”. Hence, an analysis of farmers’ decision-making needs to take into account the local and immediate relation between farmers and their land, as well as factors of broader geographical scale, which define the range of choices available to the farmer. Zimmerer and Basset (2003) highlight Blaikie and Brookfield’s ‘chain of explanation’ model as a hallmark in political ecology. The model “starts with the land managers and their direct relations with the land (crop rotations, fuelwood use, stocking densities, capital investments and so on). Then the next link concerns their relations with each other, other land users and groups in the wider society who affect them in any way, which in turn determines land management. The state and the world economy constitute the last links in the chain” (Blaikie and Brookfield, 1987:27). Thus while external dimensions of scale are important considerations, the role of local agency and knowledge is fundamental to interpreting political-ecological change (Zimmerer and Basset, 2003).

At the core of political ecology is this interface between local agency and external factors of political economy. Thus the approach allows for an analysis of the dialectic interaction between top-down and bottom-up drivers of change, as well as their respective trade-offs or feedback-loops at the point of land management decisions, eventually projected in transformations of the agro-ecological landscape. To analyze the latter process, an additional concept will be added to the theoretical approach, that of landesque capital.

**2.1.1 Landesque capital**

Blaikie and Brookfield (1987:9) introduced the definition of landesque capital as it is now most widely used explaining that it “refers to any investment in land with an anticipated life well beyond that of the present crop, or crop cycle.” Furthermore, “the creation of landesque capital involves a substantial ‘saving’ of labor and other inputs for future production” (ibid.). Examples of landesque capital are stone walls, terraces, irrigation systems and drainage systems. An important distinction is made between land management in relation to the current crop and land management designed to secure future production, thus constituting capital. In this way an initial labor investment accumulates in the land and creates ‘capital’ (by the saving of labor) for later crops (ibid.).

Rather than the widespread focus of environmental research on the destructive characteristics of human modification (land degradation, soil erosion etc), the concept of landesque capital acknowledges human improvement of natural conditions (Widgren, 2007:63). Thus, instead of focusing on land degradation and marginalization, the concept can be used as an analytical tool to explain investments in land: how and why they are created and maintained, as well as how they are valued by the farmers (Håkansson & Widgren, forthcoming).
According to Brookfield (2001b:183f) farmers’ purposes of the creation of landesque capital include enhancement of production, as well as reduction of risk. Furthermore, the concept examines the social and economic conditions that govern whether or not labor is invested in the land, thus it has a strong connection to the political ecology approach. Connected to the question of how landesque capital is created is whether it is produced intentionally or not. Investments in some cases certainly do need socially coordinated efforts and high population densities, as has been highly emphasized in research. But it is not the only way in which investments are made. In some cases, landesque capital has been observed to be created incrementally, in processes where cultivation, construction and maintenance are “inextricably mixed activities” (Doolittle, 1984:135; Börjeson, 2004). These different types of investments involve different temporal scales; incremental investments are gradual, while substantial systematical investments often require a shorter time-frame (Widgren, 2007:68). Embracing the fact that landesque capital does not have to be created as a result of conscious actions to intensify agriculture, it is important to take varying drivers and synergy effects into consideration when studying the creation of landesque capital.

By analyzing agricultural landscapes, landesque capital can be used to operationalize the study of human-environment interrelations. Crumley (2007:17) states that a “landscape is the spatial manifestation of human-environment relation”. Similarly Fry (2001:164) adds: “we can easily observe the interplay between nature and culture at the landscape level. We are also forced to consider the relationships and trade-offs between many different functions when managing landscapes”. Landesque capital can here serve as a tool for an analysis of the historical interaction between ‘Nature Capital’, ‘Human capital’ and ‘Human-made capital’ in specific geographical locations (Figure 4).

**Figure 4**: Conceptual framework of landesque capital set in relation to other capitals. *Source: Börjeson, 2012, Conference presentation.*
Greening the concept of landesque capital

Research on landesque capital has largely focused on physical structures, such as stonewalls, terraces, irrigation systems and drainage systems, as opposed to the more ecological aspects of the concept. Brookfield (2001a:184), however mentions that landesque capital additionally can involve these less studied ecological aspects, such as trees or whole field systems, which are less obvious in land management, since they do not require a substantial labor input. Brookfield (2001b:174f) distinguishes the physical capital purchased or created by farmers into three categories: The first is “the working capital of farm tools, livestock, and household storage and equipment.” The second includes “trees and deliberate modifications of the vegetation that endure for a long time, even centuries.” And finally the third consists of “physical works, which include manufactured soils as well as terraces, drainage and irrigation systems, and wells.” While the first one does not involve long-term modification of the environment, the latter two do and they therefore constitute different forms of landesque capital. Börjesson (forthcoming) suggests that the ecological aspects of the concept could be termed ‘green’ landesque capital, whereas the physical structures previously emphasized in literature could be referred to as ‘brown’. An inclusion of the greener aspects of landesque capital would imply a need to elaborate how the concept relates to ecology and biophysical processes to include for example trees, open fields, biodiversity and landscape patchiness as forms of accumulated landesque capital (ibid.). Börjeson (forthcoming) also emphasizes the need to examine how this green concept of landesque capital would relate to other concepts such as ecosystem services (and disservices).

Incorporating the green aspect in landesque capital adds an important dimension in the analysis of agricultural intensification; that of the relationship between agriculture and biodiversity. Following a Malthusian concern for population pressure causing environmental degradation, Boserupian followers have argued that an intensification of agriculture would spare pristine lands from degradation (Malthusian and Boserupian theories will further be discussed in chapter 2.2.1). As Green et al. (2005:553) argue, we may “face a choice between having a greater area of low-yielding wildlife-friendly farmland and less intact habitat or having a smaller area of high-yielding, less wildlife-friendly farmland and more area available for wild nature elsewhere”. Hence, intensive agriculture (in terms of the increased capital inputs e.g. fertilizers, mechanization, HYVs, associated with the Green Revolution) on the whole is argued to be a more efficient way of conserving biodiversity, even though this form of agriculture as such is known to have low biodiversity (monocultures) and negative external effects on the environment^5 (Djurfeldt, 2005; Borlaug, 2002; Green et al. 2005). A focus for conservation biologists has concomitantly historically been on preserving islands of wild nature, while the rest of the landscape largely has been ignored.

Criticizing this view, ecologists now argue for a new conservation paradigm that takes a more holistic approach by incorporating the agro-ecological system (Perfecto et al. 2009; Rosenzweig, 2003). By characterizing agricultural landscapes in the tropics as fragmented (natural habitats embedded in an agro-ecological system) rather than deforested, they argue that it is the quality of the matrix as a whole that matters in determining the balance between

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^5 The environmental effects of the Green Revolution have been explored in a range of literature, where it has caused pollution of waters, eutrophication of water bodies because of the spread of fertilizers, increased vulnerability to pests and diseases to name some (See e.g. Perfecto et al. 2009).
extinction and migration (Perfecto et al. 2009:31). Since local extinctions in preserved islands are and will be inevitable, the concern should rather be whether extinctions of subpopulations can be offset by a migration event or if they will eventually become part of a regional extinction of a whole metapopulation (ibid:9). What is important is thus the ability of the matrix to serve as habitat or as a passageway for migrating organisms. Rosenzweig (2003) accordingly highlights that setting aside ‘islands’ protected from human use is in the long run only delaying biodiversity loss. Instead he proposes a conservation regime he terms ‘reconciliation ecology’, which focuses on anthropogenic habitats’ ability to be used by a wide variety of species; thereby increasing the area available for nature with “techniques to give many species back their geographical ranges without taking away ours” (ibid:201). This debate highlights the potential of a greener conceptualization of landesque capital in the study of agro-ecological landscapes. “If we accept the fact that most tropical areas are highly fragmented and that for biodiversity conservation the matrix matters, and we recognize that ‘the matrix’ consists of managed ecosystems, mostly agriculture, then the way we manage those agricultural systems becomes crucial for biodiversity conservation” (Perfecto et al. 2009:7).

There is thus a need for research on how small-scale farmers interact with biodiversity and ecosystem services. This also implies the importance of studying agriculture from a landscape perspective, with awareness about the human-environment interactions taking place. Trees have been highlighted as important components of biodiversity management in agricultural systems. Trees used in agroforestry “influence the micro-climate, matter and energy cycles and biotic processes” (Scroth et al. 2004a:1). Furthermore, agroforestry systems can serve as complementary forest-like habitats for various animal and plant species, as well as to facilitating the movement of species between natural habitats (Scroth et al. 2004b:491ff). Trees could be seen as “a prerequisite for many forest species to thrive in a nonforest habitat”, even single trees in the agricultural landscape can provide important functions for e.g. epiphytic plants, birds, tree and shrub regeneration (Hylander & Nemomissa, 2008:401). Additionally, trees reduce wind strength, provide shade and prevent erosion (Yin & Hyde, 2000). As Brookfield (2001a:184) notes, trees are “capital assets, however they are used. They may provide wood, fruit and nuts or cash income, but they also scavenge, cycle and store nutrients: a proportion, often selected for specific use, additionally fix atmospheric nitrogen. They may perform other services such as watersheds and slope protection. Resources devoted to trees… are important elements in the total managed landscape, contributing greatly to production and livelihood.” The nitrogen-fixating abilities of trees have been highlighted in other research too, as well as the provision of shade inhibiting weed growth (McCann, 2005:182; Perfecto et al. 2009:139). On the other hand however, trees also compete with crops for water and sunlight, why there is a tree density limit to positive effects on crop productivity (Yin & Hyde, 2000). A study of trees in agriculture is thus important in many aspects, the contribution of applying the lens of landesque capital involves that the farmer (i.e. labor) is put at the focal point of the analysis.

Since agriculture is deeply intertwined with the landscape where the cultivation takes place, it is of importance to look at the interconnection between agricultural practices (crop choices) and landesque capital. “The human labor force has to mobilize its inputs of time in relation to the choice of crops. It has to do this in a way that will avoid or minimize conflicting demands, and be adaptable to the weather” (Brookfield, 2001a:183-184). In this way, landesque capital might be redefined or modified, depending on the prevailing agricultural practice. On the other hand, agricultural practices and crop choices could to some extent be dependent on already existing landesque capital. Looking into the dynamics behind farmers’ decisions regarding their
agricultural practices therefore enables a deeper understanding of the creation of landesque capital.

To summarize, while the concept of landesque capital serves as a precise analytical tool to explore farmers’ interaction with the agro-ecological landscape in terms of long-term investments, the use of an overarching political ecology framework here adds a wider dimension to the analysis of agro-ecological change. In the analysis of the wider context of the local agro-ecological system, crop choices and landesque capital are key elements in shaping agro-ecological change.

### 2.2 Literature review

#### 2.2.1 Agricultural change in Africa

There is, in literature and the wider development discourse, a widespread view of African agriculture as extensive and low-yielding (Adams, 2004). Smallholder farming is the backbone of African agriculture and food security even though population densities historically have been comparatively low (Dixon et al. 2004). In much of scientific debate the destructive power of the landscape change induced by small-scale farming in Africa has often been emphasized (land degradation, desertification and deforestation). Agricultural productivity (in per capita grain production) is said to be stagnating or slowly increasing, lagging behind the rest of the developing regions of the world (Djurfeldt et al. 2005; Brzeska et al. 2012). In the light of the substantial population increase currently taking place in the region, a growing concern for an ‘African food crisis’ took off in developing circles by the end of the 20th century (Widgren, 2004). According to statistics from FAO (2011:8), the number of undernourished in Africa, after slightly decreasing between 2004-2006, again increased as a consequence of the world food crisis 2006-2008.

Intensification needs to take place, and voices opting for a Green Revolution in Africa are increasingly heard (Djurfeldt et al. 2005; Brzeska et al. 2012; AGRA, 2012, *website*). The Asian Green Revolution is often taken as an example, it is supposed to be targeted towards smallholders by bringing modernized agriculture in the form of improved seeds, fertilizers, pesticides, access to credit, infrastructure etcetera (Djurfeldt et al. 2005; Brzeska et al. 2012; AGRA, 2012, *website*; Goldman, 1995).

As a contrast, a substantial body of research has shown that land management in Africa is not as destructive as anticipated in Western narratives of smallholder societies and environments (Fairhead & Leach, 1995; Tiffen & Mortimore, 1994; Netting, 1993). Small farmers’ investments in agricultural intensification have also been highlighted by the literature on landesque capital (Brookfield, 2001; Börjeson, 2004; Cairns & Brookfield, 2011; Widgren, 2007; Henley, 2005). Furthermore, Chambers (2003:46f) criticizes the ‘production thinking’ adopted by agricultural scientists and economists on three grounds. First, historically, situations of food shortage have been related to poor people’s access to food rather than the actual food availability. Second, the concentration on yield per hectare as the most important factor for farmers is said to be simplistic; it has been proven in studies that a range of factors are as, or even more important for local farmers, such as timing of yield, disease resistance, labor intensity, taste etcetera. Third, he criticizes the use of grain production as a measure of total
food production, since it excludes other important sources of food, such as vegetables, root crops and fruits. While it should not be denied that land degradation and agricultural productivity is a concern in many places in Africa, the insights provided by this body of research show that the study of agriculture and agricultural productivity needs to allow for more diversity and complexity.

The intensification narrative is often based on an underlying Malthusian and Boserupian concern for how to feed a growing population when the possibility of taking new land into cultivation is no longer there. While the Malthusian perspective takes a pessimistic approach; focusing on how increased population density means that less productive land have to be taken into cultivation resulting in diminishing returns and environmental degradation, eventually leading to a sustainability crisis. Boserup adds innovation (and intensification) into the process; once there is land scarcity because of population pressure, this will lead to an intensification process (additional labor and technical input) resulting in increased output per hectare, thus solving (at least temporarily) the problem by increasing the carrying capacity of the land. According to Brookfield (2001b:199), Boserupian arguments for agricultural intensification “has become almost orthodoxy since the 1980s”.

The theories have been criticized since they fail to capture the diversity of historical realities by focusing on only one factor, population growth, as the driver of agricultural change (Brookfield, 2001b:199; Fisher & Feinman, 2005; Börjeson, 2004). “A successive pairing of Malthusian pressures with Boserup technical leaps is not the only way in which agricultural transformation can be explained” (Brookfield, 2001a:189).

Many researchers put forth market demand and commercialization as a significant driver of agricultural change (Henley, 2005; Börjeson, 2004:33; Brookfield 2001a). Börjeson (2004; 2007) also brings up the importance to look at synergies and positive feed-back loops in the analysis. In his study of the agricultural history of Iraqw, in Tanzania, intensification was found to largely have been “its own driving force” (Börjeson, 2004:170). Moreover, since smallholder farmers have limited resources to cope with failure, they have often been found to act in a risk-averting manner, making crop choices (often diversifying) as a way of managing the unpredictability of weather, price volatility, pest damage and crop disease (Blaikie and Brookfield, 1987:35; McCann, 2005:167). This provides an alternative explanation to an otherwise prevailing view of African smallholders as ‘resistant to change’, to use Adams (2004:134) words.

When concluding the anthology Islands of intensive agriculture in Eastern Africa, Adams (2004:137f) asks himself why farmers intensify, finding the answer to be fourfold. First, it has to do with the ecology of the production system, setting constraints both on crop choice and cropping system diversity as well as on the range of non-farm productive opportunities. Second, the nature of household labor economy is important; farmers make calculations of the allocation of labor and make crop choices accordingly. Third is the relationship between cultivation and wider cultural practices; identity and social relations were found to have a crucial role in forming and sustaining intensification practices. Fourth is the nature of exogenous forcing factors, these are the external factors constituting the context of the wider political economy.

Recent research hence shows that the dynamics behind agricultural change are complex, and therefore the debate on African agriculture needs to become more nuanced. A prerequisite for this to be achieved is an increased availability of empirically grounded research on small-scale
farming in Africa, which analyzes the dynamics driving the interaction between farmers and the local agro-ecological landscape. Instead of adhering to unilinear approaches, researchers need to recognize that farmers’ reality “is one of constant adaptation to changing biophysical, social, demographic, economic and political conditions and has been so for a very long time” (Brookfield, 2001a:182).

2.2.2 Agriculture in Ethiopia

This subchapter provides a more specific overview of agricultural processes in Ethiopia. By highlighting the most important elements of the current agricultural system, as well as recent historical transformations, this section serves as an introduction to the empirical chapters that will follow.

Around three-quarters of the population in Ethiopia is engaged in agriculture according to FAOSTAT (2011), this fact makes agricultural activities imperative to overall economic growth and poverty reduction in the country (Diao et al. 2012). Whereas the most important cash crops for export are coffee and khat, more than 70 percent of Ethiopia’s cropland is devoted to cereal production (Diao et al. 2012; Pender et al. 2006; Feyisa & Aune, 2003).

Maize is the main staple food of Africa, yet it is not an African crop. It was introduced to the continent during the 16th century from the Americas, as part of the substantial ecological and demographic transformation resulting from the Columbian exchange (McCann, 2005:23). Although maize started being grown as a garden vegetable in most of Africa, and so also in Ethiopia, maize showed to be suitable for agro-ecological conditions in the continent and gradually more widespread field production took off (ibid.). In Ethiopia, the spread of maize as a staple was slower than in the rest of Africa. Even though the crop seem to have arrived as early as the 1600s, it was not until the 1980s that production took off in the country as a whole (ibid:185). The high preference for teff (the main ingredient in injera), a cereal endemic to Ethiopia, has been the most common explanation to the comparatively late spread. Yet now, maize has taken the lead in terms of quantity of cereals produced in Ethiopia, teff still remains number one in areal extent of production, but it is now second in terms of quantity produced (Diao et al. 2012). For both categories, sorghum (also indigenous to Africa) is ranked third and wheat fourth.

