EDRI

Ethiopian Development Research Institute

EDRI Working Paper 15

November, 2016

Coffee Income, Food Security and Diet Diversity of Smallholder Coffee Growers in Ethiopia

Tadesse Kuma Worako[a], Mekdim Dereje[b] and Bart Minten[c]

[a] Ethiopian Development Research Institute (EDRI), Ethiopia

[b&c] International Food Policy Research Institute (IFPRI)/Ethiopia Strategy Support Program (ESSP)

THE ETHIOPIAN DEVELOPMENT RESEARCH INSTITUTE

WORKING PAPERS

ABOUT EDRI

Founded in August 1999 as a semi-autonomous government development research institute, EDRI's primary mission is to conduct quality research on the development of the Ethiopian economy and disseminate the results to key stakeholders within and outside of Ethiopia. EDRI is sponsored by the Ethiopian government, ACBF, UNDP, IDRC-TTI and IFPRI/ESSP. For more information, as well as other publications by EDRI staff and its affiliates, see http://www.edri.org.et/

Ethiopian Development Research Institute (EDRI)
P.O. Box 2479
Tel: 251-11-550-6066
Fax: 251-11-550-5588
Email: info@edri.org.et
Website: http://www.edri.org.et

ABOUT THESE WORKING PAPERS

The Ethiopian Development Research Institute (EDRI) Working Papers contain peer-reviewed material from EDRI and/or its partners. They are circulated in order to stimulate discussion and critical comment. The opinions are those of the authors and do not necessarily reflect those of their home institutions or supporting organizations.

Paper citation: Worako, T.K., Dereje, M., Minten, B**.** 2015. Coffee income, food security and diet diversity of smallholder coffee growers in Ethiopia. **EDRI Working Paper 15**. Addis Ababa: Ethiopian Development Research Institute.

About the Author(s): Tadesse Kuma is a Research Fellow and Coordinator of Agriculture and Rural Development Center at the Ethiopian Development Research Institute (EDRI); Mekdim Dereje is a Research Officer at the Ethiopia Strategy Support Program – Ethiopia Development Research Institute (ESSP/EDRI) and Bart Minten is a Program Leader and Senior Research Fellow at the Ethiopia Strategy Support Program of the Development Strategy and Governance Division, International Food Policy Research Institute.

Coffee Income, Food Security and Diet Diversity of Smallholder Coffee Growers in Ethiopia

Tadesse Kuma Worako[a], Mekdim Dereje[b] and Bart Minten[c]

[a] Ethiopian Development Research Institute (EDRI), Ethiopia

[b&c] International Food Policy Research Institute (IFPRI)/Ethiopia Strategy Support Program (ESSP)

Table of Contents

List of Tables

List of Figures

Abstract

A large primary survey was conducted to understand the status of food security and diet diversity of smallholder coffee farmers from within major commercial coffee producing zones in the country. We relied on data from almost 1,600 households that were randomly selected and then interviewed using a multi-stage sampling technique. The study applied both descriptive and econometric methods to analyse data from the household survey. As core findings indicate, income from coffee sales was found to be positively and significantly related to food security while better diet diversity is found to be associated with total household wealth. However, diet diversity has no positive or negative association with the share of coffee in total household income. In both cases of food security and diet diversity, land size, the total value of household assets and the value of livestock are found to have a positive contribution as predicted. This implies that cash crop production of coffee can help to assure improved food security in the country, although other additional measures are needed to obtain improved diet diversity of smallholder coffee growers.

1. Introduction

Despite dramatic improvements in global crop yields over the past half-century, chronic food and nutrition insecurity, hunger and undernourishment persist in many developing countries[1]. This issue has been and will remain one of the development challenges at the center of the development agenda for national governments and development partners for some time to come. As a strategy to support food security via generating additional income, cash crops production has been promoted in many African countries, mainly since the advent of colonialism in Africa (Zeller and Sharma, 2000).[2] There are several underlying arguments by proponents about the role of cash crop production in improving food security: (1) specialization in cash crop production allows farm households to increase their overall income by producing a commodity which provides a higher income; they can then use the cash income obtained from sales of produce to buy food as well as consumption goods and achieve a higher level of welfare, including food security (Timmer, 1988); (2) Cash crop production reduces rural poverty because it contributes to the diversification of livelihoods, thus increasing household's average income earning potential, which in turn increases the household's spending potential on food and non-food items; (3) Benefits from cash cropping accrue to non-cash crop producers by providing employment, particularly since producing cash crops is typically labor-intensive (Poulton et.al., 2001); (4) Introduction of cash cropping opportunities results often in an alleviation of cash constraints during planting periods of food crops, ensuring access to inputs for food crops which in turn positively affects the productivity of these crops since households are able to afford improved technologies (Govereh and Jayne, 2003). This cash income ultimately offers opportunities for farmers to invest in their farm and improve the farms' management, hence stimulating agricultural innovation and increasing yields. In general, proponents believe cash crop production will pave the path for agricultural transformation.

However, despite continued efforts to promote cash crop agriculture as a means of reducing rural poverty and food insecurity, it is unclear to what extent and under which conditions cash crop production can achieve this at the household level (Jones and Gibbon 2011). The opinion of scholars is still divided over the efficacy of cash crop production as an instrument for ensuring food and nutrition security (Masanjala, 2006). The most recent literature reveals inconclusive results on the relationship between cash crop production, food security and diet diversity. Some authors have identified a positive relationship while others find more negative or neutral results. For instance, Pierre-Louis et al. (2007) show positive correlations between the production of peanuts in Mali and food security and diet diversity. Von Braun (1995) and Kennedy et al. (1992) also identified a positive contribution of cardamom production in Papua New Guinea, rice in the Gambia, maize in Zambia, and potatoes in Rwanda. Negash et al. (2013) further found positive correlations of food caloric intake with the participation of the household in the production of castor beans used for biofuel in Ethiopia. On the other hand, negative correlations were found with the production of cassava as a cash crop in Ecuador (Leonard et al., 1994), cacao and sugarcane production in Mexico

[1] Almost 850 million people do not have enough to eat and, alarmingly, in many parts of the world, the number is on the increase (FAO, 2013).

2 A cash crop is defined as a crop grown for direct sale or for the market, rather than for subsistence food or for household consumption. Cash crops could be classified into two categories: first, crops that are exclusively grown for sale (i.e. non-food) which include crops such as cotton, coffee, cocoa or tea and second, food crops that may be consumed by the household or sold on markets, such as rice or maize, and also certain fruits and vegetables. In this study, we focus mostly on the first category.

(Dewey, 1981), and cold-weather vegetables production in Guatemala (Immink and Alarcon, 1993).

The global literature shows that the impact of cash crop production on food and nutrition security is seemingly context specific and its impact varies significantly across geographical areas, crop choice, local and global social structures, market situation, and policy environment (Branca et al., 1993; Dewalt, 1993; Sharma, 1999). Its effect varies also with demographic and socio-economic status of the household such as land holding, family size, gender of household head, education levels, risk levels, and other factors (Kiriti and Tisdell, 2004; Gauchan, 1997; Komarek, 2010). As stated by Reardon et al. (1992), cash crop production is also more susceptible to production, market and price risks than food crops. Hence, rather than fully specializing in the production of a single commodity, farm households prefer to diversify their production portfolio and therefore smoothen their consumption over time (Fafchamps, 1992).

We look at this issue in the case of coffee production in Ethiopia. Coffee is one of the most important cash crops produced and marketed not only in Ethiopia but also in more than 50 developing countries. Small-scale farmers are estimated to contribute 70 percent of the world's coffee supply (Eakin et al., 2009).[3] In Ethiopia, coffee is seen as green gold for the nation; it has been and remains to be the leading cash crop and export commodity, accounting on average for about four percent of Ethiopia's gross domestic product (GDP), 10 percent of agricultural production, and about 37 percent of total export earnings over the past decade. It is further estimated that coffee production is mostly in the hands of smallholders and that about 4.2 million smallholder farming households contribute to 93-95 percent of national coffee production (MOA, 2014). These smallholder coffee producers are heavily dependent on coffee income as the main source of their livelihood. Moreover, the coffee sector in Ethiopia directly and indirectly affects the livelihood of a quarter of Ethiopia's total population, providing jobs for farmers, local traders, processors, transporters, bankers, exporters and different service providers.

However, due to the volatile nature of coffee production and prices, i.e. weather and international market related shocks, smallholder coffee producers are usually exposed to large variations in their coffee production, sales, and income which in turn affect their total income, food consumption and overall welfare of coffee growers. Terms of trade between coffee and grain prices also has substantial implications on food security and diet diversity of coffee farming households. In years with good coffee prices, farmers are able to pay their agricultural credit, government taxes and other obligations from coffee sales and are also able to purchase adequate food grains for family consumption. Conversely, when income from coffee fails to cover cash requirements, this negatively affects food security and increases depth of poverty of farming households.

Nevertheless, there have been very few global in-depth studies based on comprehensive datasets to understand the association between coffee income, food security and diet diversity of coffee farming households. In other words, how the improvement of food security is linked to coffee production is not well known. To fill this apparent knowledge gap, this

[3] Worldwide, the industry supports about 25 million coffee producers. When we consider participants in the coffee value chain including coffee harvesters, processors, transporters, casual and regular workers, closer to 100 million people are engaged in the sector and their livelihood depends on the crop in some way (Jha et al, 2011).

study aims to understand to what extent coffee production and its income make a difference in food security and diet diversity of smallholder coffee farming households in Ethiopia. More specifically, the study addresses the following research questions: (1) How is coffee production linked with coffee sales? What is the role of own consumption? How does it differ across regions and size of farm? (2) How is food security connected to diet diversity for coffee producers? (3) What is the link between cash income from coffee and food security/nutrition indicators? (4) What are the determinants of food security and diet diversity indicators?

The rest of this paper is organized as follows. The next section briefly outlines a conceptual model. Section 3 provides an overview of the importance of coffee in the Ethiopian economy. In Section 4, we present an overview of the data and the sampling methodology. Section 5 discusses the descriptive results. Section 6 provides information on the determinants of coffee sales/income. Section 7 explores the status of food and nutrition security or diet diversity and their determinants within coffee producing households, followed by the final section which is devoted to conclusions and recommendations.

2. Conceptual framework

2.1. Changing perception on concepts of food and nutrition security

Traditionally, a stable and sufficiently high level of food production in low income countries was often considered to be adequate for good nutrition. However, over the years, the perception that agricultural production and food availability were not particularly relevant to favorable nutrition outcomes has grown (Kennedy, 1989). In the 1970s, the focus was mainly on increasing food supply as the key determinant of food security and nutrition. The limitations of such focus on food supply only became clear during the mid-1980s with a number of food crises occurring in Africa. It became evident that adequate food availability at the national level did not automatically translate into food security at the individual and household levels, and the realization that food insecurity was occurring in situations where food was available but not accessible because of a dwindling entitlement to food (Borton and Shoham, 1991).

The Amartya Sen's influential finding on food entitlement has been widely credited with its impact on food security. Sen brought to attention questions surrounding individual access and entitlement (Sen, 1981). In particular, Sen's (1981) theory on food entitlement[4] had a considerable influence on the mindset at this time. He explained failures in terms of 'entitlements' or inability of individuals to access the food they needed due to poverty. He illustrated his argument by explaining the Bengal famine of 1943 in terms of the disjuncture between soaring rice prices and stagnant wages for farm labor, which left workers unable to buy enough food. In this way of thinking, income and food prices were considered to be major determinants of the food security status of a household.

In the early 1990s a study made by UNICEF on the causes of malnutrition demonstrated that food is not only one factor in the malnutrition equation; in addition to dietary intake, health and disease, maternal and child care are also important determinants of food and nutrition

[4] Households derive food entitlements from their own production, income, gathering of wild foods, community support (claims), assets, migration, etc. Thus a number of socio-economic variables have an influence on a household's access to food.

security. Access to resources or income is not a sufficient condition unless it is known how it translates to satisfactory nutritional levels (World Bank, 1989). The concept of food and nutrition security has therefore expanded, especially since early 1990s. According to Maxwell and Smith (1992), food is only one aspect of a whole range of factors that determine why the poor take decisions and spread risk, and how they finely balance competing interests in order to subsist in the short and longer term. People may choose to go hungry to preserve their assets and future livelihoods. It is misleading to treat food security as the fundamental issue, independent of wider livelihood considerations; and in this notion food is assumed to be only one of the priorities that people consider fundamental.

