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Food security in former Agroforestry Homegardens in Wondo Genet

Helena Jonsson

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SLU-Skogsmästarskolan
Box 43
739 21 SKINNSKATTEBERG
Tel: 0222-349 50

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Handledare: Karl-Erik Johansson, Torgny Söderman, SLU Skogsmästarskolan

Examinator: Eric Sundstedt, SLU Skogsmästarskolan

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Omslagsbild: Next generation of agroforesters in Wondo Genet. Photo: Helena Jonsson**.**

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FOREWORD

Fiat Panis – Let there be bread

This thesis is written in the BSc programme in Forest Management at the School for Forest Management - Swedish University of Agricultural Sciences in Skinnskatteberg.

My first trip to an African country gave me impressions and experiences for life. Discussing questions about agriculture, forestry and rural development in countries where there is poverty and rapid population increase provided me with new skills, insights and a wider approach to rural development. I also got the chance to drink the best coffee I have ever tasted!

I would like to thank Mersha Sahilu Gebrehiwot at Wondo Genet College of Forestry and Natural Resources, not only for making it possible for me and my classmate to come and stay in Wondo Genet as well as being a key person and a big support during my field work, but also for inviting us to your home and being the friendly and helpful person that you are! I would also like to thank Karl-Erik Johansson for supervision and advise during the writing of the report and Torgny Söderman for council throughout the project and wonderful years in Skinnskatteberg. A thank you to Menfese Tadesse for helping with the translation and design of the surveys. I am also very grateful to the friendly people that we interacted with and got information from in Wondo Genet and among them especially Getacho Taye, who helped us to carry through the interviews. And at last, thank you Fredrik Larsson, for sharing the Ethiopian adventure with me.

Skinnskatteberg, May 2018

Helena Jonsson

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1. ABSTRACT

The purpose of this report is to get an insight in how food security for individual farming households will change depending on their choice of production. Furthermore, to study how the food supply in the local market has changed due to the transition of farming practices in surrounding farms. The study focuses on the comparison of the traditional system of agroforestry homegardens in Wondo Genet, Ethiopia, with a newer system of monoculture production of cash crops.

The well-functioning system of homegardens in Wondo Genet is since the 1990s undergoing a change towards monoculture production of cash crops. Where farmers try to meet the household needs for income. Also, population increase in the area has led to a reduction in farm size.

By interviewing farmers, traders and key informants in the area, the results show that cash crop production in favor of food production along with population growth and climate change are the main causes believed to affect food security as well as the supply of food products in the local market. It is concluded that current production of cash crops in Wondo Genet impedes food security of individual farming households as well as the food supply to the local market.

Possible remedies to the challenges of food security in Wondo Genet are promotion of climate resilient farming techniques along with making family planning accessible to the rural community.

2. INTRODUCTION

2.1 Ethiopia

Ethiopia is a tropical country located in the Horn of Africa, with a land area of 1,14 million km^2 and a great variety of landscapes. Big mountains, highlands, valleys and lowland plains stretching across the country, from 148 meters below sea level up to 4620 meters above sea level. Because of the big geophysical differences, the country holds a great natural diversity. Altitude and climate, terrain and soil, flora and fauna show a wide diversity throughout the country. Of the total area, 45 percent is arable land and the population is about 85 million people (Ethiopian Government Portal, 2018) of which 85 percent depends on self-sustaining and small-scale agriculture to secure their livelihood (Gebrehiwot, et al., 2015).

Ethiopia consists of nine regional states. One of them being the Southern Nations, Nationalities and Peoples Regional State (SNNP Regional State). This state is located in the southern part of the country. Here over 90 percent of the population is rural and more than 45 indigenous groups are living in this multi-ethnic state (Ethiopian Government Portal, 2018).

2.2 Agroforestry

The main land use issue in the tropics is connected to deforestation. The forest cover is continuously decreasing in this biome (Atangana, et al., 2014). Also land degradation, fragmentation of forest landscapes and biodiversity loss are big issues in most developing countries (Gebrehiwot Sahilu, 2017). An increasing population leads to land use changes where forests are cleared and converted to agricultural land for crops or pasture. Forests are also legally or illegally harvested for commercial purposes, fuel and construction. A higher urban population also demands more energy (Buck, 1989).

With the increasing population, high potential farm holdings will be divided into smaller plots and people are increasingly forced to move to less productive areas with lower potential of effective agriculture. All these factors lead to further deforestation which in turn increases soil erosion, soil infertility and also increases negative effects of climate and natural disasters. This results in production and nutrition problems, food shortage and poverty for the people dependent on the land. Other direct effects following the loss of trees are a scarcity of fuel wood, construction materials (Buck, 1989) and other non-timber forest products (NTFPs) (Atangana, et al., 2014).

Agroforestry is the name used for a combination of different practices combining trees and crops and/or pasture in the same unit of land. It has potential to reduce several problems connected to both environment and development, especially in tropical developing countries. It is known to increase land productivity and reduce land use conflict. It provides multiple benefits and ecosystem services like building materials and fuel wood, food and fodder. It will also stabilize the soil and increase soil fertility, hold and stabilize moisture content in the soil and serve as shelter from climatic effects like wind (Buck,

1989). Agroforestry is also considered to have an important role in biodiversity conservation and carbon sequestration for climate change mitigation. So, it has the potential to improve livelihoods at the same time as reducing land use pressure along with other positive effects (Gebrehiwot Sahilu, 2017).

This type of land-use is ancient and can be noticed to have happened in different combinations and ways all over the world. Though, it would wait up until the 1970s before agroforestry would get general acceptance as a land-use system of agriculture and forestry. Then intergovernmental organizations like the World Bank and the Food and Agriculture Organization of the United Nations changed policies and the subject got an increased scientific interest (Ramachandran Nair, 1993).

In 1977 the International Centre for Research in Agroforestry (ICRAF) was established for the institutionalization of agroforestry (Nair & Muschler, 1993). And in 1982; expert definitions of agroforestry were there summarized by Lundgren (1982) down to two characteristics:

- *the deliberate growing of woody perennials on the same unit of land as agricultural crops and/or animals, either in some form of spatial mixture or sequence;*
- *there must be a significant interaction (positive and/or negative) between the woody and nonwoody components of the system, either ecological and/or economical.*

Later, more refined definitions have been developed. The main attributes of agroforestry remain as to maintain or increase *productivity*, retain *sustainability* and hold *adoptability* to be accepted and modified to fit local features (Ramachandran Nair, 1993).

To classify agroforestry systems, it can be looked upon different features of output and environment. Structural basis refers to the composition and arrangement of the components in the system. Function will tell the main function of the system, production purposes or protection purposes. Socioeconomic features depend on the level of input, management and commercial goals. Ecology refers to the environmental adaptability and in which ecological conditions the system is suitable (Ramachandran Nair, 1993).

