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Trends in Production, Productivity and Marketing of Major Food and Cash Crops in Coffee Growing Zones of Ethiopia

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Abstract **– The sound performance of agriculture warrants the availability of food crops. This accomplishment in agriculture does not only signify the adequate acquisition of food crops to attain food security, but also heralds a positive aspect of the economy. In regard to this, collective efforts are being geared to securing agricultural outputs of the desired level so that self reliance in food supply can be achieved and disaster caused by food shortages can be contained in the shortest possible time in Ethiopia. Towards this end the effort being exerted by the Government of Ethiopia (GoE) to improve the production and productivity of major food and cash crops is very crucial element of transforming the Ethiopian agriculture thereby enhancing the livelihood of smallholder farmers in the country. This study was conducted in major coffee growing livelihood zones to assess the trends of production and productivity of the major food and cash crops being grown by farmers in coffee growing zones of the country with a view to analyze the market potential and price trends of the major crops was conducted. Key-informant interviews were also held with staffs of district agriculture office and traders. Checklists and various formats to collect price and production and productivity related data from CSA as well as from studied districts. Reviews of secondary sources were also used to capture relevant data and information for the study. The study reveals that during the last four years, the average total production of maize in the studied coffee based livelihood zones has increased by more than 45%. Similarly during the same period, the average total production of Sorghum in these livelihood zones has increased by 23%. The fluctuations or changes in the price of the major food crops within a year, their average prices (Maize, sorghum and Ethiopian Cabbage) during the last three years have demonstrated increasing trend. The study also identifies in aggregate, the price of maize taking the average of prices in all the markets has increased by 46%.**

Keywords **– Crop, Household Income, Livelihood, Productivity.**

I. INTRODUCTION

Agriculture is way of life for millions of Ethiopia who are directly engaged its production, trade, processing and distribution of its products. Thus, accelerating growth and poverty reduction, and the ultimate achievement of structural transformation, are the critical policy challenges in present day Ethiopia. Several studies on agricultural and economic growth linkages revealed that agricultural growth can induce higher overall growth and faster poverty reduction than nonagricultural growth (Diao, Fekadu, Haggblade, Taffesse, Wamisho and Yu, 2007).

As part of the effort in supporting the Ethiopian agriculture, particularly smallholder farmers in the major coffee growing zones of Ethiopia, SOLIDARIDAD has initiated the Food Security Program that will be implemented in Ethiopia and Kenya (FOSEK). The program is planned to be implemented with a prime purpose of demonstrating improved farmer resilience based upon combining coffee as a cash crop with the production of a considered selection of food crops (intercropping) for farmers' own consumption and also for sale to the local markets. The program is also expected to generate a more stable income for coffee farmers throughout the year and contribute for access to nutritious food and availability of food for the local markets. It will also include a dairy enterprise for increased revenues and improved nutrition.

The objective of this study are to assess the trends of production and productivity of the major food and cash crops being grown by farmers in coffee growing zones of the country with a view to analyze the market potential and price trends of the major crops was conducted.

II. METHODOLOGY

2.1. Data Collection Techniques and Analysis

The data for the study was collected through various instruments. These includes checklist and various formats to collect price and production and productivity related data from central statistical agency (CSA) of Ethiopia as well as from studied districts. Review of secondary sources such as reports of case studies, technical reports of various governmental and non-governmental organizations and performance reports of agricultural office were also used to capture relevant data and information for the study. The production, productivity, and price data for each crop commodities considered in this report were obtained mainly from Central Statistical Agency of Ethiopia.

Key-informant interviews were also held with staffs of district agriculture office and traders in the study locations to obtain price data and understand the functioning of major food/cash crop commodities value chain. Market potential and price trends of the major crops was conducted.

III. RESULTS AND DISCUSSIONS

3.1. Major Food and Cash Crops Grown: Reviewed Literature Based on Previous Studies

Nation-wide the area coverage of maize, wheat, sorghum and finger millet account for 47% of cultivated grain crop area of the country in the 2012/13 cropping season (USAID, 2010). Despite a high degree of coffee commercialization, crop diversification is an important livelihood strategy of farmers. In all studied coffee growing zones, the average number of crops being

cultivated by farmers ranged from four to six crops. Coffee, maize, sorghum, finger millet, chat, pulses, Enset and different kinds of fruits and vegetables are the most common food and cash crops in the cropping pattern of all studied regions. Diversified production reduces smallholders' vulnerability to market and production risks and provides them with the opportunity to select a particular crop or crops in order to increase farm-generated income while improving household food security. Smallholders' simultaneous adoption of coffee commercialization and crop diversification is also one of the household livelihood strategies which is a response to unreliable food markets, high transaction costs and risks associated with increased specialization in coffee.

