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By

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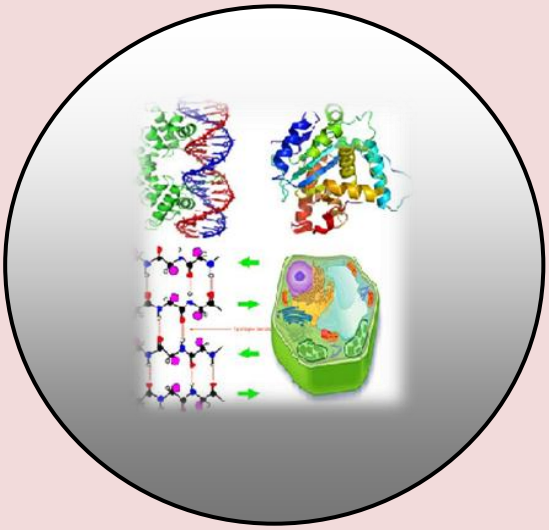

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Coffee Value Chain Analysis in Limmu Seka District, Jimma Zone of Oromia National Regional State, Ethiopia

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ABSTRACT

The Coffee sector is the backbone of Ethiopian economy. It is the most important export crop, accounting for 22 percent of the country's commodity exports. Limmu-Seka, one of the woredas in Jimma Zone, Oromiya region. This study was conducted with the aim of analyzing the coffee market supply in Limmu-Seka woreda, Jimma zone. The specific objectives were to identify factors affecting market supply in the study area. For this research the primary data was collected both in quantitative and qualitative methods from 149 randomly sampled household farmers and 9 traders from 5 kebeles in the district. Data were selected using secondary and primary sources through structured questionnaire and check-lists accordingly. Results in identifying direct actors in the value chain, showed that there are four major actors with different functions engaged directly in production, processing, and marketing. The result of econometric analysis using multiple linear regression models revealed that from 8 explanatory variables, 4 variables were significantly affecting the supply at 1 % level. The study concludes that the linkage between value chain actors was weak and the profitability of producers lacks fairness when compared to intermediates. Thus it is recommended that the chain actors should work in an integrated way to improve production, and to strengthen sustainable market linkage in the study area. Furthermore future researches on determinant factors and effects of coffee value chain performance are needed in order to investigate other extraneous variables that could contribute for improvements in coffee marketing performance.

Keywords: Limmu Seka, Coffee, Marketing, Multi Linear Regression, Export and Value Addition.

INTRODUCTION

Background of the Study

Agricultural value chain analysis is a dynamic approach that examines how markets and industries respond to changes in the domestic and international demand and supply for a commodity, technological change in production and marketing, and developments in organizational models, institutional arrangements or management techniques. Coffee is one of the highest valued commodities in international trade, with annual export revenues worth around $10 billion on average, and annual retail sales of approximately $50 billion. It is a highly labor-intensive industry employing an estimated 100 million people in over 60 developing countries, where it is often a vital source of export revenues and income to producers, many of whom are smallholder. The dependence in coffee is greatest in Africa, where there are some 25 coffee exporting countries (ICO, 2018).

Global annual coffee production fluctuates between 6 to 10 million tones, with production in the crop year 2017/18 totaling 9.5 million tones. Three countries, Brazil, Colombia and Vietnam, account for almost 58 % of world coffee production. While Africa, whose share has been falling, produces between 15 % and 18 %. Ethiopia is now Africa's largest producer but still only accounts for about 3 % of global output (Sänger, 2018).

Important changes are happening in global agricultural value chains, as shown in recent research. For example, some researchers have shown the impact of the increasing importance of modern retail globally and its effect on trade and production patterns in developing countries (Reardon et al., 2003, 2009, Michelson et al*.,* 2012, Timmer, 2009). Other researchers have looked at the impact of more stringent quality and food safety standards and how the consequent transformation of global supply chains impacts production practices and welfare of smallholders (Maertens and Swinnen, 2009, Kersting and Wollni, 2012, Kleemann and Abdulai, 2013).

Some observers indicated that Ethiopia's annual production of coffee is between 140,000 and 180,000 tons annually. About 44% of the coffee produced in Ethiopia is exported to other countries (Italy, United Kingdom, Netherlands, Djibouti, Germany, Japan, Saudi Arabia, France, and the United States), The potential for coffee production in Ethiopia is very high as there is suitable altitude, ample rainfall, optimum temperatures, appropriate planting materials and fertile soil. The total area covered by coffee is about 400,000 hectares, with a total production of 200,000 tons of clean coffee per annum. On average 5.67 quintals of clean coffee can be produced in one hectare and in a single hectare of land 1800 mother coffee tree can be cultivated (ICO, 2015).

The Coffee sector is the most important export crop, accounting for 22 percent of the country's commodity exports in 2013/14 (Minten, 2015). According to the ICO report of (Sänger, 2018), Ethiopia exported an average of194,400 tons of coffee per annum to the world market and earned a total sum of 421million USD, which in fact indicates a significant improvement in the coffee business between 2012-2016.