Depending on the structure and nature of components in the system, three terms are often used to describe them. Agro-silviculture, where the production is focused on forest products and crops. Silvo-pastural systems, where the production is focused on livestock and wood production. And Agro-silvocultural systems, where the management is focused on all three components of trees, crops and livestock (Buck, 1989).

All the agroforestry systems can be sorted into about 20 different practices. One of them being the agroforestry homegardens (Nair & Muschler, 1993).

2.3 Agroforestry Homegardens

The agroforestry homegardens are widely spread and used over the tropics. It has a long tradition in many tropical countries and can be found in almost all tropical and subtropical eco-regions. They consist of a combination of agricultural crops, plants and trees growing around the home compound. Also, animals are often included in the homegardens and labor is carried out by the family members for their own self sustainment. A continuous production of food over the year will provide the family and there is generally something to harvest at almost all times (Ramachandran Nair, 1993). Thereby homegardens hold the possibility to buffer some household food supply, in times of uncertainty like drought (Linger, 2014).

Homegardens have a close relation to the natural forest, with low biotic stress, multilayered canopy and higher diversity than conventional agricultural systems. They consist of a number of plant and tree species which are close to the species met in the natural forest. The diversity, structure and composition of the homegarden are connected to conditions like location, environment, socioeconomics and cultural factors. Within communities, the composition and structure of the homegarden will vary, depending on the choice of crops cultivated and also the management of the homegarden. They are seldom bigger than a hectare in size (Atangana, et al., 2014).

The most important species in the homegardens throughout the tropics are the ones that contribute to household food security. Second is the position of cash-crops, which are likely to continue to increase in importance in the future (Kumar & Nair, 2006).

The biggest cause of famine and food shortage in Ethiopia is connected to fluctuating rainfall. However, homegardens can reduce risks that conventional agriculture currently is facing when avoiding negative effects of uncertain climate, like drought. In a study from north-western Ethiopia (Linger, 2014), it also shows that the economic income for farmers who practice a homegarden system were higher than the farmers practicing conventional agriculture. The conventional systems show great sensitivity to fluctuating weather conditions, like lack of water, which contributes to lesser and more uncertain cash income (Linger, 2014). The ability of the homegarden system to provide harvests at different times of the year further reduces household income variability.

Agroforestry homegardens with its multilayered vegetation structure will reduce soil erosion, increase soil fertility and hold moisture through composting (Linger, 2014). They are considered to be an addition in feeding a bigger world population in the future and also one of the biggest sources of food and income for the rural people in Africa. Homegardens also has the potential to reduce poverty and increase economic growth in Ethiopia as well as reducing household vulnerability, maintain food security and sustain the natural environment (Gebrehiwot Sahilu, 2017).

In the Sidama zone in southern Ethiopia the homegardens evolved from the forest, where people made small gaps in the forest and started their living based on livestock and the growing of perennial and annual crops to sustain their own

livelihood. Enset (*Ensete ventricosum*) became the main staple food in the region, which provides both food and fodder (Gebrehiwot Sahilu, 2017; Abebe, et al., 2013). Also, coffee (*Coffea arabica*) is often grown and these two species are together seen as the main key stone species of these homegardens. Coffee is grown for commercial purposes after household consumption. Ethiopian homegardens are regarded to be ecologically as well as socioeconomically sustainable (Abebe, et al., 2006).

2.4 Changing times

Agroforestry practices need to be adoptable and homegardens are no exception. Homegardens are under constant pressure of change due to demographic, economic, technological and social reasons. They are therefor changing and adapting to new dynamics. A change from subsistence homegardening towards an increasing proportion of commercial cash-crops is taking place both in Asia and Africa (Abebe, et al., 2006).

The homegardens of SNNP Regional State is since the 1990s under change from multifunctional agroforestry towards monoculture production of cash-crops. The driving forces are complex combinations of social factors, economics, politics, demography, technology, culture and biology (Gebrehiwot, et al., 2015). One of the major cash crops being khat *(Katha edulis)*, which exceeds all other major agricultural crops in economic return and can therefor lead to increased livelihood for the producers (Dessie, 2013). Farmers change their strategy in an attempt to meet the household needs for income and the continuous population increase has led to a reduction in farm size. The increased production of cash-crops has led to reduced production of food crops, coffee, livestock and trees in the area. This has further led to increasing food prices in the local market (Gebrehiwot, 2013; Gebrehiwot Sahilu, 2017).

2.5 Objectives

The aim of this graduation project was to get an insight of how the recent change of the agroforestry homegardens in Wondo Genet, Ethiopia, affects individual households' food security and also how it affects the food supply in the local market of Wondo Genet.

The study focuses on the comparison of a traditional agroforestry system, where multiple crops are cultivated for the benefits of the family subsistence, with a newer system where monocultures of non-edible cash-crops are being produced and sold for cash income.

In order to achieve this aim, the thesis have two objectives:

#1 To study how food security for farming families will change, depending on the choice of crops cultivated.

#2 To examine how the food supply in the local market has changed because of the changes in land use.

Two research questions were formulated based on the objectives:

1. Does the food supply on household level deteriorate when cash-crops account for the main income or is a change positive for the household as a whole?

2. In what way have the transition affected the food supply in the local food markets?

3. MATERIALS & METHODS

3.1 Study area

The field study was performed in Wondo Genet in the southern part of Ethiopia in April 2018. Wondo Genet lies in the northern part of the Sidama zone, in Southern Nations Nationalities and Peoples Regional State (SNNPRS), which is a federal state in Ethiopia. The Sidama zone is densely populated with 520 people per km^2. More than 89 % of the population are rural and the dominant livelihood practice is agroforestry. Three agro-ecological zones are found in the Sidama zone, Qolla, Woyna Dega and Dega, ranging from 500 – 3500 above sea level to the highest. Wondo Genet lies in the Woyna Dega zone which has an altitude of 1500 – 2500 m a.s.l., an annual rainfall of 1000 – 1800 mm and a mean annual temperature of 15 – 20 ˚C. The Sidama zone has 19 Weredas and 532 Kebele administrations, which are sub-districts and village administrations. (Gebrehiwot Sahilu, 2017).

The study area was located around the Kebele administration in Wondo Genet of Wesha Soyoma (7°05'09.1"N 38°36'53.7"E) and its three sub-villages Gote 1, 2 and 3.

3.2 Data collection

3.2.1 Key informant interviews

To collect overall information about the selected subject key informants was interviewed in the beginning of the field-study. Five key informants from the Kebele was interviewed, the head of the Kebele administration and one development agent from the ministry of agriculture. First, I got help by translator to explain the purpose of the study and what kind of information that were looked for. Then we discussed the matter of food security connected to changing agricultural practices in the homegardens of the Kebele and about food supply in the local market. The interviews were held in Amharic, while the information was systematically noted and written down, for later translation to English. The information presented of the key informants served as a foundation when the questionnaires for interviews were designed.