The study conducted by (Samuel and Eva, 2008) based on randomly selected woredas from sidma, Wollega, Jimma and Yirgachefe areas, which also embraces three livelihood zones considered in this study (LZ-1, LZ-2 and LZ-4)) shows that Coffee is the dominant crop occupying large area of farmland and no other crop occupies a similarly large area of the farm. About 38% of coffee plots were intercropped with annual crops like maize, tef, wheat, peas, and vetch, and perennial food and cash crops such as Chat and Enset. The crops used for intercropping are largely utilized for consumption, sale and livestock feed. They contribute for enhanced household nutrition and income generation from sales of cash crops and livestock products (milk and milk products).

Next to coffee, "Enset" (false banana) and maize were grown by the majority of surveyed farm households in three of the livelihood zones (LZ-1, LZ-2 and LZ-4). Other crops in the cropping pattern include spices, Chat, root crops, fruits and vegetables. Most of these non-coffee crops provide coffee growers with products that can be either consumed directly or marketed occasionally on local markets. Enset, which is planted by about half of the surveyed households, plays an important role in the livelihood strategies of coffee growers as it serves as an insurance crop, especially at times of coffee price declines or shortage of food grains in local markets, mainly because of its high productivity, resistance to drought and availability almost all year round.

As presented in Table 1, it can be concluded that Enset, maize, fruits are the major food crops that are being grown by farmers in major coffee growing areas of the three livelihood zones, LZ-1, LZ-2 and LZ-4. Maize as staple diet next to enset (false banana) is often grown in small plots as back yard green maize and in large plots as major cereal crop for HHs consumption and cash source across the humid lowlands of Sidama Coffee livelihood zone (LZ-1). Currently "chat" (Cahta edulis) is on the ascendancy as cash crop.

Table 1. Proportion of coffee growing farm households that grow different types of crops

Crop Types	Percentage of grower farmers from total farmers	Average plot size under specific crop per grower (ha)
Coffee	77	0.63
Enset	52	0.40
Maize	49	0.58
Fruits	34	0.20
Chat	27	0.34
Eucalyptus	13	0.26
Vegetables	8	0.40

Source: Survey conducted by Samuel gebre Sillasse and Eva Ludi, 2008) on agricultural commercialization in major coffee growing areas of Ethiopia (selected woredas of Jimma, Yirgachefe, Sidama and Wollega areas).

3.2. Major Food and Cash Crops in Major Livelihood Zones

The importance of a given crop can be determined by the number of households that grow the crop. The largest the number of households engaged in the production of a given crop, the highest the importance for livelihoods security.

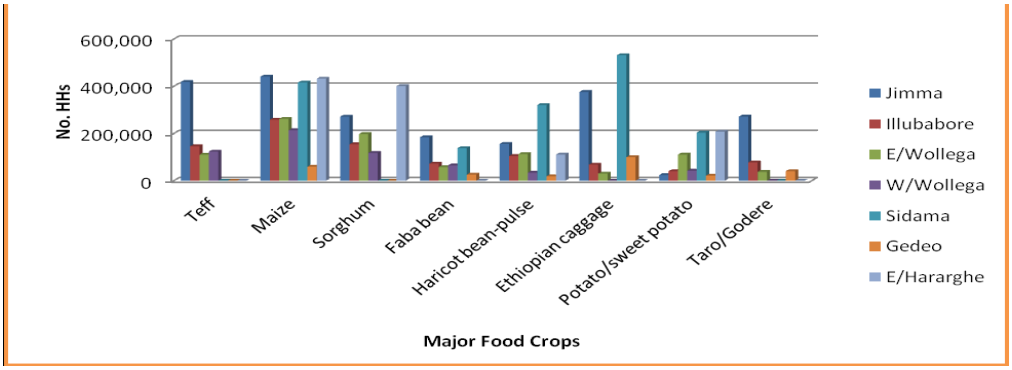

Fig. 1. Number of HHs that Grow Majro Food Crops (2013)

In terms of area coverage tef takes the highest proportion which makes it the most important crop taking the lion share of area coverage in Jima zone. During the year 2012, tef has covered 174,912 ha of land followed by Maize and coffee with total coverage of 135,710 ha and 99.702 ha, respectively. This shows that based on the number of growers and total land hectare coverage criteria the most important crops being grown by the farming HHs in West Oromiya livelihood zone of Jimma area are tef, maize, and coffee while Enset has significant importance as it is being produced by most households.