Zooming in to South and Southwestern Ethiopia, maize has however been a dominant crop since earlier. It proved to be particularly suitable in combination with coffee production, which resulted in the agricultural regime McCann terms ‘the coffee-maize complex’ (1941-1975) in his book on the agricultural history of Gera (McCann, 1995). As opposed to teff, the labor needed for maize did not conflict with the main coffee harvest. Furthermore, maize could be consumed before the other cereals at its green stage, prior to the yearly acquisition of income from coffee (ibid.). Maize thus additionally served to ensure food security at a critical time of the year. During the subsequent rule of the Derg (1974-1991), two factors impeded coffee production, namely: the coffee berry disease (CBD), which had a substantial effect on yields; and political regulation in the form of fixed coffee prices, land reform and villagization, increasingly driving farmers to convert to maize production in order to “avoid state control” on coffee (McCann, 2005:90; McCann, 1995). Gera thereby went through a process of deforestation as the coffee-maize complex transformed into the ‘tyranny of maize’ regime (1971-1990), again using McCann’s wordings (1995).
Since maize is an international crop, it has been comparatively more researched in terms of the breeding of new varieties, which can increase yields by making better use of the nutrients provided by application of inorganic fertilizers. This could explain why productivity per hectare generally is higher for maize, than indigenous crops like teff and sorghum (Diao et al. 2012). Maize has generally been favored by governments in Africa attempting to increase national food production, but farmers have also appreciated the crop, mainly because of its low labor intensity and early maturation (Holmén, 2005; McCann, 2005). In 1995, the Ethiopian government formally launched the “minimum package program” as part of an effort for an Ethiopian Green Revolution, involving the adoption of new seed varieties for cereals, particularly BH660 of maize, in combination with inorganic fertilizers and modern techniques (McCann, 2005:187f; Diao et al. 2012; Djurfeldt; Pender et al. 2006). Accordingly, national fertilizer use almost doubled between 1990 and 2000 (Diao et al. 2012:113). Ethiopia also has a particularly high use of fertilizers compared to its neighbors Uganda and Kenya (Pender et al. 2006:17). The Ethiopian fertilizer market is however government controlled and previously active private actors have now withdrawn from the market (Jayne et al. 2003).

Nonetheless some constraints are apparent, maize is more vulnerable to deficiency of water, sunlight and nitrogen, than the indigenous relatively drought tolerant crops like sorghum teff and millets (McCann, 2005; Diao et al. 2012). The BH660 variety of maize is according to McCann (2005:189) high-yielding, but slow-maturing and thus particularly susceptible to drought.

As for cash crops, coffee is the most important, representing 60 percent of Ethiopia’s export earnings (Pender et al. 2006). 95 percent of the coffee production is conducted by about 700 000 small-scale farmers (Pender et al. 2006:25; Gemech & Struthers, 2007:1132). In the early 1990s, a process of market liberalization, led by World Bank and IMF initiated Structural Adjustment Programs (SAP), followed after the fall of the Derg, during which rule the highly regulated market had been suppressing production, as mentioned above (Diao et al. 2012; Gemech & Struthers, 2007). Following market liberalization, coffee prices increased, but so did price volatility (Gemech & Struthers, 2007). Gemech & Struthers (2007:1131) further highlight the fact that Ethiopia’s economic dependency on coffee, makes the country highly vulnerable to price fluctuations, especially since Ethiopia, as a minor coffee producer in global measures is a ‘price-taker’ on the world coffee market. Similarly, Perfecto et al. (2009:120) note that in most coffee-producing countries, coffee price declines tend to have ramifying economical and political effects.

Khat is an evergreen tree, of which leaves are used as a stimulant with effects similar to amphetamine. Khat consumption has a long tradition in Ethiopia, but its consumption has recently increased significantly. Khat production took off at an increased pace following a period of low coffee prices in the beginning of the 2000s (Pender et al. 2006). Historically, the cultivation has been limited to Harerge, in the eastern part of Ethiopia, where the bulk of its production is still concentrated (Tefera, 2009; Feyisa & Aune, 2003). Its latest increase has however been substantial in a larger part of the country. In Wondo Genet, South-central Ethiopia, khat cultivation was found to have expanded to cover more than 60 percent of the farm area (Dessie & Kinlund, 2008). The trade is mainly driven by an increased national demand; khat now plays an important role in social life in Ethiopia and is chewed by virtually all segments of the population (Feyisa & Aune, 2003). Additionally, export is rapidly increasing (mostly to Djibouti and Somalia), making khat Ethiopia’s second largest export item and an important contributor to hard currency income (Feyisa & Aune, 2003; Dessie and Kinlund
Prices have consequently increased substantially; in Wondo Genet the increase was fivefold between 1991-2000 (Dessie & Kinlund, 2008). While market demand is the main driver of the expansion of khat cultivation, other factors contribute to its favorability. To name some, khat is tolerant to periods of drought and less vulnerable to pests and disease, it gives yield 2-3 times a year and the labor need is consequent throughout the year (ibid.).

The government neither encourages nor discourages production of khat, it is however taxed more than other crops, especially the khat which is exported (Dessie & Kinlund, 2008; Feyisa & Aune, 2003). In addition to the negative social and health impacts connected to increased khat consumption (Tefera, 2009), the expansion of its production was in Wondo Genet found to play an important role in deforestation and to have effects on household distribution of income, affecting women negatively (Dessie & Kinlund, 2008). Furthermore Feyisa & Aune (2003) point out the vulnerability implied in the fact that the Ethiopian economy is becoming dependent on the export of a product that is illegal in many countries.

There has been a general concern that khat production could undermine food production by reducing the area devoted to food crops as well as the number of oxen (since plowing is not needed) (Feyisa & Aune 2003; Tefera, 2009; Dessie & Kinlund, 2008). This picture has however been challenged by research showing that cash cropping, and the cultivation of khat, can have synergy effects through providing farmers with capital that they can invest in intensification of food crop production (by acquiring HYVs, inputs etc.) (Govereh & Jayne 2002; Tefera, 2009). Another perspective in the discussion is added by Dessie and Kinlund (2008:198) from their study in Wondo Genet where food crop production had decreased significantly following khat expansion, namely that khat provide farmers with means of ensuring food sufficiency (buying food) while at the same time maximizing income.

When it comes to agricultural productivity in Ethiopia, soil erosion has been brought up as a major problem (Duguma et al. 2010; Hoben, 1995). On the other hand, there has been critique highlighting that the problem is deeply exaggerated. As Hoben (1995:1009) notes, there is a narrative that “exaggerates the rate and magnitude of degradation and misrepresents the role of human agency in causing it, but there can be no doubt that there are serious problems of soil erosion in extensive areas of highland Ethiopia.” McCann (2005:14) criticizes the soil erosion narrative stating: “it is less accurate to say that Africa is losing soil than that the soils move and redeposit themselves. In placing the emphasis on soil loss, standard calculations of erosion rates, which have been grossly exaggerated for places like the Ethiopian highlands, have underestimated the historical effects of soil movement and new soil formation.”

With this insight of the present agricultural situation in Ethiopia, we will in the next two chapters proceed to examining the local agro-ecological processes taking place in Gera.
3 Crop-choices in Gera

This chapter will provide a review of the smallholders’ rationale for crop choices as well as how they are influenced by external drivers. The results are based on the interviews, focus group discussions and observations conducted during six weeks of fieldwork (20 Feb 2012 – 5 Apr 2012) in Gera District. As mentioned in chapter 1.6.2, empirical sources will be referred to in footnotes, for a detailed list of the interviews, see Appendix I. The outline of the chapter is based on a review of crop-choices crop by crop: the first subchapter will deal with three cereal crops (maize, sorghum and teff); the following subchapters concern each of the four remaining crops; coffee, khat, avocado and eucalyptus.

3.1 Cereal crops

The focus of this chapter is on the three cereals: maize, teff and sorghum. These are not the only important cereals in the district, but they are the most produced in the mid-highlands, where the bulk of my fieldwork took place (the villages of Kerebe and Wanja) (Table 1). In the crop ranking focus group discussions the farmers also agreed that the three cereals of focus are the most important ones for them, even though one group in Wanja stated that they would have wanted to add millets as well.

Table 1: List of crops by quantity produced in Wanja Karsa kebele (mid-highland, Gera District)

<table>
<thead>
<tr>
<th>Crops ranked by quantity produced in Wanja Karsa</th>
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<tbody>
<tr>
<td>1. Maize</td>
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<tr>
<td>2. Coffee</td>
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<tr>
<td>3. Avocado</td>
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<tr>
<td>4. Teff</td>
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<tr>
<td>5. Sorghum</td>
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<tr>
<td>6. Millet</td>
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<tr>
<td>7. Khat</td>
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</tbody>
</table>

*Source: (DA interview, 2 March 2012)*

The timing of a fieldwork is known to have an impact on research results. Chambers (2003:111) discusses the seasonal bias where researchers tend to carry out fieldwork in the cold and dry seasons, rather than the wet and hot. Indeed, farmers face very different conditions depending on season when it comes to labor, livelihoods as well as access to food and resources. Accordingly, the visual character of the landscape changes. Although my fieldwork was
conducted for a short period of the year, it took place during the transition from the dry to the wet season, a period that turned out to be of particular interest when it comes to cereal crop choices. Whereas people would express their plans, desires and disappointments during the end of the dry season, the farmers’ rationale changed somewhat following the advent of the rains, by the time of the actual sowing.

3.1.1 Maturation time

During the first set of interviews about crop choices for cereals, the timing of the rains was said to be a critical factor determining when, and therefore also which, cereal crop to sow. Every year, all of the three cereals of focus are grown, but the proportion of each cereal crop varies depending on the timing of the rainy season. The underlying reason is mainly each crop’s inherent water requirements. Maize is known to be vulnerable to drought, whereas sorghum and teff are considered drought resistant.

In general, the climate rationale can be summarized as follows: if the rains are early – maize is preferred, if the rains are later – the proportion of sorghum will increase, and if they are very late – teff will dominate. We interviewed a farmer while he was plowing his field in preparation for sowing sorghum in the end of March; his grandfathers taught him that it is too late to sow maize if the rains have not come in the beginning of April. After that, it is said they only get “green maize” and the yield will be substantially reduced. In its place, the proportion of sorghum should be increased, was the current case.

Whereas the climate rationale was emphasized in interviews taking place in the end of the dry season, when drought and the late advent of the rains were taking up a concern for whether maize could be sown at all. When the rains finally came, the farmers were nevertheless sowing maize. It turned out, a set of additional factors operate in forming a preference for maize, however in smaller proportions, even when weather conditions are better suited for other crops.

The main reason to why the preference for maize persists is its short maturation time. Maize can provide food at its green stage, significantly earlier than the other cereals and it thus ensures food supply during the critical period when the time since the last harvest is the longest. The reason why all three cereals are produced every year, however in different proportions, is thus because they “help them at different times”. Maize matures in 5-6 months, sorghum in 7-9 months, and teff, which is sown later, takes 4-4.5 months.

3.1.2 Consumption preferences

The crop ranking focus groups were asked to rank the cereals based on their importance for consumption, among other factors. As expected considering the dominance of maize production in the area, it turned out that maize is the most important crop for consumption (as well as for sale), followed by sorghum and teff. The farmers would often articulate their preference for

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6 CC interview 3; CC interview 5; CC interview 8; CR, mixed group, Wanja.
7 Tree interview 8
8 CR, female, Kerebe; CR, male, Kerebe; Tree interview 1
9 CR, male, Kerebe
10 ibid.
maize by expressions like, “we don’t have anything if we don’t have maize”\footnote{Tree interview 1} or “maize is everything for us”\footnote{CR, female, Wanja}. Maize is consumed starting from its green stage, in addition its stalk can be eaten like sugarcane, its residues can be fed to livestock and as a cereal it can be used to make bread or \textit{injera} and in addition it can be sold.\footnote{CR, female, Wanja; CR, mixed group, Wanja; CR, female, Kerebe}

When it comes to sorghum, other priorities come into play. Although sorghum has a long history as an Ethiopian cereal, it is seldom preferred for consumption. In order to be consumed, it should to be mixed with other cereals such as teff or millet, why some farmers say they prefer buying it rather then producing it themselves.\footnote{CR, female, Kerebe; CR, female, Wanja} “We only consume sorghum when there is scarcity of food, if there is no maize or teff”\footnote{CR, female, Wanja} it is said in a group interview. They continue by explaining that they sell sorghum because it is grown when there is drought, something implying that it does not have a high priority when it comes to consumption and gastronomic preferences.

Teff, quite on the contrary, is the most \textit{preferred} for consumption of all cereals due to its high quality, it is notably however not the most \textit{important} for consumption.\footnote{CR, male, Kerebe; CR, female, Kerebe; CR, mixed group, Wanja} It is for example said that teff cannot always be consumed since it is not available.\footnote{CR, female, Kerebe} Another benefit of teff is that it can be stored longer than maize and sorghum, which are attacked by an insect locally called \textit{dano} during storage.\footnote{CR, male, Kerebe; CR, female, Kerebe; CR, mixed group, Wanja; CC interview 18}

Preferences for consumption add further to the analysis of cereal crop choices, but considering the relatively strong preference for teff although it is not produced as much as maize (Table 1), consumption preferences and the maturation time alone cannot explain the choices of cereals.

### 3.1.3 Labor

Considering the preference given to teff for its nutritional and gastronomic values, in combination with the comparatively higher price it has on the market – it might be puzzling that teff is not produced more. However, going deeper into the issue, it becomes apparent that several constraints are at hand. Teff production is, among other things particularly labor intensive. While maize fields are plowed three times, teff fields need to be plowed four to five times. Furthermore, teff fields need to be completely cleared from weeds before sowing. In addition, harvest and processing of teff require many people working at once, which sometimes imply the need to contract workers.\footnote{CR, female, Wanja; CR, mixed group Wanja; CR, female, Kerebe} Because of the high production costs for teff, one group even prefers buying it instead of growing it, explaining that they are now producing less and less teff.\footnote{CR, female, Kerebe} An additional constraint for the coffee producers is that the timing of the harvest and
processing of teff coincides with the coffee harvest.\textsuperscript{21} This implies that the labor costs, in combination with the timing of the labor need, can constitute disincentives to grow teff (Figure 5). Cereal crops in general require continuous clearing of trees, especially in this forested area where there is continuous regeneration of trees from year to year, an aspect that will further be discussed in detail in chapter 4.4, on landesque capital.

![Figure 5: Teff is particularly labor-intensive. Here is the post-harvest processing.](image)

Going on to the other cereals, maize and sorghum both need weeding, but for sorghum the weeding requires slightly more labor. One group however says that sorghum does not need much labor since they use herbicides for it, whereas it is better if teff and maize are weeded by hand.\textsuperscript{22} Pesticides are generally used for maize, sorghum and teff (both herbicides, and insecticides used after harvest), and the farmers view is that they are expensive but useful, since they replace and simplify a lot of labor.

When it comes to the gender contract implied for cereals, plowing is exclusively done by men while the role of women is to assist the fieldwork by cooking for the husband, contract workers and neighbors helping out. Women, on the other hand, more often do weeding of maize than men. The decisions of what proportions of cereals to be grown each year is normally confined to men even though decisions sometimes are made together.\textsuperscript{23}

In the market, women rather than men are selling cereals. When asked why it is so, it is often explained that it is a matter of whom they sell them to and the quantities of cereals sold; women sell cereals because it is sold in small quantities to consumers.\textsuperscript{24} “Women sell some crops like maize and teff, but since traders buy coffee, khat and avocado our husbands sell these”\textsuperscript{25}.

\begin{footnotesize}
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\begin{itemize}
\item \textsuperscript{21} CC interview 18; McCann, 1995:178
\item \textsuperscript{22} CR, mixed group, Wanja
\item \textsuperscript{23} CR, female, Wanja; CC interview 13
\item \textsuperscript{24} CR, female, Kerebe
\item \textsuperscript{25} CC interview 7
\end{itemize}
\end{footnotesize}
During the market observations, it was noted that while women mostly brought cereals, vegetables, bananas or coffee to sell at the market, men were seldom observed bringing anything other than cash crops. In the market itself, mostly women were selling products to consumers, the few men selling products were generally traders selling items brought from elsewhere, such as clothes, spices or cereals in large quantities (e.g. sorghum, teff, maize, horse beans). There were also female traders however, selling mostly vegetables (onion, potato, sweet potato, garlic, ginger), spices and cereals, either in small or in large quantities.

3.1.4 Productivity and risk estimation

The varying labor requirements for cereals helped us gain a deeper understanding of farmers’ preferences as well as of the gender contract associated with cereals. But additionally, I often stumbled across expressions using productivity as factor explaining cereal crop choices. In a group discussion it was explained as follows: “We consume more maize because we produce more, since it is more productive.”26 Another informant who was concerned because of the late rains, said he would have preferred growing maize rather than sorghum since it is more productive.27 Maize is then considered to be more productive than other cereals, provided that it rains. But the term productivity is rather vague and in itself entails a series of further explanations. In this case, most of them were to some extent connected to an estimation of the risk of losing part of the yield.

The general perception farmers have is that teff gives lower yields than maize and sorghum. This is because teff has been affected by outbreaks of a crop disease that substantially decreases yields.28 At the time of the fieldwork, many farmers were worried about only being able to grow teff if the rains would not come soon. Joking about their worry, the participants of a focus group said that in case they only grow teff and it gets the disease, they would have no option but to ask for “help faranj” (i.e. foreign food aid).29

Growing teff thus implies a risk; the disease can damage whole yields. Nevertheless, teff is still grown, because even if it gets the disease, the residues can be fed to cows.30 But the risk, in combination with the higher labor intensity, are the two most important factors explaining why teff is grown in quite small proportions in spite of the consumption preference and higher price it has. In one group discussion, it is explained that sorghum started being cultivated more during the current government (here used as a time reference, not implying causality) as a result of the teff disease.31 On the other hand, the rather strong incentives to grow teff described previously, could be seen as the reasons why teff is still grown at all.

Another risk factor is the pest damage. In Gera, when farmers talk about pests, they mostly mention mammal pests, such as monkeys, baboons, porcupine, bush pigs and warthog. Pests are of serious concern to most farmers, which is expressed in several group discussions: “Baboons,

26 CR, female, Wanja
27 CC interview 19
28 CC interview 10; CC interview 11; CR, male, Kerebe; CR, female, Kerebe; CR, mixed group, Wanja; CC interview 19
29 CR, mixed group, Wanja
30 ibid.
31 Timelines, male, Kerebe
monkeys and pigs eat almost half of our yields”\textsuperscript{32}; when it comes to maize “we share half and half with the pests, sometimes we don’t even get yield”\textsuperscript{33}. Pests (including livestock), are a big problem for maize and sorghum, but bush pigs in particular are more serious on sorghum. Pest damage has considerable importance for crop choices: a group of women say they do not even grow sorghum because bush pigs eat it\textsuperscript{34}; pulses used to be grown in Kerebe, but now most farmers are buying it instead, because of its considerable pest damage.\textsuperscript{35} One farmer sold her maize field because of the pest problems; the farmers who took over the land have now converted it to home gardens instead.\textsuperscript{36} It is in one focus group explained that an ongoing process in the village is to change cereal fields to avocado, eucalyptus and khat because of pests.\textsuperscript{37} Pests can thus be seen as a disincentive to grow cereal crops, and sorghum in particular.