3.2.2 Interviews with farmers

To understand how food security of individual households are affected by the transition in farming practice, interviews were held with local farmers. Out of the 15 respondents there were 13 men and 2 women. The domination of men is because the interviews were held with the head of the household and due to the system of inheritance and land tenure rights in the area only men inherit land. The only way for women to get tenure rights over land is by inheriting from their past away husband (Gebrehiwot, 2013).

The surveys were translated from English to Amharic, which is the official national language of Ethiopia (Ethiopian Government Portal, 2018). A local guide who was known in the area helped to perform the interviews. The answers were

thoroughly written down and later carefully translated back to English. Due to the difference in language and need for translation the data collection of the field work was consisting of secondary sources (Kylén, 2004).

The interviews were conducted in the home of the respondent and lasted between 10 and 30 minutes. Closed questions could be followed by open ones, to allow some flexibility and get more personal answers. The questionnaire in full is attached in chapter 8 (attachment 1). The first questions were about personal information, farm size and family size. Then 12 questions followed:

- For how long have you lived in this area?
- What is your main livelihood activity?
- For how long has it been?
- What was the main production of your household 20 - 30 years ago?
- Was the food supply from the farm then enough to support your family? Followed by: If no, why?
- What major changes have you experienced on your livelihood practice for the last 20 - 30 years?
- What is the main production of your household today?
- What is the present source of food supply for your family?
  If answered “your own farm”, then the question followed by: Is the food supply from the farm enough to support your family? If no, why?
  If answered “market”, then the question followed by: What changes have you observed about market food supply, over the last 20 - 30 years? If increasing or decreasing, why?
- Does your food supply have seasonal changes and changes from year to year? Followed by: If yes, why?
- If you grow more cash-crops currently than in the past: Which farming practice do you prefer most?
- If you grow more cash-crops currently than in the past: Do you want to return to traditional farming practice?
- Comparing the past and present farming practice, how has your livelihood changed?

The answers from the interviews were transmitted to Microsoft Excel for the handling of data and analyses of results.

3.2.3 Interviews with traders

To collect information on how the food supply of the local market is affected by the change of land use in the area, interviews with local small-scale traders were conducted. Out of the 10 respondents, 9 were women and 1 was a man. This majority of female because small-scale trading being a traditional women’s-business, where surplus production from the farm is sold on the market by the women (Gebrehiwot, 2013).

The interviews were conducted in the Kebele administration office, to avoid outer disturbances. The preparation and performance of the interviews was

approximately the same as for the interviews with the farmers. They lasted between 10 and 20 minutes. Like for the household interviews, Microsoft Excel was used to analyze the answers. The full questionnaire is attached in appendices (attachment 2). The first questions were about personal information, followed by 10 questions:

- For how long have you lived in this area?
- For how long has trading been your main source of income?
- What where the main crops/food products that you sold 20 - 30 years ago?
- What are the main crops that you sell currently?
- Are there any changes in the market supply of products? Followed by: If yes, what have caused the change?
- Where did the crops mainly come from 30 years ago?
- Where do the crops mainly come from these days?
- If there is a difference, what have caused the changes?
- Do you think producers/farmers are benefitting from these changes in terms of food and livelihood security?
- Where do you see the future supply of crops comes from?

3.2.4 Focus group discussion

At the end, a focus group discussion was held. The members of the focus group discussions were randomly selected from the Kebele depending on their livelihood. Both traders and farmers were in the group, 5 women and 5 men. The discussion aimed to strengthen and validate the answers identified during the interviews and also to widening the perspective and get a deeper insight into the two selected research questions. Extra focus was put on the limitations and challenges farmers are facing to return to the practice of homegarden.

Figure 3.1 *Some of the participants during the focus group discussion. Photo – Fredrik Larsson*

Before the discussion started, the participants got information about me, the thesis and the purpose of the discussion. Like the other data collection, it was collected in Amharic for later translation into English.

4. RESULTS

4.1 Food security of individual households

4.1.1 Farmer interviews

Out of the 15 farmers that were interviewed, 13 are men and 2 women. Their age ranges from 40 – 80 years with an average of 55 years. The number of family members are 2 - 10 people per family with an average of 7 family members. Their farms vary in size from 500 m^2 – 8000 m^2, with an average of 4333 m^2.

All respondent farmers presently produce a larger proportion of cash crops and a smaller proportion of food crops compared to 20 – 30 years ago. Back then, when the main production was food crops, the food supply from all farms was enough to support their families. All respondents have gone through the same transition, new cash crops, more cash crop production and less livestock husbandry. Only one farmer mentions one new food crop that they grow nowadays for household consumption.

These days the major agricultural production in the area is of cash crops, especially khat *(Katha edulis)* and sugarcane *(Saccharum spp.)* (figure 4.1). No one of the farmers are self-sustaining on food any more. There are several reasons for that highlighted by the respondents, the most frequently being increased cash crop production due to the need of money, population growth and climate change (figure 4.2).

Figure 4.1 *The main cash crops in the area. Sugarcane (left) and khat (right). Photo – Helena Jonsson*

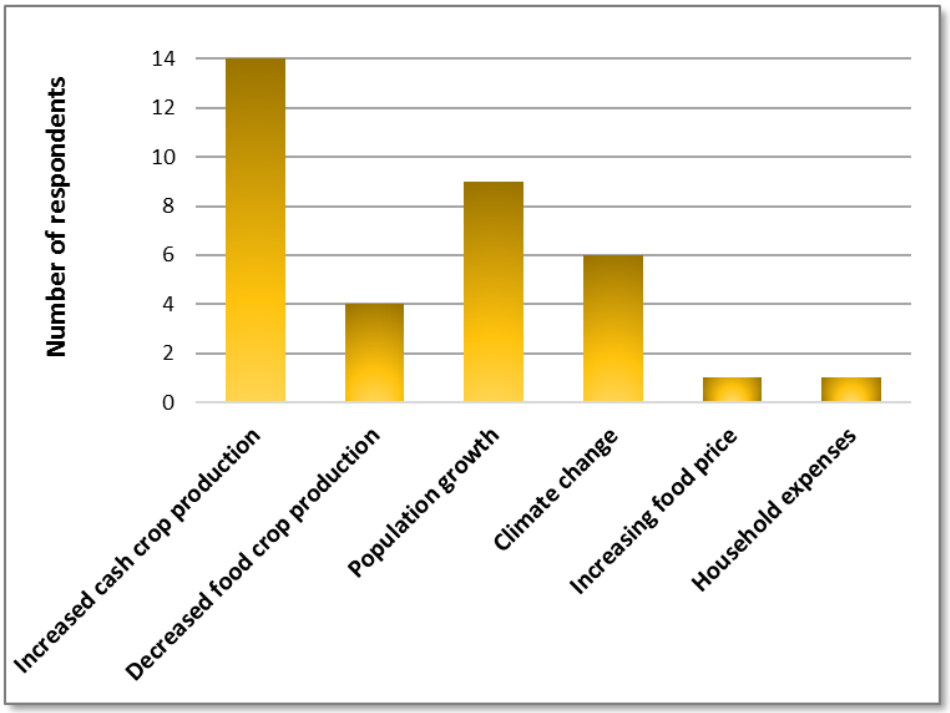

Figure 4.2 *Shows the frequency of answers on why the food supply from the farm at present is not enough to support the household needs.*

The farming households are presently relying on the possibility to buy food from the market. Still, all respondents expressed that they have observed a decreasing trend in food supply at the local market. Presented in figure 4.3 is a summary of the causes to the decreasing food supply stated by the respondents. Decreased food crop production in the local area and rapid population growth are the most frequently reported causes. Along with the climate change.