Given the importance of the coffee sector to the economy, the sector has also been exposed to a wide set of different policies over the past three major regimes: monarchic regime (prior 1974), central planning regime (1974 to 1991) and Ethiopian People's Republic Democratic Front (EPDRF) regime (1991 to present). In April 2008, The ECX was established with the aim of filling the gap created by missing institutions and infrastructure in agricultural commodity markets (Gabre-Madhin, 2001). The objective of the commodity exchange was to perform four basic functions: (i) reduce transaction costs, (ii) ensure price transparency and price discovery by creating a secure and reliable system for handling, grading and storing services for commodity transactions, (iii) promote risk-free payments, and (iv) provide a goods delivery system to settle transactions (Gabre-Madhin, 2006).

However, despite efforts, the performance of the coffee sector still remains lagging. Poorly instituted modes of production (Zewdu, A., Bamlaku A., Alemub, M., 2010), high marketing costs (Rashid et al. 2010), volatile prices (Gemech, F., Struthers, J, 2007), inadequate market infrastructure and an unorganized commodity marketing approach are indicators of market inefficiency that significantly limit coffee growers' share from the value of exports and total earnings from the sector (Gemechu Firdu and J. Struthers, 2007). On the other hand, lack of transportation, lack of market information, illiteracy of household farmers, and distance to nearest market place are some expected constraints for the farmer not to increase supply of coffee due to the remoteness of the study area.

Many previous studies have given more emphasis on marketing of already prominent coffee producers of Kafa, Wellega, Illubabor and Hararge and Sidama. Some research findings have been studied by (Assefa, 2015), (Desalegn and Solomon, 2014), in different areas. Among above mentioned researchers, (Bizualem, 2015) has been studied on value chain analysis of coffee, in Limmu-Kosa and Goma districts, two of the woreda in Jimma Zone. The study area, Limmu-Seka is located 110 km from Jimma town and geographically, the district lies between of 8.004N- 8.0561N latitude and 36.0401E-37.0131E Longitude (CSA, 2008). The study area Limmu-Sekais one of the woredas in Jimma Zone, Oromiya region. There are about 158,933 total populations living in this district. It was late in 1838 when coffee is exported from the study via Massawa. Limmu-Seka, being one of the oldest coffee exporter in the world, it is the second to export coffee after Harar from producing regions in the country. Today, the producers are accounted 17541 with total coffee farm land coverage of 23,369 hectares (Birhanu, 2013). However; no study had been conducted value chain analysis for coffee in this district. Therefore, understanding the behavior of coffee value chain in general, knowing the weakest part of the sector, channel choice decision, and the variables affecting them in particular in the study area can be of a great importance in the development of sound policies with respect to marketing and prices, imports and exports, of the coffee sector for the district as one of objective of the country is meeting the overall rural and national development.

Statement of the Problem

Ethiopia's economy is largely commodity -based on exports of agricultural crops such as coffee with little or no value addition involved. In order to accelerate sustainable and inclusive growth and development in Ethiopia there is an urgent need for fostering a new approach based on exploiting the full value chain potential of coffee in the country including inputs supply, processing, and marketing. A review of literatures on the Ethiopian coffee value chain indicate that the sector has an enormous potential and opportunities for growth and rooms for significant improvements in its number of areas (ICO, 2015) Despite the progress made in the last two decades, the coffee market supply by Ethiopian smallholder farmers currently faces many challenges due to' limited access to market information, limited access to credit and extension service (Dereje, 2007). Similarly, (Dendena, G., Efrem, L. and Lema, B., 2009) argued that small scale, dispersed and unorganized producers are unlikely to exploit market opportunities as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices.

Besides, as identified by various literatures and surveys, for example (Birhanu, 2013), (Dereje, 2007) and (Minten, 2015) participants in the Ethiopian coffee value chain are numerous which include smallholder coffee farmers or state farms, primary collectors, suppliers, processors, service cooperatives, unions, exporters and various governmental institutions. Though, markets in Ethiopia have seemingly been governed by too many controls and requirements, the market reforms might have unintended consequences on market performance and coffee quality.

Other studies, for instance the study of Jemal (2012) showed multiple variables that affects the amount of coffee supply to the market significantly and positively. Among them in his study he found that; perception household coffee farmer towards to farm-gate price, access to information and education level of household head were significant and in positive relationship with coffee supply for the case of Meta. And according to (Bizualem, 2015) distance to market place affected the market surplus negatively.

Though the government of Ethiopia has made various efforts to exploit the potential benefits in the last two decades, still there are no value chain based efforts made in the study area to understand the issues at the chain level, using representative surveys. The lack of updated representative information is a constraint for evaluations of projects, programs, and policies (Minten, 2015).

Despite benefits realized from the establishment of Ethiopian Commodity Exchange, the set-up of primary marketing centers had side-effects that might have affected system-wide transaction costs, as well as the quality of coffee in the study area, Limmu-Seka. As indicated by (Minten, 2015), a number of problems might have emerged in some areas because of this new policy. As a consequence, the need for improving performance of coffee value chain is not sufficiently addressed in the study area regardless of some efforts from the government to improve and support the sector. As an enquiry, the importance of identifying the determinant factors and analyzing the effects of the coffee subsector value chain has not been given much emphasis given its longstanding importance for small scale farmers and intermediate value chain actors in the study area. There is a need for better understanding and identification of the subsector value chain constraints to analyze the improvements and enhance its future performance.

Therefore, the aim of this proposed study is to find the weakest link of the chain and to narrow the information gap on the subject. In this regard, coffee value chain analysis is an interesting process that has not been investigated much in this specific study areas. Besides, to the best knowledge of the researcher, no empirical study has been conducted in study area that investigated the determinants of coffee supply and effects of its value chain on benefit share from the product between value chain actors. This study, therefore, was intended to bridge this theoretical and practical gap through investigation of both the downstream and the upstream components of the value chain.