Most farmers have the perception that the total number of pests has increased, their explanations for it however differ. Sometimes it is attributed to the coffee cultivation and the associated agroforestry: “the forest is their home” one focus group said\textsuperscript{38}. Anothers group said the number of pests increased after hunting was forbidden.\textsuperscript{39} Two elderly men separately claimed that the number of pests increased due to the Derg villagization resettlement in 1987.\textsuperscript{40} Earlier, when the homesteads were dispersed in the landscape, the pests were shared over a large area; now everything is concentrated to one place.

### 3.1.5 Informal institutions

Another way to approach productivity in relation to crop choices is by analyzing the practice of crop rotation. To improve fertility, the dominant maize production is altered with cultivation of teff, sorghum, millet and other cereals. The rotation cycle depend on the field, one farmer explained that he grows maize for two to three years and alters with sorghum or teff when yield starts decreasing.\textsuperscript{41} A farmer in Wanja accordingly explained that he normally never grows maize for more than two years in a row, even though the maize grown in a wetland nearby is an exception; over there maize has been grown at least for the last 30 years in a row.\textsuperscript{42} A group of farmers, preparing teff in a field in Dusta, explained that horse beans and maize improve soil fertility because their leaves inhibit sunlight from reaching the soil and the residues add nutrients when they decompose.\textsuperscript{43} Wheat and teff, on the other hand, are perceived to absorb nutrients and dry out the soil by exposing it to sunlight. Cereal crop rotation, as a means of preventing nutrient depletion, is also encouraged by development agents.\textsuperscript{44}

\textsuperscript{32} CR, male, Kerebe
\textsuperscript{33} CR, female, Kerebe
\textsuperscript{34} CC interview 7
\textsuperscript{35} CC interview 3; CC interview 10; CC interview 12; CC interview 14
\textsuperscript{36} CR, female, Kerebe
\textsuperscript{37} ibid.
\textsuperscript{38} CR, male, Kerebe
\textsuperscript{39} CR, female, Kerebe
\textsuperscript{40} CC interview 10; CC interview 12
\textsuperscript{41} Tree interview 1
\textsuperscript{42} CC interview 20
\textsuperscript{43} CC interview 18
\textsuperscript{44} DA interview, 2 March 2012
Crop rotation is however not always based on individual decisions about how to best improve soil fertility. Before harvest, the crops have to be guarded from pests day and night. For this reason, an institution locally called *didaro* is practiced to cooperate on pest protection. The practice of *didaro* implies a collective decision of which crops to grow where. In this way, fields in connection to each other will have mature crops at the same time; the farmers can therefore take turns protecting the whole fields during nighttime.45

Adding to the impact of informal institutions on crop choices, is something that became evident in the crop ranking focus groups with migrant farmers in Wanja. To them, cereal crops had a much higher priority than cash crops, as opposed to the population with a longer history in the area. The reason put forth, was that they do not have time to grow khat, avocado, eucalyptus or vegetables because of the labor they need to put on cereals.46 The focus on cereals could possibly be explained by the different agricultural history of the Northern regions Ethiopia, which is more focused on cereal production. Additionally, it seems like social status is based on cereal production; one group of migrant farmers explain that they would be ashamed to buy cereals in the market, since the community then would consider them lazy or bad farmers.47 Selling cereals in the market, on the other hand, is showing that you have excess. It was in this way apparent that to the these farmers, cereals are not only a source of food, but their production also constitute a form of social capital, an aspect not at all as evident when talking to the local population in Kerebe.

### 3.1.6 A geographical division of labor

The crop rankings carried out during the focus groups showed that market forces are clearly secondary to consumption in the choice to grow cereals. This does however not imply that cereals strictly can be considered subsistence crops to the extent of being exclusively for consumption. Abele and Frohberg’s (2003) definition of subsistence farming acknowledges the fact that the produce is almost never exclusively for household needs, but it is rather a measure of the degree of own consumption of the yield, in their definition, it needs to be more than half of the yield. But even though part of the yield is often sold in the market, own consumption is the foremost reason for growing cereals for most farmers.48 Out of the farmers who do not sell any of their cereal crops, most claim the reason to be that they simply do not produce enough, either because of pests, lack of land or since they have a big family to feed.49 Some farmers sell part of their yields provided yields or prices are good.50 A woman selling teff in the market in Bashasha says she does so when she needs to buy other things for the household, otherwise it would have been consumed within the household. In the market in Dusta most farmers have been selling part of their yield for a long time, they normally sell cereals in years with good yield.

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45 Tree interview 6; Tree interview 8; Tree interview 14  
46 CR, female, Wanja  
47 ibid.  
48 CC interview 3; CC interview 5; CC interview 6; CC interview 9; CC interview 11; CC interview 13; CC interview 14; CC interview 15; CC interview 16; CC interview 18; Tree interview 14; CR, mixed group, Wanja  
49 CR, female, Kerebe; CC interview 9; CC interview 11; CC interview 5  
50 CC interview 15; CC interview 3; CC interview 2
It thus generally seems like excess production rather than high prices is the incentive to sell cereals, something implying that market forces are not driving cereal production and only to some extent the sale of them. This was brought up in several group discussions. One group said they sell maize because they produce a lot.\textsuperscript{51} Another group added that even if the price of maize were lower, it would be sold.\textsuperscript{52} A third group stated that they sell sorghum when they produce a lot.\textsuperscript{53}

While market forces cannot be considered incentives to the sale of subsistence crops, they can, on the contrary, be considered to be driving a conversion from subsistence crops (cereals, in this case) to cash crops. These market forces are shaping farmers’ preferences, as well as policy priorities.

At the market, cereals are mainly sold to consumers, rather than to traders. In case some families do not grow all cereals a specific year, they will instead trade one cereal for another in the market.\textsuperscript{54} Rather than being driven by external market forces then, the cereal trade seems to be based on a geographical division of labor. Being a mountainous region, altitudes vary significantly within Gera district. The elevation, and hence the temperature, pose preconditions favorable for specific crops in different locations. Since maize can be grown within a certain temperature range (24-30°C), it is mainly grown in the lowlands and mid-highlands of the district (where Kerebe and Wanja is located). In the highlands (where Dusta is located), barley, wheat, teff and horse beans are predominant. This geographical division of labor can also be observed by how prices vary within the district. Farmers from Kerebe sell maize, teff and sorghum in the nearby market of Kemise, in order to buy beans and wheat.\textsuperscript{55} Since Kemise is located in the mid-highlands, maize is comparatively cheap there, whereas barley and horse beans have a higher price than in the highlands. Even though most of the trade is local, it is important to add that Gera is not an isolated district, which makes the patterns of exchange more complex. While some farmers were selling horse beans to consumers in the market in Dusta, many farmers gathered in a corner of the market to sell their beans to traders. The traders buy beans there for a comparatively low price and then sell them to other traders in Chira.\textsuperscript{56}

According to the timelines on crop prices and statistics from the agricultural office, prices of cereals have increased significantly after the Derg (See Appendix II). In general, farmers do not appreciate the rise in prices, but most importantly, a focus group notes, prices should be balanced between what is sold and bought; coffee prices should be high and cereal prices low.\textsuperscript{57} Prices of crops grown in the highlands and lowlands of the district should also be balanced, they think. The way of thinking about balance in prices is recurrent in many interviews and group discussions. A farmer from Wanja, selling cereals, says that while the price for cereals is high now, it is not equivalent with what they consume like oil, salt and clothes.\textsuperscript{58} It is clear from the discussions that while the farmers are producers of cereals, some are at the same time net-

\textsuperscript{51} CR, female, Wanja
\textsuperscript{52} CR, mixed group, Wanja
\textsuperscript{53} CR, female, Kerebe
\textsuperscript{54} ibid.
\textsuperscript{55} CC interview 8; CC interview 7; CC interview 12
\textsuperscript{56} Market observation, Dusta
\textsuperscript{57} Timelines, male, Kerebe
\textsuperscript{58} CC interview 20
buyers of them (since they want prices to be low). We hence misconceive the situation if we only consider these farmers net-producers of cereals, when many in fact are both producers and net-consumers. This has been a critical factor in the debate following the food price crisis 2006-2008, where small farmers in developing countries were found to be hard hit by the rise in food prices since many of them are in fact net purchasers of food (FAO, 2011:14f).

### 3.1.7 Intensification implemented from above

So far, we have considered how direct decision making at the farm level is carried out. But to gain a full understanding, the scope needs to be broadened. As Blaikie and Brookfield (1987:69) has noted, we need to take into account decisions defining parameters made at other scales, which in turn affect the range of choices available at the farm level. To gain this understanding, district agriculture officials and local development agents based in Gera were interviewed about policy strategies for agriculture and the challenges thereof. In addition, farmers were asked how these policies influence and impose changes on their agricultural practices.

It was found that the agricultural policy, places priority on the expansion of cash crops. Coffee, honey and commercial livestock breeding are products of priority in Gera, according to a district strategy.59 This long-term district strategy (ongoing since three years and supposed to be achieved in five) aims for about 65 percent of the land to be in coffee production, five percent in cereal production, 20 percent grazing land and ten percent other crops.60 In order to reach the goal, coffee cultivation needs to expand (now it is around 45 percent) whereas the cereal and communal grazing land needs to reduce in areal extent.61 In order to maintain food security in the district even though the land in cereal production is to decrease, measures are taken to increase cereal productivity per hectare.62

To increase areal productivity of the cereal land, Gera is currently undergoing a process of agricultural intensification implemented from above. Farmers are advised and sometimes even enforced to undertake a series of measures, such as the introduction of HYVs of maize and wheat together with the application of inorganic fertilizers, namely diammonium phosphate (DAP) and urea, or compost, on maize, wheat, teff, sorghum, barley and beans. The interviews show that these top-down intensification practices are not firmly accepted by farmers in general.

The adoption of new agricultural technologies was often brought up early on in the interviews, by the farmers themselves, something implying that it is a topic of concern as well as the most obvious agricultural change they are currently experiencing. According to a group discussion, inorganic fertilizers have been used in the area since a long time, but they themselves were choosing not to use them.63 Since three years ago however, they have been enforced to use fertilizers on maize, sorghum, teff, wheat and barley.64 Last year, they were registered to buy a minimum amount of 18 kg fertilizers: 12 kg of DAP and 6 kg of urea. Most of the farmers I interviewed started using fertilizers only one to four years ago.

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59 DA interview, 9 March 2012
60 Gera District Agriculture office, March 2012; Gera District Agriculture Office, 3 April 2012
61 ibid.
62 ibid.
63 CR, male, Kerebe
64 ibid.
Among farmers, opinions on the use of fertilizers differ, it was however evident that during the course of the fieldwork the opinions expressed seemed to change somewhat. While many farmers expressed a positive view towards fertilizers in the beginning, more critical and negative views of their use gradually evolved, sometimes from the very same farmers. In one interview we were told that other farmers were afraid to talk to us about the fertilizers because they thought we were from the government.\(^{65}\) This is something that could explain the process of change of interview data that followed after a longer time spent in the field and with the use of more participatory methods. Building a rapport is a process taking time, but it is naturally also affected by the approach of the researcher (the methods used). It was shown that in this way the informants’ confidence to share sensitive information increased by the use of PRA techniques such as group discussions and participatory observations in combination with personal approach and continuous feedback (often in the form of distribution of photos).

Some farmers express that the new variety of maize gives better yield since it is planted with inputs.\(^ {66}\) Among the more negative views, the high cost of fertilizers was often brought up; considering the modest impact on the yield, the fertilizers are not perceived to make up for the costs of buying them.\(^ {67}\) Another farmer is concerned because the increase in yield is not reliable from year to year; she says fertilizers do not work during drought, since the seeds need more water.\(^ {68}\) Some of the farmers, especially after some time of fieldwork, expressed more political views on the issue. One farmer explained that the government tells them to use fertilizers, but he is not convinced that productivity will improve by their use since he does not believe that the government’s advice is based on soil research.\(^ {69}\) This farmer was at the time of the fieldwork not growing new varieties after having observed that fertilizers did not improve his neighbors’ yields. He was however worried he might be forced to use them the approaching season. According to him, an enforcement to use fertilizers is there since four years and it is now getting stronger and stronger, everyone has to buy fertilizers, he explains. Another farmer has tried using fertilizers, but realized that the yield decreased by their use.\(^ {70}\) He explains that the government forces them to use inputs, so they use them when they are ordered to. “If we don’t buy fertilizers, we are imprisoned”; if a farmer refuses to buy them and is observed plowing his field, he will be imprisoned.\(^ {71}\) This farmer himself buys fertilizers, but puts them on the shelf instead of using them. This is a phenomenon that seems common also according to the development agent.\(^ {72}\)

A development agent explained that the HYV of maize, BH660, was used by 21 farmers in Wanja Kersa kebele last year and this year it is to be used by everyone.\(^ {73}\) The HYV seeds are more expensive than the local ones; BH660 of maize is 275 Birr per 12,5 kg, whereas local maize is 50 Birr per 12,5 kg.\(^ {74}\) Additionally, improved seeds cannot be reused, so the farmers

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\(^{65}\) CC interview 11

\(^{66}\) CC interview 2; CC interview 9; CC interview 15

\(^{67}\) CC interview 9; CC interview 17

\(^{68}\) CC interview 13

\(^{69}\) CC interview 20

\(^{70}\) CC interview 11

\(^{71}\) ibid.

\(^{72}\) DA interview, 9 March 2012

\(^{73}\) DA interview, 2 March 2012

\(^{74}\) ibid.
have to buy new seeds every year. Furthermore, the new varieties are never grown without fertilizers. One development agent says it is difficult to convince some farmers to use HYVs and fertilizers.\textsuperscript{75} The other one similarly says: “the farmers are not willing to use the new technology. We try to convince them as much as possible.”\textsuperscript{76} The strategy is to convince farmers to accept their advice by letting a few farmers start, in order to serve as an example, inspiring neighboring farmers once they see the results.\textsuperscript{77} One of the interviewed development agents, claims the farmers are not obliged, but only recommended to adopt the new varieties and fertilizers. However, the development agent from the neighboring kebele gives a different view, one that is more coherent with that of the farmers. He says those who have cereal fields have to buy one bottle of DAP and one of urea, otherwise they are imprisoned.\textsuperscript{78} Accordingly, most farmers do use DAP and urea, while some also use the improved varieties of seeds. Though there is some uncertainty about the degree of enforcement, something that may also differ from kebele to kebele, it is clear that it is a top-down intervention.

Discussing why the farmers are not willing to adopt new techniques the development agent mentions two reasons. First, farmers believe that using fertilizers will deplete soils of nutrients, making them dependent on using inputs every year. Second, there is a muslim leader who does not use it, inspiring the muslim farmers not to use it either. Further the development agent speculates that a third reason could be that fertilizers are expensive, but he thinks it should be okay if the farmers take a loan.\textsuperscript{79}

An important part of this discussion is what alternative or traditional practices farmers have previously been using to improve soil fertility. Crop rotation has already been mentioned, but compost and manure are also used in order to improve fertility. Compost is by many perceived to be better than inorganic fertilizers.\textsuperscript{80} Inorganic fertilizers deplete the soil and therefore have to be applied every year, whereas manure gives a good yield for two to three years, it is explained in a group discussion.\textsuperscript{81} “Manure keeps the natural fertility of the soil and lets it stay for a long time”.\textsuperscript{82} The practice of adding manure to make the fields more fertile is done by tying livestock to one place in the maize field overnight and then shifting them to another spot in the field every third night.\textsuperscript{83}

Another aspect of the agro-technological intensification package has caused a quite unexpected discontent among the farmers. Instead of being sowed by broadcasting, as is done with traditional seeds, the new varieties have to be planted in rows to facilitate an efficient application of fertilizers. In a group discussion this discontent is thoroughly described. When planting in rows, less seeds are sown and bare land is exposed between the plants. The bare land

\textsuperscript{75} ibid.
\textsuperscript{76} DA interview, 9 March 2012
\textsuperscript{77} DA interview, 2 March 2012
\textsuperscript{78} DA interview, 9 March 2012
\textsuperscript{79} ibid.
\textsuperscript{80} CC interview 20; CR, male, Kerebe
\textsuperscript{81} CR, male, Kerebe
\textsuperscript{82} ibid.
\textsuperscript{83} CC interview 20
is not only of no use, but it also facilitates for mammal pests to pass through and thereby increases pest damage.\textsuperscript{84}

While this enforcement from above is applied to agricultural practices with food crops, there is more freedom for farmers to choose when it comes to cash crops.\textsuperscript{85} Hence in the long run, the enforcement could turn out to be a disincentive to grow cereals. “We have lost our land since fertilizers came” a group discussion participant said.\textsuperscript{86}

Several historical examples have showed that these kinds of top-down implementations of new techniques in agriculture seldom are approved by the very farmers who have to carry out the changes. In this case farmers are recalcitrant, not only because of the lack of inclusion in the process of this implementation, but also because of the lack of participation in the process has deepened the discrepancy between the farmers’ and ‘the experts’’ perception of the problem and its solutions. The policy perception that productivity per hectare needs to improve to ensure food security following a conversion to cash crops is not necessarily a concern at the farm-level. In fact, none of the farmers connected their own expansion of cash crops with a concern for not having enough food crops, even if it was taking place on the extent of them. One farmer explained he is not worried about growing less cereals following an expansion of coffee “we produce enough anyways”, he says.\textsuperscript{87} Additionally, productivity improvement would be approached in different ways by farmers than by ‘experts’. While soil fertility is certainly a factor of concern, so are other factors like pest damage, crop disease and drought, which once they occur, cause far more dramatic yield losses. These latter issues are not addressed by the introduced agro-technological methods and therefore many farmers do not consider them very useful.