3.3. Trend in the Production of Major Food Crops

The three major crops that are selected as strategic commodities for improving food security in the livelihood

zones have generally exhibited increasing trend of total production during the last four years. Such increasing trend as shown on Figure 4 below reveals that the crops have essential role to play in increasing availability of food. During the last four years, the average total production of maize in the studied coffee based livelihood zones has increased by more than 45%. Similarly during the same period, the average total production of Sorghum in these livelihood zones has increased by 23%. Ethiopian cabbage has more or less demonstrated stable trend during the last four years.

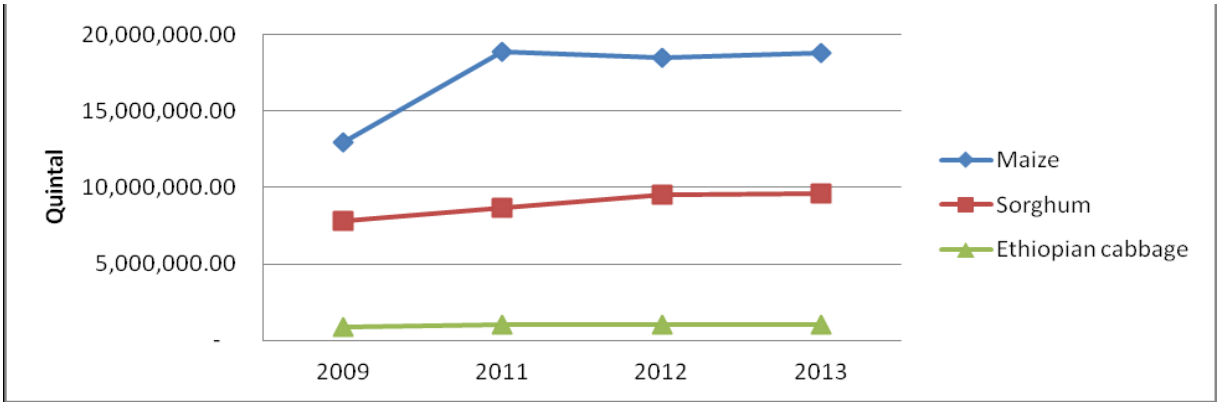

Fig. 2. Trends in Average Total Production of Major Food Crops in Coffee Growing Zones 2009 - 2013

3.4. Productivity Potentials of Major Food Crops

The national average productivity of major crops is generally observed to be very low. The national average yields for maize, wheat and sorghum, and finger millet, for instance, are 3.0, 2.0 and 1.7 ton/ha, respectively in 2012/2013. Available evidence suggests that yields of major crops under farmers' traditional management practices are still far lower than what can be obtained under on-station and on-farm research managed plots (Alemayehu, Dorosh and Sinafikeh, 2011). This is a clear indication of large yield gaps between traditional practices and improved technologies. There are several factors that are believed to contribute to low productivity of crops including, among others, moistures stress, and shortage of seeds for improved varieties, soil fertility degradation, insect pests, diseases, weeds and birds. The productivity of the major crops being grown by farmers in all the livelihood zones is very low compared to their potential. The finding from agricultural research shows that the productivity level of these crops could be improved by more folds if modern agricultural technologies and practices are used. The productivity level of the major crops is illustrated on the table below (Table 2).