Based on the changing perception on food security, the FAO acknowledges that food security has been a “flexible” concept, and defines it as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO, 2001). This definition is generally perceived as being comprehensive because it includes the concepts of food availability, food access, and utilization. In other words, it considers food quantity, quality and safety. Indeed, causes of food insecurity are complex: money and poverty, powerlessness, conflict, discrimination, demographic factors, and unsustainable natural resource management, all together account for the problem (Pinstrup-Anderson, 2002).

In the 2000s, further evolution occurred in concepts of food and nutrition security. It shifted from simply ensuring food and nutrition security to household livelihood security, embracing the importance of food security in a broader, more comprehensive perspective. Household livelihood security is defined as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration). According to this view, livelihoods are secure when households have secure ownership and access to resources and income earning activities, including reserves and assets, to offset risks, so that they can cope with shocks and meet contingencies. Households also need a voice or position in the legal, political and social fabric of society not only food (Chambers and Conway, 1992; Drinkwater and McEwan, 1992).

2.2. Impact pathway of cash crop production

There is conventional wisdom that the production of cash crops has a comparative advantage for rural poverty alleviation and income growth through a number of pathways. First, it contributes to the diversification of livelihoods and poverty alleviation by directly increasing the farm household's income earning potential, which in turn increases the household's spending potential on food as well as non-food items. Since cash crops may possibly lead to higher monetary income than food crops, the production of cash crops enables the farm household to obtain more income and food than it could obtain by devoting the same resources to own-food crop production. Second, benefits from cash cropping also accrue to non-participants due to higher returns to labor (Poulton et al., 2001). Since most cash crops tend to be labor-intensive, cash cropping entails a substantial expansion of the demand for hired labor that has rural employment effects. Third, cash crop production opens up opportunities to the development of rural financial markets. The introduction of cash cropping opportunities results in a partial relaxation of cash constraints during the planting of

food crops through the delivery of inputs at the needed periods (Goetz, 1993). Moreover, the introduction of cash cropping opportunities may also positively affect the productivity of food crops through encouraging adoption of improved technology and modern input use (Govereh and Jayne, 2003). This ultimately offers farmers opportunities for investment and improved management of their farms, stimulating agricultural innovation and increasing yields to pave the path for agricultural transformation.

Cash crop production can contribute beyond food security. When its production leads to increases in household income, the income can be used to purchase goods that affect health status. Better clothing and the ability of households to purchase improved healthcare are examples of this potential to improve health status. Higher incomes can also be used to purchase more food, higher-quality food, and a more diverse diet. These will directly improve nutritional status. Higher incomes will affect health indirectly through their impact on nutritional status and directly where the food purchased has fewer pathogens and thereby reduce exposure to food- and water-borne diseases (IFPRI, 2012).

However, cash crop production is also likely to sustain considerable yields, market and price risks, often more than other agricultural products. As farm households prefer to smoothen their consumption over time, they are inclined to be risk-averse, and rather than fully specializing, household resources will in part be allocated to different crops to minimize the overall risk of income (Reardon et al., 1992; Fafchamps, 1992). For these reasons, farmers combine cash crop production with food crop cultivation to ensure that this mixed production set-up will create synergies and lead to less food and nutrition insecurity.

Moreover, under credit and input market failures, which are common in many parts of Africa, commercialization may be one of the few feasible ways for farmers to acquire additional cash income used to purchase inputs. Access to liquidity of cash crop farmers might induce private investment in small-scale farm implements/access to animal tractions and commercialization may also support private investment in infrastructure and human capital that has broader benefits for other economic activities such as food crop production. These potential synergies between cash crops and food crops have generally been neglected in food crop research and extension programs, although they may have important implications for programs designed to promote smallholder food crop productivity growth. However, despite these synergies, there is also a trade-off between the production of cash and food crops.

In many instances, peasant households do not save, and so households dependent on cash income find it difficult to stretch this cash income to purchase food in the slack seasons (Kiriti and Tisdell, 2003). Income from sales of cash crops is also affected by the price at local and international markets and on the terms of trade (TOT) between the cash crop and food commodities. Accordingly, in the “cash versus food crop debate” proponents of the “food first” group deny the positive and sustainable effects of cash crop production because it will have negative impacts on food security with respect to the distribution and may rise dependency on food imports. The major concern is that, with increasing cash crop production, rural households will produce less food and the local demand might raise, causing a rise in food prices. As poor households spend a higher percentage of total income on food, this might especially have a negative impact on them (Kiriti and Tisdell, 2003). On the other hand, since cash crop production competes with food crops for limited land, and as

the area under cash crop cultivation increases, it might jeopardize households' food security, especially should food markets fail to provide adequate returns (Jayne et al., 2004). According to Anderman et al (2014), there are high synergies and tradeoffs between cash crop production and food security. Their findings from the study made in rural Ghana showed that cash crop production may increase household cash income and food stocks. However, this increases the vulnerability of households to food price changes because of high dependency on local market, and it shifts income control from females to males.

Proponents of "cash crop first" argue that viable and sustainable cash crop marketing arrangements can intensify food crop production by establishing assured access to inputs. This impact is even stronger under constrained access to farm credit or limited working capital (Govereh and Jayne, 2003; Govereh et al., 1999). The often observed absence of credit and input markets in rural areas, can therefore make the decision to grow cash crops non-separable from the demand of inputs for food crops (Govereh et al., 1999) and cash cropping is often observed to be positively associated with higher input use both for the cash and food crops. Maxwell and Fernando (1989) argue that the reality falls between these two extreme positions and although there is no one fit for all, production of cash crop (when everything remains constant) seems to affect food and nutrition security for the better. However, this effect seemingly varies with context.

2.3. Framework to analyze the impact of cash crop income on food and nutrition security

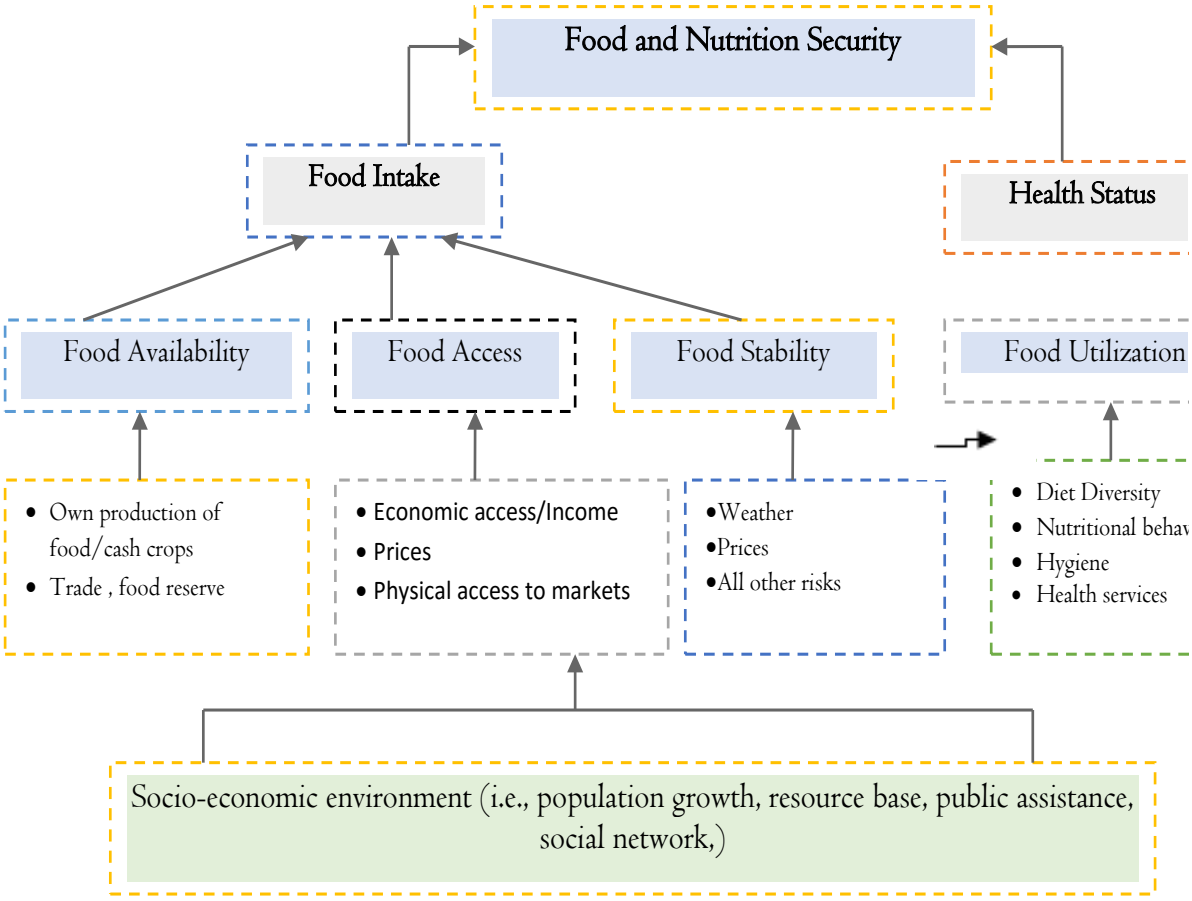
The association between cash crop income and food and nutrition security can be analyzed using a simple framework which includes the three dimensions of food security i.e., availability, access, and utilization (See Figure 2.1). Smallholder farmers produce cash crops, like coffee mainly for commercial purposes; they then sell these crops and generate income which could be used to purchase food and non-food consumable goods, pay taxes, investment on durable and consumable household assets, cover school fees of their kids, etc. Income from cash crop sales face seasonal effects that might hamper households' ability to smoothen consumption as large lump-sum incomes are more likely to be used to buy durable assets, or to make investments, rather than spend it on additional food and diet diversification (Masanjala, 2006).

As depicted in Figure 2.1, food and nutrition security is affected by complex economic and social factors. There are two major components: food intake and health components. Food intake is affected by food availability, access and stability (seasonal variation of supply), and each of these components is again affected by such things as own production, trade, weather, infrastructure, market functionality, level of national food reserve, and own and transfer income. Non-agricultural income from petty trade, labor services, safety net programs, and so on, have also an important contribution for household food security or intake. Health components are affected by diet diversity, nutritional behavior of households, hygiene and access and availability of health services. The overall outcome for food security cannot be explained adequately without information on the nutritional status of the population.

The socio-economic environment, including population growth rate compared to food production, changing food habits with changes in per capita income, the resource base of

individual household or the wealth status, age and education level of the household head and other family members, plus the level of social network that each family has, also affects food and diet diversity situation of a household. Over and above, public assistance during food crisis and capacity of a country to cope with food shocks are also very important determinants of food and nutrition security.

Figure 2.1: Factors affect food and nutrition security



3. Coffee and Ethiopian economy

3.1. Importance of coffee

Ethiopia is probably the oldest producer and exporter of coffee in the world and is the primary center of origin and genetic diversity of *Coffee Arabica*, which grows wild in the forests of Kaffa, Illubabore and Wollega (Worako, 2008). It is the home of unique and world-renowned coffees such as Yirgachefe, Sidama, Lekemt, Bebeka, Limu and Harar. The existence of a wild coffee population in the natural forests lends credence to the claim that Ethiopia is the center of origin of *Coffee Arabica*. Currently about 4,500 finest Ethiopian coffee species are reserved in coffee field gene banks in the Kaffa region, which is a good indication of the rich diversity of the Ethiopian coffee plant population (ITC, 2002).

The importance of coffee for the Ethiopian economy is well documented. It has high economic, social and cultural significance. It is often called the “green gold of Ethiopia”, illustrating its place in the economy. Coffee has long held a central place among Ethiopia's merchandise exports. In the early 20s, its share of total export earning was above 50 percent. However, its share has dropped in recent years due to diversification of export

commodities. Yet, it is still the first top contributor; for instance, average annual earnings from coffee exports in total exports were estimated to be as high as 27 percent for the period 2009-2013/14. As depicted in Table 3.1, the value of coffee production was estimated to account for 3.6 percent of GDP, 8.7 percent of agricultural GDP, and 12.7 percent of crop GDP on average over the period 2006 to 2013 (MoFED, 2013). It is estimated that the coffee sub-sector affects approximately one quarter of the population, providing jobs for farmers, local traders, processors, transporters, bankers and exporters. The various taxes on the crop are also important sources of government revenue (EDE, 1997; Oxfam, 2002; LMC, 2003).