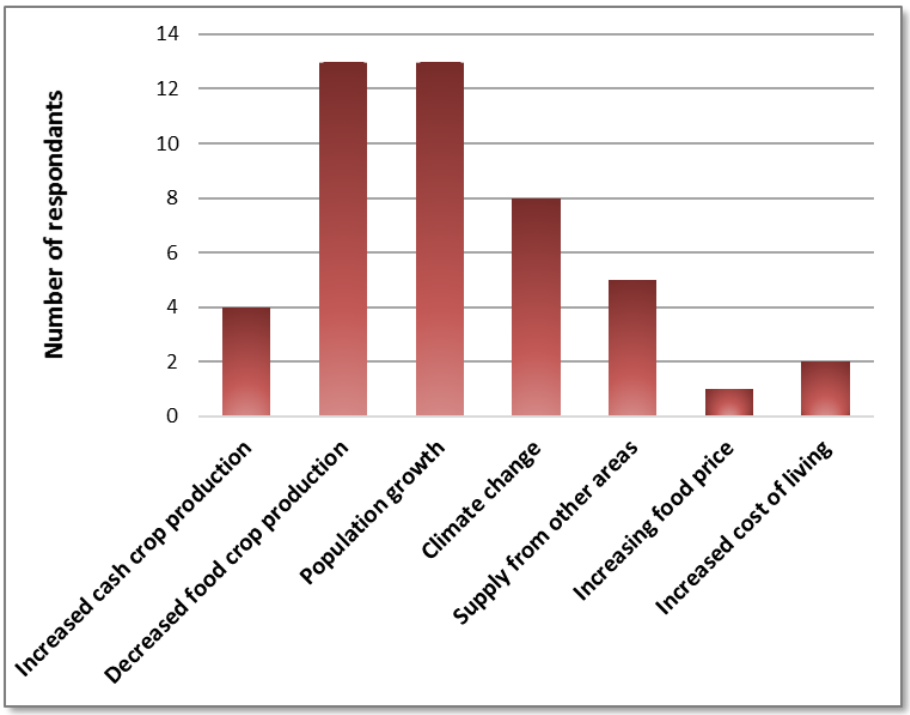

Figure 4.3 *The farmers view on why the food supply in local markets is decreasing.*

Because of seasonal changes in weather conditions, the food supply for the households is varying. Most of the respondents (12 out of 15) argue that the climate change is the reason for their seasonal changes, or changes from year to year, in household food supply. All farmers reason that the variations are connected to drought. Limited or fluctuating rainfall and decreased possibility for irrigation when springs dries out are seen as major problems (figure 4.4).

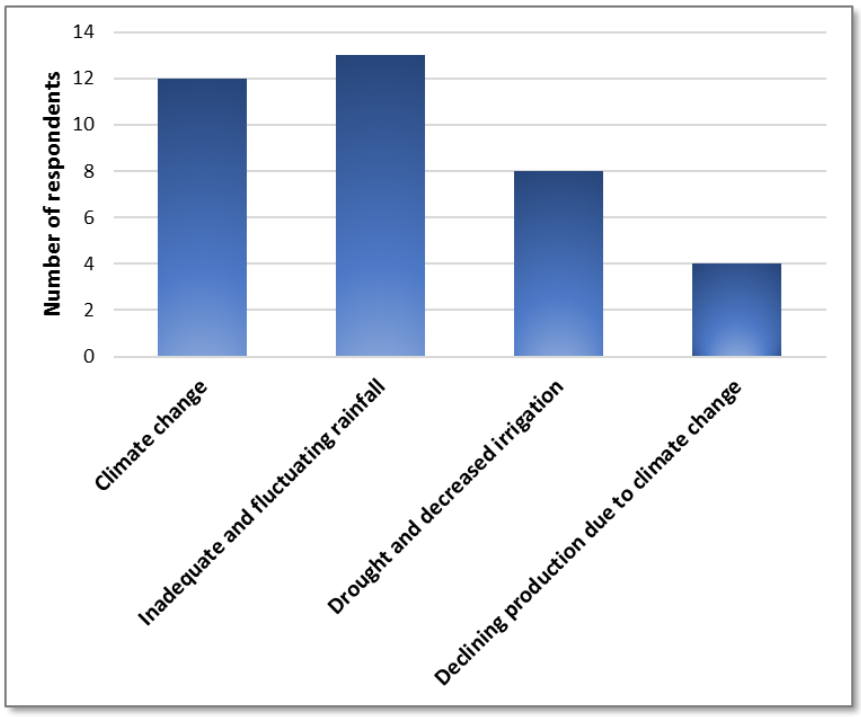

Figure 4.4 *The main reasons for seasonal changes in household food supply.*

Out of the 15 farmers who responded on the survey, 14 feels like their livelihood in terms of food security has decreased when comparing the past and present farming practice. To quote one respondents answer:

"We are struggling to support our family with adequate food, to send our children to school and to feed our children."

On the question if they wanted to return and go back to traditional farming practice of homegarden, all answer yes. The adequate food supply that they experienced in the past along with a smaller population, bigger farms and better local climate are the main reasons:

"-Because previously the supply of everything was adequate."

Some also point out that the possibility to return to the practice of agroforestry homegarden today is not possible due to population increase and smaller plot sizes:

"-The farmland that I have is too small to maintain previous practice."

4.1.2 Key informant interviews

The key informants stated that in Wondo Genet with its nearby surroundings, farmers grew a great number of food crops in their agroforestry homegardens 20 – 30 years ago. The food supply was then more than enough to support the families and community. The quantity of crops that were harvested even gave an excess, which was at sometimes given away to neighbors and relatives but also to poor people from the surroundings. The respondents claim that the present transition of farming has led to an important change, farmers do not grow food crops anymore but cash crops.

Nowadays, when the production of food and the supply is low in the area, governmental agricultural advisers are trying to advice farmers to grow more food crops instead of cash crops. This, in order to mitigate any food shortages in the area. However, the poorer farmers with smaller landholdings are stuck with the cash crop production and cannot afford the investment to go back to the previous practice. They now need a continuous income of cash to sustain their livelihood. On the other hand, the respondents reasoned that some richer farmers are reducing the cash crop production in favor of producing more food crops again.

4.1.3 Focus group discussion

During the focus group discussion, the main topic were population growth and land shortage. Limitations to return to agroforestry homegardens after a change to cash crop production was also discussed and the changed livelihood in the area.