3.2 Coffee

3.2.1 From a regulated market to market liberalization

Throughout the period under the rule of the Derg, coffee prices remained low, only slightly increasing (See Appendix II).\textsuperscript{88} At the time, coffee was mostly sold locally in Gera or Agaro and the market was regulated. This is confirmed by McCann (1995:183-184) who explains that coffee production, after booming during the 1950s and 1960s, drastically reduced following the 1974 revolution, partly as a result of fixed prices that were significantly lower than world market prices. The low prices are explained by one group to have been because the Derg focused on war, rather than foreign relations and export.\textsuperscript{89} However, at the District Agriculture Office we are told that world market prices always have influenced local coffee prices, but the reason why prices were cheap during the Derg was rather that the coffee was of low quality.\textsuperscript{90}

\textsuperscript{84 CR, male, Kerebe}
\textsuperscript{85 CC interview 11}
\textsuperscript{86 CR, male, Kerebe}
\textsuperscript{87 CC interview 19}
\textsuperscript{88 Timelines, male, Kerebe; Timelines, female, Kerebe}
\textsuperscript{89 Timelines, male, Kerebe}
\textsuperscript{90 Gera District Agriculture Office, 3 April 2012}
The low quality is also mentioned in a group discussion; it is explained to have been low since the coffee was dried on the ground and additionally there were no coffee washing factories in Gera then.91

After the fall of the Derg regime, coffee prices remained low for about four years. The price did not surpass 17 Birr/farazula before 1995. After that year, the price started increasing and in 2002 it was up at 100-120 Birr/farazula.92 Between ten to five years ago, the price remained more or less at the same level.93 Thus, it is only since the last two years (2010-2012) that the prices have increased radically.94 The price at the time of the fieldwork was 20-28 Birr/kg, depending on quality, making 425 Birr/farazula. The drastic rise is primarily attributed to a higher quality of the coffee, which has been achieved by improved methods for postharvest processing and storage.95 An outcome of the quality improvement is that more coffee can be exported, which explains the significant impact it has had on the price.

The general impression of the current coffee price seems to be that although it varies, it is increasing on a long-term basis. The local price for coffee is set by the world market price, although it is additionally influenced by local supply.96 A development agent however noted local small traders may exaggerate world market prices.97 Farmers and local traders in Kerebe get information about coffee prices from other farmers, or from the coffee washing factories in the neighboring village of Sadi.

3.2.2 A dominating cash crop

Coffee is pointed out to be the most important cash crop in several group discussions.98 Accordingly, the most frequently mentioned motive to grow coffee is in order to attain a cash income or because of high prices.99 Coffee has an unchallenged importance as a cash crop: “Coffee is everything to us” a group of farmers said, continuing by explaining how the income from coffee covers all their costs, for e.g. clothes, construction material, livestock, food, soap, oil, spices etcetera.100

A recurrent market observation was that relatively little coffee was sold in the market itself (that is, directly to consumers). Most farmers bringing coffee were lining up in a separate section, in close connection to the market, to sell their coffee to traders. In the smaller markets, only one or a few traders were buying coffee.101 In Chira, the capital of Gera District, where most washing factories are centered, coffee was sold in a large compound where several traders as well as
cooperatives were purchasing coffee from farmers. The price is normally negotiated on the spot, but farmers keep informed about prices before going there. Most traders are connected to factories in Chira. The washing factories prepare and sort the coffee in different standards: “special” for export; and “rejected” for local sale, before the coffee is transported to Addis Ababa.\footnote{Visit to coffee factory, 3 March 2012
Timelines, male, Kerebe
Gera District Forest Department, 3 April 2012
ibid.
ibid.
ibid.
Market observation Dusta}

The dominating role of coffee in Gera has synergy effects on the local economy, not only by providing an income. Many people perceive price fluctuations of other products to be attributed to variations in coffee prices. One group expresses that prices of what they consume generally have increased because of the high price of coffee.\footnote{ibid.} A more specific example comes from the livestock market observation in Bashasha. Towards the end of the market day, disappointed farmers were bringing back the livestock they had brought to sell because prices were found to be too low. Two factors were repeatedly brought up to explain the low price. First, the decline was attributed to the comparatively low coffee price at the moment (which had decreased from 25 Birr the week before, to 20), which in turn caused a higher supply of livestock on the market. Second, the drought was thought to have decreased the demand of livestock because of shortage of livestock forage. The coffee prices seem to, at least to some extent, influence local demand, with spinoff effects on the local economy as a whole. This in itself is a manifestation of coffee’s importance as major cash crop in the district.

3.2.3 Cooperatives – organic coffee

In Gera District, there are two cooperatives, namely: Red Coffee Technoserve, supported by the Bill and Melinda Gates Foundation; and JAICA, a cooperative which is part of a participatory forest management initiative founded by the Japanese International Cooperation Agency (JAICA). The JAICA project is ongoing since three to four years. In the beginning, farmers were reluctant to join the cooperative, but lately they have become more interested in joining, after seeing what the benefits are, and the farmers are now in the process of taking over the management of JAICA.\footnote{ibid.} The coffee sold under the JAICA cooperative is certified by Rainforest Alliance through an internal control system.\footnote{ibid.} The certification only includes coffee growing within the forest boundary (i.e. ‘shade coffee’), in addition a list of criteria needs to be fulfilled, among other things about the forest canopy and prohibition of chemical use.\footnote{ibid.} The cooperatives offer premium prices as well as training for drying and quality improvement. The certified coffee is mainly exported to North America and Japan. Only the quality coffee is exported, but since quality is gradually improving as a result of the training given, more and more can be exported.\footnote{ibid.}

A woman carrying coffee on her way to Dusta market explains that coffee prices are lower in Dusta than in Chira.\footnote{ibid.} The reason, she said, is that the JAICA cooperative is only present in Chira; if JAICA offer 29 Birr for coffee there, then traders will buy it for 28 Birr. JAICA also
buys coffee Kemise, there they give 30 Birr per kg, while traders in the market a few hundred meters away buy a kg for 20 Birr.\textsuperscript{109} Normally however, the difference is not as substantial it seems, but in any case the presence of cooperatives seems to locally increase competition and thus also the bargaining power of the farmers.

### 3.2.4 Policies and trade restrictions

Since cooperatives sell organic coffee, the district policy is that no chemical inputs should be used for coffee.\textsuperscript{110} The policy to keep all coffee organic is confirmed by the farmers, expressing that pesticides are not used for coffee since they are forbidden.\textsuperscript{111} A private trader buying coffee from farmers in the Kemise market, does however not sell coffee as organic even though it is; only the cooperatives are certified.\textsuperscript{112} All coffee in Gera is thus by directives from above grown organically, even though only cooperative coffee has the organic certification.

Moreover, as mentioned in cereal chapter 3.1.7, the District strategy is to increase the land in coffee production significantly. The coffee expansion is to take place in different parts of the agricultural landscape. First; in the deep forest, where coffee will be planted, and second; on farming land (grazing and cereal) where farmers will be planting trees in order to grow coffee.\textsuperscript{113} The coffee expansion is planned to take place in the lowland and mid-highland, but not in the highland, since coffee cultivation is less suitable there.\textsuperscript{114} The farmers themselves also do have an interest in expanding the coffee production according to the development agent, “everybody wants to plant coffee”.\textsuperscript{115}

The area in coffee production per person was in a group discussion reported to have decreased because of population increase (land division among sons), but in total, the land in coffee cultivation is increasing.\textsuperscript{116} The government is additionally giving land rights to large-scale coffee investors, something that has caused conflict over land rights in the area. The farmers claim that the land that has been sold to coffee investors was theirs. It was land that they had inherited from their parents and grandparents, but since it was held through customary property rights it has not been officially recognized, since all forestland formally is government land.\textsuperscript{117} One of the participants in a group discussion himself lost 2,5 hectares and another participant’s parents lost land in two places.\textsuperscript{118}

When going out of the urban center of Chira towards Agaro, a rope is lying across the road. Some people standing by the small house connected to it explain that this is a check-point for vehicles going out from Chira. A license is needed in order for traders to be allowed to trade coffee outside of the district.

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\textsuperscript{109} Market observation Kemise 2
\textsuperscript{110} DA interview, 9 March 2012
\textsuperscript{111} CR, male, Kerebe
\textsuperscript{112} Market observation Kemise 2
\textsuperscript{113} DA interview, 2 March 2012; DA interview, 9 March 2012
\textsuperscript{114} Gera District Agriculture Office, 3 April 2012
\textsuperscript{115} DA interview, 9 March 2012
\textsuperscript{116} Timelines, male, Kerebe
\textsuperscript{117} ibid.
\textsuperscript{118} ibid.
On the market day in Kemise, a farmer previously interviewed in Kerebe came up to me to small talk about the research project; he said he realized what the farmers’ main problem is. The problem, he continued, is that farmers are not allowed to sell their coffee outside Gera district, even though prices are higher in the neighboring districts of Goma and Jimma. When I later asked a small trader about it, he said the price difference between the districts of Gera and Goma is around 6 Birr per kg. This was also confirmed by the development agent who explained that the reason is that Goma is well connected to Jimma with a tarmac road, which means there are more traders there.

Looking further into the coffee trade and its restrictions, a trader in Kemise market was asked to explain the coffee production chain. The coffee he buys in Kemise will be washed in a factory in Chira and then, since he has a trader’s license, he will transport the washed coffee to Addis Ababa, from where it is later exported. The license is needed for any trade across district borders. It is hard to attain a license, the requirement is to have storage capacity and capital assets of at least 300 000 Birr. Local, unlicensed traders also buy coffee from farmers, but they sell it to licensed traders within the district in order to get a small profit only. The trade license is required in order for the district to attain tax income from the coffee. In Ethiopia, washed coffee is taxed (about 500-1.000 Birr per truck, according to a local trader) when it leaves the production district. An unlicensed local trader we talked to explained he feels it is a great problem that it is “practically impossible” to attain a license. Based on statements in several interviews, it can however be assumed that at least some part of the coffee trade across the district boundary takes place informally, by unlicensed traders. The small trader we talked to earlier was once caught trying to bring coffee out of the district and was imprisoned for four days. In the same way, a group discussion participant mentioned he once was imprisoned for three days for having brought coffee to sell in Agaro.

Even though there has been market liberalization in Ethiopia on a national and international scale, farmers and small traders are to a large extent excluded from trade at the local level. While access to the world market has increased, it is confined to a trading elite carrying a license. This in turn decreases the bargaining power of the farmers, as competition is confined to licensed traders within the district.

### 3.2.5 Pests, disease and disease resistant varieties

“During our grandfathers time”, the yields were even better than today. But during the Derg the yields started decreasing, due to the outbreak of the coffee berry disease (CBD), locally called cholera.

It was not only the regulated market and low quality that constrained coffee production during the Derg regime, in 1971 the CBD spread among coffee bushes in Gera with devastating effects

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119 Village small trader, March 2012
120 Market observation Kemise 2
121 Village small trader, March 2012
122 ibid.
123 ibid.
124 ibid.
on coffee production for decades to come (McCann, 1995:184). The fungal disease encountered particularly favorable conditions in Gera, which was the region hardest hit in Ethiopia. It was thus, as mentioned in chapter 2.2.2, a combination of the regulation of the coffee market and the coffee berry disease that caused a dramatic decline in coffee production throughout the time of the Derg. Towards the later part of the Derg rule, a disease resistant variety was developed, which is still in use. It started being distributed in 1981 and the first bushes gave yield in 1985. Since it started being used, coffee production has again been increasing.

When it comes to pest damage, it is not reported to be significantly high for coffee. Sometimes baboons or monkeys break the plants or eat the red (fresh) coffee. In Wanja, where the distance from forest is further, pests seem to be even less of a problem for coffee although monkeys and birds are mentioned as pests there.

### 3.2.6 Labor

The labor needed for coffee depends on season. Yields are reported to be depending on how well the coffee is worked with. Coffee is usually planted by men, then while the plants are young the soil is tilled to improve the yields. Weeding is considered very important and is done by both men and women, after which mulching is performed to add nutrients resulting in more branches and beans. The coffee is sometimes also fertilized with manure, and pruned, to enhance growth. The most labor-intensive period for coffee is harvest time, those who have a lot of land then contract additional labor for a payment of 1 Birr per kilo harvested. After harvest the coffee is dried, unless it is sold fresh. During the most intensive harvesting period, both men and women harvest coffee, but the harvest season lasts for five months and in the end of it, only women and children pick dry coffee from the ground.

### 3.2.7 Food security

The importance of coffee for farmers’ livelihoods is viewed differently by the male and female focus groups. The way the views differ, tells us a lot about the gender contract for coffee and the sale thereof. The female focus group rank coffee very high for consumption, even though the consumption of coffee itself is not given particular importance (See Appendix III). They explained they would like to classify coffee as a subsistence crop anyways, because to them, the main importance of coffee is to sustain food security. Looking further into the matter, we need to acknowledge the different ways in which coffee is sold by men and women. Women bring coffee in small quantities to the market to sell it in order to buy food or household products such

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125 ibid.
126 Gera District Agriculture Office, 3 April 2012
127 CR, male, Kerebe; CR, female, Kerebe
128 CR, female, Wanja; CR, mixed group, Wanja
129 Timelines, male, Kerebe
130 CR, male, Kerebe; CR, female, Wanja; Timelines, male Kerebe; CR, female, Kerebe
131 CR, female, Wanja; CR, female, Kerebe; CR, male, Kerebe
132 CC interview 14
133 CR, female, Kerebe; Tree interview 4
134 CR, female, Kerebe
as cereals, spices, soap or oil. In this way, bringing coffee to the market is the same as bringing something to pay with. When it comes to coffee as a cash crop, which is also ranked high by the female group, they explicitly mean the coffee sold by men. Even though both men and women sell coffee, it is sold in different ways. Coffee as a cash crop implicates a longer time perspective; this concept involves the larger quantities of coffee sold to traders in connection to the main harvest, from which the income generated is either saved in some form (as construction material, furniture, livestock), or used to pay land rent. The conventional difference between a cash crop and subsistence crop would be if the crop itself is consumed or sold in the market. However, with the distinction made by the female focus group, whether it is a cash crop or a subsistence crop depend on the purpose of its sale. The conclusion we can draw from this way of seeing it, is that coffee’s importance in sustaining household food supply, as compared to the importance in providing cash income, is gender coded.

### 3.2.8 Consumption

As can be derived by the importance of coffee as a cash crop, its importance for consumption is subordinate. However, since coffee is a crop endemic to the area, its consumption is nevertheless an integral part of the culture in this part of Ethiopia. To the informants in Wanja, who have migrated from the northern regions of the country, this is not as apparent as for the population with a longer settlement history in the area. Coffee is not consumed much in Wanja, in fact not at all by one of the focus groups. They say there is an ongoing debate among their religious leaders (Orthodox Christian) about whether or not coffee should be allowed, why they decided not to drink coffee. Nevertheless, some of the migrants claim they did move to Gera with the purpose of growing coffee for cash.

While consumption cannot be seen as a driver to grow coffee, these cultural differences are clearly a reason to why the migrants place less emphasis on coffee cultivation than cereal cultivation (see chapter 3.1.5), as compared to those who have a longer history in the area, even though both groups do grow both cereal and coffee.

### 3.2.9 Character of coffee expansion: shade as potential driver

An expansion of the coffee cultivation is underway, but we have not learnt in what way and where the expansion is taking place. A long history of cultivation in the region, access to the world market (market liberalization and quality increase by training), increasing prices, the function of ensuring household food supply, policy priorities, disease resistant varieties, little pest damage and the cultural anchoring of the product, all constitute factors driving the choice to grow coffee. So far, we have dealt mainly with how external driving forces are driving a systematic expansion of coffee growth. But one aspect of the coffee expansion is still missing, an aspect not included in the narrative on crop choices and therefore not often mentioned in interviews. It nevertheless became clear, during the transect walks and tree interviews, when

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135 ibid.
136 ibid.
137 CR, mixed group, Wanja; CR, female, Wanja
138 CR, mixed group, Wanja
139 CC interview 20; Market observation Kemise 1
questions where asked about specific coffee fields and bushes using them as artefacts of inquiry, that external forces alone could not explain the expansion. Regardless of external incentives, or perhaps more correctly in combination with them, a somewhat incremental expansion of coffee cultivation is taking place, in the pace of tree growth (and appearance of shade) in the agricultural landscape.

**Figure 6:** Incremental expansion of coffee. Here, coffee has been planted in the shade of a tree fence (red leaves) designated for a khat field.

During the fieldwork, I encountered numerous examples of ongoing coffee expansion, all distinctive, depending on each farmers individual decisions in the course of the their everyday agricultural practice. Sometimes trees were planted or retained with the purpose of growing coffee in their shade; in other cases coffee was planted in the shade of trees grown primarily for other purposes (For the latter, see Figure 6). In either case, the different forms of expansion observed were often found to be gradual. In Table 2, each specific example of coffee expansion has been placed along a systematic-incremental gradient.

Doolittle (2001) argues it is in fact in this way small-scale agricultural change generally occurs, the similarity with his observation of the orange tree expansion on expense of maize in Mexico is striking. He explains that smallholders do not have the financial capacity to at once abandon dependable subsistence crops for commercial crops (perennials) that cannot provide income until after years. Instead, smallholders tend to “keep their subsistence crop in place and plant, among the corn, as many orange saplings as they can afford to purchase each year. Over time the orange trees will increase in both number and size. Concomitantly, the number of corn plants will diminish” (Doolittle, 2001:428).
Table 2: Coffee expansion along systematic-incremental gradient

<table>
<thead>
<tr>
<th>SYSTEMATIC</th>
<th>⇒</th>
<th>Gradual expansion by purposive tree growth</th>
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<tr>
<td>Expansion by purposive tree growth</td>
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<td>Coffee field expanding into a maize field,</td>
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<td>Expansion by occurrence of shade in agricultural land</td>
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<td>in the pace of tree regeneration.</td>
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<td>Trees planted in former grazing land, in order</td>
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<td>Coffee recently planted in the shade of a tree</td>
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<td>to grow coffee.</td>
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<td>fence for khat, additional tree seedling retained</td>
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<td>inside the field to provide shade for coffee.</td>
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<td>Fast-growing exotic tree species and coffee,</td>
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<td>Fruit trees in the middle of a maize field</td>
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<td>recently planted in home garden.</td>
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<td>initially planted to provide fruit, but after</td>
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<td>inhibiting maize growth in their shade, coffee</td>
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<td>Trees retained in a grazing land, in order to</td>
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<td>A row of trees planted in cereal field after</td>
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<td>grow coffee instead.</td>
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<td>an inheritance division. Coffee subsequently</td>
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<td>planted in their shade.</td>
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<td>Inconveniency of removing substantial tree</td>
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<td>regeneration in a sorghum field, causing</td>
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<td>farmers to retain the trees and plant coffee</td>
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Sources: CC interview 3; CC interview 5; CC interview 11; CC interview 19; CC interview 20; Tree interview 1; Tree interview 11; Tree interview 12; Tree interview 17.