Table 3.1: Value of coffee production as percentage share of GDP, agricultural GDP and crop GDP

Industry\Year	2006	2007	2008	2009	2010	2011	2012	2013	Avg
Aggregate GDP (Million Birr)	335519	371717	404437	455196	506079	548922	618328	679766	489996
Agriculture GDP(Million Birr)	158,311	170173	180985	194797	212361	222804	238438	251334	203650
Crop GDP(Million Birr)	106,403	114904	122343	133040	146766	154092	166699	177665	140239
Total value of coffee production	7483	9795	7864	13827	27236	28850	27196	27416	18708.
Coffee value									
% share of GDP	2.2	2.6	1.9	3.0	5.4	5.3	4.4	4.0	3.6
% share of agri. GDP	4.7	5.8	4.3	7.1	12.8	12.9	11.4	10.9	8.7
% share of crop GDP	7.0	8.5	6.4	10.4	18.6	18.7	16.3	15.4	12.7

Source: Ministry of Finance and Economic Development; GDP estimate based on 2003 EFY base year series

3.2. Changes in the policy environment

With a change in the political regime since 1991, the Ethiopian economy has undergone a transformation from a centrally planned to a more liberalized market economy where the private sector has a more important role to play. A number of policy measures have been implemented since then with the aim of putting in place a more dynamic, competitive, and free market oriented economy. Accordingly, the coffee sector went through various reform measures with the objective to increase prices received by farmers, to enhance production and to reduce the incidence of coffee smuggling to neighboring countries (LMC, 2003). Some of the most significant changes were observed in terms of marketing, pricing, taxation, encouraging the development of coffee production and processing, and improving market efficiency, quality and services. These measures ultimately aim to increase benefits directed to producers through the development of a more competitive marketing system where a large number of buyers and sellers can freely compete.

In light of this, the government has taken several measures to reduce government intervention in the coffee market and strengthen the role of the private sector. Some of the measures implemented by the Ethiopian government to achieve these goals include: the devaluation of the Ethiopian Birr in October 1992, foreign exchange liberalization, the removal of entry barriers (Pro. No. 70/1993), the consolidation of all taxes and duties levied on coffee export into a single tax family (Pro. No. 99/1998), abolishment of the quota system at auction, allowing private traders to trade in washed coffees, allowing ‘akrabis’ (suppliers) and exporters to sell coffee domestically at market-determined prices, the establishment of the Ethiopian Commodity Exchange (Pro. 550/2007), and coffee quality control and marketing (Pro. 602/2008).

With the aim to modernize the marketing system, the government established the Ethiopian Commodity Exchange (ECX) in April 2008. Trading on ECX took off at the end of 2008 after a law was passed in July 2008 that all coffee trade would have to go through ECX. This was

followed later by a number of other export crops, including sesame and haricot beans. The purpose of the exchange is “to connect all buyers and sellers in an efficient, reliable, and transparent market”. The ultimate purpose was to promote increased participation of small agricultural producers by providing up-to-date market information and enhancing their bargaining power. To this end, the government established an efficient, orderly and unified marketing system.

ECX has introduced four major changes. First, it established primary quality inspection and warehouses in the major coffee producing zones which reduced the marketing cost of the supplier and enabled producers to have more market information. Second, it prompted the transfer of payments to seller accounts with zero default and created linkages with banks and ECX to engage in payment settlement. Third, it promoted the transaction to take place in the designated primary coffee marketing centers. Fourth, it established a warehouse receipt system and introduced a new classification system, including grades based on processing classes (washed versus unwashed), types according to origins, and a quality grading system. However, exactly how much these policy reform measures contributed in terms of increasing production, productivity, share of producers in the final price, volume and value of export, is not clearly known.

The Growth and Transformation Plan I (GTP I) envisaged to increase coffee production from 341,000 ton in 2009/10 to 831,000 ton in 2014/15, an increase of over 240 percent. During the same period, the area under coffee production was earmarked to increase from 462,000 to 815,000 hectare, equivalent to an expansion of 137 percent. To attain the envisaged growth in volume of production, productivity was expected to grow from 0.71 ton to 1.25 ton, or an increase of 76 percent. Similarly, over this period, coffee exports were projected to rise from 172,210 tons to 600,970 tons and export earnings from $528 million to $2.037 billion, a 380 percent increase. Despite this ambitious plan, progress during GTP I in terms of production, productivity and export, remained marginal. It is estimated that the actual achievement over the considered period was about 50 percent of the targeted growth.

3.3. Production, export, and innovations in the sector

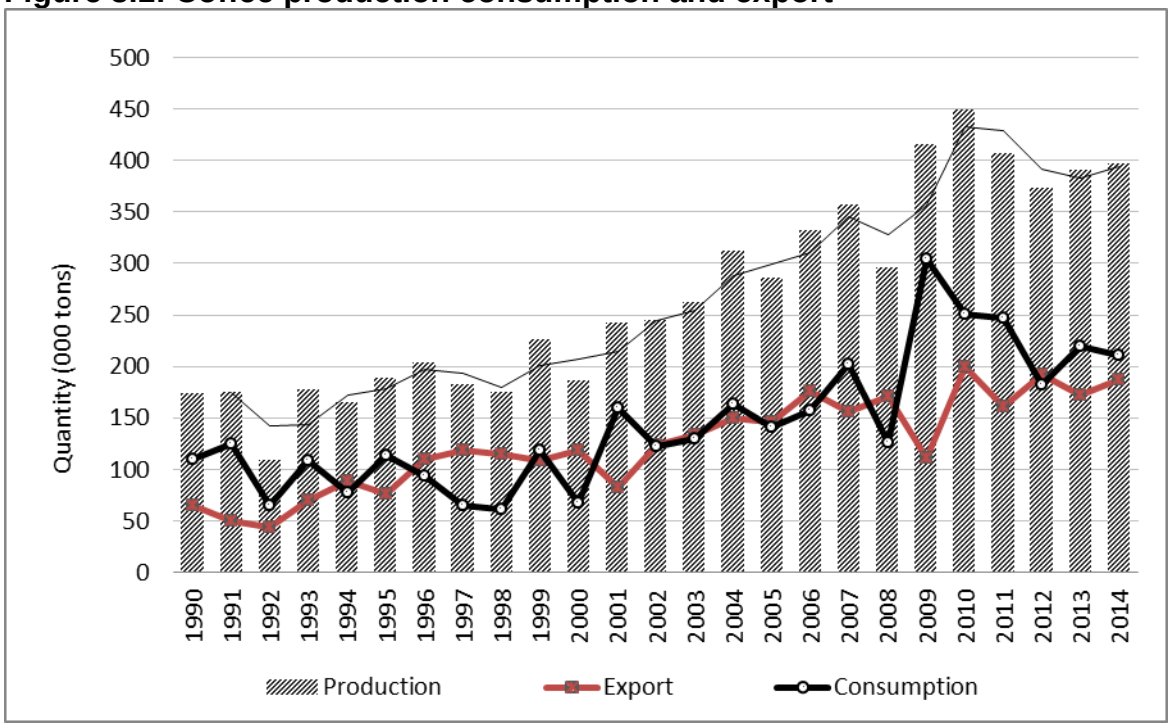
In Ethiopia coffee grows in many parts of the country. However, the major commercial coffee cultivation areas are located in the southern, south-western and eastern parts of the country. The south-western coffee-producing regions cover Illubabor, Wollega, Jimma, Kaffa, Shaka and Bench Maji, which are estimated to account for 52 percent of national production. The southern coffee-growing regions include: Sidama, Gedio, Borena, Wolayta, Gamo Goffa, Kambata Alaba Tambaro, Gurage and others. These together contribute an estimated 35 percent of national production. Similarly, the eastern coffee-growing regions include Hararge, Arsi and Bale which together represent 8 percent of the national production. The three major coffee-producing areas account for 95 percent of the total national coffee production (CSA, 2013). Apart from the main coffee-growing regions, there are small patches of remnant coffee regions to the west (Gambella and Benishangul Gumuz) and the north (Amhara and Tigray)[5] that grow coffee mainly for own consumption in that region.

As depicted in the Figure 3.1, the quantity of coffee production grew from 246 to 391 thousand tons over 2003 to 2013 period, registering a 4.9 percent annual average growth. Coffee export also grew from 123 to 187 thousand tons in the same period, recording a 6.7 percent annual growth. During the same period, domestic coffee consumption grew from 122 to 219 thousand tons or an average increase of 11.6 percent per year. This high domestic

[5] Ethiopia has also suitable agro-ecology for intensification of coffee production. According to MoA (2015), total land highly suitable, moderately suitable, and marginally suitable for coffee production are estimated to be 5.5, 17.7 and 2.1 million hectares respectively.

consumption growth may possibly be explained by high population growth, urbanization, and per capita income growth.

Figure 3.1: Coffee production consumption and export



Source: International Coffee Organization (ICO) data base

Ethiopia is not only a major producer and exporter of coffee, but it is also the second largest consumer of coffee among coffee producing countries in the world (next to Brazil). The country seems to be the origin of the dissemination of a coffee-drinking culture. Coffee is not a luxury beverage for Ethiopians, but is often considered a necessity. Based on the official statistics, it is the only nation among the coffee-producing nations that has been consuming on average half of its national production as domestic consumption over the past half a century (ICO database, 1965-2014). In large parts of the country, coffee is culturally prepared and consumed two to three times per day – together with breakfast, lunch and dinner. In addition, coffee is served with light meals at special social gatherings, for instance weddings, births, holidays, burial gatherings, and many other types of social and cultural events (CTA, 1999).

Different coffee consumption habits exist in different coffee producing communities. *Buna kella* (coffee beans boiled with butter) is popular in most coffee-growing areas. In Sidama, Wolayta, and Gamo Gofa, coffee beans boiled with butter are served to visitors and guests at different gatherings. (Ameya, 2002). In Hararge, an infusion of roasted coffee leaves (kuti) and husks mixed with milk (hoja) is consumed. In the Kaficho and Shakicho zones, where coffee was first domesticated, coffee leaves collected from wild coffee plants are brewed and spiced with pepper and ginger to prepare *chamo* (CTA, 1999). This is commonly consumed in many coffee growing areas, especially at the end and the beginning of the year when coffee beans are relatively expensive. Although it is often difficult to substantiate, this cultural coffee drinking has a large social value in that people share ideas, develop friendships and harmony, and consult on solutions to communal problems (CTA, 1999). However, meeting the growing domestic demand for coffee consumption without affecting export levels, remains an area of policy attention in the country.

4. Data and methodology

Before conducting a formal survey in February 2014, a rapid rural appraisal of some coffee communities was conducted. Focus group discussions were held with key informants including processors, extension agents, government officials, growers' associations, and coffee cooperatives to find out information related to farmers' production systems, technology adoption, sales, consumption, income and related challenges impacting food and nutrition security in relation to coffee production. This initial ground work contributed hugely to the preparation of the survey instrument used for the collection of quantitative data.

A survey was conducted with Ethiopia's coffee producers and processors in February 2014. It focused on those areas with the highest coffee production in the country. The 10 zones that made up 77 percent of all coffee production in 2012/13 were selected based on production data obtained from the Central Statistical Agency (CSA). These 10 zones were stratified based on the coffee variety produced in that zone, as defined using the classification for export markets by the Ethiopia Commodity Exchange (ECX). Districts (woredas) within each strata were ranked from the highest to the lowest based on their production history. They were divided in two; the less productive woredas (cultivating 50 percent of the area) and the more productive woredas (also cultivating 50 percent of the area). Four woredas, two from each category, were randomly selected (i.e., four woredas from each coffee zone). A list of all the Peasant Associations (or by *kebeles)* of the selected woredas was then obtained from Woreda Administrative Offices and then two kebeles were randomly chosen from the top and the bottom 50 percent producing categories of kebeles. Finally, a list of all households in the selected kebeles was obtained from the kebele administration. They were ranked from small to large coffee producers based on areas cultivated in the year before the survey (i.e., 2005 EC). The farmers were divided into two groups, the less productive (cultivating 50 percent of the area) and the more productive farmers (also cultivating 50 percent of the area). A total of 20 farmers was then selected: 10 from the less productive and 10 from the highly productive farmers. A total of 16 kebeles multiplied by 20 farmers, i.e. 320 farmers was interviewed per stratum (Sidama, Jimma, Nekempte, Harar, Yirgacheffe). In total, 1,598 coffee farming households were interviewed[6]. The responses by coffee households was by a recall system. To minimize measurement errors due to recall based responses, we used the most recent periods of production and farm practices. Besides, recall questions were carefully designed and fielded to capture the required information easily.