Research Questions

The central questions that this study addressed was how the coffee value chain in the study area organized within the umbrella of these central questions the study had answered the following specific questions.

- What are the factors affecting the market supply of coffee?

Objectives of the Study

General Objectives

- The general objective of this study was to assess and illustrate coffee market supply in the study area.

The specific objectives of the study were

- To identify factors affecting coffee market supply in the study area.

Significance of the Study

This research had been under taken in one of major coffee producing areas to assess margin and profit share of coffee value chain actors. It was identified actors role and factors affecting coffee market supply along coffee value chain that was a foremost asset to design and implement in the study area.

It is assumed to be helpful for any intervention planned by private, government as well as non-government programs. It can be a reference document for other similar studies of value chain analysis in different crops of the country and adds to the already existing literature on coffee value chain. This study contributed to existing literature of coffee value chain analysis in the study area. It also considered necessary with regard to the allocation of nation's resources.

RESEARCH METHODOLOGY

This chapter summarizes description of the study areas, data types, and source of data and method of data collection, sampling procedure and sample size. It also describes method of data analysis (descriptive and econometrics).

Description of the Study Area

The study was conducted in Jimma Zone, one of the 28 Zones in the Oromia Regional State. According to census (2007) the population of Oromia Regional State was estimated that about 26,993,993 and out of this male 13,595,006 and female 13,398,927. The total population of the Jimma Zone was estimated 2,486,155 and out of this male 1,250,527 and female 1,235,628. The total population of Limmu-Seka District also estimated 189,463 and out of this male 95,869 and female 93,594.

Limmu-Seka is located in 110 km from Jimma town and geographically, the district lies between latitude of 8.004 N- 8.0561N and 36.0401E-37.0131E Longitude (CSA, 2008). Limmu-Seka is one of the woreda in the Oromia region of Ethiopia and found in Jimma Zone. These are about 158,933 total populations are living in this district from the total population 78,542 are male and 80,391 are females. The coffee producer's farmers are accounted 17541 and out of which 1237 are females. The total coffee farm land coverage is 23,369 hectares. The average land holding size per household is 0.5 to 2 hectares. The total household farmers are male 8,209, female 1,230, and a total of 9,439. The annual temperature ranges from 10^{o}c to 25^{o}c.

It is bounded by Yaanfaworeda in the west, Limmu Genet in the north, Nono benja woreda in the south and Chora botor in the east. According to the Limmu-Seka district MOARD office, the district covers an area of approximately 1694 km square and divided in to 38 rural kebeles and one town (Atenago). The Agro-Ecology is characterized by 13 percent highland and 55 percent Mid-highland and 32 percent lowland. The altitude of the Woreda is between 1400m and 2200m above sea level. In the district, 10,241 hectares are currently covered by forest and Bush, while 38,874 hectares used for crop production there are two distinct seasons in Limmu-Seka; the rainy season starting in late March and ending in October and the dry season occurring during November to early March. The rain fall is in excess of 1,800 mm per annun (MOAR 2018).

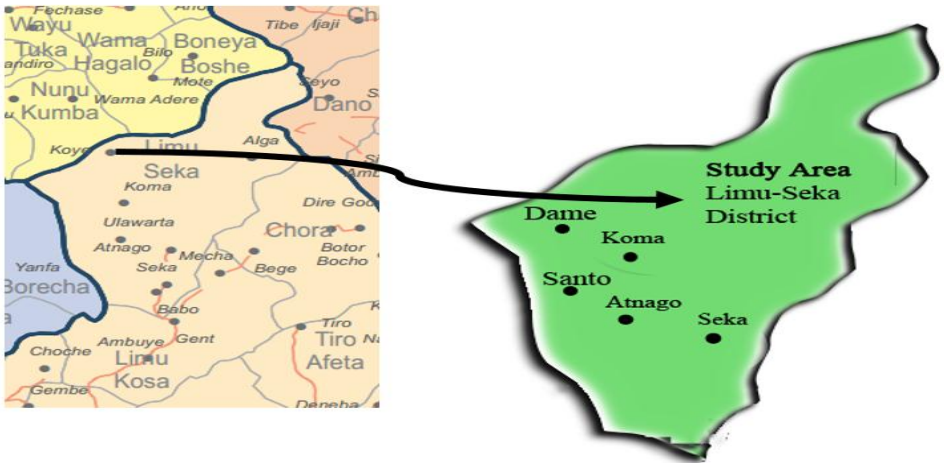

Figure 1. Geographical boundary of the study area 2018.

Data Types, Sources and Method of Data Collection

The cross-sectional data from both primary and secondary sources used for the study. The primary data was collected from producers and traders by using semi structured questionnaires designed. The questionnaires were pre-tested before the actual data collection practices. The primary and secondary data selected. The secondary data was selected from record of different books, reports from government bodies, journals and Internet. Both mixed approaches of quantitative and qualitative methods were used for this study. For data collection, enumerators trained and employed, who have acquaintance with socio-economic concepts and knowledge of the culture of the society as well as Oromifa language proficiency was selected ample Size and Sampling Procedures.