The focus group members argued that population growth has led to subdivision of the farms, resulting in smaller plot sizes. They state that previously the main production of the homegardens was enset and livestock, now it has changed to monoculture production of cash crops. People have come to value money higher and compete amongst each other. Farmers have changed and modernized their standard of living with better houses, healthcare and improved education for the kids.

Nowadays though, with increasing prices of food and living, the group members claim that household food supply is now becoming the limiting factor. They further discuss that most farmers have lost the opportunity to return to traditional practice, and that they need to grow cash crops in order to get food for the day.

4.2 Food supply in local markets

4.2.1 Trader interviews

The 10 respondent traders are mainly women, 9 out of 10. They are between 28 - 82 years old, with an average of 44 years.

All respondents claim that the origin of food products in the local market has gradually turned from being produced mainly in the local area towards to be increasingly imported from surrounding areas over the past 30 years. While at the same time a gradual transition of the local agricultural system has occurred, from the traditional agroforestry homegarden towards monoculture production of cash crops.

The respondents argue that when most of the farmers change their production to monocultures of cash crops the local production of food is lowered and consequently the local source of food products becomes limited. Furthermore, they claim that the local market then relies on supply from nearby cities and market places to meet the demand for food. The main reasons are shown in figure 4.5. Most of the respondents (7 out of 10) claim the change of origin to be a result of population growth. That declining farm size and increasing demand cannot be sustained by the current production. Even the main staple food enset is replaced by the growing of cash crops some respondents tell. Quote:

"-In the past everything was produced from local areas and the price was very cheap, now it is not there."

Increased cash crop production in the area, at the expense of food production was the second most frequently stated cause. The third most frequently cause given by the ten respondents was the increasing food price.

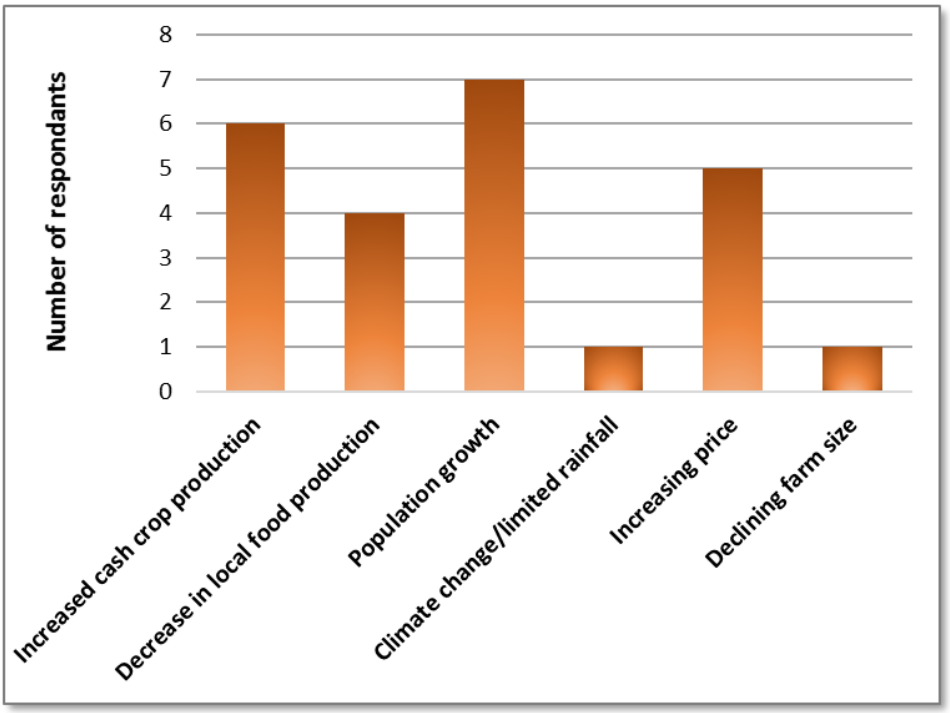

Figure 4.5 *The causes of change in market food crop origin. From being mainly locally produced towards being increasingly produced in other near places.*

Because of the existence of permanent cash crops in the local area, future supply is believed by 50 percent of the respondents to continue to come from neighboring areas. The other 50 percent answer that they cannot tell, it is too difficult to predict. Many respondents are afraid. They feel like the future is very uncertain and could get even worst.

There is a fear that the community could be facing starvation when no local food production is at hand and the supply to the market is under problem. One respondent argue that as food shortage is becoming a limiting factor, farmers will have to go back to traditional practice of growing diversified crops again. A quote from a respondent on the question where they see the future supply of crops to come from:

"-Cannot tell. The future is scary, as most of the local farming is producing cash-crops there will be starvation. Supply to the market will be under serious problem."

All ten respondents believe that the food supply in the local markets is different today compared to 20 – 30 years ago. Shown in figure 4.6 is what they believe causes this change. The most frequently stated cause is an increased production of cash crops in the local area and secondly population growth.

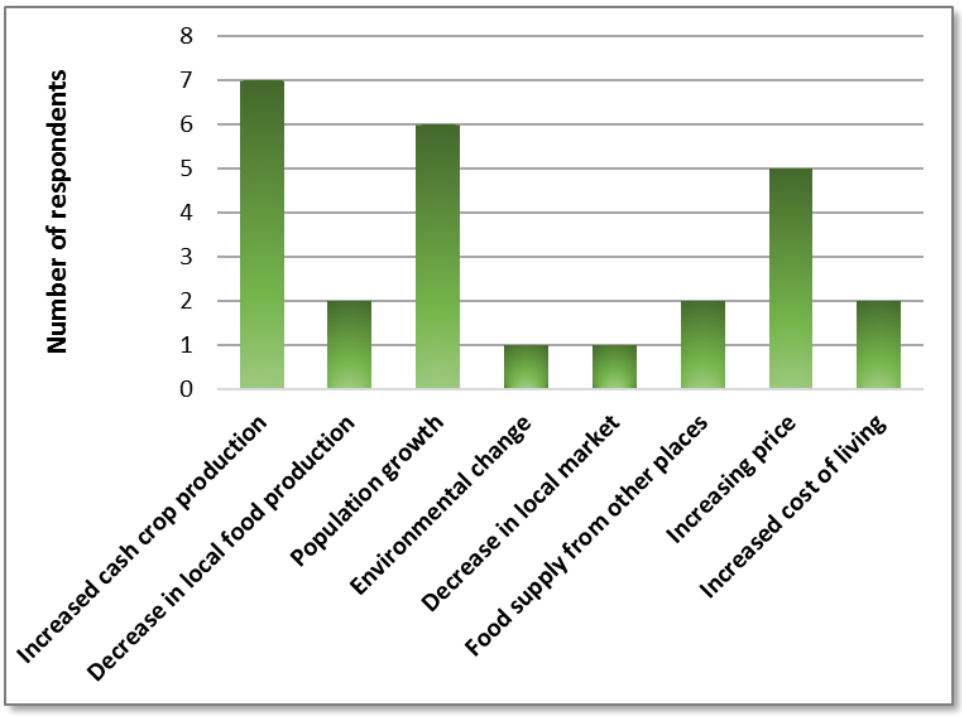

Figure 4.6 *Shows the frequency of respondent traders opinion of causes of changes in market food supply.*

No one of the respondent traders see that the farmers are benefitting from the changes in terms of food and livelihood security. Most of the respondents claim that both farmers and small-scale traders are negatively affected as the local farming transitions from agroforestry homegardens to monoculture production of cash crops. The only beneficiaries are claimed to be the big wholesale traders.

