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Factors affecting the quantity of coffee supply and marketing at primary level coffee transaction center (PLCTCs) on farm level, in case of Sidama National Regional State, Ethiopia.

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Abstract

The objective of this study was to assess the factors that affect the quantity of coffee supply and marketing at primary level coffee Marketing center on farm level. Coffee production and Marketing is important to the Ethiopian economy with about 15 million people directly or indirectly deriving their livelihoods from coffee. Coffee is also a major Ethiopian export commodity generating about 25% of Ethiopia's total export earnings. Coffee market challenged by long and complex coffee market chain, poor market access, illegal coffee trade, the low base of market infrastructure and information, unorganized and fragmented coffee market, high transaction cost, inadequate capital and produce wastage (low supply). Developing efficient agricultural markets has a large impact on the economic development and improves livelihoods of coffee producers. Both primary and secondary data were used for this study. Primary data were collected through interview, group discussion and structured questionnaire from the samples of small holder coffee producers, primary coffee marketing cooperatives, Suppliers and relevant offices by multi –stage stratified sampling technique among engaged in respondents. 399 smallholder coffee producing farmers were determined by using the formula given by Yamane from 12 primary level coffee transaction centers which selected 4 highest coffee producing woreda of the region. Data were analyzed using descriptive and inferential statistics with the aid of STATA Software. The study revealed that, the success of coffee supply and marketing at PLCTCs were in problem, it is clear they have not displaced informal coffee trade. Out of sampled producers 54.40% were sold their coffee to illegal traders on village. According to this study, the major factors that significantly affect the quantity of coffee supplied and marketing through PLCTCs were; sex of the household head, their level of education and income, access to information, distance(access) to market, access of extension services, membership of cooperative, amount of coffee produced, mode of payment(capital), transport cost, price of coffee were significantly influenced quantity of coffee supplied and marketing through PLCTCs, Households, who are accessed to market information, accessed to extension advice, membership to cooperative, produced high quantity of coffee and obtained high income were more likely to supplied high amount of coffee and marketing through PLCTCs as opposed to illegal traders. On the other

hands, farmers who have low income, non-member of cooperative, no information, far to market, preferred illegal traders or collectors. Hence, Sidama National Regional State (SNRS) and concerned offices should solve these problems of coffee marketing at production level.

Keywords: Coffee supply and marketing, Ethiopia, Ordered logit, Primary level coffee transaction Center

1. Introduction

Coffee has a great social, cultural and livelihoods importance for the majority of Ethiopian population and to the national economy as well. It is backbone of the Ethiopia economy, generating about 25% of Ethiopia's total export earnings and about 15 million people directly or indirectly deriving their livelihoods from coffee. Despite its economic and social importance for the Ethiopian economy, the market operation on the coffee sector has remained unsatisfactory especially for smallholders coffee growers. Efficient marketing of agricultural products plays a crucial role in accelerating the pace of economic development by ensuring a high level of producers' share of consumer price, reducing number of middlemen, low marketing charges and reducing malpractices in the marketing chain [1]. Most agricultural marketing channels in developing countries are long and complex which finally leads to high transaction costs and lower producers' share of the consumer's price [2].

Some of the Coffee marketing challenges in Ethiopia are long and complex coffee market chain, poor market access(remoteness), illegal coffee trade, the low base of market infrastructure and information, unorganized and fragmented coffee market, high transaction cost, inadequate capital and non- enforcement of standardized grades and qualities. To avoid or at least minimize these age old problems in the coffee industry, the Ethiopian government has established new marketing system by virtue of a coffee quality and marketing Proclamation no. 602/2008 which has been enforced since August 2008 by the House of Peoples Representatives. The proclamation recognizes three coffee marketing chains. These are primary level coffee transaction centers at farm level, Ethiopian Commodity Exchange and international coffee market chains the export level [3].

The main objectives of these new coffee marketing system in Ethiopia is to increase supply of quality coffee to the international market, to exploit the potential of coffee production to contribute national economic development and to improve income of coffee producers in access and create efficient and well-organized coffee market, in promoting small-scale farmers in coffee market participation in creating short supply chain of coffee and controlling illegal activities and actors, in providing reliable, timely and accurate information and in making fast and cost effective coffee marketing system and building confidence between partners of trade.

Primary Level Coffee Transaction Centers (PLCTCs) is a coffee market place where coffee farmers and suppliers transact coffee in local farm level. They are located near to the coffee farms and established proximity for coffee producers and suppliers in order to coffee transaction are carried out only between coffee farmers and suppliers (legal suppliers and primary cooperatives). Currently there are about 979 primary coffee marketing centers in the country [4]. In these centers, producers sell their produce direct to suppliers and, in a way, avoid unnecessary role of intermediaries and the role of the previous collectors. It make shortens the long chain of the coffee market, improved market information access, lower transaction costs, assure competitive and transparent transaction which enabling the producers get better price from the suppliers and increase coffee supply.