While an interesting question from a conservation biology perspective would be whether coffee expansion is taking place by enhancing tree growth in the agricultural landscape (i.e. as a reforestation or afforestation process) or in natural habitats (i.e. as a deforestation process), this cannot be answered in the present thesis, since the large-scale systematical expansion of coffee investors is out of scope of this thesis. The thesis can however provide an insight into the dynamics behind the coffee expansion and associated tree growth that is taking place in the agricultural landscape of the small-scale farmers.

3.3 Khat

3.3.1 The rise of a new cash crop

Khat has been consumed traditionally in Ethiopia for a very long time for medicinal purposes, as well as in religious ceremonies.\(^{140}\) As a traditional socializing drug in Ethiopia, the chewing of its leaves “probably pre-dates the use of coffee” (Balint et al. 2009:605). Nevertheless,
during the Derg, not more than five to six households in Kerebe were growing khat and its use was not widespread. The price for a bunch of khat at that time was very low (0,2-0,5 Birr) and in case it was not sold in the market it would simply be given away for free. But ten years ago a change took off, traders started coming to buy khat and people consequently drew more attention to the crop. The initial increase in prices was slow. Five years ago the bunch was three Birr, subsequently “Birr by Birr” the price went up until it skyrocketed the last two to three years. While the consumer price was 20 Birr last year, it had at the time of the fieldwork increased to 50 Birr in Kerebe and 70-100 Birr in the markets in Sadi and Chira. The District Agriculture Office in Gera make a similar estimation of the past price development; at the time of the interview 100 kg was 1.120 Birr, nearly twice as much as last year’s 600 Birr / 100 kg.

How did this striking price increase come about then? Two crucial factors were raised during a focus group discussion: more people chew khat now; and it has started being exported. While consumption in Ethiopia traditionally has been confined to muslim men, it now involves a much larger group. It is explained that nowadays everyone in the village chew khat, whereas only a few did when it started being grown, around 20 years ago. Recalling the time of the Derg, a focus group explained that back then everyone was drinking alcohol. Those who chewed khat were considered bad or jobless people, hence not so many people chewed it. The restrictive attitude against khat did not change directly with the fall of the Derg, rather it was consistent well into the 1990s, they continue. Nevertheless there are several reasons to why people now prefer khat over alcohol: when chewing khat it is possible to work as opposed to with alcohol; awareness of religious restrictions on alcohol consumption has increased; and khat does not cause an aggressive behavior like alcohol does.

Khat is nowadays by many considered the second most important cash crop after coffee. The most common explanation to why khat is grown is accordingly attributed to its high price or potential to generate cash. In one interview it was even pointed out that the price is better than for coffee. Also farmers who are not growing khat recognize the price advantage saying “the price of khat is very good and those who have it can buy whatever they want with their ‘khat-Birr’” (i.e. the cash income from khat).

141 Timelines, male, Kerebe; CC interview 9
142 ibid.
143 Timelines, male, Kerebe; DA interview, 2 March 2012
144 Timelines, male, Kerebe, Market observation Chira
145 Gera District Agriculture office, March 2012
146 Timelines, male, Kerebe
147 CC interview 7
148 Timelines, male, Kerebe
149 ibid.
150 CR, male, Kerebe; CR, female, Kerebe
151 CC interview 1; CC interview 2; CC interview 3; CC interview 12; CC interview 13; Timelines, male, Kerebe; CR, male, Kerebe
152 CC interview 4
153 CR, mixed group, Wanja
3.3.2 Market characteristics

Khat was both sold and bought in all markets where observations were carried out, normally the khat stands would be located in a section a bit separate from the rest of the market. The lines were crowded by men queuing to buy khat from traders selling it side by side. Even though women do chew khat, they were seldom observed either buying or chewing it in public.

The traders we talked to, out of whom only one had sold khat for more than five years, all claimed they had increased their capacity since they started.\textsuperscript{154} Most purchase khat both from farmers bringing it to the market, as well as directly from farmers’ fields. One trader explained that the price is lower when khat is bought directly from the fields. This was confirmed by a farmer carrying khat on his head on the way to the market in Chira, about to sell it to traders at the market. According to him, the price is a lot higher if he sells it there instead of having traders buying it from his field\textsuperscript{155}. When sold at the field, the price is negotiated before harvest, based on area rather than the actual quantity. Nevertheless, an advantage of selling khat in the field is an increased bargaining power with the possibility of delaying harvest in case of low prices.\textsuperscript{156}

A development agent explained that if khat is more expensive in Agaro, it will be taken there, otherwise local traders buy and sell it locally.\textsuperscript{157} A trader buying khat in Dusta sells most of it in Chira. A farmer however said traders sell his khat in Jimma and Agaro.\textsuperscript{158} When I ask khat traders in Jimma if they ever buy khat from Gera they laugh and say, “the only things we get from Gera are coffee and honey”. It thus seems they do not need to go very far to get a hold of khat. They also claimed that khat from this region is not exported, that is rather the khat from Hararghe. The khat trade in Gera thus seems to be local in extent. It is mostly confined to the district, even if small quantities are sold to neighboring districts in case of low supply.

The local characteristic of the market is confirmed by perceptions of what determines khat prices. The farmers describe khat prices as generally high, but varying.\textsuperscript{159} It is explained that prices vary according to local supply, which in turn is connected to the rains; the variation is significant, from 50 Birr in the dry season to 20 Birr in the rainy season.\textsuperscript{160} The price volatility is however not expressed as a problem, a possible reason could be that price predictability is high, since it is driven by local factors.

3.3.3 Providing a continuous income

Another driver, in one way connected to market drivers, but rather a measure of the \textit{productivity} of khat become apparent when the relative importance of coffee and khat as cash crops was compared. While coffee is uncontested as the most important cash crop considering the quantity

\textsuperscript{154} Market observation Bashasha; Market observation Kemise 2; Market observation Dusta; Market observation Chira
\textsuperscript{155} Market observation Chira
\textsuperscript{156} CC interview 3
\textsuperscript{157} DA interview, 2 March 2012
\textsuperscript{158} CC interview 3
\textsuperscript{159} CC interview 3; CC interview 1; CC interview 9
\textsuperscript{160} Gera District Agriculture office, March 2012; CC interview 3; CC interview 9
produced, khat is especially appreciated because it gives yield three times a year.\textsuperscript{161} Khat thus provides a more even income throughout the year, than the other cash crops. Similarly, a development agent analyzed why khat nowadays is grown in virtually all home gardens; it is a combination of the high price and that it can be harvested three times a year.\textsuperscript{162} Another productivity advantage with khat is that it gives yield relatively fast compared to other perennials.\textsuperscript{163}

### 3.3.4 Less vulnerability: no pest damage

One driver, confined to the local context of the agroecology, is khat’s lack of pest damage as compared to other crops, especially cereals and vegetables. In fact, it is stated in many interviews that khat has no mammal pest damage at all.\textsuperscript{164} Goats and sheep are however fond of khat leaves, why it is always grown within fences. Substantial pest damage constitutes a disincentive to grow some crops and hence drive a conversion to crops less prone to pest damage, like khat. Accordingly, numerous observations of newly planted khat trees were on land in home gardens previously been devoted for cereal crops. Moreover, khat is not vulnerable to drought, which is a factor one focus group held as the reason making it a more important cash crop than avocado.\textsuperscript{165}

### 3.3.5 Importance of own consumption

A very strong driver that has already been mentioned is the increased consumption. Here market demand is however considered a market force, why another aspect of consumption will be dealt with in this section, namely the importance of the farmer’s personal consumption of khat in the decision to grow it. Though personal consumption is clearly subordinate to market forces as a driver of expansion, its importance cannot be neglected. While ranking the importance of khat according to different criteria, among those consumption and cash, one group expressed that they do consume khat, but it has a lower priority since they do not actually need it, but are addicted.\textsuperscript{166} Another group expressed in a similar way, that consumption is important only for those who are addicted.\textsuperscript{167} Normally khat is grown for cash, they continue, and even in case it is grown for consumption the bulk of it is sold. In the individual interviews, some farmers explicitly say they grow khat for their own consumption.\textsuperscript{168} One farmer explains he started growing khat for own consumption as well as for decoration 22 years ago, but since ten years ago he has been growing it for the market since demand has increased.\textsuperscript{169} The dynamics behind khat cultivation and the importance of consumption has evidently changed the role of the crop. What was previously a crop grown to a limited extent for own consumption, with practically no market, has now become a leading cash crop in the area.

\textsuperscript{161} CC interview 4; CC interview 3; CR, female, Kerebe; CR, male, Kerebe; Timelines, male, Kerebe
\textsuperscript{162} DA interview, 9 March 2012
\textsuperscript{163} CR, male, Kerebe
\textsuperscript{164} CC interview 3; CR, male, Kerebe; CR, female, Kerebe; CR, mixed group, Wanja
\textsuperscript{165} CR, male, Kerebe
\textsuperscript{166} ibid.
\textsuperscript{167} CR, female, Kerebe
\textsuperscript{168} CC interview 13; CC interview 14; CC interview 9
\textsuperscript{169} CC interview 4
The importance of the farmers’ own consumption of khat becomes particularly clear when looking at the few farmers who do not grow khat. One farmer, who has migrated from a different part of Oromia region, says he is not growing khat because then they will start chewing it, which would not be good since it causes problems like addiction and loss of appetite. Similarly, the participants in the group discussions in Wanja, who are not either originally from the area, do not consume khat themselves because according to them “it is not their culture” and they therefore grow very little. Looking deeper into why it is not part of their culture, they explain that their religion, Orthodox Christianity, tells them that khat is not good. While consumption is not driving production, the relationship between khat production and farmers consumption seem to be the reverse; the ones who consume khat also grow it, whereas the ones who do not consume khat grow very little or nothing at all.

3.3.6 High but continuous labor intensity

An aspect beyond non-consumption is added to why the farmers in Wanja are not growing khat. They consider khat to be too labor intensive and say they do not have time for it because they need to work with cereal crops. The other focus groups agree that khat requires comparatively much labor in total terms, but the character of the labor need is continuous (including weeding and tilling every 1-2 weeks), why it does not compete with the labor need for other crops.

When it comes to gender, it becomes clear that not only consumption in public is confined to men, additionally the cultivation of khat is described as “the duty of men”. The focus group further explains that women can help out when the plants are small, but when they are big only men work with it. Khat is also exclusively sold by men since it is bought by traders.

3.3.7 Little policy intervention

From the administration side, the expansion of khat is seen as problematic, but it is neither encouraged nor discouraged. According to the development agents, the government’s view is that the increased consumption is bad, but at the same time they recognize that it is culturally accepted and provides an important livelihood opportunity for the farmers, why they simply “keep quiet” about it. As mentioned in the literature review (see chapter 2.2.2), the reasons why the government does not intervene in khat production seems to be twofold. On the one hand, there is a combined concern that khat expansion might be threatening food security and that its consumption causes social and health problems. On the other hand, khat is a major export item, thus contributing substantially to economic growth. The lack of policy for khat, nevertheless tells us something about the character of the expansion, which is exclusively a

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170 CC interview 8
171 CR, female, Wanja
172 CR, mixed group, Wanja
173 CR, female, Wanja; CR, mixed group, Wanja
174 CR, male, Kerebe; CR, female, Kerebe; Tree interview 17
175 CR, female, Kerebe
176 CC interview 7
177 DA interview, 9 March 2012
178 DA interview, 2 March 2012; DA interview, 9 March 2012
bottom-up response to market forces, local preferences and favorable crop characteristics (continuous labor and income).

### 3.3.8 Effects on the landscape

It is clear that khat cultivation is in a process of expansion. In order to analyze how this expansion interacts with and transforms the local agroecology, it is of importance to know where the expansion is taking place. During the fieldwork, khat was only observed in home gardens, which means it was confined to small fields within fences, something that was confirmed in many interviews. Various explanations for this were brought up. One is to protect khat from being eaten by goats, while another was because of the risk for looting. A development agent similarly explains that khat is grown in home gardens since farmers are afraid of theft, but he also adds that khat needs continuous watering and mulching. The continuous character of the labor in combination with the need for protection from looting and livestock thus so far confines khat expansion to small fields in home gardens. But this could also be a sign that khat is in its initial state of expansion, as Feyisa and Aune (2003:186) note, “normally khat cuttings are first planted around the homestead and expand from there to the rest of the farmland.” Moreover, in Wondo Genet, where khat production is more widespread, it has been observed to drive a resettlement pattern from nuclear to dispersed settlements since khat is a perennial and requires protection (Dessie & Kinlund, 2008). In Kerebe, khat production is instead nuclear, confined to where the ‘original’ settlements are (since the Derg villagization). Thus so far, the expansion of khat is confined to home garden production, whether it will expand further or not, depends on the future of the khat market in combination with the crop’s relative importance compared to other major cash crops in the area.

Furthermore, the fact that khat production is only grown in home gardens confines the expansion to mostly be replacing home garden cereal fields or land used for livestock (it was however not observed to be grown on the extent of the home garden vegetables). It is hence worth noting that khat expansion is not taking place on the expense of coffee, since the two crops are grown in different parts of the agricultural landscape, whether there are indirect effects on coffee however remains unanswered. An additional aspect of the landscape change induced by khat is that it is grown surrounded by tree fences. This aspect will be explored in detail in chapter 4.5 on landesque capital.

### 3.4 Avocado

#### 3.4.1 From top-down to bottom-up

When it comes to avocado, the story of crop choices takes quite a different turn. The introduction of avocado, as opposed to most other crops, has an exact date. It was the result of a
development program by Save the Children Norway, based in Kemise, starting from 1985. Among other activities to improve the livelihoods of the farming families, avocado seedlings were distributed for free. A focus group recalled, “they told us, ‘this is avocado, take it and plant it!’” Avocado was initially unknown to the farmers and the advice was first met with skepticism. They did not see the reason to grow it when they would have to wait seven years until it gave fruit and additionally there was no local market for it at the time. Nevertheless, some farmers started growing the tree. Seven years later, the first trees eventually gave yield and local people gradually became familiar with the fruit. A market slowly evolved and local consumption started increasing. Once the tree gave fruit and farmers could see that it provided an income to those of their neighbors who had initially agreed to plant the tree, more and more farmers became interested and planted avocado by imitating them. The cultivation of avocado thus started as a result of external advice, initially met with reluctance from the farmers side, but increasingly adopted as the benefits of the crop became apparent and a market started evolving. The cultivation of avocado is still encouraged by development agents and the advice is said to be the reason why some farmers start growing it now too.

### 3.4.2 An emerging market

Avocado has now been a well-known fruit among farmers since the last six years. Nowadays, avocado production has increased to become one of the most important cash crops in the area (Table 1). It is ranked the third most important cash crop after coffee and khat by the focus groups in Kerebe and the second most important in Wanja, where the group participants chose not to rank khat. One of the foremost reasons to grow avocado is because it has a good price and that market demand is increasing.

In the villages, avocado is nowadays consumed with injera or bread and sugar. In combination with the increased local consumption, urban demand has grown, with cafés now serving avocado juice (particularly delicious in combination with mango!). But avocado producers and traders are not only providing a juice ingredient for the growing urban middle class, the fruit is also requested from the beauty industry as the main ingredient in a product called ‘hair food’. Ten years ago, avocado started being sold, since then the price has increased and is still, as the fruit gets more and more well-known. Avocado was five Birr per kg last year and now it has increased to seven.

Traders come to the villages and pick avocado from the whole tree at a given price. The fact that avocado does not have to be harvested before sale gives an opportunity to wait if the price

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183 CC interview 9; CC interview 15; DA interview, 9 March 2012
184 Timelines, male, Kerebe
185 Timelines, male, Kerebe
186 Timelines, male, Kerebe; CC interview 8
187 DA interview, 9 March 2012; CC interview 8
188 Timelines, male, Kerebe
189 CR, male, Kerebe; CR, female, Wanja; CR, mixed group, Wanja
190 CC interview 8; CC interview 15; CC interview 14; CR, mixed group, Wanja
191 Timelines, male, Kerebe
192 ibid.
193 Gera District Agriculture office, March 2012
suggested by the trader is too low, something that increases bargaining power of farmers. While there is no institutional cooperation among farmers on price negotiation, they do ask around what price other farmers get before sale.\textsuperscript{194}

3.4.3 Productivity: a perennial crop

The price of avocado is said to be as good as for khat and coffee, but it has less importance as a cash crop since is less is produced.\textsuperscript{195} As opposed to the more continuous income provided from khat, or the long harvest season for coffee, avocado gives a lot of income at once - a single tree can give up to 6,000 Birr, which an appreciated factor in some of the group discussions.\textsuperscript{196} On the other hand, a constraint is that it takes seven years until avocado trees give fruit.\textsuperscript{197} Some, however, consider the fact that the tree is perennial an incentive, since it gives yield for many years.\textsuperscript{198}

3.4.4 Low labor intensity

As for most perennial tree crops, growing avocado does not require much labor. As a seedling however, it requires protection from livestock and porcupine as well as application of compost.\textsuperscript{199} Both men and women work with avocado.\textsuperscript{200} The low labor intensity is taken as an incentive when the crops are ranked in the focus group discussions, since growing avocado does not compete with labor needs for other agricultural activities.

Even though there seems to be no clear gender contract in the care of the trees, it is there when it comes to the sale of avocado. Avocado, as other cash crops, is sold by men since traders buy them.\textsuperscript{201} In the markets in Bashasha and Kemise, avocado was however only observed to be sold by women.\textsuperscript{202} This could imply that the sale of avocado is gender coded in a way similar to coffee; confining the sale of the bulk to men; while smaller quantities, picked before and after the main harvest, sold to local consumers rather than traders, are sold by women.