4.2.2 Key informant interviews

The respondents express that a big change has occurred in the local market. That the community have gone from being a net producer of food in the area to become a net consumer. Fully dependent on food entry from other places. Before 30 years ago, bigger traders of food used to come to the community to trade with the staple food of enset, among other products. Now, they argue that the new farming practices has removed that possibility and big wholesale traders only come there to trade with cash crops. They claim that the food price has increased rapidly and in connection to that, some rich farmers are now producing more food again.

5. DISCUSSION

5.1 Food security of individual households

All respondent farmers in this study claimed that their livelihood has declined, since the new farming practice and conditions do not support their family with adequate household food supply. The old practice was more than enough to support them with food. This correspond with the conclusions of Gebrehiwot Sahilu (2017) that agroforestry homegardens keeps food security of the individual households. On the other hand, their livelihood in terms of healthcare, modern houses and education seem to have improved nowadays with the cash income they get from the cash crops.

This finding both agrees and contradicts to Dessie (2013), who claim that the growing of khat can improve the livelihood of the producers. In Wondo Genet, it seems like the livelihoods improved at first, at least up until the food prices started to rise. When increasingly more farmers changed their production towards monoculture production of cash crops, food production in the area decreases resulting in a decrease of local food products. That in turn increase food prices in the area. Thereby decreasing the farmers livelihood and food security. With rising prices, food will like my respondents believe – become the limiting factor. Another interesting result in this respect is Lingers (2014) results from north-western Ethiopia showing a higher income from homegardens than from conventional monoculture agriculture.

Moreover, population growth and current farm size are brought up as major reasons why the food security is decreasing. Some negative effects followed by population increase (Buck, 1989) are more mouths to feed along with decreasing possibilities to practice different farming techniques. The respondents tell that the farm sizes are often too small nowadays to apply the homegarden practice. The farms included in this study span from 500 m^2 to 8000 m^2 in size, not one of the farms are bigger than a hectare. The average size of the family is seven people. One interesting aspect connected to the causality between high population growth and increasing food insecurity is family planning – that smaller families with fewer siblings would reduce further farmland fragmentation, that in turn, significantly improve the possibility to sustain the production capacity of the land and prevent unsustainable land use (Buck, 1989).

Most of the farmers claim to experience a recent climate change. They all claim to have seasonal changes in their food supply connected to limited water resources and inadequate possibility for irrigation. However, homegardens are better according to Linger (2014) in reducing soil erosion, increasing soil fertility, hold moisture and being more robust against fluctuating weather. Also, according to Gebrehiwot Sahilu (2017) homegardens will reduce household vurnerability. Moreover, the removal of trees in the area, when most of the farmers have changed their production away from agroforestry, could also affect the ability of the soil to retain moisture and handle the resources of water (Buck, 1989).

5.2 Food supply in local markets

The food supply in Wondo Genets local markets has changed. The increased cash crop production in the area is seen as the main cause, where the local production of food has decreased. These results are closely connected to the farming practices of the area. The origin of the food supply to the local market today is from other areas, not locally produced, because of the current lack of local food production.

When now increasingly relying on the supply from nearby communities and marketplaces to meet the local demand for food, the change of source of supply along with increasing distance, in turn, leads to increasing prices of food products. The traders express a fear of the future, stressing the risk of not producing food in the local area but instead being increasingly dependent on the flow of food from outside in to the community. The sustainability of this system can be questioned, especially in times of crisis and climate change.

Another negative effect for the small-scale local traders of the ongoing transition is that big wholesale traders will replace them in the business of cash crops. The local traders then miss their livelihood, as the goods that they trade are disappearing from their area.

5.3 Conclusions

Cash crop production, population growth and climate change are the major causes to the problem of food security and supply claimed by all types of respondents in this study. I argue that the current production of cash crops in Wondo Genet impedes food security of individual households in the area and the food supply to the local market.

To answer my research questions:

1. *Does the food supply on household level deteriorate when cash-crops account for the main income or is a change positive for the household as a whole?*

   Yes, in Wondo Genet the food supply at household level deteriorate when cash crop production account for the main income.

2. *In what way have the transition affected the food supply in the local food markets?*

   The transition has led to decreasing local food production, resulting in decreasing local supply, that in turn, has changed the origin of the food products in the local market – not being of local origin anymore. Together, these changes result in increasing food prices at the local market.

5.4 Reflections & recommendations

I argue that the rising food prices in Wondo Genet can lead to a higher economic return for individual households who apply the homegarden practice with a stronger focus on food production and climate resilient farming methods. The rapidly increasing population with following reduction in farm size are among the

causes to why monocultural production continues to be favored in the area instead of agroforestry, resulting in a shortage of local food supply in the area. The market now need to stabilize along with the supply. If homegardens in Wondo Genet have a higher or at least give a more resilient economic return, being more flexible to climate fluctuations, it could be a driver for farmers to return to the more resilient practice of agroforestry homegarden. To continue to point out the actual benefits of agroforestry systems will hopefully make increasingly more farmers to compare and analyze their production and, by the guidance from agricultural advisory service, start to apply agroforestry practices. Not only producing more food for themselves and the community, but also apply the multifunctional practice that homegarden is, with multilayered canopy and thereby get improved diversity, increasing water infiltration, moisture holding capacity, improving soil fertility and reducing soil erosion.

The agroforestry homegarden practice will mitigate production losses and reduce vulnerability to market and weather changes. Farm sizes are currently claimed to be too small to apply the homegarden practice. However, to be able to compare the influence of the interaction between household size and the size of family landholding under different agricultural practices I argue for further research. Thereby to tell if the total arable land in the area is currently enough to fully sustain the local population with food, when applying sustainable land use systems.

Further, I argue for the integration of family planning in future studies and development efforts to improve food security. I push for the overall need of available family planning for the rural people. To reduce women health risk, reduce family sizes and slowing population growth along with other positive effects. These question along with women's rights, have not been in focus during this study, but are nevertheless important and of big importance when discussing sustainability of farming systems and rural development. I suggest that guidance should be provided to the families and also to make contraceptives available. Whether this is possible to apply in the field, I do not know. However, I claim that the population growth need to slow down as to improve sustainability of any farming system in densely populated areas.