Sample Size and Sampling Procedures

Producers sampling

For this study, 149 coffee producers were sampled and interviewed from the District for the total population size is 3417. This study implemented two stage random sampling procedure. In the first stage, out of 38 kebeles in Limmu Seka District, a total of five coffee producing *kebeles* were selected randomly as a representative sample. In the second stage using probability proportional to size technique, producers of coffee were selected from each selected *kebeles*.

Sample size determination for producers

The sample keeping the proportion to each kebeles was selected based on the sample size estimated for the study. The determination of sample size is resolved by means of (Yamane 1967) sample formula with 92 percent confidence level. The reason of using margin errors at 8 % for this study is because of time and budget limitation.

Equation 1: Sample size

$$n = \frac{N}{1 + N(e)^2} = \frac{3417}{1 + 3417(0.08)^2} = 149$$

n = Sample size for the respondent

N = Total number of respondents in four coffee producing Kebeles

e = Margin of errors at 8%

Table 2. Sample distribution of coffee producers in selected *kebele.*

No.	Kebeles	Total number of coffee producers	Proportion	Number of sampled households
1	Dame	750	21.9	32.7
2	Seka	788	23	34.4
3	Koma	486	14.2	21.1v
4	Atenago	248	7.1	10.8
5	Santo	1148	33.7	50.0
	Total	3417		149

Source: own computation (2018)

Sample size determination for actors

In addition to farm households, sample respondents were selected from the other value chain actors on the basis of their size and availability and interviewed based on their respective functions in the chain. The sample size of coffee traders was 32. Since the number of coffee traders in the District was few, almost all of them were interviewed. By preparing questioner of 20 collectors, 7 primary cooperative, 4 processors/supplier, one Exporter and supporting actors were interviewed in the study area. A checklist was used to guide the discussions conducted at different places with producers and key informant in the study area.

Methods of Data Analysis

The data collected was analyzed using descriptive and econometrics analysis qualitatively and quantitatively in order to analyze the existing coffee value chain.

Descriptive statistical analysis

Descriptive statistics analysis was used to clearly compare and contrast different characteristics of the sample households along with descriptive statistics such as ratios, frequencies, percentages, means and standard deviations to analyze the collected data.

Econometric analysis

Factors affecting market supply

Multiple linear regression model (OLS) was appropriate to analyze factors affecting volume of sales because all sampled households producing coffee participated in marketing. Multiple linear regressions (MLR) are a statistical technique that uses several explanatory variables to predict the outcome of a response variable. Its goal is to model the relationship between the explanatory and response variables. It is based on least squares: the model is fit such that the sum-of-squares of differences of observed and predicted values is minimized.

Model equation: The model expresses the value of a dependent variable as a linear function of one or more independent variables and an error term:

Where,

Equation 2: Multiple linear regression models for the study

$Y_i=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+U_i$

β = a vector of estimated coefficient of the explanatory variables

X = a vector of explanatory variables

U_i = disturbance term

Y_i = Sales quantity of coffee/quintal

X_1= Information access

X_2 = Perception of household toward farm-gate Price

X_3 = Average age of plantation

X_4 = distance to the market

X_5 = Education level of household

X_6= Size of land allocated for coffee production

X_7= Credit access

X_8= Availability of extension service

Definitions of variables and Hypothesis

Dependent variables

Dependent variable: Sales quantity of coffee in kg (Y_i) or it is the quantity of coffee supplied by the sample farmers during 2017-2018 harvest season, expressed in kg.

Independent variables

The explanatory variables expected to influence the dependent variables were following

Education level of household (X_5): it is a continuous variable which was measured by grade level. Education plays an important role in the adoption of innovations /new technologies. Further, education was believed to improve the readiness of the household to accept new idea and innovations and to get updated demand and supply. Price information which in turn enhance producers' willingness to produce more and increase coffee market entry decision and volume of sale. A study conducted by (Holloway et, al., 1999) indicated positive relationship between education and producer household coffee entry decision and marketed coffee volume.

Access to market information (X_1): is a dummy variable taking value of 1 if the producer had access to market information and zero otherwise. It was expected that it would affect the market coffee supply of the household positively. The better information farmers have the more likely they supply coffee to the market. The general idea is that maintaining a competitive advantage requires a sound business plan. Again, business decisions are based on dynamic information such as consumer needs and market trends. This requires due attention to new market opportunities, changing needs of the consumer and how market trends influence buying (CIAT, 2004).

Perception of household toward farm-gate price (X_2): is farm gate price of coffee and this is dummy variable, if a farmer think the price is fair it has value of one otherwise zero and it was hypothesized that, if farmer think the price is fair, he/she can supply more coffee to the market; if not he would decide to sell other time after hording it. Thus Perception of household toward farm-gate price directly and positively related to the supply of coffee. The study by (Goetz, 1992) on household marketing behavior in Sub-Saharan Africa found a significant positive relationship between grain price and the probability of quantities sold.

Table 1. Explanatory variables and their measurement.