3.4.5 Risk aversion becoming a risk

Pests are generally not perceived to be a problem with avocado, except when the tree is young. Otherwise only birds and baboons eat the fruit when it is mature.\textsuperscript{203} The lack of pest damage to avocado is therefore another incentive to grow it.

\begin{flushleft}
\textsuperscript{194} CC interview 9
\textsuperscript{195} CR, female, Kerebe
\textsuperscript{196} CR, female, Kerebe, CR, male, Kerebe
\textsuperscript{197} CR, male, Kerebe
\textsuperscript{198} CC interview 8
\textsuperscript{199} CR, male, Kerebe; CR, female, Kerebe; CR, mixed group, Wanja; CR, female, Wanja
\textsuperscript{200} CR, female, Kerebe
\textsuperscript{201} CC interview 7
\textsuperscript{202} Market observation Bashasha; Market observation Kemise 1
\textsuperscript{203} CR, female, Kerebe
\end{flushleft}
On the other hand, there are several risk factors implied in the cultivation of avocado. Avocado has become subject to a disease, which is causing concern among farmers.\textsuperscript{204} It is also reported that the wind sometimes breaks the trees and that it is vulnerable to drought.\textsuperscript{205}

### 3.4.6 Consumption

Even though avocado is consumed by some, it is rather consumed because it is available than the reverse. One restriction for consumption is that it cannot be stored.\textsuperscript{206} The trees are however used for construction once they do not give fruit anymore.\textsuperscript{207}

### 3.4.7 Effects on the landscape

Avocado trees are mostly found in homestead compounds, even though they are sometimes also found in connection to fields in the agricultural landscape. In one home garden, an avocado tree has been planted in a spot where the family is planning to build an additional house.\textsuperscript{208} The trees are generally planted near the house or in the fences around the homestead compound as wind protection as well as to provide shade. Another reason for growing avocado trees around homesteads is that the trees need the particularly fertile soils where livestock is tied at night.\textsuperscript{209} It is additionally good to have the trees close to the house to protect it from livestock and pests.\textsuperscript{210}

The thick and relatively big leaves of avocado trees cause a lot of shade, making the trees unsuitable for intercropping. In a crop ranking discussion, the productivity of avocado was discussed by a thorough calculation of the income it gives compared to the land it takes into account. Even though the shade was estimated to impede growth of other crops within a radius of five meters, it was concluded that avocado in comparison requires very little land.\textsuperscript{211}

### 3.5 Eucalyptus

#### 3.5.1 History - a tree for forest protection

Eucalyptus was first introduced in Ethiopia in 1894-1895, it started being cultivated in the surroundings of Addis Ababa as a solution to a shortage of fuelwood and has since been of the main tree species planted in the central highlands of Ethiopia (Pohjonen & Pukkala, 1990). Since Gera is a highly forested district in comparison, the expansion of eucalyptus has historically not been an as significant feature in this part of the country.
Even though there have been eucalyptus plantations in the surrounding areas for a longer time, it was not until ten years ago that farmers in Kerebe started planting eucalyptus.\textsuperscript{212} Eucalyptus was introduced when the forest was protected and trees could not be cut for construction there anymore.\textsuperscript{213} While explaining that the focus group however emphasized that it is not exclusively because the forest was protected that eucalyptus is grown, since the protection itself does not impede them from cutting trees anyway. Ultimately it was rather because they themselves wanted to preserve the forest that they started growing eucalyptus, “the forest brings us rain” one participant explained.\textsuperscript{214}

### 3.5.2 Changing policies

As mentioned, eucalyptus was initially introduced in Gera as a measure to prevent deforestation. Eucalyptus seedlings were distributed to farmers for free. However, as negative effects of eucalyptus on soil and water were recognized, the distribution stopped and farmers were instead discouraged to grow eucalyptus. According to a development agent, eucalyptus is a “big challenge”.\textsuperscript{215} This is because even though it depletes soils of nutrients and water, it is at the same time useful as a source of income for farmers as well as for construction. But the development agent added that the expansion of eucalyptus now has stopped since other crops like coffee and avocado are more profitable. Additionally farmers are not allowed to plant eucalyptus in farming land because of its effects on the soil, it is advised only to be planted where there is no plowing.\textsuperscript{216} In the interviews this is e.g. mirrored by explanations to why eucalyptus is not grown based on the fact that it needs an exclusive field since it demands a lot of water and nutrients.\textsuperscript{217} If a farmer grows eucalyptus to the extent it affects other fields, neighbors will report it and it will be removed, according to a development agent.\textsuperscript{218}

### 3.5.3 Preferred for construction

In the crop ranking discussions as well as interviews, there is agreement that eucalyptus is most of all good for construction, while branches and leaves are used for fuel.\textsuperscript{219} It is even stated that a house is never built without eucalyptus. Eucalyptus is particularly suitable for construction since it is straight and fast-growing.

### 3.5.4 Market

In the case of eucalyptus, the market situation differs somewhat from that of other cash crops. Eucalyptus is mainly sold locally, to other villagers who are constructing.\textsuperscript{220} When the farmers

\textsuperscript{212} Timelines, male, Kerebe  
\textsuperscript{213} CC interview 11; Timelines, male, Kerebe  
\textsuperscript{214} Timelines, male, Kerebe  
\textsuperscript{215} DA interview, 2 March 2012  
\textsuperscript{216} DA interview, 9 March 2012  
\textsuperscript{217} CC interview 5; CC interview 9  
\textsuperscript{218} DA interview, 2 March 2012  
\textsuperscript{219} CR, male, Kerebe; CR, female, Kerebe; CR, female, Wanja; CR, mixed group, Wanja; CC interview 3; CC interview 4; CC interview 8; CC interview 16  
\textsuperscript{220} CR, male, Kerebe; CR, mixed group, Wanja; CC interview 3; CC interview 8
started growing eucalyptus ten years ago, the price was low, around two to five Birr for a small pole (the measure is shown by hand), although one of the group participants recalls he even got it for free when constructing his house at that time.\textsuperscript{221} Five years ago, the price had increased to five Birr per pole and now it is at least ten Birr.

Those who grow a lot, however, can sell their eucalyptus to coffee investors or to traders who take it to towns like Agaro, Jimma or the central part of Ethiopia.\textsuperscript{222} Traders have recently started buying eucalyptus; they come from Agaro and buy it by the road.\textsuperscript{223}

One focus group explains that they sell their eucalyptus in situations when they face economical problems.\textsuperscript{224} They consider the planting of eucalyptus a long-term investment since it has a long life and may be inherited. In this way, eucalyptus, since it is a tree and the value of it increases at it grows, is by some perceived as a type of economical insurance or investment that can be sold at unexpected times of need. In terms of economical importance, it is perhaps more similar to livestock than other cash crops like coffee, khat and avocado, which give yearly yields and therefore have more liquid income characteristics. The traders are however not coming everywhere, in Dusta, which has a more peripheral location in the district, eucalyptus is exclusively sold within the village, something that explains why the farmer interviewed there will not expand, saying there is no infrastructure for it.\textsuperscript{225}

Eucalyptus is however seen as a good cash generator, giving a good income at once. Eucalyptus is ranked the third most important cash crop by a group in Wanja (the one not ranking khat), after some discussion it was decided it should be after avocado.\textsuperscript{226} Usually, the argument to rank avocado higher was that it gives income for several years, whereas eucalyptus only does when it is cut. Even though eucalyptus is fast-growing when compared to other trees for construction, it is on the contrary considered to be giving an income after a long time when compared to other cash crops. The other groups confirm the view, saying that since it takes at least three years until it can be sold, why it is not as important as coffee, khat and avocado.\textsuperscript{227} One farmer accordingly describes that he does not devote time to eucalyptus since he earns more on coffee and avocado.\textsuperscript{228} It seems like the possibility to grow other, possibly more income generating cash crops, has slowed down the expansion of eucalyptus in this area as compared to elsewhere in the country.

\textsuperscript{221} Timelines, male, Kerebe
\textsuperscript{222} CR, male, Kerebe; CR, mixed group, Wanja
\textsuperscript{223} CR, mixed group, Wanja
\textsuperscript{224} ibid.
\textsuperscript{225} CC interview 17
\textsuperscript{226} CR, mixed group, Wanja
\textsuperscript{227} CR, male, Kerebe; CR, female, Kerebe
\textsuperscript{228} CC interview 8
### 3.5.5 Additional benefits: low labor intensity and little pest damage

Eucalyptus requires very little labor; the soil is tilled before planting, then a fence is raised around it to protect it from being trampled by livestock when it is small.  

Eucalyptus is referred to as a ‘male crop’ by the female focus group in Kerebe.  

Even though most groups dedicate little labor to eucalyptus, one group in Wanja say they do not grow eucalyptus for the reason that it is too labor demanding, competing with the labor they need to put on cereals.  

Considering the other groups’ reports, this statement probably says more about this groups’ higher priority for labor-demanding cereal crops than it does about the labor intensity of eucalyptus as such (see chapter 3.1.5).

As mentioned earlier, it is said to be part of an ongoing process in the village to convert to cash crops, among them eucalyptus, because of the pest damage on cereals. Eucalyptus has comparatively little pests, except that it is sometimes eaten and broken by colobos monkeys, especially when the trees are small.

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229 CR, female, Kerebe; CR, male, Kerebe 
230 CR, female, Kerebe 
231 CR, female, Wanja 
232 CR, female, Kerebe 
233 CR, male, Kerebe; CR, female, Kerebe; CR, female, Wanja
4 Tree management in the agricultural landscape

4.1 Landesque capital as an analytical tool

This section explores how the concept of landesque capital can be used as an analytical tool to understand tree management in relation to long-term agricultural productivity in Gera. As noted earlier, a focus of previous research on landesque capital has been on physical structures in the agricultural landscape, whereas the concept’s relation to ecosystem management, what we may term ‘green’ landesque capital, has been much less explored (See chapter 2.1.1). Due to the lack of previous research on green landesque capital, there is little guidance as for how to explore the concept empirically. Using landesque capital as an analytical tool to explore the agricultural management of trees involves more than the identification of management practices enhancing long-term agricultural productivity and calling them landesque capital. The purpose is to gain an understanding of how and why landesque capital is created, whether it is valued as such by the land managers, as well as to discuss how the concept is distinctive from other related concepts such as ecosystem-services and natural capital.

4.2 Trees in the local agro-ecological landscape

The agricultural landscape in Gera exposes a mosaic of different features of tree use. As Brookfield (2001:51) notes, farmers commonly “recognize different sets of field types, widely repeated between farms and often over a large area”. The field types are usually grouped within areas of similar ecology and normally each type is dedicated to a specific set of crops. Based on the interviews and observations during the fieldwork, an arbitrary classification of the agricultural landscape in Gera was made as follows. First, there is the forested landscape, dedicated for cultivation of shade coffee. Second, the forest plots are altered with open fields dedicated for cereal crops, commonly featuring a few single trees dispersed in the fields. Third, there are home gardens, either dispersed in the landscape or centered along straight roads as a result of the Derg villagization in 1987. The home gardens are surrounded by tree fences protecting the garden crops; mainly subsistence crops (cereals and vegetables) as well as khat, coffee and fruit trees. From now on, this third field type will be referred to as khat fields (that are inside home gardens). In addition to these field types, there is land designated for other land use, mainly grazing land, which can be either open or forested; this land is however out of scope of this study, since the focus here is strictly on tree management in relation to crop production.

As can be derived by the landscape mosaic described above, there is a striking difference between how trees are used in combination with different crops (Figure 7). By organization and reorganization of trees, the local agroecology is adapted to the changes in land use, crop choices and agricultural practices described in the previous chapter. Along with such agricultural
transformations, trees are either removed, retained or planted, in order to benefit the productivity of the current crop choice as much as possible. Trees are however not only used as a manner of improving productivity of the land (i.e. as landesque capital), they additionally constitute symbolic capital by marking property boundaries to avoid conflict or by providing aesthetic value.

When exploring the management of trees as landesque capital it helps look at how trees are organized in the landscape. This implies that we consider not only how and where trees are used to improve productivity, but also the purpose of removing trees. Because while trees can improve productivity by providing shade, protection from livestock and habitats for pest predators, or by improving soil fertility and inhibiting soil erosion – trees can also compete with crops for nutrients, sunlight and water, pose physical constraints for plowing, as well as provide habitats for pests. The uses and constraints posed by trees vary in combination with different crops, therefore a landscape perspective stir the analysis to how trees are reorganized, rather than simply how they are removed, planted or retained in specific sites.

4.3 Defining green landesque capital – the importance of labor

Recognizing disservices from trees, from the farmer’s perspective, by acknowledging that open fields, cleared of trees also constitute landesque capital is an important distinction provided by the concept in relation to related ones like ecosystem services. Additionally, when it comes to
defining green landesque capital in relation to these similar concepts, labor is key. As Börjeson (2012, conference presentation) notes, a greener conceptualization of landesque capital adds to studies of agricultural landscape dynamics by focusing on labor-ecology interactions, thus linking political economy, farmer centric and ecological perspectives on investments in agricultural landscapes. Intentionality may or may not be included, but as opposed to ecosystem services provided purely as natural capital, the theory of landesque capital focuses on labor investments improving the long-term productivity of the land. In this way, the concept distinguishes modified nature from un-modified nature. The focus is therefore in this case on how farmers organize trees in the agricultural landscape: on the one hand, in order to make use of the benefits they provide (ecosystem services); on the other hand, to avoid their disservices. In addition to provision of ecosystem services and disservices, trees constitute physical structures, why they also can be used as fences, shelters and boundaries etc.

During the course of the fieldwork, defining the labor put into tree management proved to be quite a challenging task. When it comes to specific trees, labor characteristics vary significantly depending on species, location of the tree, surrounding land use, if it was naturally grown or planted etcetera. As labor put into tree management often is of an incremental character, it is usually not part of a narrative, but rather a practice that needs to be derived after extensive interviews and observations. Again, in this case it was found that raising the analysis to a landscape perspective was crucial for a full understanding of the concept. Because even though individual trees are sometimes retained without any labor put into them, that specific tree might be an integral part of a landscape organization of trees where the bulk of the labor is put into the removal of trees. In this case, it is rather the open field that constitutes landesque capital. In Table 3, an overview is provided for the characteristics of labor for each field type.

During an interview with a young man plowing a maize field, while telling me about a tree that he thinks has no use, he gave it a single cut with his axe.\textsuperscript{234} After looking closer at the tree, it was clear that this was not its first cut, so I asked him why he would not just cut the tree down at once. He shows me his ax and explains that it is not sharp enough; he rather gives it a cut every now and then when passing by. Such incremental removal of trees was repeatedly observed, however explanations to why it was done were never the same.

\section*{4.4 Open cereal fields}

The fact that tree regeneration is substantial in this forested landscape poses particular challenges for cereal cultivation, since additional labor input is required for continuous removal of tree seedlings, as well as pruning or removal of already grown trees. From a landscape perspective, it may look as if though single trees are dispersed inside cereal fields, but the trees are almost always planted or retained on individual field boundaries. The perception that trees inhibit cereal productivity because of the competition for sunlight is widespread.\textsuperscript{235} This is the primary reason why cereals are grown in open fields. Even though trees on boundaries sometimes primarily serve as boundaries, they have often been planted or retained on boundaries primarily for other purposes. Among such purposes is the building up of night

\textsuperscript{234} Tree interview 3
\textsuperscript{235} TR, male, Kerebe; Tree interview 1; Tree interview 3; Tree interview 6; Tree interview 9
shelters for protection against pests during harvest season (Figure 8). 236 Other trees are there in order to provide shade to farmers while working in the field. 237 In one case, the trees on the boundary to a grazing land were there in order to use the thorny branches each season to make a fence protecting the cereals from livestock. 238 These trees often also have a use for firewood or construction, however this is normally not valued as the primary use, but rather an additional benefit. It also happens that trees are retained on boundaries simply to save the labor it would require to remove them. 239

Figure 8: Trees are kept on boundaries in cereal fields for different reasons. This one started growing here after it was used to build a shelter for the person guarding the field from pests at night the last season. Now it is retained since it can be used for the same reason next time again.

In an interview about the tree use in different landscapes a farmer explains that trees generally improve soil fertility by adding nutrients to the soil when the leaves decompose, but in cereal and khat fields, these benefits are outweighed by the disadvantage of the shade. 240 For this reason, trees inside cereal fields are pruned if they become too big, in order to reduce their shade. Another constraint to having trees in cereal fields is reported to be that they make plowing difficult. Nevertheless, some cereal fields do have a few trees inside, then they are explained to be serving the purpose of improving soil fertility 241 , inhibiting soil erosion 242 , they

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236 Tree interview 1; Tree interview 2
237 Tree interview 9; CC interview 3
238 Tree interview 6
239 Tree interview 9
240 TR, male, Kerebe
241 CC interview 18; CC interview 8
242 CC interview 3; CC interview 8
can be there to provide construction material and firewood\textsuperscript{243}, or in order to put honey hives in.\textsuperscript{244}

4.5 Khat fences

The khat fields in Gera were only observed surrounded by tree fences. But khat is not only planted within fences, trees are also planted as fences around new fields taken into khat cultivation. These fences protect khat from being eaten by goats and sheep, but also from being tramped by mammal pests like bush pigs and porcupines.\textsuperscript{245} Seen in this way, fences are a means of averting the risk of losing a substantial part of the yield. When khat is grown in shade, its leaves become yellow and will not be good to chew.\textsuperscript{246} Therefore species of trees that do not inhibit too much sunlight, like \textit{Spathodea nilotica}, are preferred in fences, when these trees grow large they are also easily pruned.\textsuperscript{247}

While tree fences surround khat fields, trees are a rare feature inside the fields (other than khat trees obviously). A seedling is observed in the middle of a khat field during an interview; it started growing there after last tilling and will be removed next time the farmer explained.\textsuperscript{248} A continuous ‘weeding of trees’ is hence carried out within khat fields by tilling.