Table 2. Average Productivity (qt./ha) Level of Major Crops (2013)

Livelihood zones	Administrative ZONES	MAJOR CROPS							
		Maize	Tef	Sorghum	Sweet potato	Haricot bean	Ethiopian cabbage	Chat	Coffee
West Oromiya LZ	Jimma	28.18	12.31	17.21		6.35	108.88	9.91	7.79
	Illubabore	31.51	10.01	23	92.6	9.28	112	10.48	6.44
	West wollega	31.75	9.17	21.30	85.2	8.58	114.23	10.42	6.29
	East Wollega	38.94	12.86	23.57	96.52	17.36	-	11.43	7.06
East & West Hararghe LZ	East Hararghe	28.88	-	19.74	87.08	19.76	-	10.20	7.32
	West Hararghe	31.24	10.77	19.74	87.08	19.76	-	10.20	7.32
Sidama Coffee LZ	Sidama	34.21	-	-	5.88	13.14	110.99	13.13	9.58
Gedeo/Yirgachefe LZ	Gedeo	27.76	-	-	102.66	7.51	106.17	-	7.8
Average Productivity (Qt/ha)		31.55	11.02	20.76	79.57	12.71	110.45	10.82	7.45
On-station yield potential Qt/ha		60-70	18-20	42	543.6	23-36	NA	NA	
On-farm Yield (Qt/ha)		50-60	14-18	33	322	15-35	NA	NA	

Source: CSA Agricultural Sample Survey Report (2013)

The average productivity level of Maize, sorghum, tef and haricot bean which are the major and important food crops that are commonly growing in all the studied livelihood zones are 31 qt/ha; 20.76 qt/ha; 11.02 qt/ha and 12.71 qt/ha, respectively. These commodities have high potential to improve food security status of farm HHs by increasing the productivity level through application of modern varieties and associated packages of agronomic practices. The productivity potential of important food crops has been presented in Table 5 above. As it is observed on the table, the potential productivity level of maize attainable at farmers' condition ranges from 50-60 qt/ha while the current average level of productivity of maize in the coffee growing regions (livelihood zones) is 31 Qt/ha. If appropriate agronomic practices are applied and improved varieties are used, there will be 100% yield

increment of maize from 31.55 Qt/ha to 50-60 Qt/ha. Similarly there is high potential to increase productivity level of Sorghum from its current level of 20.76 Qt/ha to 33 Qt/ha attainable at farmers conditions if improved varieties and associated modern management practices are applied. Therefore increasing the productivity level of sorghum and maize by 50% and 100%, respectively, contributes significant improvement of food security status of farm households in coffee growing zones of the country.

3.5. Major Food Crops and their Market Potential and Price Trends

3.5.1. Major Cash and Food Crops Market Potentials

Maize and sorghum which are the priority food crops commodities in terms of number of growers and total area of land covered under these crops make them the most crucial food crops having significant importance for food security. These crops in all the studied coffee growing livelihood zones and any other regions of the country are the major constituents of staple food and also income sources. As a result such diversified importance, these crops are believed to have high market potential.

Growth and transformation plan (GTP) of Ethiopia has also identified these crops as strategic commodities to achieve food security in Ethiopia.

In general, in East and West Hararghe Livelihood zone, the development trend for cash crops production over the last decades is clearly positive, with chat being the leading crop, followed by Irish potatoes, onion/shallots and other vegetables. On the other hand, coffee generally marks a very low development trend except for three districts in West Hararghe. While being the only cash crop, there is some localized negative trend exhibited by coffee. This negative trend is accompanied by replacement of coffee farms with chat. This is largely attributed to the ever fluctuating and volatility of coffee prices in the international market.

Being a very perishable commodity which has to reach the consumer within two days, chat requires a sophisticated marketing system with a well functioning transportation network, especially when final destinations are as far as Djibouti and Aden (by air from Dire Dawa) and Hargeisa, Berbera and Boosaaso (by air from Hargeisa). Therefore, Chat from Hararghe has an ever growing export market. The cultivation of onion/shallots is even more labor intensive than that of potatoes, with an average of 1,300 to over 2,600 hours per hectare. Yields vary a lot and can be considered in the range between 3.5 to 9 MT per hectare. The non- marketable yield, representing some 20%, will be used as planting material, for home consumption and for sell on the local market. Being an important ingredient for the Ethiopian kitchen, onion and shallots have a good marketing potential within the country and less dependent on export trade, even if the price level might be lower.

In West Oromia livelihood zone as well as Sidama Coffee and Yirgachefe livelihood zones, despite Enset is the most important food crop being produced by farmers it has limited market potential as its consumption is not very common in major towns of the Ethiopia.