Variables	Measurement	Expected effect
Access to Market information	Dummy(Yes = 1 or No = 0)	+ve
Perception of household Towards farm gate price	Dummy (Yes = 1 or No = 0)	+ve
Average age of plantation	Continuous (years)	-ve
Distance to Nearest Market	Continuous (mint)	-ve
Education level	Continuous (years)	+ve
The size of land allocated to production	Continuous (Ha)	+ve
Access to credit	Dummy (Yes=1 or no = 0)	+ve
Availability of extension service	Dummy (yes=1 or No=0)	+ve

Average age of plantations (X_3): is the age of coffee plantations in years from the time of planting. It was expected that the coffee plant starts to bear fruit from three to five years reaches maximum production during the age of seven to ten years and yield starts to decline in the period from ten to twelve years and above as dictated by the biological growth pattern of coffee. The study by (Elias, 2005) indicated that positive relationship between the ages of coffee with coffee of supply.

Distance to the market (X_4): is a continuous variable defined as the distance for coffee producer's households from the nearest market and measured in minutes of single trip. This variable was negatively affected coffee market supply due to adverse impact on market participation (Abraham, 2013), indicated that distance to market caused market supply of cabbage to decline.

Size of land allocated for coffee production (X_6): is the total land holding, which is continuous variable. If the producer has large land size he/she was allocated more land to his coffee production. Thus, increase in size of land was expected to have direct influence on marketed surplus. Branson and Norvell (1983) and DNIVA (2005) found expanding the area under crop result in increased the marketable supply of the crop.

Access to credit (X_7): This is a dummy variable taking the value of 1, if a farmer takes loan for production and marketing activities related to coffee and 0, if otherwise. A credit is a key financial instrument to break low level production and then marketing problems. It is critical in financing investment and purchase of new inputs (Ellis, 1992 as cited in Shemelis 2004). Sarkar and Roy (2013) found that the access to credit affected market supply positively. In current study it had positive relationship between coffee market supply and access to credit in study area.

Availability of extension service (X_8): is a dummy variable taking value of one if the appropriate extension services provided and zero otherwise. It was expected that it affects the market coffee supply of the household positively. If weak extension service is provided, it was expected that it affects the market coffee supply of the household negatively (Elias, 2005) used in his study the appropriate extension service can affects coffee supply to the market positively.

RESULTS AND DISSCUSSION

This section deals with the major outcomes of the study. It is divided into four main sections. The first section deals with descriptive statistics of the sample households. The second section presents value chain analysis of coffee which includes actors and their roles, value chain map, value chain governance, coffee production cost, and marketing costs of coffee along the chain.

The third section presents marketing channel and performance analysis of the value chain actors which comprises of marketing channels, marketing costs and margins, benefit shares of actors, and share of value addition in coffee value chain. The fourth section presents results of econometric analyses which contain factors affecting market supply of coffee by using OLS model.

Demographic and socio-economic characteristics of the sample House holds

The sample population of farmers respondents handled during the survey was 149. Of the total 143 (96 %) were male-headed households and only 6 (4 %) female-headed. The age of the sampled household head ranges from 25 to 70 years. The average age of the sampled heads is about 36.4 years. About 93.3 % of the respondents were found in most actively working age category (25- 45). Hence, the younger the age, the better to communicate and access to market information and the better to adopt technology. The survey also showed that the majority of respondents 135 (90.6 %) were married and 3 (2 %) were divorced and 11 (7.4 %) were single.

As indicated in table above 99 (66.7 %) of the total respondents were illiterate, 4 (2.6 %) can read and write, 29 (19.5 %) attended Grade 1- 4, 10 (6.7 %) attended Grade 5-8, 7 (4.5 %) attended Grade 9-12 and the rest 2 (1.3 %) were a diploma holder. This shows the more literate and better educated household increases their production by using improved agricultural inputs and improves negotiation capacity of the household in the coffee market. Besides that, the presence of literate people in the household has a better access to information and resource and better adoption of improved technologies in a household level. The study mainly focused on the coffee value chain analysis in Limmu-Seka district, Jimma Zone, Western Oromia. Limmu-Seka is one of the main coffee producers from Jimma Zone. Hence, this study was critically examined the factors affected coffee value chain and identified the actors role, margins and share in the case area.

Table 2. Demographic characteristics of sample households.

Description		Frequency	Percent
Gender	Male	143	96
	Female	6	4
Age	25 – 35	80	53.7
	36 – 45	55	37
	46 – 64	14	9.3
	Mean	36.4	
Marital status	Married	135	90.6
	Divorced	3	2
	Single	11	7.4
Education level	Illiterate	99	66.7
	Can read and write	4	2.6
	Grade 1- 4	29	19.5
	Grade 5- 8	10	6.7
	Grade 9- 12	7	4.5
Status of house	Stone walled and metal roofed	37	24.8
	Mud walled and metal roofed	98	65.8
	Mud walled and grass roofed	14	9.4

Source: **Study result, 2018**

Table 3. Demographic and Socio-economic characteristics of traders.

Description		Frequency	Percent
Gender	Male	29	90.6 %
	Female	32	9.4 %
Age	15-64	32	100 %
	>64	0	0
Marital status	Married	31	96.9
	Single	1	3.1 %
	Divorced	0	0
Education level	Illiterate	0	0
	5-8	5	15.6 %
	9-12	27	84.4 %
Ethnic group	Oromo	24	75 %
	Amhara	5	15.6
Religion	Christian	14	43.75 %
	Muslim	18	56.25
Status of house	Stone walled and metal roofed	19	59.4 %
	Mud walled and metal roofed	13	41.6 %
		3	33.33

Source: Study result, 2018

Demographic and Socio-economic characteristics of traders

The demographic and socio-economic characteristics of traders were conducted in survey 2018 as below table show that from 32 traders 29 (90.6 %) and female 3 (9.4). The age status of both male and female were categorized from 15-64 years. The marital status of traders 31 (96.9 %) were married and female 1 (3.1 %). The traders ethnic group was categorized as Oromo, 24 (74 %), Amhara 5 (15.6 %) and others 3 (9.6 %). From those 32 traders, 14 (43.75) were Christian, the 18 traders (56.25 % were Muslims. From the shelter type of traders, 19 (59.4 %), traders have stone walled and metal roofed house, and the rest 13 (41.6 %) have mud walled and metal roofed house.