Moreover, I argue that with difficult climate conditions, fluctuating weather and market conditions agroforestry practices will be advantageous compared to conventional agriculture and would therefor be a better alternative than monoculture production. As climate change is estimated to be an even bigger risk in the future, I argue that diverse, robust and sustainable systems should be looked for and are needed. Also, new food crops better suited for periods of drought would be an interesting aspect to look even further into, especially as only one farmer in my study mentioned one new food crop that they grew.

The necessity of climate resilient food production along with accessible family planning are my two main recommendations based on my learning experience of this study. To find a sustainable way forward, I argue for the need of integrated research that consider the effect and interaction of family planning, the increasing variations in climate, the use of alternative crops as well as local and global prices and policies.

6. SUMMARY

Ethiopia, located in the Horn of Africa, consists of nine regional states, one of them being the Southern Nations, Nationalities and Peoples Regional State (SNNP Regional State). Here over 90 percent of the population is rural and in the Sidama zone, the main livelihood activity is small-scale farming and agroforestry.

Agroforestry is the name for a combination of different practices combining trees and crops and/or pasture in the same unit of land. It has potential to reduce problems of environment and development, with a focus on developing countries in the tropics. It provides multiple benefits and ecosystem services, is important for biodiversity conservation and climate change mitigation, increases land productivity, reduces land use conflict and has the potential to improve livelihoods at the same time as reducing land use pressure.

Agroforestry homegarden is the practice of growing crops, plants and trees around the home compound. Often in combination with livestock husbandry and with the labor carried out by the family members for their own livelihood. Homegardens have low biotic stress and high biodiversity compared to conventional agricultural systems and can better avoid negative effects of climate, like drought. With a multilayered vegetation structure, it will reduce soil erosion, increase soil fertility and better hold moisture. In the Sidama zone of Ethiopia, Enset *(Ensete ventricosum)* is the main staple food and a part of the homegardens, which produces both food and fodder. Agroforestry homegardens are seen as one of the biggest sources of food and income for the rural people in Africa and has the potential to increase economic growth and reduce poverty in Ethiopia.

Since the 1990s the homegardens are under pressure of change. Moving away from agroforestry toward monoculture production of cash crops. The driving forces are complex. The farmers try to meet the household need for income and also, population growth has led to smaller farming plots. The aim of this thesis was to understand how the recent change of production affects the food security of individual households. Also, to investigate how the transition affects the food supply of the local market.

The field study was conducted in Wondo Genet, Ethiopia, in April 2018. The results were built upon the information received from interviews with local farmers and traders, interviews with key informants and also, information gathered from a focus group discussion.

The results show that individual households food security is at stake due to the magnitude of cash crops which presently are grown in their farms, at the expense of food crops. With reduced food production in the families are dependent on the food supply in the market to sustain their need for food. Population growth has led to fragmentation of farmland, reducing the possibilities for well-functioning agroforestry homegarden. Further, climate change in the area reduces the food supply and periods of drought affect the community harder nowadays than 20 – 30 years ago.

The food supply in the local market has also been affected by the difference in agricultural practices of the surroundings. Nowadays, when cash crop production in the area has increased at the expense of food crop production, the local market has become dependent on food to entry the community from nearby places. The food price has increased rapidly, the future supply seems uncertain.

To provide subjects for future research, comparison between farming households with different land holding- and family sizes would give insight in how population growth affects the sustainability of the different farming systems agroforestry homegardens and monoculture production of cash crops. Also, to slow down population growth, well-functioning and available family planning for the rural communities should be integrated in future studies as well as in development efforts to improve food security.

As further recommendations, climate resilient farming practices should be applied and will be advantageous compared to monoculture production, since the risks of climate change is estimated to increase in the future.

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8. APPENDICES

Questions for household survey ***Date:***

Name / ሰም_____

Gender: Male ☐ Female ☐
ጾታ ወንድ ሴት

Age / እድሜ _____

Name of Kebele Administration (KA) / ቀበሌ አስተዳደር : _____

No. of family members / የቤተሰብ ቁጥር:_____

Size of farm / የመሬት ስፋት: _____

No. of farms / የመሬት ቁጥር: _____

1. For how long have you lived in this area?

   ለምን ያህል ጊዜ እዚህ ቦታ ቆይተዋል?

   Whole life ☐ More than 20 years ☐ Less than 20 years ☐
   ሙሉ እድሜዬን ከ20 አመት በላይ ከ20 አመት በታች

2. What is your main livelihood activity?

   ዋና መተዳደሪያ ምንድነው?

   a. Farming ☐
      በእርሻ
   b. Daily labor ☐
      በቀን ሙያ
   c. Small scale trading ☐
      በንግድ
   d. A combination of above ☐
      በልዩ ልዩ
   e. Other ☐
      ሌሎች

3. For how long has it been?

   ለምን ያህል ጊዜ

   Whole life ☐ More than 20 years ☐ Less than 20 years ☐
   ሙሉ እድሜዬን ከ20 አመት በላይ ከ20 አመት በታች

4. What was the main production of your household 20-30 years ago?

   የሚመረቱት ዋና ዋና ሰብሎች ከ20-30 አመት በፊት ምን ነበር?

Food crops / የምግብሰብል	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐
Cash-crops / ለገበያ	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐
Livestock / የቤት እንስሳት	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐

5. Was the food supply from the farm then enough to support your family?

   ከመሬትም የሚያመርቱት ሰብል የቤትዎን ምግብ አቅርቦት ይሸፍን ነበር?

   Yes ☐ No ☐

   አዎ አይደለም

   If no, why?

   ካልሸፈን ለምን?

   _____
   _____
   _____
   _____

6. What major changes have you experienced on your livelihood practice for the last 20 - 30 years?

   ባለፉት 20-30 አመት ምን አይነት ለውጦችን በስራዎ/አስናንዱ/አዩ?

   More cash-crop production ☐
   የገበያ ምርት መጨመር

   New cash-crops ☐
   አዲስ የሽያጭ ሰብል Example / ምሳሌ:_____

   New food crops ☐
   አዲስየምግብሰብል Example / ምሳሌ:_____

   Less livestock ☐
   የከብትእርባታመቀነስ

   More livestock ☐
   የከብት እርባታ መጨመር

   Minor changes – still homegarden as it was before ☐
   ለወጡ መጠነኛ ነው እስካሁንም ጥምር እርሻ ይከናወናል

7. What is the main production of your household today?

   በአሁኑ ሰዓት የምታመርቱት ዋና ዋና ሰብል ምንድን ነዉ?

Food crops / የምግብሰብል	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐
Cash-crops / ለገበያ	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐
Livestock / የቤት እንስሳት	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐

8. What is the present source of food supply for your family

   አሁን የሰው ምግብ አቅርቦት ምንም የቤተሰብ ገበያ?

Your own farm ከእርሻዎ	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐
Market ከገበያ	All / በሙሉ/☐	¾☐	½☐	¼☐	None / የለም☐

   If answer is mainly "Your own farm":

   Is the food supply from the farm enough to support your family?