The study applies both descriptive and econometric tools to analyze the relation between coffee income and household food and nutrition security. For the regression, all continuous variables were transformed to a logarithmic form to reduce the influence of extreme values and ease of interpretation.

[6] Chire, Dara, Dale, Adola reda, Bulehora, Dilla Zuria, Yirgachefe, Qercha, Chora Botor, Mettu, Ale, Gomma, Genji, Haru, Lalo Asabi, Soya, Habro, Bedeno, Darolobu, Boke

Table 4.1: Distribution of sample households by coffee variety and by major zones

	Coffee type/varieties	Zones	Woredas	Total number of HHs
1	Sidama	Sidama Borena	Dale, Dara, & Chere Bule Hora	320
2	Jimma	Jimma Illu Aba Bora	Gomma & Chora Botar Mattuu & Ale	318
3	Nekemt	West Wollega Qelem Wollega	Haroo, Lalo Asabi & Ganji Sayo	320
4	Harar	West Hararge East Hararge	Boke, Daro Labu & Habroo Badeno	320
5	Yirgachefe	Gedio Guji	Dilla Zuria, Yirgachefie Adola Rede & Qerecha	320
			Total	1598

Source: Authors' calculations based on ESSP's coffee survey, 2014

5. Descriptive analysis

The descriptive analysis covers information regarding household characteristics, household asset ownership, access to basic facilities, and distribution of coffee farming households by wealth quintiles.

5.1. Overview of characteristics of respondent households

Table 5.1 depicts some descriptive results summarized based on the interview with sample households covered in the study. The total sample households are equally distributed among the five major strata. The average age of the heads of households was about 45 years, with few differences over the strata (Table 5.1). This statistics seems to indicate that with the right policy and market incentives, coffee farmers have a huge potential to enhance the production of coffee. Male-headed households account for the biggest share of all households (i.e. 94 percent). The average family size of coffee producing households is 6.1, which is relatively high compared to the average family size obtained from the nationally representative Demographic and Health Survey of 2014 (i.e., 5 per household). The household size is highest in Yirgachefe (i.e., 7.2), followed by Sidama (7.1). Education levels for coffee farming households are low: 34 percent of the heads of the sample households reported to have had no education whereas 52 percent received some form of primary education and very few have completed secondary (7 percent) and tertiary education (2 percent).

Landholding and its use is one of the core issues covered in the survey. The respondents in the sample own on average 1.8 hectares of total land, used for coffee, other crops, and grazing. On average 53 percent of the total land that they own is used for coffee production (0.9 hectares). This land area varies by stratum. In Yirgachefe farmers allocate the largest share of their land for coffee (68 percent) while in Harar they allocate the smallest share (33 percent). The decision on how much land to allocate to coffee might be based on the expected extent of return from their input. It seems that, especially in Harar, there is competition between coffee and *chat*.

Table 5.1: Mean age, education, family size, land covered with coffee and access to basic infrastructure by major coffee zones

		Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average
1	**Mean age and sex of heads of HHs**						
	Age	45.8	45.8	45.7	46.4	40.7	44.9
	Sex (male % share)	0.97	0.95	0.94	0.93	0.95	0.94
	Family size	7.1	7.2	6.1	5.3	6.7	6.1
2	**Level of Education (% of HH heads)**						
	None	23	26	42	29	49	34
	Other education	6	5	3	3	11	5
	Primary education	64	56	47	56	39	52
	Secondary education	6	10	7	9	2	7
	Tertiary education	1	4	2	3	0	2
3	**Land holding (in hectare)**						
	Total land	1.70	1.99	2.25	1.68	0.95	1.79
	Coffee area	0.98	1.09	1.08	0.86	0.33	0.92
	% of coffee area	61%	68%	49%	50%	38%	53%
	Cultivated coffee area	1.01	1.10	1.08	0.88	0.33	0.93
4	**Mean distance of households from infrastructure (in minutes) by (zone)**						
	Dry season road	12	11	20	19	27	18
	All season road	90	39	40	46	57	54
	Asphalted road	178	121	157	295	270	204
	Nearest wet mill	68	38	139	130	.	94
	Nearest Huller	127	81	157	105	92	112
	Coop. that buys coffee	92	57	105	57	67	77
	Coop. that distributes inputs	110	64	56	50	57	67

Source: Authors' calculations based on ESSP's coffee survey, 2014

Table 5.1 also shows the mean distance of households from different types of road infrastructure and services. Households travel on average one-way about 18, 54, and 204 minutes to get to dry-season, all-season and asphalted roads respectively. The average distance from all-weather roads serves also as proxy for remoteness. Distance to the nearest wet mill and hulling center is on average 94 and 112 minutes, respectively for all coffee producing areas. However, access to wet mills is much closer for Yirgachefe (38 minutes) and Sidama (68 minutes). This highlights the fact that washed coffee processing is mainly dominated by these zones. In the other zones, farmers spend considerable time to get to these facilities. Cooperatives that buy coffee from farmers are also located relatively closer for the areas of Yirgachefe and Sidama than for farmers in the other strata.

5.2. Access to improved facilities

Coffee growers were also asked about their sources of drinking water, the type of sanitation facilities available to them, their access to electricity, and the type of roofs used for their houses, all indicators of the welfare of households in these coffee zones. Table 5.2 shows the share of households with access to these improved facilities. The share of households that have access to different water sources varies on average, such as: piped (3 percent), public tap (21 percent), tube well (4 percent), dug well (7 percent), protected spring (26 percent), unprotected spring (29 percent), and surface water (10 percent). Unprotected and surface water account for 39 percent of water sources, indicating the work required to improve access to better water sources in these coffee areas. When we compare this figure with the Ethiopian Demographic Health Survey (2014), we see that households using an

improved source of drinking water in the coffee sample study area are 61 percent, while the national average from DHS (2014) [7] is 57 percent.

In terms of sources of lighting, on average 60 percent of households use traditional oil lamp lighting. This is similar across strata. Although there is some level of divergence between strata; on average 16 percent of households benefit from the government's Rural Electrification initiatives. About 68 percent of households live in houses covered by corrugated iron roofs. 85 percent of households use pit latrines and only 13 percent use no toilet. The latter two indicators are relatively high compared to the national averages.

Table 5.2: Number of households have access to improved living standard facilities (%)

		Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average	DHS 2014
1	Source of drinking water (% of HHs)							
	Piped	2	3	6	0	1	3	12.8
	Public tab	24	23	13	13	31	21	20.1
	Tube well	4	9	3	2	0	4	13.8
	Dug well	5	7	13	3	7	7	
	Protected spring	33	17	36	44	3	26	9.3
	Unprotected spring	28	36	21	25	33	29	24.8
	Surface Water	3	4	7	14	24	10	13.1
2	Source of lightning							
	Main grid electricity	21	30	22	8	2	16	23.8%
	Solar electricity	1	1	5	1	33	8	
	Torch light	6	13	29	8	2	11	
	Oil lamps	67	48	42	80	63	60	
	Other sources	5	8	2	3	0	5	
3	Types of Household Roofing							
	Plastic	2	5	0	2	1	2	0.6
	Woods/thatch	55	29	29	8	26	30	1.5
	Mud	0	1	0	0	0	0	36.7
	Corrugated Iron	43	64	70	90	73	68	52.9
4	Types of toilet used by households							
	No toilet	11	5	4	6	37	13	33.5
	Flush	4	3	0	1	1	2	1.4
	Pit latrine	83	93	96	93	62	85	63.2
	Other (composting, bucket)	2.0	0.0	0.0	0.0	0.0	0.0	1.9

Source: Authors' calculations based on ESSP's coffee survey, 2014

Finally, we looked at the relative distribution of wealth in the sample households. Based on an asset index, the population is divided into equal quintiles (one-fifth (20 percent) of the total population surveyed). Table 5.3 shows the distribution of households covered in the survey by wealth quintile. The regions of Harar, Sidama and Yirgachefe are seemingly home to relatively poorer households as 48 percent, 47 percent, and 46 percent respectively of the coffee farmers in these parts are within the two poorest quintiles overall. The share of households that are in these two categories are significantly smaller for Jimma (24 percent) and Nekemt (35 percent), indicating their relative better-off status. Similarly, the share of households that fall under the 4th and 5th quintile (i.e., wealthiest category) are largest for Jimma (58 percent) and Nekemt (39 percent). We also looked at two other indicators of wealth. The number of livestock owned and measured in Tropical Livestock Unit (TLU) is on average 3.3 for all sample households combined. This figure is significantly higher in Jimma with 4.8 TLUs. The average number of cows and oxen owned is also significantly higher in Jimma than in the other coffee producing areas.

[7] The proportion of the population using improved sources of drinking water are those households that are connected to piped water, a public standpipe, a borehole, protected dug well or spring, rainwater collection, or bottled water.

Table 5.3: Distribution of households into wealth quintiles

	Zones/varieties	Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average
1	**Distribution of HH into wealth quintile as proportion (%)**						
	Poorest	28	25	10	16	21	20
	Poor	19	21	14	19	27	20
	Middle	16	18	19	25	22	20
	Rich	19	15	25	22	20	20
	Richest	18	21	33	17	10	20
2	**Number of livestock in TLU**						
	Mean	3.3	2.6	4.8	2.9	2.9	3.3
	Median	2.3	0.7	3.8	2.2	2.6	2.3
3	**Number of oxen and cow owned**						
	Oxen	0.12	0.47	1.24	0.63	0.41	0.57
	Cow	1.65	0.93	1.74	0.95	0.87	1.23

Source: Authors' calculations based on ESSP's coffee survey, 2014

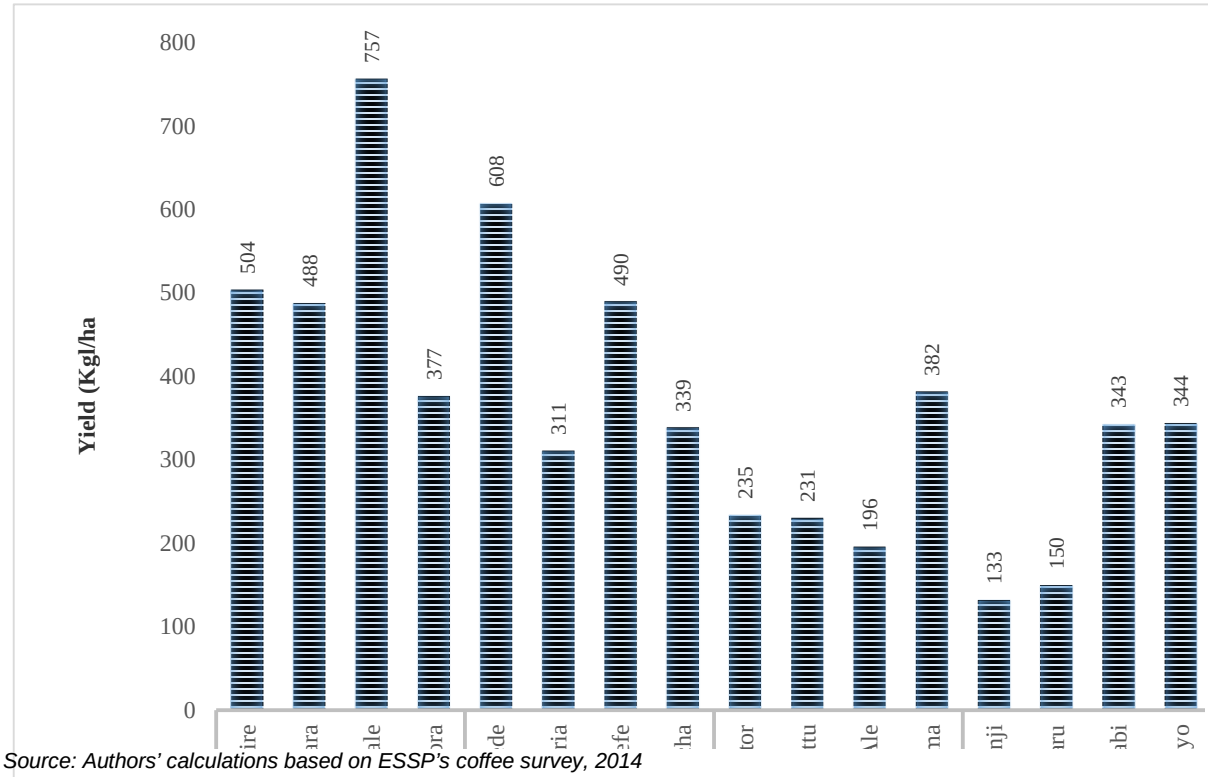
6. Coffee production, sales, and consumption