Factors affecting the amount of coffee supply to the market

For this study, eight explanatory variables were included in the model estimation to identify factors affecting coffee Marketable supply at household level. In this regard, the result of multiple linear regression models revealed that, of eight variables included in the model three variables affect marketed supply of coffee positively at household level and one variable affects negatively.

Descriptive statistics of the variables

Market information and extension service: Farmers in the study area get market information mainly through own observation, discussion with other farmers and relatives and from primary cooperative before selling their produce. Sometimes they also get this market inputs from traders even if market price fluctuate over market days within a week. Market information occurs in the processes of buying and selling of agricultural inputs, outputs and services. Thus, agricultural market information includes demand and supply of agricultural commodities and involved input and service sectors (Tiago and Yen, 2007). The objectives of these information is to assist farmers and be able to monitor the market and make better decisions on where to sell their products and to negotiate for improved prices rather than being compliant price takers. Based on survey result, sample producers get market information through personal observation, from cooperatives, from other farmers and traders. The extension service and market information flow to sample Coffee producing household heads in the area is presented on table 10 below.

Table 4. Frequency and percentage response of dummy variables

Total Samples = 149 Variables	Unit of Measurement	Frequency	Percent
Do you have the access to Market information?	Yes	107	71.3
	No	42	28.7
Do you have access to extension service?	Yes	38	25.3
	No	111	74.7
Do you have access to credit?	Yes	25	17.3
	No	124	82.7
Is farm gate price is fair?	Yes	15	10.1
	No	134	89.9

Source: Study result, 2018

Access to credit: Farmers seek credit to buy agricultural input in order to increase the coffee production. Even though credit is very important for production and marketing activities for farmers who cannot finance themselves, the access to get credit service from microfinance and other lending company are very limited. According to our survey results only 17.3 % of the respondents are used the access to credit service and the rest 82.7 % didn't used the credit service provided, or they believe the credit access isn't available.

Perception of household towards farm gate price: This variable was hypothesized that, the presence of primary cooperatives at the nearest the household farmers, they have the chance to deliver red cherry coffee to them. In the case of dry cherry coffee the farmers deliver to collectors, who collected coffee from remote areas. But the drawback that observed from this study the collectors were not genuine to pay fair price based on daily price information.

Age of plantation: The traditional productive systems are as living old trees, the coffee bushes would provide bitter testing and inferior quality beans. It also the luck of higher adoption of improved technologies and the old indigenous coffee plantation caused low coffee yield as a data gathered from respondents.

The well managed coffee farm can give high yield from the age of 7 to 11 years interval and after 12 years starts to decline to give yield. During this age rejuvenation of coffee trees is very important. But as concluded from this study 106 (71.1 %) of respondents were confirmed their old coffee plantation is not give yield until 3-4 years, 21 (14.1 %) respondents use the improved and new plantation farming system that they benefited from their farm.

Distance to market: It is a continuous variable measured in kilometers. The closer the market the lesser the transportation charges, reduced transaction costs, and reduce other marketing cost. The study conducted by Berhanu and Hoekstra (2008) on enhancing market orientation of smallholders on grain marketed surplus in Ethiopia revealed negative relationship between grain marketed surplus and distance to market. Therefore, as the market becomes far from the farm the marketed surplus was low. Thus, distance to the nearest market was hypothesized to have negative relationship with marketed surplus of Potato. According to (Moti, 2007) market choices are perfectly related to the distance of market. Therefore, the probability that farmers prefer the nearest market may be high.

Land size allotted: This variable is a continuous variable measured in terms of hectare a farmer allocate for coffee and the result from descriptive statistics shows that the average land allocation for coffee by a smallholder farmer is 1.04 ha with a std. dev. of 0.567. It expected this variable affects the dependent variable positively .This is because; producers who own more hectare of land can produce and supply more than a producers who own less hectare of land. According to Frehiwot (2010), area of land covered by haricot been affected amount produced and market supply positively and significantly.

Table 5. Descriptive results of sampled house hold for continuous variables.

Variables N=149	Unit of measurements	Frequency	Percent
Age category of coffee Plantation	1-3 years	10	6.7
	4-6 years	12	8.1
	7-11 years	21	14.1
	Over 12 years	106	71.1
Education level	Illiterate	99	66.7
	Can read and write	4	2.6
	Grade 1- 4	29	19.5
	Grade 5- 8	10	6.7
	Grade 9- 12	7	4.5
		Mean	Std. dev.
Distance from the Primary market	minutes	40	6.3
Land allocated for coffee production	Ha	1.04	0.567

Source: **Study result, 2018**

Education level of household heads:-The small holder farmer education levels were low, with 66.7 % of the farmer respondents were illiterate and the rest 33.3 % were literate according to (Anteneh, 2011) found that the education level of the house hold head have impact on market outlet choice by small holder coffee farmers in Ethiopia.