When it comes to the species of trees used for fences, a transformation is in progress. Since the traditionally used endemic species \textit{Erythrina brucei} and a tree locally called Emo have become subject to pest damage\textsuperscript{249}, they are now to an increasing extent replaced by the species of a thorny cactus-like tree, a \textit{Euphorbia} spp., and the red tree previously mentioned; \textit{Spathodea nilotica} (Figure 9). The \textit{Euphorbia} spp. has been used for fences in the area for long, but its use has recently started to increase. \textit{Spathodea nilotica} on the other hand, has only been grown the last 12 years, with a widespread use since the last four years.\textsuperscript{250}

The most obvious advantage of these two species is that their milky sap impedes the pest

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{khat_planted_in_home_garden_within_a_tree_fence_of_the_species_Spathodea_nilotica.jpg}
\caption{Khat planted in home garden within a tree fence of the species \textit{Spathodea nilotica}.}
\end{figure}

\textsuperscript{243} CC interview 8; CC interview 11; Tree interview 3; Tree interview 6; Tree interview 9
\textsuperscript{244} Tree interview 3; CC interview 8
\textsuperscript{245} TR, male, Kerebe; CC interview 11; Tree interview 5; Tree interview 17
\textsuperscript{246} TR, male, Kerebe; Tree interview 17
\textsuperscript{247} Tree interview 18
\textsuperscript{248} Tree interview 17
\textsuperscript{249} In Tree interview 17 it is described as a disease “eating the roots” so the trees die. In Tree interview 18 it is described as a “disease caused by ants eating the roots”.
\textsuperscript{250} Tree interview 17, Tree interview 18
damage that has affected the previously used tree species as well as some crops. A negative aspect is however that the sap is painful if you get it in your eyes and that bees die if they forage on it. Nevertheless additional reasons to use Spathodea nilotica are its beautiful red color and uniformity in fences and the fact that it is fast-growing.

The labor implied in rising and maintaining fences is of systematic character. In addition to the plantation, the trees are tied together horizontally with branches, and pruned when they grow too big.

### 4.6 Shade coffee - Agroforestry

To farmers, the most obvious value of trees in coffee cultivation is that they provide shade (See Figure 10). Coffee however also needs sunlight, why trees are used in a selective way. Trees with thick leaves for example, provide too much shade and are not favored in coffee forests.

In addition to the obvious importance of trees by providing shade, several farmers say that the fallen leaves of trees improve soil fertility. One farmer for example explains that “the soil around the trees becomes thick and more fertile”. On the other hand, other tree species are rejected since they “absorb the soil”.

Depending on the previous land use history of the coffee fields, trees are either planted (usually in new fields where previous land use has not included extensive use of trees), or simply retained. In Kerebe, which is situated close to an old coffee forest, trees are never planted. Nevertheless, the species retained in the forest are subject to a selective process, although to a varying extent depending on individual decisions. In Wanja, however, where the distance from forest is longer and natural regeneration of trees is not as frequent, trees are often planted instead. In this case a fast-growing species is advised to be planted by development agents, which additionally can be used in fences, for construction and as livestock forage.

The trees in coffee fields in this way have many uses that are not directly connected to coffee productivity. When houses are constructed, the vertical poles are usually from eucalyptus, but

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251 ibid.
252 Tree interview 17; Tree interview 5; CC interview 19
253 Tree interview 5; Tree interview 16; Tree interview 17; CC interview 19
254 Tree interview 5, Tree interview 16, Tree interview 18
255 TR, male, Kerebe; CC interview 8; CC interview 13; Tree interview 9; Tree interview 10; Tree interview 12
256 Timeline, male, Kerebe; Tree interview 9; Tree interview 10
257 CC interview 8; Tree interview 9
258 Tree interview 12
259 e.g. Premna schimperi
260 Tree interview 12
261 Tree interview 9
262 Trees considered to be good in combination with coffee are Albizia schimperiana, Milletia ferruginea, Prunus africana, Vernonia amygdalina, Ehertia cymosa and an Acacia spp. locally called ‘Lafto’
263 CC interview 19, CC interview 20
these are altered with horizontal poles taken from the coffee forest. In addition, firewood is collected from the coffee forests. Furthermore, honey hives can be placed in some tree species inside the coffee forest.

In the coffee forests, some trees are used to indicate boundaries between individual fields. Sometimes boundary trees are marked when fields are inherited and divided between sons. This use of the trees as symbolic capital also, to some extent, constitutes landesque capital since transaction costs are reduced.

When asked about the labor dedicated for trees in coffee fields the initial answer would usually be that no labor is dedicated to the trees unless they are planted. At closer thought however, labor of an incremental character was sometimes acknowledged by the farmers. For example, two farmers separately explained that they indirectly work with trees, while taking care of the coffee e.g. removing weeds and bushes. Additionally, the trees are said to be protected from livestock when small.

Figure 10: Shade-coffee as an agroforestry practice.

As discussed in chapter 3.2.9, the decision to plant coffee in new sites or to gradually expand existing coffee fields, imply the planting of trees or retaining of naturally grown trees. We have

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264 Timeline, male, Kerebe
265 TR, male, Kerebe; Tree interview 9; Tree interview 15
266 Such species are Albizia schimperiana, Croton macrostachys and Ficus sur
267 Tree interview 10; Tree interview 4; Tree interview 9
268 Tree interview 9
269 Tree interview 10; Tree interview 12
also learnt that part of this expansion of coffee cultivation can be associated with an incremental process, where farmers take advantage of shade from trees in agricultural land primarily serving as fences, boundary trees or commercial trees (Table 2). It thus seems like already built up landesque capital in itself can constitute a driving force for the expansion of coffee. In this way, the creation of landesque capital, in turn creates synergies resulting in an intensification process of agriculture in the form of an incremental expansion of coffee.

To clarify the various ways of characterizing trees as green landesque capital in Gera, Table 3 provides an overview of tree management and its effects in terms of agricultural productivity, field type by field type.

Table 3: Characteristics of green landesque capital in different field types

<table>
<thead>
<tr>
<th>Field type</th>
<th>Feature</th>
<th>Systematic labor</th>
<th>Incremental labor</th>
<th>Productivity effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal field</td>
<td>Open fields</td>
<td>Initial clearing of trees (historical - not observed)</td>
<td>Continuous ‘weeding of trees’</td>
<td>Enhancing sunlight, facilitating plowing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pruning of trees on boundaries</td>
<td></td>
</tr>
<tr>
<td>Khat field</td>
<td>Tree fences</td>
<td>Initial planting of trees and preparation of fence</td>
<td>Continuous ‘weeding of trees’ inside field</td>
<td>Enhancing sunlight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pruning of high fence trees</td>
<td>Reducing pest damage and looting.</td>
</tr>
<tr>
<td>Coffee forest</td>
<td>Agroforestry</td>
<td>Purposive planting of trees in order to grow coffee (in some cases)</td>
<td>‘Working with trees while working with coffee’</td>
<td>Providing shade, improving soil fertility,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Selective removal of undesired species</td>
<td></td>
</tr>
</tbody>
</table>

4.7 Commercial trees as landesque capital

Trees with primary characteristics of being crops in themselves pose a challenge to the definition of green landesque capital.

Eucalyptus is primarily grown for construction, firewood or sale, in this way its agricultural function is more similar to that of a crop, because the tree itself constitutes the agricultural output. In this case, the question whether they also in a way constitute landesque capital or not, is made easier by the fact that eucalyptus trees are perceived to have a destructive effect on soils by both farmers and administration (see chapter 3.5.2). Eucalyptus is thus not valued as landesque capital, but rather as a crop. In the case of another commonly used commercial tree in the area, avocado, the situation is similar. Avocado trees have the primary function of giving fruit for sale. Additional benefits of avocado trees are that they provide wind protection and shade for houses. But when it comes to the relation of the tree to land productivity it is reported to be giving too much shade because of its thick leaves and to be competing for nutrients with
khat and coffee. Additionally, both khat and coffee are also trees, in this thesis they have however exclusively been treated as crops, why a conclusion cannot be drawn for whether they can be seen to in themselves also constitute landesque capital.

Even though the management of commercial trees is not found to constitute landesque capital in this case, it does not imply that other commercial trees never do. What is important to note are the distinctive characteristics of the tree use and how they are valued by farmers, taking possible synergies between the primary and secondary use of trees into account.

### 4.8 Top-down creation of landesque capital

To sum up, the analysis of farmers’ reorganization of trees in the agricultural landscape would benefit from being contrasted against another process of accumulation of landesque capital currently taking place in Gera. A striking impression of agricultural transformation in progress is the digging of ditches on cereal land that is part of an ongoing national program for soil and water conservation (SWC). Though the construction of these ditches also comprise a building up of landesque capital, this case is fundamentally distinctive in terms of the dynamics driving its production; this is exclusively a product of external driving forces (Figure 11).

As noted in previous research, such programs in Ethiopia have a history of being characterized by top-down approaches usually ill-adapted to existing local systems, since neither their planning nor implementation have taken local knowledge into account (Krüger et al. 1996). This has resulted in SWC programs being highly unpopular among farmers in Ethiopia (ibid.). On the topic of top-down production of landesque capital Blaikie and Brookfield (1987:34) note: “the lesser task of obtaining the co-operation of farmers in works of protection and drainage, often involving restrictions on land use and the creation of some landesque capital at the farm level, is seldom achieved without a great deal of persuasion and example, and not infrequently fails”.

A development agent explained that the implementation of the SWC program involves the preparation of ditches and planting of vetiver or elephant grass on cereal cropland in slopes from 10-50 percent, and to reforest farming land in slopes between 40-50 percent by planting trees instead of grass in the ditches. The purpose is that all cereal land with a slope of more than ten percent should have ditches within five years. While the preparation of the ditches is performed collectively by all farmers, their maintenance, including the planting of grasses, is the individual farmer’s responsibility. According to a development agent, the ditches are well met by the farmers. He claimed farmers are convinced that this will improve the weather situation and reduce the drought problems that have been the result of deforestation.

When talking to the farmers, it seems the ditches are not quite met with the enthusiasm described by the development agent. A farmer in Dusta is clearly upset, his main concern is that

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270 CC interview 8; CC interview 9
271 Cupressus Lusitanica
272 DA interview, 9 March 2012
273 ibid.
the ditches will inhibit plowing since they are too close to each other.\textsuperscript{274} Even though he is aware that this part of a national soil conservation program, he seems to believe the intention is to disturb the farmers. According to this farmer, there is no serious problem with soil erosion in the area, he said, “throughout my lifetime I have plowed this land, and soil erosion has not been a problem.”\textsuperscript{275} Apparently, all male farmers in the village are obliged to participate in preparing the ditches for four days a week from 9-14 and if they do not show up, they are fined.\textsuperscript{276} He seems determined to fill the ditches again once his field is to be plowed.

In Kerebe, no ditches have been prepared yet, the farmers have however already been informed about them and have received some training. The farmers seem aware of that the purpose of the ditches is to reduce soil erosion, but they are worried about having to dig the ditches and the general perception is that there is no problem with soil erosion. One farmer said that the main source of concern is that they are supposed to plant trees in the ditches, saying, “it’s not a forest, it’s a field, then how can we plow it?” after planting trees there the land will only be good for coffee, he continued.\textsuperscript{277}

To contrast, the ditches serve as an example of a simultaneous process of creation of landesque capital as a direct response to external forces. As we have learnt from the review of how farmers organize trees in the agricultural landscape, this feature in a cereal cropland additionally conflicts with how landesque capital is currently built up. In this way, the top-down intervention

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure11.png}
\caption{Ditches in preparation in slopes in cereal fields in Dusta.}
\end{figure}

\textsuperscript{274} CC interview 18
\textsuperscript{275} ibid.
\textsuperscript{276} CC interview 11; CC interview 18
\textsuperscript{277} CC interview 11
has resulted in an introduced field structure that is conflicting with the ruling technical paradigm (ox-plowing) as well as the prevailing bottom-up dynamics behind accumulation of landesque capital.
5 Concluding discussion

A recurrent theme in this thesis is how external forces interact with local farmers’ priorities in forming agro-ecological change in Gera. Crop by crop, as well as in the creation of landesque capital, we have by using a political ecology approach seen examples of how top-down and bottom-up forces interact. At the point of specific land management decisions, the interaction results different sets of trade-offs and synergies, ultimately projected in gradual transformations of the agro-ecological landscape.

Starting with the case of coffee, a set of external drivers is influencing individual farmers’ choice to grow coffee to the extent that it is dominating the economy in Gera. At the top is the world market demand in combination with a process of market liberalization in Ethiopia, resulting in favorable prices. Additionally, since coffee is endemic to the area, it is particularly suitable for the local ecological conditions, it has a long history of cultivation in the area, and its consumption and sale are well anchored in the culture of the local population. These external and local factors are mutually reinforcing the choice to grow coffee. Nevertheless, other factors are working at the expense of these favorable conditions, because while a market liberalization process has occurred on a national scale, farmers and local traders are to a large extent excluded from coffee trade. Furthermore, while prices are higher as a result of market liberalization, they have also become more volatile, which means there is high vulnerability implied in the strong economic dependency on coffee. In addition, a conflict on land rights in the area has evolved as a result of large-scale coffee investors’ acquisition of land, of which some had previously been held by local farmers through customary land rights. While these constraints do currently not directly constitute disincentives for farmers to grow coffee, they are and will be key issues of concern for smallholders in this coffee dominated economy.

While an expansion of coffee is encouraged at the policy level, the consequent reduction in cereal land is resulting in a policy concern for local food security. Therefore, measures are taken to increase land productivity through the implementation of an agro-technological intensification program, involving the adoption of HYVs and inorganic fertilizers. This is in turn part of a national process, associated with a global concern for agricultural productivity in Africa opting for an African Green Revolution. At the local level however, this modernization program implemented from above is not firmly met with enthusiasm from the farmers. It was found that there is a discrepancy between top-down and bottom-up approaches to the concept of agricultural productivity. While the agro-technology regime focuses on increasing yield per hectare, it was found that local farmers’ approach to productivity is different; for them, substantial yield losses due to pest damage, disease or drought are far more demanding. Taking into account the higher production costs implied (more capital inputs), the economical risk farmers face become even higher with the adoption of HYVs and fertilizers.

But this is not the only case of top-down interventions in cereal land. In the chapter on landesque capital, we learnt that farmers confine cereal production to open fields to enhance sunlight and facilitate ox-plowing. However, a SWC program has now resulted in the introduction of a new field structure (consisting of ditches planted with vetiver grass, or trees in steep slopes) that is conflicting with the ruling technical paradigm of ox-plowing, as well as with prevailing dynamics behind the bottom-up accumulation of landesque capital. Looking
deeper into the issue, this is yet again rooted in conflicting perceptions of the problem; here, it is a result of the different scales of inquiry and implementation. Soil erosion has been put forward as a major problem for agriculture in Ethiopia. This view has however been criticized for not taking the full system of redistribution of soil into account, because as soil erodes from one place it accumulates somewhere else. In this case, considering the fact that local farmers do not perceive soil erosion as a problem, the implementation of the program on a national scale does not seem to have taken local variations of the phenomenon as a whole into account.

In the analysis of cereal crop choices we however saw that cereals, and maize in particular, have a crucial importance to farmers by ensuring household food supply throughout the year. Farmers take factors like consumption preference, labor intensity, maturation time as well as productivity and estimations of risk into account in the choice to grow specific cereal crops. This understanding of the bottom-up rationale for cereal crop choices helps us understand the underlying dynamics of farmers reaction to external factors.

The discrepancy between top-down interventions and bottom-up dynamics in the case of cereals, might in fact result in a gradual conversion to other crops, to use McCann’s (2005:90) wordings, in order to ‘avoid state control’, although this time around it implies a conversion from cereals to cash crops as opposed to the conversion from coffee to maize in McCann’s analysis of the situation in Gera under the Derg rule.

When it comes to khat, a relative newcomer as a commercial crop in the area, this tree has various additional benefits to the strong market demand (and high price) that is mainly driving its expansion. The continuous character of its labor requirement and productivity, which implies that there are no bottle-neck situations where labor competes with other crops and that it gives income three times a year, is a substantial benefit in comparison, or perhaps more correctly in combination, with other cash crops. Additionally the tree is less vulnerable to pest damage and drought than many other crops. Altogether, these factors, in combination with a relative lack of state control (except from substantial taxation, which was however not raised as an issue at the farm-level in Gera), make khat in many ways ‘the perfect crop’ from a bottom-up perspective. However from a macro perspective, concern has been raised. Whereas khat has grown to become one of Ethiopia’s main export items, the bulk of its consumption is confined to the national market, resulting in health problems as well as social issues. The export market is also subject to unpredictability, as there is uncertainty whether khat might become illegal in more states in the future. Additionally, concern has been raised that khat expansion might be taking place at the expense of local production of food crops, thus posing a threat to national food security. While possible synergy effects have been presented in literature as increased income from khat might encourage farmers’ investment in capital inputs for food crop production, this does not seem like a plausible effect in Gera, considering that farmers’ reluctance to use inputs is not only based on economical constraints. Quite the opposite, the data of this thesis rather points to that top-down interventions to increase cereal land productivity, and the lack there of for khat, could be driving a conversion from cereal crops to khat.

Taking heterarchical forms of organization into account, a bottom-up perspective is however not a single perspective. Especially when it comes to khat, the crop has different significance for different people. The gender contract has in this study been shown to be specifically adapted to each crop regime. Whereas women have a distinctive role in the gender contract for the cultivation and sale of cereals and coffee, khat is exclusively a male responsibility. Therefore the expansion of this crop will have implications for gender relations, as well as for the
household distribution of income as noted by Dessie and Kinlund (2008) in the case of Wondo Genet. However, gender contracts are dynamic, therefore a renegotiation could occur as an expansion of khat would imply that its role in terms of household labor and economy changes, but so far such a process remains unobserved.

To contrast, both avocado and eucalyptus were introduced as a result of direct external interventions; avocado as part of a development aid program and eucalyptus as part of a forest conservation strategy. Whereas the cultivation of eucalyptus was firmly accepted by local farmers quite instantaneously because of a joint consent for forest conservation in combination with the tree’s favorable characteristics for construction, the adoption of avocado was significantly slower. Not only was there no market for avocado, additionally it was introduced in a time of political instability, which would cause farmers to refrain from growing perennial crops. As the first farmers got fruit from their trees and a market evolved, the political situation was however also becoming more stable. These factors combined, though unrelated, created an interest among farmers who after a some time-lag since its introduction started growing the tree by imitating those farmers who had initially agreed to plant it. The local process thus seems to have been quite independent of interventions, however not of external forces. As for eucalyptus, of concern for its tendency to deplete soils of water and nutrients, it started being discouraged some time after its introduction. While the discouragement seems to limit eucalyptus expansion, the tree has already become indispensible in terms of local preference for construction. When it comes to avocado and eucalyptus, external and local drivers of change have not been completely at odds, but neither have they been mutually reinforcing.