6.1. Coffee yield

The average yield per hectare for overall sample coffee households is 376 kgs/ha[8], in clean or green coffee (Figure 6.1). This average yield figure is 48 percent lower than that of the official production estimate figure reported by CSA in 2013 (i.e., 720kgs/ha). This difference might partly be explained by methodological differences as CSA relies on crop-cuts, while our survey used recall questions. From Farmers' Group Discussions (FGD), the reported causes of the low yields include the amount and fluctuation of rain fall during flowering and fruit bearing stages especially for Wollega, Illubabor and Harar. Also, widespread incidences of coffee diseases, lack of improved and high-yielding varieties, the minimal coffee extension services for farmers, and increasing number of aging coffee trees affected yields. However, some woreda and strata perform better compared to others. For instance, in woredas such as Dale in Sidama and Adola in the Guji zone, where coffee trees are younger and where farmers apply improved practices, higher yields are noted (see Figure 6.1). On the other hand, woredas such as Genji and Haru in the Nekemt strata were affected by drought during the survey period, which explains their reported low yield level compared to all other woredas.

[8] . The average conversion rate for dried cherry to clean coffee, is 2kgs of dried cherry to 1kg of clean coffee

Figure 6.1: Coffee Yield (Kgs /Ha) by sample woredas, in clean coffee



Source: Authors' calculations based on ESSP's coffee survey, 2014

Coffee production and sales are an important source of revenue for a large part of Ethiopia's rural population. Table 6.1 shows the level of coffee production, consumption, and sales for the different woredas that were part of our survey. The relative importance of red and dry cherry harvest and sales varies significantly by strata. The greatest share of sample households harvest their coffee when it is red (85 percent) and the rest harvest it when it has dried, either on the tree or on the ground. The share of red cherry sales in total sales is on average 23 percent, indicating that the bulk of sales is made in the form of dry cherries. This is contrary to the Government's intention of wanting to increase the share of red cherry sales and thereby increase the volume of washed coffee exports in the total coffee exports. However, it seems that some farmers are reluctant to sell red cherries because of expected price differences (i.e. higher prices) later on in the season, and because dried coffee is also used as a form of savings. Table 6.1 further shows the share of total production that is sold and the share that is consumed. The numbers indicate that about three quarters of the coffee produced is sold and that just over 20 percent is kept for own consumption. The own consumption shares are especially high in strata of Jimma and Nekemte, with 33 and 30 percent, respectively.

Table 6.1: Coffee production, sales and consumption

	Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average
1. Area (ha), production, yield and coffee sales (dry cherry equivalent)						
Cultivated coffee land	0.9	1.0	1.1	0.9	0.3	0.9
Coffee production (Q)	6.9	6.9	5.1	3.6	2.2	4.9
Coffee yield (Q/ha)	10.6	8.7	5.2	4.9	8.1	7.5
coffee sales (Q)	6.1	6.1	4.3	2.7	1.6	4.2
Relative importance of red cherry, sales and proportion of coffee sold and consumed (%)						
Share of red cherry in total harvest	74	76	90	93	92	85
Share of red cherry in total sales	57	33	10	0	7	23
Proportion of coffee sold	84	80	65	61	78	74
Proportion of coffee consumed	15	18	33	30	10	21

Source: Authors' calculations based on ESSP's coffee survey, 2014

6.2. Coffee income and its use

Income from coffee is directly and indirectly linked to food security and food diversity. Income from coffee sales is used for multiple purposes including tax payments, school fees, food and non-food purchases, investment in durable and non-durable household assets, and related activities. The contribution of coffee sales to the household cash needs is affected by the volume of production, market prices, weather condition, and time of sales and so on. In addition to coffee, coffee farmers also produce food crops like maize, sorghum, wheat, cash crops like chat, and root crops like enset, and other types of agricultural products. Livestock production and marketing is also often a major source of livelihood for a majority of coffee farming households. Households also often engage in non-farm activities to complement their coffee income mainly in the slack seasons when coffee income declines.

Table 6.2 shows the income that originates from coffee and other sources for sample households. Coffee on average accounts for 37 percent of total household income. The share of coffee income is the highest for Yirgachefe and Sidama where coffee accounts for 47 and 42 percent of the total household income respectively. Its contribution is relatively lower for Harar (27 percent), Jimma (31 percent) and Nekemte (31 percent). Crop income is the second most important source of income for sample households as it accounts for 34 percent of total household income. Its share is found to be the highest in the Nekemt (32 percent) and lowest in the Yirgachefe (27 percent) areas. Income from chat (a mild stimulant crop) is highest for Harar (19 percent) compared to all other strata. The total household income is found to be highest for Yirgachefe and Sidama followed by Jimma and Harar. Nekemte has the lowest estimated household income.

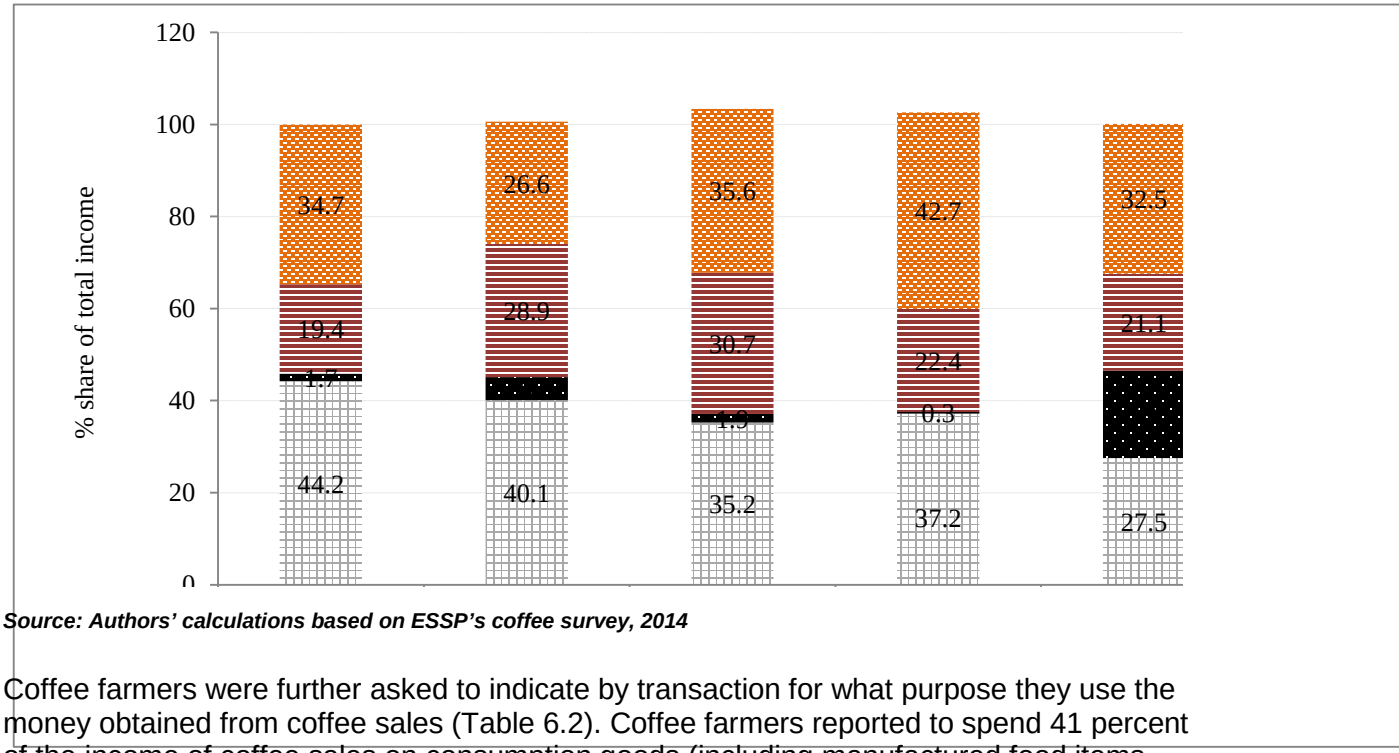
Table 6.2: Coffee income and its use

Different sources of income	Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average	% share
Coffee income	9432	10194	7511	4981	5355	7495	37.1%
Chat income	358	1,270	409	41	3,714	1159	5.7%
Crop income	7,401	6,768	7,604	5,714	6,331	6764	33.5%
Non-crop income	4,147	7,366	6,560	2,998	4,125	5039	24.9%
Total income	21337	25451	21366	13377	19505	20207	100%
Share of coffee in total income (%)	42	47	31	31	27	36	
Crop income share (%)	35	27	36	43	32	34	
Total coffee sales (both from red cherries & dry) used for							
Repayment of debts	28	31	19	59	5	142	4.2%
Agricultural inputs	109	83	138	114	60	504	15.0%
Purchase food	123	182	109	41	69	524	15.6%
Education-health expenditure	128	95	51	56	31	361	10.8%
Purchase cons. goods	562	374	167	75	190	1368	40.8%
Building assets	90	68	40	25	52	275	8.2%
Other uses	63	39	35	22	16	175	5.2%
Total income	1103	872	559	392	423	3349	100%

Source: Authors' calculations based on ESSP's coffee survey, 2014

Although the importance of coffee income (as the share of total income) varies with producing areas, its income is still relatively high compared to all other sources. As shown in Table 6.2, income from coffee accounts on average for 37 percent of total household income. The crop and non-crop income are the second and third most important sources of household incomes for these coffee producing households (Figure 6.2). The major finding from these numbers is that coffee producing households obtain, in one way or another, a large part of their income not only from coffee but also from the sales of crops and from non-farm incomes.

Figure 6.2: Coffee income (as % share of total income)



Source: Authors' calculations based on ESSP's coffee survey, 2014

Coffee farmers were further asked to indicate by transaction for what purpose they use the money obtained from coffee sales (Table 6.2). Coffee farmers reported to spend 41 percent of the income of coffee sales on consumption goods (including manufactured food items, clothes, household utensils, etc.), 16 percent to purchase food, 15 percent to purchase agricultural inputs, 11 percent on education and health, and 8 percent on asset building. The latter four spending categories have direct or indirect important implications on food and nutrition security of the household.

6.3. Role of women on coffee sales

The role of women in coffee production, processing and marketing is indispensable. However, despite their important role in the coffee sector, they seem to have a limited role in final spending decisions. Though heads of households usually get anxious if there is no food for the family, in most cases mothers carry relatively more responsibility to provide food for every family member. Despite this responsibility, the power in terms of coffee sales and income management is limited to women in these settings. As shown in Table 6.3, the male was responsible for the sale of coffee in 73 percent of cases while the woman's share was about 11 percent only. However, this share varies widely by region. In Harar women controlled 42 percent of coffee sales while in Sidama this share was about 6 percent only. Assuming that the share of coffee sales by women serves as proxy for the amount of coffee resources managed by women, this again has implications for food security. It has been proven in multiple studies that when women control resources, they spend relatively more to satisfy their immediate family food needs. However, in many developing countries and as also seen in the case of the coffee sector here, the role of women is weak in these income decisions. Moreover, in some of the coffee areas women are prohibited from inheriting family land and they have therefore limited access to the productive resources as well (Woldeamanuel, 2009).