Econometric Model Result

In this section factors affecting the amount of coffee supply in Kg were analyzed by multiple linear regressions using statistical package software, SPSS 20. The resulting model was tested to see the problem of multicollinearity and Heteroscedasticity among the variables. According to (Gujarati, 2004), there are various indicators of multicollinearity and Heteroscedasticity.

Model test for multicollinearity and heteroscedasticity

Detecting Multicollinearity: Multicollinearity is a high degree of correlation (linear dependency) among several independent variables. It commonly occurs when a large number of independent variables are incorporated in a regression model.

It is because some of them may measure the same concepts or phenomena. Symptoms of multicollinearity may be observed in situations: Small changes in the data produce wide swings in the parameter estimates; Coefficients may have very high standard errors and low significance levels even though they are jointly significant and the R^2 for the regression is quite high; Coefficients may have the "wrong" sign or implausible magnitude (Greene 2000: 256). VIF value greater than 10 indicates severe co linearity among repressors. Similarly, Contingency Coefficient (CC) test uses a correlation coefficient of 0.75 as its tolerable critical value in which CC value more than 0.75 indicates co linearity problem Gujarati (2004). Since the mean value of VIF is 2.017 that is less than 10 and Contingency Coefficient (CC) value less than 0.75 the test estimates show that there is no serious correlation among the proposed explanatory variables. Heteroscedasticity was also detected. This test led to rejection of the existence of heteroscedasticity hypothesis.

Thus marketed supply is affected by Age of plantation, Access to market information, Access to credit, Education level of house hold. Age of plantation affected marketed supply of coffee negatively and significantly. The result shows that the model was statistically significant at 1 % level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R^2) was used to check goodness of fit for the regression model. Hence, R^2indicates that 51.5 % of the variation in the marketed supply of coffee was explained by the explanatory variables included in the model.

Age of plantation: As hypothesized the regression coefficient of age of plantation was negatively and significantly related with coffee quantity supplied to market at 1 % probability level. The negative and significant relationships between the two variables indicate that age is very important variable affecting household head volume of coffee supply. The coefficient implies that an increase in age of plantation by one year after twelve years of an old coffee tree resulted in a decreased in marketed supply of coffee by 90.93 Kg of clean coffee bean, keeping other factors constant.

Education level of household head: This variable affects marketed supply of coffee positively at 1 % significance level. This implies that, if the producer is literate, that enables him to gather better knowledge of producing coffee effectively and efficiently, there would be a gain of 68.55 Kg of clean coffee bean. Illiterate producer lost 68.55 kg of clean coffee bean due to his/her education status.

Table 6. Determinants of amount of coffee supplied to market (OLS estimates).

Variables	coefficient	Std. Error	t-ratio	Sig.
(Constant)	5.438	2.213	15.836	.000
Distance to the nearest market	-.033	.076	-0.016***	.429
Age of plantation	-0.013	.038	3.010***	.003
Education level of house-hold	0.538	0.1952	2.755***	.007
Access to credit	0.086	0.7748	2.597***	.010
Access to market information	0.679	.289	2.347***	.020
Access to extension service	1.000	1.773	0.564	.251
Perception on farm gate price	0.157	0.1413	1.054	.312
Land allocated for coffee	2.176	1.420	1.524	.412
R^2 = 0.840 , multiple R = 0.917 , adjusted R = 0.826 Computed F = 59.06*** Significant level ***P< 0.01, ** P < 0.05, *P< 0.10 Dependent variable = determinants of coffee supply				

Source: Study result, 2018.

Access to Information: The result of estimated coefficient of this variable was positively significant at 1% significance level and affects marketed supply of coffee positively. This means as the farmer access to market information, amount of coffee supply increased by 41.26 Kg of clean coffee bean. This study agree with Goetz (1992) noted that better market information significantly raises the probability of market participation for potential selling households.

Access to credit: The result indicated that, the estimated coefficient of this variable affects positively at 1% significance level means that as coffee producers have access to credit, the quantity of coffee supply to the market increased by 62.99 Kg of clean coffee bean. From this result it can be stated that those farmers who have access to credit, in cash cover purchasing of agricultural inputs and increase production thereby increase marketable supply. This study agree with earlier study Rahmeto, 2007 reveals that credit affect the probability of adoption of improved varieties, the quantity of fertilizer farmers apply increase production thereby improve marketed supply of haricot bean.

However, Perception of house-hold towards farm gate price is insignificant this may be due to that 89.9 % of the respondents believe they don't get fair farm gate price for their production. Availability of extension service is insignificant because out of 149 sampled household 111 (74.5 %) believe that they don't get useful extension service. Distance from the market was also insignificant because the mean distance to nearest market is 3.04 km with std. dev. of 1.55 as reported by sample respondents. This implies almost all samples were at least 2.49-4.59 km far away from primary market. This slight difference will bring no deviation for transportation cost. Land size allocated by coffee was also one of variable that is insignificant in this regression due to that mean allocation is 1.04 with deviation of 0.567, which indicates that there is little difference between samples response.

CONCLUSIONS AND RECOMMENDATION

Conclusions

Coffee is major cash crop dominated by small producers in the study area. These producers predominantly live in rural areas of the district. They usually lack access to credit, and very few live in well suited shelter. These producers cannot get enough income to sustain their life without coffee, in which most of farm land in the study area is covered by coffee trees.