Despite its great potential for alleviating food insecurity, enset is grown and consumed in a limited area of the country. In the 2008 and 2009 cropping seasons, enset was produced on only 2.5% of total agricultural land in Ethiopia. Furthermore, enset is not typically consumed outside of its areas of cultivation. Markets for sale of enset are not well developed, and where they exist there are few buyers and farmers generally have poor access to information about market prices and consumer preferences of enset. Enset is also viewed by many urban dwellers as a "poor person's food." There have been signs that this is changing, however, as enset is increasingly sold at urban markets. Restaurants in the Ethiopian capital, Addis Ababa, have also begun to feature kocho, a dish made with the pulp of the enset root, on their menus. Rising cereal prices may also increase demand for enset products as a cheaper substitution. If demand increases, this can encourage increased enset production and expand the positive impact that enset has on Ethiopian food security.

Despite of increasing production and supply of fruits such as Banana, avocado, and mango, fruit production is, in general, at its rudimentary stage in all the studied livelihood zones. Most fruits are consumed with in the zones and very little is coming out to the big markets in the country. There are very few cafeterias in most towns that produce juice mainly from avocado. There are also road side cafes that sell avocado snacks at affordable price for local consumers. The main actors in the supply of fruits include women who come to towns with small amount of fruit and the youth who are the main distributers of banana on the road sides. Otherwise there is not as such a vibrant fruit marketing and processing for that matter.

The market price for major commodities was collected from the major local markets in each of the coffee growing livelihood zones. The retail prices for the major commodities for West Oromia livelihood zone was taken from major towns particularly Nekemt, Bedele, Jimma Metu and Gimbi. These are the major markets in Western Oromia as these towns are big market sinks for most of the agricultural commodities that are produced in the districts of West Oromia livelihood zones. The retail prices for major food crops in Eastern and Western Hararghe livelihood zone was taken from Chiro, Dire Dawa, Haremaya, Harar and Adama towns as these towns are the major market sinks for agricultural products that are produced in different districts of East and West Haraghe livelihood zones. Similarly, for the Sidama Coffee and Gedeo/Yigachefe Coffee livelihood zone, retail prices for major food commodities were taken from Yirgachefe, Dilla and Awasa towns.

Based on the price data at Nekemt town market in the West Oromiya Livelihood zone, Maize which is one of the most important food crops, has relatively exhibited slight increment between the period of January 2012 to October 2013 at a price of Birr 4.50/kg. The price has increased from birr 4.50/kg to birr 7.00/kg in October and December which shows that the retail price of maize fluctuates seasonally which is associated with excess supply in one

season and shortage of supply in another season of the same year. Nekemt market is the major sink market for maize that is produced in major coffee growing districts of the Western Oromia livelihood zone. In order to stabilize the retail price of maize, there has to be a system that will ensure sustainable supply of the crop throughout the year. This can be done mainly through increasing productivity of the crop and through provision of storage facilities to enable farmers supply the crop throughout the year.

The price of maize at Jima has also fluctuated and during the last 7 months price of maize has increased by 25% (Figure 5). In almost all market location the price of Ethiopian cabbage has shown declining price trend during the same months in the period of 2013 mainly because of excess supply of the produce.

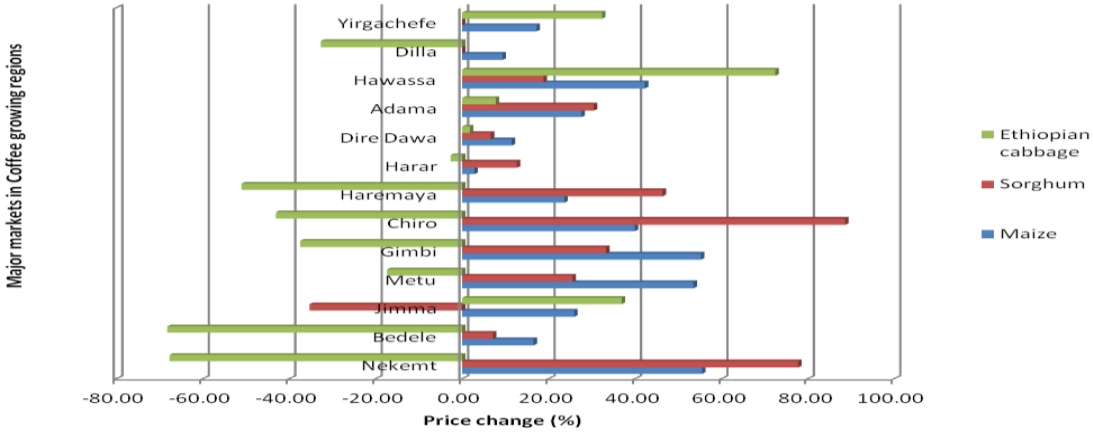

Fig. 3. Trends of Retail Price Changes for 3 major Food Crops (January – December 2013