Table 6.3: Sale of coffee by gender

		Sidama	Yirgachefe	Jimma	Nekemte	Harar	Total
1	**Gender of person who sold dry cherry**						
	Adult man	283	302	282	330	228	1425
	Adult woman	12	19	34	24	126	215
	Child	2	10	1	8	11	32
	Mix	99	55	22	25	29	230
	Total	396	386	339	387	394	1902
2	**Gender of person who sold red cherry**						
	Adult man	492	346	187	4	10	1,039
	Adult woman	61	46	22	1	15	145
	Child	21	19	7	0	2	49
	Mix	133	75	6	0	2	216
	Total	707	486	222	5	29	1,449

Source: Authors' calculations based on ESSP's coffee survey, 2014

6.4. Determinants of coffee sales/income

The amount of income generated from coffee sales depends on the volume of coffee supplied to market. The decision on how much coffee is to be sold is affected by several economic and social factors including characteristics of household head (age, sex, education), household asset level (land size, livestock ownership, source of non-farm income), and remoteness (i.e., distance to major market site, distance to cooperatives/dry or wet mills, distance to all weather road, etc.) as the latter affect incentives for marketing. To analyze the determinants of the commercial share of coffee production, a tobit model is estimated with *share of coffee sales out of total production* as an outcome variable and number of households, village and location variables as explanatory variables. We also controlled for remoteness indicators in the regression. The results presented in Table 6.4 indicate that besides location, coffee area appears to be the main determinant for the share of coffee sold. Specifically, the size of land allocated for coffee production is found to have a strong positive relation with the share of coffee sold by households.

Table 6.4: Determinants of the share of coffee sales

Variables	Model 1	Model 2	Model 3	Model 4
Head Sex	0.0268	0.00486	0.00581	0.00918
	(0.798)	(0.148)	(0.174)	(0.274)
log (head Age)	-0.0959	-0.405	-0.395	-0.433
	(-0.198)	(-0.853)	(-0.831)	(-0.946)
log (head Age squared)	0.00943	0.0466	0.0448	0.0506
	(0.148)	(0.746)	(0.716)	(0.840)
Household max schooling (base=No education)				
Primary education	0.00300	-0.00323	-0.00358	-0.0154
	(0.0850)	(-0.0938)	(-0.103)	(-0.436)
Secondary education or higher	0.00201	-0.0280	-0.0232	-0.0365
	(0.0534)	(-0.758)	(-0.617)	(-0.968)
log (coffee area in ha)		0.164***	0.171***	0.171***
		(7.239)	(7.084)	(7.507)
log (all other area in ha)		0.0244	0.0244	0.0164
		(1.111)	(1.086)	(0.754)
log (asset value)			-0.00677	-0.000905
			(-1.097)	(-0.150)
log (livestock value)			0.00252	0.00145
			(0.810)	(0.485)
log (distance to all weather road)				0.00702
				(1.105)
log (distance to woreda administration center)				0.00513
				(0.435)
log (distance to coops that buy coffee)				0.00449
				(0.479)
sigma	0.29***	0.28***	0.28***	0.26***
Constant	1.036	1.586*	1.593*	1.547*
	(1.131)	(1.768)	(1.776)	(1.777)
Observations	1,590	1,590	1,590	1,430

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations based on ESSP's coffee survey, 2014

6.5. Determinants of total income of coffee farming households

We further looked at coffee farming households' aggregated household income generated from multiple sources, i.e. from coffee, crop and livestock production and sales; non-farm, remittances, social networks, government supports, etc. This total income from different sources is affected by household characteristics, size of land devoted for coffee production, proximity to market and cooperatives, household characteristics like education, age, and sex. As shown in Table 6.5, the elasticity of quantity sold to cultivated coffee land is very large (about 0.75) implying any additional land brought under coffee production has significant effects on total household income. Household distances from woreda administrative centers have negative association with total income.

The elasticity of total income to age of household head is higher than one implying that those household heads who are older, sell relatively more compared to younger headed households, possibly because as people become older, households may accumulate more

resources. Wealth status of household measured in terms of asset and livestock value are also positively associated with total income.

Table 6.5: Determinants of total income (in Birr), log transformed

Variable	Model 1	Model 2	Model 3	Model 4
Head Sex	0.363***	0.0724	0.0682	0.0765
	(3.461)	(0.813)	(0.778)	(0.875)
log (head Age)	3.696***	2.257**	2.502**	2.381**
	(2.594)	(1.968)	(2.199)	(2.092)
log (head Age squared)	-0.476**	-0.292*	-0.331**	-0.315**
	(-2.543)	(-1.943)	(-2.219)	(-2.108)
Household max schooling (base=No education)				
Primary education	0.330***	0.260***	0.275***	0.262***
	(3.225)	(3.173)	(3.444)	(3.308)
Secondary education or higher	0.620***	0.240***	0.257***	0.231***
	(5.561)	(2.686)	(2.948)	(2.659)
log (household size)	0.410***	0.119*	0.0729	0.0752
	(5.499)	(1.926)	(1.195)	(1.240)
log (asset value)		0.206***	0.197***	0.193***
		(12.53)	(11.68)	(11.53)
log (livestock value)		0.0452***	0.0385***	0.0398***
		(5.867)	(4.993)	(5.203)
log (coffee area in ha)		0.812***	0.748***	0.751***
		(14.73)	(13.53)	(13.52)
log (all other area in ha)			0.330***	0.338***
			(6.259)	(6.445)
log (distance to woreda administration center)				-0.108***
				(-4.164)
log (distance to all weather road)				0.0336**
Constant	1.064	2.491	2.144	2.783
	(0.399)	(1.157)	(1.004)	(1.297)
Observations	1,598	1,598	1,598	1,598
R-squared	0.231	0.511	0.524	0.530

*** p<0.01, ** p<0.05, * p<0.1
Robust t-statistics in parentheses
Source: Authors' calculations based on ESSP's coffee survey, 2014

7. Food security and diet diversity

This section analyzes the level of food security and diet diversity of sample households and how cash income from coffee relates to food security and nutritional indicators.

7.1. Food security

As stated in Section 2, food security is defined as "access by all people at all times to enough food for an active and healthy life". The definition suggests that a food secured household has readily available, nutritionally adequate, and safe foods and an assured ability to acquire acceptable foods in socially acceptable ways. Several indicators are suggested in the literature to measure food security including gross household production, food balance sheets, anthropometric measurement, per capita income and expenditures (Maxwell and Frankenberger, 1992). In this study, we employ two other commonly suggested measures, namely an index of 24-hour recalls of food consumption for individual members of a household and an index constructed from short-term coping mechanisms during insufficient food periods in the household. Given the difficulties of acquiring valid and reliable data for income, expenditures, and production, and because they are more easily described by intuition, these measures are considered to be advantageous over the others.

The second measure is built based on a method suggested by Maxwell (1995). In our survey, we asked the person primarily responsible for the preparation and provision of food nine standard short-term coping mechanisms used when there is not sufficient food in the household. The mechanisms range from relatively small changes in eating practices (such as eating less preferred food) to relatively severe changes (such as going for an entire day without eating). In order of increased severity, the mechanisms were assigned values, with the first five (less preferred food, limiting variety, limiting portion size) roughly equivalent in terms of severity, assigned 1; the next three (skipping meals) were assigned 2; and the last one, the most severe, (skipping whole days) was assigned number 3. These various strategies were discussed in focus groups, and respondents assigned an ordinal rank to each strategy according to its perceived severity. Finally, an ordinal value of 1 to 3 was given to the frequency with which a strategy had to be used (rarely, sometimes and often). This simple scale of 1 to 3 for the frequency of each individual strategy was multiplied by the weighting factor based on severity in order to provide a cumulative scale of food security. The larger the index number, the more food secure the household is and vice versa. Alternatively, we also created the food security index using the Principal Component Analysis (PCA). The result of this and the index based on short-term coping mechanisms, is given in Table 7.1, by coffee strata. It shows that households producing Nekemte coffee type are on average more food secure and households producing Harar coffee type are less food secure.

Table 7.1. Average food security index by coffee type

Zone	Maxwell Food Security Index		PCA FS Index	
	Mean	Median	Mean	Median
Sidama	48.5	53.5	0.1	1.4
Yirgachefe	48.3	53.0	0.1	1.1
Jimma	48.0	50.0	0.0	0.5
Nekemte	50.2	53.0	0.5	1.2
Harar	45.2	48.0	-0.7	-0.1
Total	48.0	52.0	0.0	0.8

Source: Authors' calculations based on ESSP's coffee survey, 2014

We first explored the relationship between per capita household income and self-reported household food security level with simple graphs. As indicated in Figure 7.1, per capita income and food security index have a positive correlation. To assess if coffee income has a role in food security beyond its income effect, we examined the association between the share of coffee income in total household income with the computed food security index. The result given in Figure 7.1 shows that there is a strong and positive association between coffee income and food security.

Figure 7.1: Share of coffee income and food security measure

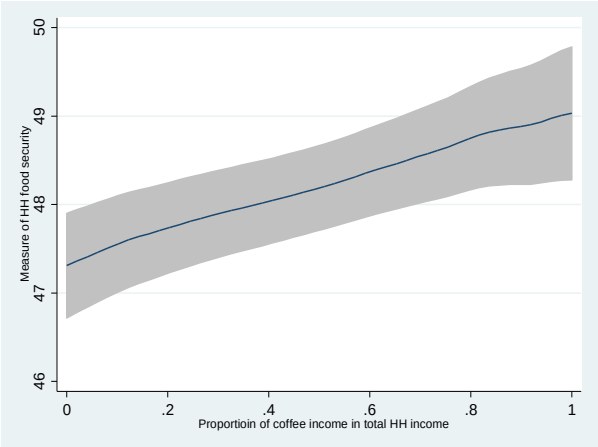
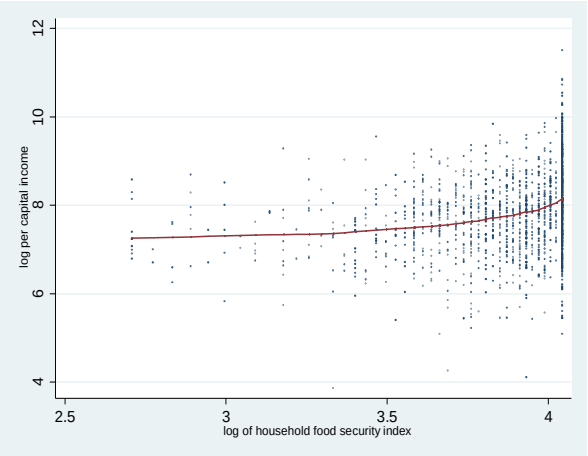


Figure 7.2: correlation between per capita household income and food security index



Source: Authors' calculations based on ESSP's coffee survey, 2014

We explored those relationships in a multivariate regression framework. Table 7.2 shows that results of a regression where food security index (measured following Maxwell (1995)) was regressed on a number of associates. The results show that the share of coffee income is positively and significantly associated with the food security index. This result is robust to different alternative specifications. This is in contrast with the sales of chat that does not show that positive relationship. The land owned by household, household asset values, and the livestock value all have an anticipated positive association. However, as has been documented in other settings, the distance to all-weather roads is found to have a negative association with the food security index. Finally, the distance to coffee cooperatives that buy coffee and woreda administrative centers are found to have no significant relation with household food security status.