Finally, taking this discussion one step further involves an analysis of how the above-described dynamics of change are shaping the local agro-ecological landscape. In order to do this, the analysis of landesque capital from the previous chapter needs to be taken into account. Three field types were identified, each dedicated to a distinctive set of crops and with specific characteristics related to their associated tree management. Since coffee production is increasing as a result of combined top-down and bottom-up priorities, the land dedicated to cereal production (and grazing land) seems to be subject to areal reduction. In terms of agro-ecological change, the process involves an expansion of an agroforestry system at the expense of an open field system, hence the tree cover in the agricultural landscape is likely to increase. This process is further reinforced by the fact khat cultivation is increasing as well, even though khat is not intercropped with other trees, the fields are surrounded by tree fences. A probable further expansion of its cultivation would result in a ‘khatification’ of the landscape, with associated tree fences planted along individual field boundaries. This agro-ecological transformation is of importance for the quality of the agro-ecological matrix – where an increased amount of trees would be increasing the potential of the agro-ecological landscape to provide habitats as well as to act as a passageway for organisms. Notably, when it comes to tree fences, this potential of trees might seem contradictory since the trees are structured to prevent passage. While this is true when it comes to mammals, the structure of tree fences should not be stopping other biota, such as birds or insects. What needs to be examined however is how different tree species in fences affect this potential. Additionally, since the expansion of commercial crop cultivation, in this case associated with agroforestry practices, in turn drives a policy concern for food security, the modernization of the remaining land in cereal cultivation adds yet another variable to the analysis of the quality of the agro-ecological matrix.

Important to note is that the agricultural system as a whole involves other land uses as well as a process of large-scale coffee expansion by investors, which is known to be taking place inside
the forest. As mentioned in chapter 3.2.9, this study is however confined to the small-scale agricultural landscape why a full-scale analysis of these agro-ecological processes cannot be made.

In the small-scale agricultural landscape, the building up of landesque capital was found to in itself constitute a driving force for agricultural change. As the use of trees in field types other than coffee fields, in combination with other driving forces in favor of coffee production, results in an incremental expansion of coffee in the pace of tree growth.

To summarize, accumulated individual decisions of farmers regarding agricultural practices are taken in relation to the local agro-ecology as well as to political economy influences at various scales. Top-down and bottom-up driving forces, in this way constitute an interacting dialectic eventually forming agro-ecological landscape change. External factors sometimes have a reinforcing effect at the local scale, as in the case of khat, but when top-down interventions are incoherent with bottom-up priorities, as in the case of cereals, a conflict occurs. Exclusion and ignorance of local farmers’ knowledge and experiences in the formation of policies have little potential, instead there is a need for a mutual understanding of locally specific agro-ecological change. To achieve this, the complex realities of farmers need to be put central stage of inquiry.

While providing critique of reductionist approaches to research, a constraint of the political ecology framework could be that in doing so, it embraces complexity to the extent that it looses its theoretical strength. My research however shows that it precisely the failure of previous research to capture this complexity that has resulted in narratives that are largely incoherent with local concerns and priorities. Complexity is a feature of reality and through incorporating it in research by combining local specificity with contextual factors of scale, while keeping the analytical focus on discerning patterns and deriving causation, the political ecology framework provides a strong alternative in the study of human-environment interrelationships. Another critique of the political ecology approach has been that it is biased towards the political economy aspects of the concept, thus not being ‘ecology enough’ (Vayda & Walters, 1999). While the approach is indeed leaning towards the social sciences, this does not imply that it is irrelevant in the study of ecology. In my case, the more ecological aspects of land management have been strengthened through the incorporation of the concept of landesque capital, as it is a more precise analytical tool in the study of the local agro-ecological landscape. In this way, the use of an overarching political ecology framework made possible an analysis of external drivers and local dynamics of agricultural change, while the concept of landesque capital proved to be key in exploring how these forces interact at the point of the land management decision as well as in relation to the agro-ecological landscape.
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**Articles, books and reports:**


Internet sources:


Other sources:


Caretta, M.A. 2012: Personal communication. PhD candidate at the Department of Human Geography, Stockholm University, focusing on gender contracts in agriculture.

Empirical sources:

CC interviews 1-20 (crop-choice interviews), Tree interviews 1-18, CR (crop ranking focus groups), Timelines (focus groups), TR (tree ranking focus group): Interviews and focus
group discussions with farmers carried out in Kerebe, Wanja and Dusta. 23 Feb – 2 April 2012.

Market observations: Market observations carried out in the weekly markets in Kemise, Bashasha, Chira and Dusta. 1 March – 15 March 2012.


DA interviews, Gera District Agriculture Office, Gera District Forest Department: Interviews with agriculture officials in Gera District. 2 March – 3 April 2012.

For detailed descriptions of each interview situation, see Appendix I
Appendix I:  List of empirical sources

_Crop-choice interviews (semi-structured: 30 Min – 1.5 hrs):_

Crop-choice interview 1, 23 February 2012: Interview with a man during a transect walk in his homegarden. Kerebe, Gera District.

Crop-choice interview 2, 23 February 2012: Interview with a man while he was constructing a house. Kerebe, Gera District.

Crop-choice interview 3, 24 February 2012: Interview with a man during a transect walk in his cereal field, coffee field and homegarden. Kerebe, Gera District.

Crop-choice interview 4, 24 February 2012: Interview with a husband and wife in their house while having coffee and maize cake. Kerebe, Gera District.

Crop-choice interview 5, 24 February 2012: Interview with a man during a transect walk in his cereal field and homegarden. Kerebe, Gera District.

Crop-choice interview 6, 24 February 2012: Interview with an old man in his homegarden. Kerebe, Gera District.

Crop-choice interview 7, 27 February 2012: Interview with two younger and two older women on the village road. Kerebe, Gera District.

Crop-choice interview 8, 27 February 2012: Interview with a husband and wife during a transect walk in their grazing land, cereal field and homegarden. Kerebe, Gera District.

Crop-choice interview 9, 28 February 2012: Interview with a man during a transect walk in his homegarden and khat field. Kerebe, Gera District.

Crop-choice interview 10, 28 February 2012: Interview with an older man sitting in his homegarden, his son was present. Kerebe, Gera District.

Crop-choice interview 11, 28 February 2012: Interview with a man during a transect walk in his cereal, khat and coffee fields continuing in his house while having coffee with his daughters and sons. Kerebe, Gera District.

Crop-choice interview 12, 29 February 2012: Interview with an old man sitting in his homegarden. Kerebe, Gera District.

Crop-choice interview 13, 29 February 2012: Interview with a woman during a transect walk through cereal field to her coffee fields and then while harvesting coffee. Kerebe, Gera District.

Crop-choice interview 14, 29 February 2012: Interview with a young woman and after a while also her mother during a transect walk in their homegarden. Kerebe, Gera District.

Crop-choice interview 15, 29 February 2012: Interview with a husband and wife in their homegarden. Kerebe, Gera District.

Crop-choice interview 16, 6 March 2012: Interview with four women in their homegarden while they are processing teff. Dusta, Gera District.
Crop-choice interview 17, 6 March 2012: Interview with a man on the road while looking at his grazing land and eucalyptus plantation, several villagers pass by listening and adding comments during the interview. Dusta, Gera District.

Crop-choice interview 18, 6 March 2012: Interview with a group of farmers (five men and a woman) during the lunch break in a cereal field where they are processing teff. Dusta, Gera District.

Crop-choice interview 19, 19 March 2012: Interview with a man while he is plowing his cereal field inside his homegarden. Wanja Karsa, Gera District.

Crop-choice interview 20, 19 March 2012: Interview with a husband and wife inside their house while they are processing maize. Wanja Karsa, Gera District.

Tree interviews (semi-structured, 30 Min – 1 hr):

Tree interview 1, 26 March 2012: A man interviewed while plowing his cereal field. Kerebe, Gera District.

Tree interview 2, 26 March 2012: Three young boys, interviewed while plowing their father’s cereal field. Kerebe, Gera District.

Tree interview 3, 26 March 2012: Two young boys, interviewed next to a grazing land while plowing a cereal field in their homegarden. Kerebe, Gera District.

Tree interview 4, 26 March 2012: Two women and their mother in Kerebe, interviewed while harvesting coffee in a coffee field. Kerebe, Gera District.

Tree interview 5, 26 March 2012: A woman interviewed about a fence around her homegarden where khat is grown. Kerebe, Gera District.

Tree interview 6, 27 March 2012: A man interviewed while plowing his cereal field. Kerebe, Gera District.

Tree interview 7, 27 March 2012: A woman interviewed about her grazing land in her homegarden next to it. Kerebe, Gera District.

Tree interview 8, 27 March 2012: A man interviewed while plowing his cereal field together with his son. Kerebe, Gera District.

Tree interview 9, 27 March 2012: A son and his father interviewed in their coffee field. Kerebe, Gera District.

Tree interview 10, 27 March 2012: A man interviewed next to a coffee field (not his own). Kerebe, Gera District.

Tree interview 11, 28 March 2012: Four young boys interviewed while plowing a cereal field. Wanja Karsa, Gera District.

Tree interview 12, 28 March 2012: A husband and wife interviewed in their maize and coffee fields. Wanja Karsa, Gera District.


Tree interview 14, 28 March 2012: A man interviewed while plowing his cereal field for the first time in a former communal grazing land. Wanja Karsa, Gera District.
Tree interview 15, 28 March 2012: *A woman interviewed walking around in her homegarden with coffee and avocado.* Wanja Karsa, Gera District.

Tree interview 16, 28 March 2012: *A young man and two older men about a fence in their homegarden.* Wanja Karsa, Gera District.

Tree interview 17, 2 April 2012: *A man interviewed in his khat field.* Kerebe, Gera District.

Tree interview 18, 2 April 2012: *Two young men interviewed outside their homegarden about the fence.* Kerebe, Gera District.

**Focus group discussions (1-2hrs):**

Crop ranking, male group, Kerebe, 14 March 2012: *Crop ranking with three men using a matrix* (previously interviewed in Crop-choice interview 3, 5 & 11). Kerebe, Gera District.

Crop ranking, female group, Kerebe, 16 March 2012: *Crop ranking with five women using a matrix* (two of whom were previously interviewed in Crop-choice interview 4 & 8). Kerebe, Gera District.

Crop ranking, female group, Wanja Karsa, 20 March 2012: *Crop ranking with three women using a matrix* (one of whom was previously interviewed in Crop-choice interview 20). Wanja Karsa, Gera District.

Crop ranking, mixed group, Wanja Karsa, 20 March 2012: *Crop ranking with one woman and two men using a matrix* (one of the men was previously interviewed in Crop-choice interview 19). Wanja Karsa, Gera District.

Timelines, male group, Kerebe, 23 March 2012: *Making timelines of crop prices with three men* (one of whom was previously interviewed in Crop-choice interview 4). Kerebe, Gera District.

Timelines, female group, Kerebe, 24 March 2012: *Making timelines of crop prices with three women* (two of whom were previously interviewed in Crop-choice interview 7). Kerebe, Gera District.

Tree ranking, male group, Kerebe, 2 April 2012: *Two men ranking the use of trees using a matrix* (previously interviewed in Tree interview 3 and 9). Kerebe, Gera District.

**Market observations (at weekly village markets):**

Market observation Kemise 1, 1 March 2012: *Observation, short interviews with traders and farmers in the market and with farmers having coffee after the market.* Kemise, Gera District.

Market observation Chira, 3 March 2012: *Participatory observation following people to the market, short interviews with traders at the market.* Chira, Gera District.

Market observation Bashasha, 5 March 2012: *Observation, short interviews with traders and farmers, participatory observation following people on the way home from the market.* Bashasha, Goma District.

Market observation Dusta, 8 March 2012: *Participatory observation following people to the market, observation and short interviews with traders and farmers in the market.* Dusta, Gera District.
Market observation Kemise 2, 15 March 2012: Participatory observation following people to the market, talking to traders, and extension agents (DAs) at the market. Kemise, Gera District.

**Local traders:**

Village small trader, Gera District. 27 February and 15 March 2012.

Visit to coffee factory, Chira, Gera District 3 March 2012.

**Interviews with officials:**

Visit to Gera District Agriculture Office, 5 March and 3 April 2012: Asking for statistics and about agricultural policies.

Gera District Forest Department, 3 April 2012: Interview about forestry and coffee production and collectives.

Interview with Development Agent, 2 March 2012: 2 hours semi-structured interview. Wanja Karsa Kabele, Gera District.

Interview with Development Agent, 9 March 2012: 1,5 hours semi-structured interview. Sadiloya Kabele, Gera District
Appendix II: Crop prices

Timelines - Male group

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1987</th>
<th>1991</th>
<th>10 years ago</th>
<th>5 years ago</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>1 Birr/ kg</td>
<td>12 Birr/ farazula</td>
<td>17 Birr/ farazula</td>
<td>120 Birr/ farazula</td>
<td>120 Birr/ farazula</td>
<td>425 Birr/ farazula</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2 Birr/ pole</td>
<td>4 Birr/ pole</td>
<td>10 Birr/ pole</td>
</tr>
<tr>
<td>Avocado</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0,75 Birr/ kg</td>
<td>0,6-0,8 Birr/ kg</td>
<td>2 Birr/ kg</td>
</tr>
<tr>
<td>Khat</td>
<td>0,2-0,5 Birr</td>
<td>0,5-1 Birr</td>
<td>0,5-1,5 Birr</td>
<td>2-3 Birr</td>
<td>6 Birr</td>
<td>50 Birr</td>
</tr>
<tr>
<td>Maize</td>
<td>2 Birr/ farazula</td>
<td>20 Birr/ 100kg</td>
<td>1,5 Birr/ farazula</td>
<td>15 Birr/ farazula</td>
<td>22 Birr/ farazula</td>
<td>72 Birr/ farazula</td>
</tr>
<tr>
<td>Sorghum</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5 Birr/ farazula</td>
<td>15-20 Birr/ farazula</td>
<td>90 Birr/ farazula</td>
</tr>
</tbody>
</table>

Timelines - Female group

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1987</th>
<th>1991</th>
<th>10 years ago</th>
<th>5 years ago</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>6 Birr/ farazula</td>
<td>6 Birr/ farazula</td>
<td>4-5 Birr/ farazula</td>
<td>1 cup 1 Birr</td>
<td>60 Birr/ farazula or 4-5 cups / Birr</td>
<td>8 cups / 10 Birr</td>
</tr>
<tr>
<td>Sorghum</td>
<td>30 cups / Birr</td>
<td>25 cups/ Birr</td>
<td>20 cups/ Birr</td>
<td>8 cups/ Birr</td>
<td>6 cups/ Birr</td>
<td>1 cup/ Birr or 5 cups/ 4 Birr</td>
</tr>
<tr>
<td>Teff</td>
<td>12 cups/ Birr</td>
<td>3 cups/ Birr or 20 Birr/ farazula</td>
<td>4 cups/ Birr</td>
<td>3 cups/ 2 Birr</td>
<td>1 cup/Birr</td>
<td>1 cup/ 2 Birr or 210 Birr/ farazula</td>
</tr>
<tr>
<td>Coffee</td>
<td>9 Birr/ farazula</td>
<td>30 Birr/ farazula</td>
<td>30 Birr/ farazula</td>
<td>100 Birr/ farazula</td>
<td>7 Birr/kg</td>
<td>20-27 Birr/ kg</td>
</tr>
</tbody>
</table>
### Cereal prices in Gera (2000-2011 in Birr)

<table>
<thead>
<tr>
<th>Year</th>
<th>Teff</th>
<th>Wheat</th>
<th>Barley</th>
<th>Maize</th>
<th>Sorghum</th>
<th>Horse bean</th>
<th>Field pea</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>228</td>
<td>240</td>
<td>252</td>
<td>102</td>
<td>180</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>2001</td>
<td>180</td>
<td>120</td>
<td>90</td>
<td>72</td>
<td>96</td>
<td>108</td>
<td>108</td>
</tr>
<tr>
<td>2002</td>
<td>150</td>
<td>120</td>
<td>90</td>
<td>60</td>
<td>60</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>2003</td>
<td>180</td>
<td>156</td>
<td>154</td>
<td>80</td>
<td>120</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>2004</td>
<td>204</td>
<td>144</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>140</td>
<td>130</td>
</tr>
<tr>
<td>2005</td>
<td>240</td>
<td>228</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>2006</td>
<td>251</td>
<td>234</td>
<td>228</td>
<td>150</td>
<td>120</td>
<td>228</td>
<td>228</td>
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<tr>
<td>2007</td>
<td>258</td>
<td>240</td>
<td>271</td>
<td>140</td>
<td>140</td>
<td>240</td>
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<tr>
<td>2008</td>
<td>420</td>
<td>288</td>
<td>270</td>
<td>144</td>
<td>144</td>
<td>285</td>
<td>285</td>
</tr>
<tr>
<td>2009</td>
<td>640</td>
<td>630</td>
<td>540</td>
<td>450</td>
<td>540</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>2010</td>
<td>475</td>
<td>288</td>
<td>240</td>
<td>140</td>
<td>180</td>
<td>540</td>
<td>540</td>
</tr>
<tr>
<td>2011</td>
<td>1035</td>
<td>720</td>
<td>610</td>
<td>405</td>
<td>585</td>
<td>1170</td>
<td>1170</td>
</tr>
</tbody>
</table>
Appendix III: Focus group crop ranking matrices

The participants were asked to rank crop from 1-5 (low to high) in order of importance for cash and consumption, relative labor intensity and degree of pest damage. In some groups, the participants emphasized certain characteristics by ranking higher than 5. Teff was added to the crop rankings in Wanja, since its importance was realized during the focus groups in Kerebe.

### Crop ranking, Female group, Wanja

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Cash</th>
<th>Labor</th>
<th>Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Sorghum</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Teff</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Coffee</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Khat</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Avocado</td>
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<td>7</td>
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<td>1</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

### Crop ranking, Mixed group, Wanja

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Cash</th>
<th>Labor</th>
<th>Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sorghum</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teff</td>
<td>5</td>
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<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Coffee</td>
<td>3</td>
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<td>1</td>
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<tr>
<td>Khat</td>
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<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Avocado</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
**Crop ranking, Male group, Kerebe**

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Cash</th>
<th>Labor</th>
<th>Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sorghum</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Khat</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Coffee</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Avocado</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Crop ranking, Female group, Kerebe**

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Cash</th>
<th>Labor</th>
<th>Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sorghum</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Khat</td>
<td>3</td>
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<td>Coffee</td>
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<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Avocado</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Eucalyptus</td>
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<td>5</td>
<td>2</td>
<td>1</td>
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</table>