   ከእርሻዎ ከሆነ :

   ከእርሻዎ የሚያገኙት ምርት የቤተሰብዎን የምግብ ፍላጎት ሙሉ በሙሉ መደገፍ ይችላል?

   Yes ☐ No ☐

   አዎ አይደለም

   If no, why?

   የቤተሰብዎን የምግብ ፍላጎት መደገፍ ካልቻለ ለምን ?

   _____

   _____

   _____

   _____

If the answer is mainly “Market”:

What changes have you observed about market food supply,over the last 20 - 30 years?

ከገበያ ከሆነ

በገበያው ምርት አቅርቦት ላይ ምን ለውጦች ተገነዘቡ ላለፉት 20-30 አመታት?

Increasing ☐ Decreasing ☐ No change ☐

መጨምር መቀነስ ለዉጥ የለዉም

If increasing or decreasing, why?

ከቀነሰ ወይም ከጨመረ ለምን?

_____
_____
_____
_____

9. Does your food supply have seasonal changes and changes from year to year?

የሰብል አቅርቦቱ ተለዋዋጭነት አለው በወቅታዊ ወይም በአመታዊ?

Yes ☐ No ☐

አዎ አይደለም

If yes, why?

ይለዋወጣል ከሆነ ለምን?

_____
_____
_____
_____

10. If you grow more cash-crops currently than in the past:

Which farming practice do you prefer most?

የገበያ ሰብል ምርት በአርሻዎ ላይ እየጨመረ ነው

ከጥንቱና ከአሁኑ አርሻ ሰብልዎ የቱን ይመርጣሉ?

Traditional homegarden ☐

የዱሮውን ጥምር እርሻ

Present monoculture cash-crop production ☐

የአሁኑን የገበያ ሰብል ምርት

11. If you grow more cash-crops currently than in the past:

Do you want to return to traditional farming practice?

የገበያ ሰብል ምርት በአርሻዎ ላይ እየጨመረ ነው ይሁን እንጂ ወደ ቀድሞው ጥምር እርሻ ደን መመለስ

ትፈልጋላችሁ;?

Yes ☐ No ☐

አዎ አይደለም

Why?

ለምን?

_____

_____

_____

_____

12. Comparing the past and present farming practice, how has your livelihood changed?

የድሮውና የአሁኑ ሲወዳደር ምን ያህል አኗኗርዎ ተቀይሯል?

Increasing ☐ Decreasing ☐

ከፍ ብሏል ቀንሷል

Questions for traders survey **Date:**

Name / ስም _____

Gender: Male ☐ Female ☐

ፆታ ወንድ ሴት

Age / እድሜ _____

Name of Kebele Administration (KA) / ቀበሌ አስተዳደር : _____

1. For how long have you lived in this area?

   ለምን ያህል ጊዜ እዚህ አካባቢ ቆዩ?

   Whole life ☐ More than 20 years ☐ Less than 20 years ☐

   ሙሉ እድሜዬን ከ20 አመት በላይ ከ20 አመት በታች

2. For how long has trading been your main source of income?

   በንግድ ስራ ለምን ያህል ጊዜ ቆዩ?

   Whole life ☐ More than 20 years ☐ Less than 20 years ☐

   ሙሉ እድሜዬን ከ20 አመት በላይ ከ20 አመት በታች

3. What where the main crops/food products that you sold 20-30 years ago?

   ከ20-30 አመት በፊት የምትነግዱት ዋና ዋና ምርት ምን ነበር?

   Enset ☐ Potato ☐ Sweet potato ☐ Maize ☐ Beans ☐

   እሰት ድንች ስኳር ድንች ቦቆሎ አደንጓሬ

   Teff ☐ Carrots ☐ Cabbage ☐ Sugarcane ☐ Coffee ☐

   ጤፍ ካሮት ጎመን ሸንኮራ ቡና

   Banana ☐ Avocado ☐ Papaya ☐ Mango ☐ Others ☐

   ሙዝ አቮካዶ ፓፓዬ ማንጎ ሌሎች

   Dairy Products ☐

   እንስሳት ተዋጾ

4. What are the main crops that you sell currently?

   በአሁኑ ጊዜ የምትነግዱትበት ዋና ዋና ምርት ምንድነው?

Enset ☐	Potato ☐	Sweet potato ☐	Maize ☐	Beans ☐
እሰት	ድንች	ስኳር ድንች	ቦቆሎ	አደንጓሬ
Teff ☐	Carrots ☐	Cabbage ☐	Sugarcane ☐	Coffee ☐
ጤፍ	ካሮት	ጎመን	ሸንኮራ	ቡና
Banana ☐	Avocado ☐	Papaya ☐	Mango ☐	Others ☐
ሙዝ	አቮካዶ	ፓፓዬ	ማንጎ	ሌሎች

Dairy Products ☐
እንስሳት ተዋጾ

5. Are there any changes in the market supply of products?

   አሁን ከድሮው ጋር ሲነጻጸር በገበያ ምርት አቅርቦት ላይ ለውጥ አለ?

Yes ☐ No ☐
አዎ አይደለም

If yes, what is the cause of the change?

መልስዎ አዎ ከሆነ የለውጡ መንስኤ ምንድነው?

_____
_____
_____
_____

6. Where did the crops mainly come from 20- 30 years ago?

   የገበያ አቅርቦቱ ዋና ምንጭ ከ20-30 አመት በፊት ከየት ነበር?

Local production / አከባቢው ነ	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐
From nearby places / ከጎረቤት ገበያዎች	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐
Imported from distant places / ከሩቅ ገበያዎች	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐

7. Where do the crops mainly come from these days?

   የገበያ አቅርቦቱ በአሁኑ ወቅት ከየት ነው?

Local production / አከባቢው ነ	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐
From nearby places / ከጎረቤት ገበያዎች	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐
Imported from distant places / ከሩቅ ገበያዎች	All / በሙሉ ☐ ¾ ☐ ½ ☐ ¼ ☐

8. If there is a difference, what have caused the changes?

   በድሮና በአሁኑ አቅርቦት ላይ ለውጥ አለ ? በአሁኑና በዳሮው መካካል ለተፈጠረው ልነት መንስኤ.ው ምንድ ነው?

   _____
   _____
   _____
   _____
   _____

9. Do you think producers/farmers are benefitting from these changes in terms of food and livelihood security?

   ከዚህ ገበያ ለውጥ በምግብ ራስን በመቻል ማን ተጠቃሚ የሚሆን ይመስልአል ?

   _____
   _____
   _____
   _____

10. Where do you see the future supply of crops comes from?

    በዚህ ከቀጠለ የወደፊት የገበያ አቅርቦት ከየት ሊሆን ይችላል ?

Local production / አከባቢው ፡	All / በመሉ/☐ ¾☐ ½☐ ¼☐
From nearby places / ከነረቤት ገበያዎች	All / በመሉ/☐ ¾☐ ½☐ ¼☐
Imported from distant places / ከሩቅ ገበያዎች	All / በመሉ/☐ ¾☐ ½☐ ¼☐