Promoting the performance of the coffee value chain in order to effectively meet the needs of small-holders farmer and the end buyer consumers will require action from different actors in the value chain. There is different value chain functions were undertaken from input supply, production, processing, up to trading at ECX floor. Along each function different key actors and their role were involved. However some functions are performed by more than one actor and one actor performs more than one function. This shows the linkage between these actors is weak. Despite the efforts made by the ECX, there is no platform or responsible body who is working for effective and efficient linkage between the coffee value chain actors.

Small-scale farmers are responsible for the coffee production and harvesting. Most of these farmers in this study area sundry coffee cherries they harvested and they sold it in the form of dry cherry. Collectors bought larger portion of dry cherry and small amount of red cherry from these farmers and they sold it to suppliers without no processing undertaken by them. Suppliers also called processors bought coffee mainly from collectors and slightly from farmers then they processed and sold it to exporters and local wholesalers at ECX floor. Accordingly, they sold rejected coffee to local wholesalers at lower price than the certified coffee they sold to exporters. Here, collector's price was not affected due to rejected coffee, this situation making them to mix decorated (lower quality) raw coffees with quality coffee to increase their profit. This is the reason for increased amount of rejected coffee in the study area.

Only few portion of the coffee is sold in the form of red cherry to primary cooperatives, the reason being PCs are unreachable for the market deep in the rural areas. Despite the share and profit from PCs sale is greater than the supplier sale which largely pass through the collectors, PCs in the district are less in number and their capacities are weak to be involved in coffee business. However, cooperatives are now a means to bring collective action and barging to increase share of farmer.

The amount coffee supply by farmers is constrained by four factors which are, Age of plantation, Education level of house-hold, Access to credit, and Access to market information. From the study, most of the coffee trees allocated by producers are older than twelve years. This factor is affecting the supply with greater value. Literacy of the house-hold farmer has played an important role in the study area, that educated farmer have advanced supply than illiterate farmers. However most of household farmers are illiterate, unable to write and read well. In addition access to credit and market information is limited in the area affecting the coffee supply. Despite the constrained, Lmmu Seka woreda has high potential for specialty coffee production, higher amount of coffee production and higher supply for export. Hence the country has to explore these opportunities.

Recommendations

On the basis of the results of this study, the following recommendations for policy makers, developments actors and researchers who have strong interest in promoting value chain and upgrading strategies of coffee in the study area.

❖ Increasing the proportion of red cherry coffee sale by producers improves the quality of coffee supplied and it will bring better benefit for small-holder farmers. Thus farmers in the study area have to be encouraged for red cherry coffee sale at primary markets by setting higher price for it. Also the quality can be improved by sharing responsibilities among actors for the coffee supplied. Specifically, collectors at the study area were found to be irresponsible for the quality the coffee they sold to suppliers. Thus, the study recommends that collectors should be capable to be trusted for the coffee they supply to the market and farmers are advised to prefer PC to sell their coffee, the reason being their higher purchase price and higher quality coffee passed through cooperatives. In order to make farmers to deliver their coffee via PCs, PCs should be available at the nearest market place.

❖ Strengthening the linkage/interaction among value chain actors is necessary. There is a need to change the outlook of actors, by improving ground rules that will bind the relationship between producers and traders. In particular, positive attitudes toward partnership, interaction, networking and learning need to be developed among main actors in the value chain. So the government should have to instruct farmers about their channel choice in order to compromise the quality of their product, so as to gain a better benefit from the sector. By increasing the number of cooperative unions the coffee sector can be stronger and give benefits to small holder farmers. Also, the chain actors should work in an integrated way to improve production, and to strengthen sustainable market linkage in the study area.

❖ The government or the District's agriculture and sector office should have to assist the smallholder farmers by observing the farms so as to enhance the production by replacing old trees with the newest one, since age of plantation is highest significant negative determinant for the coffee supply in the district. And also the author of this study suggests rejuvenation of the old coffee tree should be possessed by producer to increase their production, so as the supply.

❖ Creating suitable conditions for farmers to upgrade their formal knowledge will also improve the quality and quantity of coffee production and supply. The concerned bodies, for instance development agents should focus on increasing quantity production and supply of coffee through promoting and providing training on improved coffee production skill, technical support to producers, increasing follow up starting from production to supply.

❖ Econometric analysis results of the study suggested that increasing quantity supplied of coffee in the area by improving credit accessibility of producers. Thus, credit have to be facilitated by the supportive actors and also the major intermediate actors to smallholder coffee producers.

❖ Market information found to be significant and positive determinant factors of the quantity of coffee supplied. Therefore, market information services have to be strengthened to provide farmers and traders accurate and timely information on current supply, demand and prices in the district. So, both ECX and Limmu-Seka district office of coffee and tea marketing authority have to continue providing daily marketing price of coffee efficiently.

❖ Future researches on determinant factors and effects of coffee value chain performance like this study are needed in order to investigate other extraneous variables other than the items used in this study that could contribute for improvements in coffee value chain performance. But the findings showed that these items still hold as factors.

❖ The author of this study points out the following four crucial study areas for coffee in Limmu-Seka district.

1. Furthermore, it is essential to assess the value addition process under taken by producers, primary processors and market intermediates in the area to enhance coffee quality.

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