Apart from the fluctuations or changes in the price of the major food crops within a year, their average prices (Maize, sorghum and Ethiopian Cabbage) during the last three years have demonstrated increasing trend. This increasing trend resulted from the rising demand for the crops as these crops are the major sources of staple foods in the studied coffee growing livelihood zones. In aggregate, the price of maize taking the average of prices in all the markets has increased by 46%. The trend in the prices of Maize at each market in coffee growing livelihood zones is shown on the figure below (Figure 6).

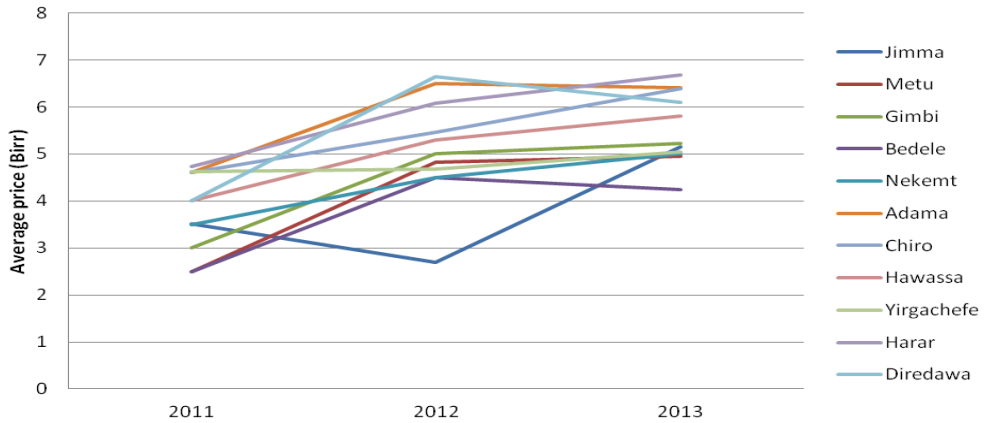

Fig. 4. Trends of Retail Prices of Maize in Major Market of Coffee Growing Regions

IV. Key Production and Marketing Constraints of Major Food and Cash Crops

Limited access to seed of improved varieties of maize and sorghum as well as Ethiopian cabbage crops is the key constraint that affected production and productivity of these major crops in all studied livelihood zones. As a result, the productivity level of these crops remained very low compared to their potential. Limited productivity coupled with limited numbers of improved variety growers has restricted production levels of these crops.

The production of sorghum in East and West Hararghe livelihood zone as well as other studied livelihood zones is constrained by high incidence of striga and stoke borer which are causing devastating effect in the overall production and productivity of sorghum in Ethiopia, in general, and in studied livelihood zones of Ethiopia, in particular.

The productivity of these major crops is highly associated with the low level use of inputs being practiced by smallholder farmers. The main input in this regard is fertilizer. As the cost of fertilizer is very high, farmers tend to use the rate that is much below the research recommended rate.

Due to the highly perishable nature of milk coupled with mishandling practices from production up to the consumption stages, the amount produced is subject to high post harvest losses. Estimated post harvest losses of up to 40% of milk and its derivatives have been reported from milking to consumption (Felleke, 2003). Post harvest losses and quality deterioration are mainly attributed to mishandling in the dairy chain from farm to fork. These include:

- Contamination during milking and further handling coupled with storage time and temperature before consumption.
- Deliberate adulteration of milk during sale.
- Unhygienic handling, transportation and distribution systems.
- Inefficient processing technologies.
- Inadequate fresh milk outlet and
- Spillage losses during milking.