Table 7.2: Determinants of household food security

Variable	Model 1	Model 2	Model 3
Head Sex	0.0197	-0.0131	-0.00789
	(0.679)	(-0.464)	(-0.248)
log (head Age)	-0.307	-0.559*	-0.474
	(-0.932)	(-1.685)	(-1.363)
log (head Age squared)	0.0369	0.0712	0.0600
	(0.849)	(1.623)	(1.310)
Household max schooling (base=No education)			
Primary education	0.0312	0.0122	-0.00668
	(1.098)	(0.430)	(-0.214)
Secondary education or higher	0.0800***	0.0385	0.0213
	(2.698)	(1.271)	(0.644)
log (all other area in ha)	0.0649***	0.0275*	0.0305**
	(4.746)	(1.953)	(2.029)
log (per capita income)	0.0520***	0.0344***	0.0302***
	(7.523)	(4.853)	(3.972)
Share In total income (base other income)			
Coffee Income	0.122***	0.130***	0.124***
	(3.877)	(4.202)	(3.895)
Chat Income	0.129**	0.128**	0.116
	(2.169)	(2.229)	(1.575)

Cereal Income	0.122***	0.133***	0.134***
	(3.664)	(4.065)	(3.998)
log (asset value)		0.0303***	0.0296***
		(5.518)	(5.099)
log (livestock value)		0.00730***	0.00657**
		(2.687)	(2.441)
log (distance to all weather road)			-0.0108**
			(-2.266)
log (woreda administration center)			-0.00209
			(-0.231)
log (distance to coop that buys coffee)			0.0125
Constant	4.007***	4.407***	4.305***
	(6.336)	(6.936)	(6.383)
Observations	1,598	1,598	1,438
R-squared	0.270	0.300	0.302

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations based on ESSP's coffee survey, 2014

7.2. Household dietary diversity

Household diet diversity is measured using the protocols recommended by Fanta (Anne & Paula, 2006). Respondents were asked whether any household member ate a series of food items listed in the Table 7.4 in the last 24 hours. These were grouped into twelve categories: grains; roots & tubers; legumes and nuts; vegetables; fruits; meat; eggs; fish; dairy products (milk, yogurt, cheese); oils and fats; sweets and spices (Table 7.4). The household dietary diversity index is then computed by summing up the number of food groups consumed by the household. As indicated in Table 7.3 below, the average number of food groups consumed by the household in our sampled households is six, but for children it is only four groups.

Table 7.3: Number of food groups consumed out of 12

	Children		Household	
Zone	Food Groups	N of obs.	Food Groups	N of obs.
Sidama	4.03	185	6.19	320
Yirgachefe	3.54	191	5.38	320
Jimma	4.77	156	7.28	318
Nekemte	4.34	109	5.99	320
Harar	3.71	232	5.44	320
Total	4.01	873	6.06	1,598

Source: Authors' calculations based on ESSP's coffee survey, 2014

Table 7.4 shows the 12 food groups and the proportion of households consuming each food group by coffee stratum. As expected, cereals is the most prominent food group followed by spices, oil and fats, and vegetables. The proportion of households that consume high value food groups like fish, egg and meat is low. When we consider the aggregate food groups consumed out of 12 groups, the results are 7.28, 6.19, and 5.99 food groups for Jimma, Sidama and Nekemt, respectively.

Table 7.4: Proportion of the households consuming different the food groups

Zone	Sidama	Yirgachefe	Jimma	Nekemte	Harar	Average
Cereals	0.75	0.57	1	1	1	0.86
Roots & tubers	0.76	0.66	0.55	0.41	0.21	0.52
Vegetable	0.83	0.73	0.74	0.76	0.67	0.75
Fruits	0.47	0.3	0.28	0.37	0.22	0.33
Meat	0.16	0.23	0.44	0.13	0.02	0.20
Eggs	0.08	0.08	0.25	0.17	0.07	0.13
Fish	0.01	0.02	0.03	0.01	0.01	0.02
Pulses & legumes	0.49	0.45	0.81	0.81	0.67	0.65
Milk	0.54	0.31	0.65	0.33	0.47	0.46
Oils & fats	0.81	0.72	0.92	0.92	0.78	0.83
Sweets	0.35	0.39	0.62	0.27	0.53	0.43
Spices	0.94	0.92	0.99	0.81	0.79	0.89
Total	6.19	5.38	7.28	5.99	5.44	6.06

Source: Authors' calculations based on ESSP's coffee survey, 2014

Figure 7.3 below shows that per capita income is positively correlated with household diet diversity. However, the share of coffee income in total household income is not strongly related to the diet diversity measure (see Figure 7.4) implying that the source of income might not be particularly important to diversify food consumption. To see if this relationship endures after controlling for other factors, we run OLS regression of diet diversity score on household and location variables (See Table 7.5).

Figure 7.3: Number of food groups consumed and per capita income

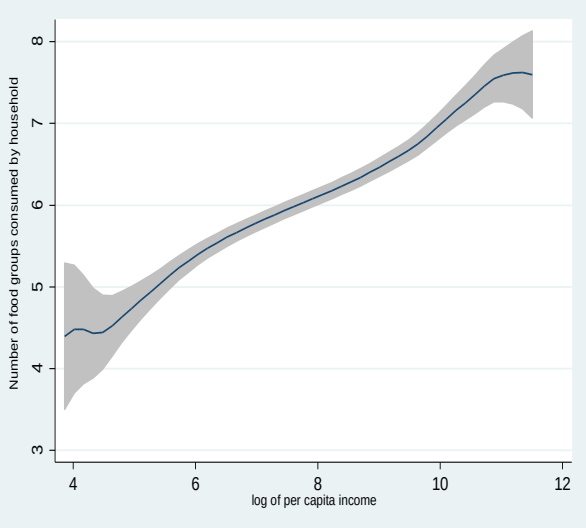
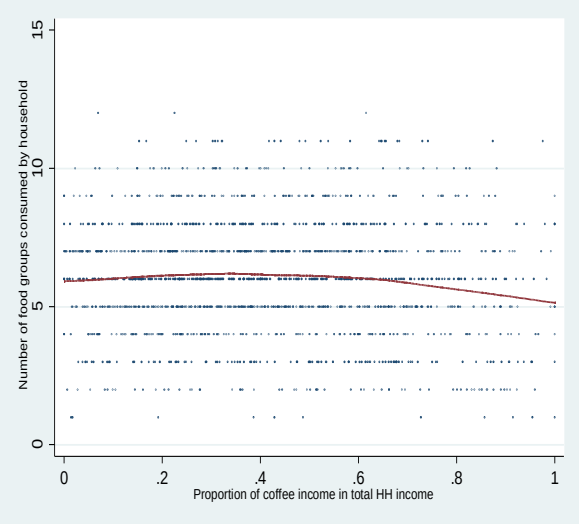


Figure 7.4: Number of food groups consumed and share of coffee income



Source: Authors' calculations based on ESSP's coffee survey, 2014

Wealth quantiles (poor, middle, rich and richest) were included as a right-hand variable taking the poorest as a base group. We further include the share of coffee, cereals, chat, livestock and other income shares in total income as explanatory variables. The results show that per capita income has a positive and significant association with improved diet diversity for all alternative

estimates. As households get richer, their diet diversity also improves with their income level. Table 7.5 also shows that besides the current income level, accumulated wealth also matters to diet diversity. Compared to the poorest quintile, all the remaining wealth categories have consistently higher diversity scores as given by their respective coefficients. In other words, poorer income quartiles with limited resources have less chance to ensure their diet diversity. However, controlling for a number of confounding factors, coffee income as share of total income has no association with diet diversity. Income from chat and cereals also have no visible association with diet diversity, reaffirming our conclusion above.

Table 7.5: Determinants of HH diet diversity score

Variable	Model 1	Model 2	Model 3
Head Sex	0.258	0.117	0.197
	(1.421)	(0.645)	(0.990)
log (head Age)	0.000503	0.00360	-0.00243
	(0.0238)	(0.176)	(-0.116)
log (head Age squared)	-0.0688	-0.0874	-0.0513
	(-0.513)	(-0.677)	(-0.386)
Household Size	0.0728***	0.00907	0.00997
	(3.067)	(0.378)	(0.402)
Household max schooling (base=No education)			
Primary education	0.339*	0.271	0.191
	(1.710)	(1.425)	(0.926)
Secondary education or higher	0.611***	0.350*	0.346
	(2.803)	(1.666)	(1.544)
log (all other area in ha)	0.266**	-0.0241	0.0250
	(2.049)	(-0.186)	(0.189)
log (per capita income)	0.658***	0.434***	0.395***
	(10.68)	(6.711)	(5.854)
Share In total income (base= other income)			
Coffee Income	-0.0383	-0.463	-0.491
	(-0.0971)	(-1.193)	(-1.259)
Chat Income	0.000555	-0.287	-0.00313
	(0.00104)	(-0.535)	(-0.00518)
Cereal Income	0.485	-0.0270	0.0424
	(1.139)	(-0.0642)	(0.0998)
Non-crop Non-livestock Income	0.154	-0.208	-0.0591
	(0.347)	(-0.479)	(-0.135)
Livestock Income	0.495	-0.0838	0.0662
	(1.071)	(-0.182)	(0.137)
Wealth Quintiles (base=the poorest)			
poor		0.391***	0.375***
		(2.881)	(2.616)
middle		0.762***	0.750***
		(5.196)	(4.831)
rich		1.129***	1.073***
		(7.020)	(6.184)
richest		1.644***	1.626***
		(9.230)	(8.724)
log (distance to all weather road)			0.0303
			(0.803)
log (woreda administration center)			0.163**
			(2.159)
log (distance to coop that buys coffee)			0.0404
			(0.697)
Constant	0.862	3.385***	2.095
	(0.758)	(2.984)	(1.639)
Observations	1,598	1,598	1,438
R-squared	0.315	0.354	0.362

Robust t-statistics in parentheses [*** p<0.01, ** p<0.05, * p<0.1]
Source: Authors' calculations based on ESSP's coffee survey, 2014

8. Conclusions and policy implication

Ethiopia has made considerable strides, despite a multitude of challenges, to realize a start in the structural transformation of its economy. However, food and nutrition insecurity still remains high. Nearly a quarter of the total population lives below the poverty line, and a vast majority still depends on subsistence agriculture for its livelihood. Chronic and acute food insecurity are prevalent, especially among rural populations and smallholder farmers. However, the depth and severity might vary with the agricultural production system and asset level of households. As a way out, cash crop production – such as coffee - has been promoted by different political regimes as a strategy to improve food security through the generation of additional income and employment.

Accordingly, coffee production and sales is vital to business and an important source of income for millions of smallholder growers in Ethiopia. Its contribution to foreign exchange earnings is still higher than any other export commodity though its share has been declining in the recent years. Its contribution to poverty reduction through employment and income generation is well recognized. Moreover, it is estimated that in Ethiopia more than 93 percent of the total coffee production is supplied by smallholder coffee growers and income from coffee sales by these smallholders has substantial implications on their livelihood. However, it is not well understood how income from coffee is related to food security and food diversity of the household.

This study, therefore, aims to understand the association between coffee income, food security and diet diversity of coffee farming households using a comprehensive dataset generated from a survey by the Ethiopia Strategy Support Program (ESSP)/International Food Policy Research Institute (IFPRI) in collaboration with the Ethiopian Development Research Institute (EDRI). This is an important topic, given the prevalence of coffee growers in the country and the policy emphasis to improve food security and food diversity.

A number of important findings emerge from the study. Descriptive results show some important patterns for coffee producing households: (1) For the sample households, income from coffee sales account for more than one-third of total income followed by cereal income and non-farm income sources. Although there is slight variation between different strata, households allocate on average about half of their total land for coffee production. This indicates the importance of coffee for these households but also the high diversification of income sources of coffee growing households. (2) In terms of remoteness, coffee households are required to walk for a significant time in order to access: an all-weather road (1 hour), an asphalted road (2.5 hours), and wet mills (1.5 hours). This implies that although the country has made great progress in improving infrastructure, still a lot remains to be done. (3) The average coffee yield for the overall sample of households is estimated to be 376 kg of clean beans per hectare which is 48 percent lower than CSA's national average figure for 2013 (i.e., 720 kgs). These differences might be explained by methodological differences in measuring outputs and in appropriately assigning areas to coffee production in the case of multi-cropping, often practiced in coffee production. Besides, some of the major zones were also affected by drought. However, by any measure, yield is found to be low compared to the country's potential.

Further empirical results from the statistical analysis to examine the association between coffee sales, coffee income, food security and diet diversity as dependent variables, and a number of associates as right-hand variables show the following results. First, an analysis of the determinants of the commercial surplus of coffee (i.e. coffee sales as a share of total production) indicate that male-headed households sell more compared to their female counterparts, and that the size of land allocated for coffee production and proximity to all

weather roads is significantly and positively associated with coffee sales. Second, the share of coffee income in total household income is found to have a positive and significant association with food security while the share of chat income does not show that effect. The land owned by the household, the total value of assets, and the value of livestock assets all have a significant and positive association with the food security index. On the other hand, the distance to all-weather roads is found to have a negative association with the food security index. Third, results related to the determinants of diet diversity show that wealth has a positive and significant association with improved diet diversity - for different alternative specifications - implying that as people are richer, households opt to diversify their food consumption. Interestingly, the share of coffee income has no positive or negative association with diet diversity. Income from chat and cereals also has no visible association with diet diversity. This suggests that cash income does not lead to worse or better diet diversity outcomes than growing food crops.

Our findings also lead to a number of policy implications. First, the Ethiopian smallholder coffee growers have low yields linked to depletion of natural resources, erratic weather conditions, climate changes, disease, production and price shocks, and high volatility of international price. If the coffee sector were to perform better by providing yield-enhancing innovations, devising and implementing measures to improve quality control in the supply chain and therefore better prices, this could lead to improved incomes and better food and nutrition security. Second, given the riskiness of coffee production and the fact that growers rely on a multitude of other income sources, livelihood diversification should be supported so that coffee growers can reduce this risk and somehow smoothen income flows. To become less risk sensitive and better able to survive market fluctuations, diversification strategies can provide coffee farmers with a certain level of stability. In this strategy, it is important to also include food production for own consumption and not just income generation. Third, we find strong links between education and total incomes of households. We also find that households that are more educated have better outcomes related to food security and food diversity. Given that education levels of coffee farming households are very low, this indicates that improved education levels of coffee farmers will lead to better income and nutritional outcome measures. Fourth, a strong link between access to infrastructure and income variables is shown in these settings. While the government has made significant improvements in these areas, it seems that a significant number of these households are relatively still remote and further investments in road infrastructure will likely lead to important pay-offs, income and food and nutrition security at the household level.

References

Anderman T.L., Remans, R., Wood S.A., DeRosa, K. and DeFries, R. 2014. Synergies and tradeoffs between cash crop production and food security: a case study in rural Ghana. Food Security Center, the Earth Institute, Columbia University, New York, NY, USA

Borton, J. and J. Shoham. 1991. *Mapping vulnerability to food insecurity: tentative guidelines for WFP offices*. Study commissioned by the World Food Programme. London, UK, Relief and Development Institute. (Mimeo)

Branca, F., G. Pastore, T. Demissie, and A. Ferroluzzi. 1993. "The nutritional impact of seasonality in children and adults of rural Ethiopia." *European Journal of Clinical Nutrition* 47(12): 840–850.

Chambers, R. & Conway, G. 1992. Sustainable rural livelihoods: practical concepts for the 21st century. IDS Discussion Paper No. 296. Brighton, UK, Institute of Development Studies.

CTA (Coffee and Tea Authority) (1999). Et*hiopia: Cradle of the wonder bean, Coffee Arabica (Abissinica)*. Addis Ababa: CTA.

Department for International Development (DFID). 2004. Agriculture, hunger and food security. Draft work.

Dewalt, K. M. 199). "Nutrition and the commercialization of agriculture 10 years later." *Social Science & Medicine* 36(11): 1407–1416.

Drinkwater, M. & McEwan, M. 1992. Household food security and environmental sustainability in farming systems research: developing sustainable livelihoods. Paper presented to the Adaptive Planning Research Team Bi-annual Review Meeting, Mangu, Zambia, 13-16 April.

Eakin, H, A. Winkels, J. Sendzimir. 2009. "Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems." *Environmental Science & Policy* 12(4): 398-412.

Ellis, F. 1998. "Household Strategies and Rural Livelihood Diversification". *Journal of Development Studies* 35(1):1-38.

Fafchamps, M. 1992. "Cash Crop Production, Food Price Volatility and Rural Markets Integration in the Third World." *American Journal of Agricultural Economics*: 90-99.

FDRI (Federal Democratic Republic of Ethiopia). 2011. *Growth and Transformation Plan I (2010/11-2014/15)*: Ministry of Finance and Economic Development. Addis Ababa, Ethiopia.

FDRI, Federal Negarit Gazeta. 2008. Proclamation on coffee quality control and marketing (Pro. 602/2008). Addis Ababa, Ethiopia

FDRI, Federal Negarit Gazeta. 2007. *Proclamation on establishment of the Ethiopian Commodity Exchange* (Pro. 550/2007). Addis Ababa, Ethiopia.

Food and Agricultural Organization (FAO). 2001. Trade Reforms and Food Security. Rome: FAO. (Available from http://www.fao.org/docrep/005/y4671e/y4671e06.htm).

Gauchan, D. 1997. *Fruit tree integration: An option to improve household food security in Nepal's mountain region (Food Security and Innovations: Successes and Lessons Learned)*. New York: Peter Lang Publishing Inc.

Goetz, Stephan. 1993. Interlinked Markets and the Cash Crop-Food Crop Debate in Land-Abundant Tropical Agriculture. Economic Development and Cultural Change 41: 343-61.

Govereh, J. T. S. Jayne. 2003. "Cash cropping and food crop productivity: synergies or trade-offs?" *Agricultural Economics* 28(1): 39–50.

Govereh, J., T. S. Jayne, and J. Nyoro. 1999. *Smallholder Commercialization, Interlinked Markets and Food Crop Productivity: Cross-Country Evidence in Eastern and Southern Africa.* Department of Agricultural Economy and the Department of Economy, Michigan State University.

IFPRI (International Food Policy Research Institute). 2012. Reshaping agriculture for nutrition and health. Shenggen Fan and Rajul Pandya-Lorch (edited). Washington DC.

Immink, M. D. C., and J. A. Alarcon. 1993. "Household income, food availability, and commercial crop production by smallholder farmers in the western highlands of Guatemala." *Economic Development and Cultural Change* 41(2): 319–342.

ITC (International Trade Centre). 2002. *Coffee: An exporter's guide. Product and Market Development,* UN No. E02.III.T.6. Geneva: ITC

Jayne, T. S., T. Yamano, and J. Nyoro. 2004. "Interlinked Credit and Farm Intensification: Evidence from Kenya." *Agricultural Economics* 31(2): 209–218.

Jha, S., C.M. Bacon, S.M. Philpott, R.A. Rice, V.E. Méndez and P. Laderach. 2011. *A review of ecosystem services, farmer livelihoods, and value chains in shade coffee agroecosystems.* 141-208 In B.W. Campbell and S. Lopez-Ortiz (Eds.) Integrating agriculture, conservation, and ecotourism: examples from the field Springer Academic Publishers: New York & Berlin.

Jones, S., and Gibbon, P. 2011. "Developing agricultural markets in Sub-Saharan Africa: organic cocoa in rural Uganda." *Journal of Development Studies* 47(10): 1595–1618.

Kennedy, E. 1989. *The effects of sugarcane production on food security, health, and nutrition in Kenya: a longitudinal analysis*. International Food Policy Research Institute (IFPRI), Research report 78. ISBN 0-89620-080-8

Kiriti, T. W., and C. Tisdell. 2004. "Commercial agriculture, marital status and other influences on food availability: a Kenyan case study." *Journal of Food Agriculture & Environment* 2(3–4): 141–148.

Kiriti, T. W., and C. Tisdell. 2003. "Commercialization of agriculture in Kenya: case study of policy bias and food purchases by farm households." *Quarterly Journal of International Agriculture*,42(4): 439–457.

Kennedy E. and E. H. Bouis. 1993*. Linkage between Agriculture and Nutrition: Implication for Policy research*. International Food Policy Research Institute, Washington D.C.

Kennedy, E., and P. Peters. 1992. “Household food security and child nutrition: the interaction of income and gender of household head.” *World Development* 20(8): 1077–1085.

Komarek, A. M. 2010. “Crop diversification decisions: the case of vanilla in Uganda.” *Quarterly Journal of International Agriculture* 49(3): 227–242.

Harper, C., R. Marcus and K. Moore. 2003. “Enduring poverty and the conditions of childhood: lifecourse and intergenerational poverty transmissions.” *World Development* 31(3): 535–554.

LMC. 2003. *Review of the Ethiopian Coffee Market. Report prepared for DFID, Programme of Advisory Support Services for Rural Livelihoods*. LMC International Ltd, Oxford.

Leonard, W. R., K. M. Dewalt, J. E. Uquillas, and B. R. Dewalt. 1994. “Diet and nutritional status among cassava producing agriculturalists of coastal Ecuador.” *Ecology of Food and Nutrition* 32(3–4): 113–127.

Govereh, J., and T. S. Jayne. 2003. “Cash cropping and food crop productivity: synergies or trade-offs?” *Agricultural Economics* 28(1): 39–50.

MoA (Ministry of Agriculture). 2014. Growth and Transformation Plan II (GTP TP II) Coffee Sector Plan. Amharic version (Draft)

Masanjala, W. H. 2006. Cash Crop Liberalization and Poverty Alleviation in Africa: Evidence from Malawi. *Agricultural Economics* 35(2): 231–240. 13

Maxwell, S. 1996. “Food security: a post-modern perspective.” *Food Policy* 21(2): 155–170.

Maxwell, S., and M. Smith 1992. *Household food security: A conceptual review*. Institute of Development Studies, University of Sussex, Brighton, U.K. Mimeo.

Maxwell, S. and A. Fernando. 1989. “Cash crops in developing countries: The issues, the facts, the policies.” *World Development* 17(11): 1677–1708.

Negash, M., and J. F. M. Swinnen. 2013. “Biofuels and food security: micro-evidence from Ethiopia.” *Energy Policy* 61: 963–976.

Pierre-Louis, J. N., D. Sanjur, M. C. Nesheim, D. D. Bowman, and H. O. Mohammed. 2007. *Maternal income-generating activities, child care, and child nutrition in Mali*. Food and Nutrition Bulletin 28(1): 67–75.

Pinstrup-Anderson, P. 2002. *Achieving Sustainable Food Security for All*. Paper prepared for Mansholt Lecture, Wageningen University, The Netherlands, and November 14, 2001. (Available from http://www.ifpri.org/publication/achieving-sustainable-food-security-all)

Poulton, C., R. Al-Hassan, G. Cadish, C. Reddy and L. Smith. 2001. The Cash Crop versus Food Crop Debate. Crop Post Harvest Program, Issue Paper 3.

Poulton, C., A. Dorward and J. Kydd. 1998. “The Revival of Smallholder Cash Crops in Africa: Public and Private Roles in the Provision of Finance.” *Journal of International Development* 19(1): 85-103.

Reardon, T., C. Delgado and Peter Matlon. 1992. "Determinants and effects of income diversification amongst farm households in Burkina Faso." *Journal of Development Studies* 28(2): 264-296.

Sen, A. 1981. Poverty and Famines: an essay on entitlement and deprivation. Clarendon: Oxford, UK.

Sharma, K. R. 1999. “Farm commercialization and nutritional status of children: the case of the vegetables, fruits, and cash crops programme in western Nepal.” *Food and Nutrition Bulletin* 20(4): 445–453.

Von Braun, J. 1995. “Agricultural commercialization: impacts on income and nutrition and implications for policy.” *Food Policy* 20(3): 187–202.

Timmer, C.P. 1988. "The Agricultural Transformation" in Chenery, H and T.N. Srinivasan (Eds) Handbook of Development Economics, Amsterdam-North Holland: 278-331.

United Nations Children’s Fund (UNICEF). 1990. Strategy for improved nutrition of children and women in developing countries. New York, NY, USA, UNICEF.

Woldeamanuel S. G. 2009. *Poverty, Food insecurity and Livelihood strategies in Rural Gedeo: The case of Haroressa and Chichu PAs, SNNP*. Proceedings of the 16th International Conference of Ethiopian Studies.

Worako, T. K., H. D. Van Schalkwyk, Z. G. Alemu, and G. A. Goshu. 2008. *Price Transmission in the Deregulated Ethiopian Coffee Market.* Doctoral Dissertation, University of Free State, South Africa.

World Bank. 1989. *Mozambique food security study.* Washington, DC.

Zeller, M., and M. Sharma. 2000. “Many borrow, more save, and all insure: implication for food and micro-finance policy.” *Food Policy* 25(2): 143-167.