V. Conclusions and Recommendations

- Development intervention that aim at improving livelihoods of smallholder farmers in Coffee growing livelihood zones of Ethiopia should focus on narrowing the productivity gap of major food and cash crops.
- As total number of smallholder farmers that grow a given crop, area coverage under the crop and total volume of production are key parameters that indicate the significant importance of a food or cash crop. Therefore, it is very essential to target on priority commodities that qualify as per these criteria.
- Maize should be priority commodity that needs to be targeted in the selected coffee growing livelihood zones of Ethiopia as it is the major crop being produced by largest numbers of farmers, it covers highest proportion of land area and its total production is the highest of all other crops being grown by farmers of the studied areas.
- The second best alternative food crop which needs to be targeted under the FOSEK program should be sorghum which is serving as the major source of food and cash.
- Ethiopian cabbage is one of the major food and cash crops that need to be targeted by the FOSEK program to improve the food security situation of coffee growing smallholder farmers. The numbers of farmers that are growing it are the third highest next to Maize and Sorghum.
- The productivity level of these three major food and cash crops is very low compared to their potential. As a result, interventions that aim at improving food security situation of smallholder farmers in the selected coffee growing livelihood zones should introduce improved varieties that are high yielders and disease resistant. This has to be done by identifying and testing the available improved varieties within the agricultural research system.
- The average price of maize and sorghum during the last few years has shown increasing trend which reveals increasing imbalance between supply and demand of these crops. The supply side can be improved through promoting high yielder varieties of these crops which also gives opportunities of enhanced income for the farmers in the studied zones.

References

[1] Alemayehu Seyoum, Paul Dorosh and Sinafikeh Asrat. 2011. Crop Production in Ethiopia: Regional Patterns and Trends. Development Strategy and Governance Division, International Food Policy Research Institute, Ethiopia Strategy Support Program II, Ethiopia. ESSP II Working Paper No. 016.

[2] CARE Ethiopia. 2013. Livelihood-Based Drought Recovery Project in East and West Hararghe Zones of Oromia Region, Ethiopia.

[3] CSA (Central Statistics Agency). 2013. Agricultural Sample Survey 2012/2013 (2005 E.C.). Volume I. Report on Area and Production of Major Crops (Private Peasant Holdings, Meher Season). Statistical Bulletin 532, Addis Ababa

[4] CSA (Central Statistics Agency). 2012. Agricultural Sample Survey 2011/2012 (2004 E.C.). Volume IV. Report on Land Utilization (Private Peasant Holdings, Meher Season). Statistical Bulletin 532, Addis Ababa

[5] CSA (Central Statistics Agency). 2011. Agricultural Sample Survey 2011/2012 (2004 E.C.). Volume IV. Report on Land Utilization (Private Peasant Holdings, Meher Season). Statistical Bulletin 532, Addis Ababa

[6] CSA (Central Statistics Agency). 2010. Agricultural Sample Survey 2011/2012 (2004 E.C.). Volume IV. Report on Land Utilization (Private Peasant Holdings, Meher Season). Statistical Bulletin 532, Addis Ababa

[7] CSA. 2010b. Agricultural sample survey. Report on crop and livestock product utilization. The Federal Democratic republic of Ethiopia, Central Statistical Agency (CSA). Private Peasant Holdings. Statistical Bulletin 468, Addis Ababa, Ethiopia.

[8] CSA (Central Statistics Agency). 2009. Agricultural Sample Survey 2011/2012 (2004 E.C.). Volume IV. Report on Land Utilization (Private Peasant Holdings, Meher Season). Statistical Bulletin 532, Addis Ababa

[9] Diao, X., Fekadu,B., Haggblade, S., Taffesse, A.S. Wamisho, K. and Yu, B. (2007). Agricultural Growth Linkages in Ethiopia: Estimates using Fixed and Flexible Price Models. IFPRI Discussion paper No. 00695.

[10] Joachim D. Ahrens. 1998. West and East haraghe after Meher harvest: Significant Yield Reductions.

[11] Nelli Niemisto. 2011. The Resilience of Rural Ethiopian Livelihoods: A Case Study from Hararghe Zone, Eastern Ethiopia.

[12] Ulfina Galmessa and et'al (2013) Dairy Production Potential and Challenges in Western Oromia-Milk Value Chain, Oromia, Ethiopia. Journal of Agriculture and Sustainability, ISSN 2201-4357, Volume 2 (2013), Number 1, 1-21, Ambo University, Ethiopia.

[13] USAID (United States Agency for International Development). 2010. Staple Foods Value Chain Analysis. Country Report, Ethiopia. Addis Ababa.