Coffee is Sidama's number one cash crop. Despite high coffee production potential and economic importance, the coffee supply and marketing is faced by different problem in the

region [5]. Currently there are about 592 PLCTCs in the region. But, all coffee producers in the region did not sold their produce though these PLCTCs, still some producers were sold their coffee produce informal coffee transaction root and illegal collectors. These affect amount of coffee supply and quality coffee to international market which hurts national economy and individual income of coffee producers. Therefore, there is a need to analyses and identifying the major coffee market chain actors and factors that affects or determines smallholder coffee producers' choose of coffee market outlets at production level to sell their coffee produce. Consequently, this study tried to investigate factors affecting coffee supply and marketing through a primary level coffee transaction center on farm level, in case of Sidama National Regional State, Ethiopia [3]. The objective of this study was:

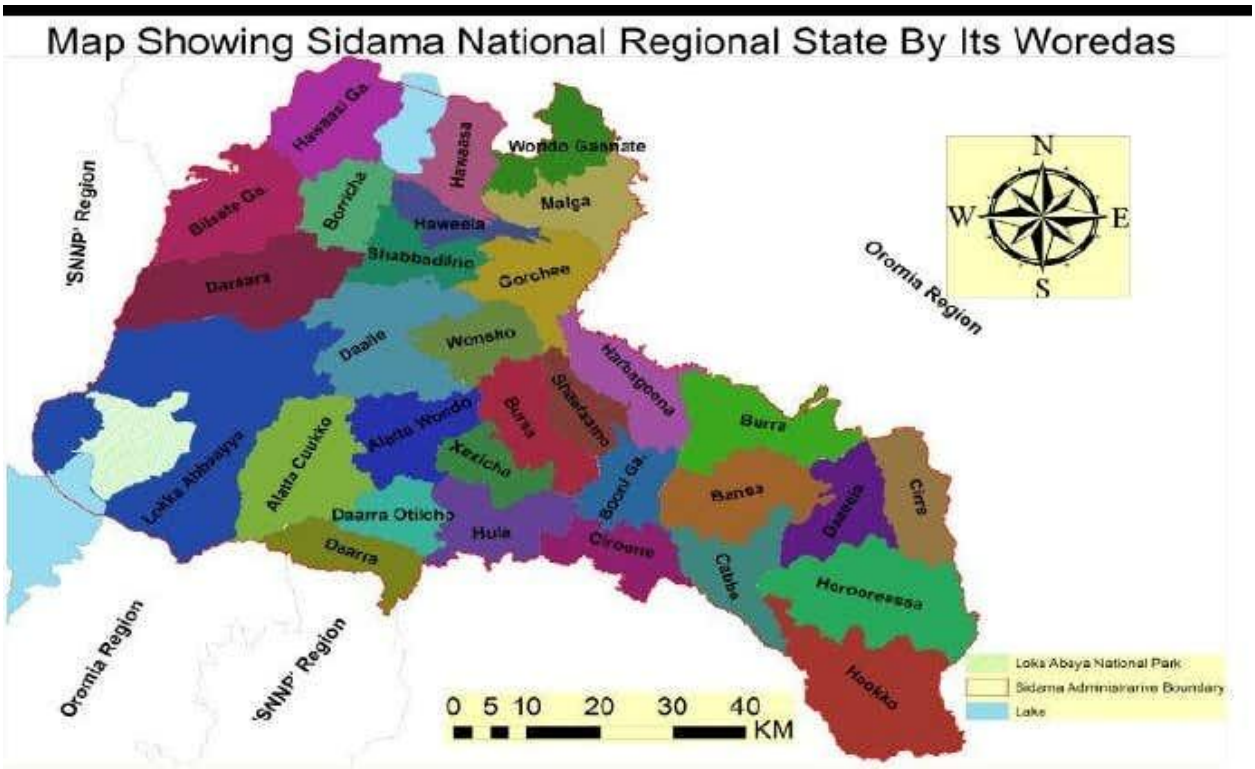
- To assess the factors that affect the quantity of coffee supply and marketing at primary level coffee Marketing center on farm level.

2. Materials and Methodology

2.1. Description of the Study Area

This study was conducted on factor affecting coffee supply and transaction through primary level coffee transaction center on farm level in Sidama regional state some selected woredas; these selected Woredas are Bensa, Aletawondo, Dalle, and Shebedino. The Sidama Region state is found in southern part of Ethiopia. The region geographically is bordered on the North, East and South East by Oromia Region, on the South west by Gedio Zone and on west by Wolayita Zone. The region is divided into 30 woredas, seven administrative towns and 528 rural kebeles as below shown on map of the region. Sidama has a population of around 3.2 million in 2017 who speak Cushitic. Sidama has geographic coordinates of latitude, north: 5‟45‟‟‟ and 6‟45‟‟‟ and longitude, east, 38‟ and 39‟. It has a total area of 598,000 sq km, of which 97.71% is land and 2.29% is covered by water. Hawassa lake and logita falls are water bodies that attract tourists [6].

The Most residents are subsistence farmers. According to regional bureau of agriculture, Sidama grows several crop types like enset (false banana), maize, and haricot bean, and vegetables, spices, fruits and livestock production. It is a major coffee-growing area, with coffee the most popular agricultural product in the region. Its prized coffee is sold on the world market. Coffee exports contribute to the country's revenue and foreign exchange and the production and exchange of coffee has been used as the main economic power of people living in Sidama.



Sourse: Sidama regional state administration Geo spitial & admn stracture study area [7].

Conceptual framework

To achieve part of the research objective and to test the research hypotheses, this study used the conceptual framework. In this study the dependent variable is performance of coffee supply and marketing at PLCMCs, while the independent variables are Socio-demographic factors such as sex, age and family size of households, coffee price, distance to PLCTCs, extension services, Illegal trade, transport cost, member of cooperative, infrastructure, financial factors and access market Information. The study is interested in testing the variability of these variables. Do these variables truly in any way affect the effectiveness on coffee supplied and marketing at PLCTCs or not.

Independent variables

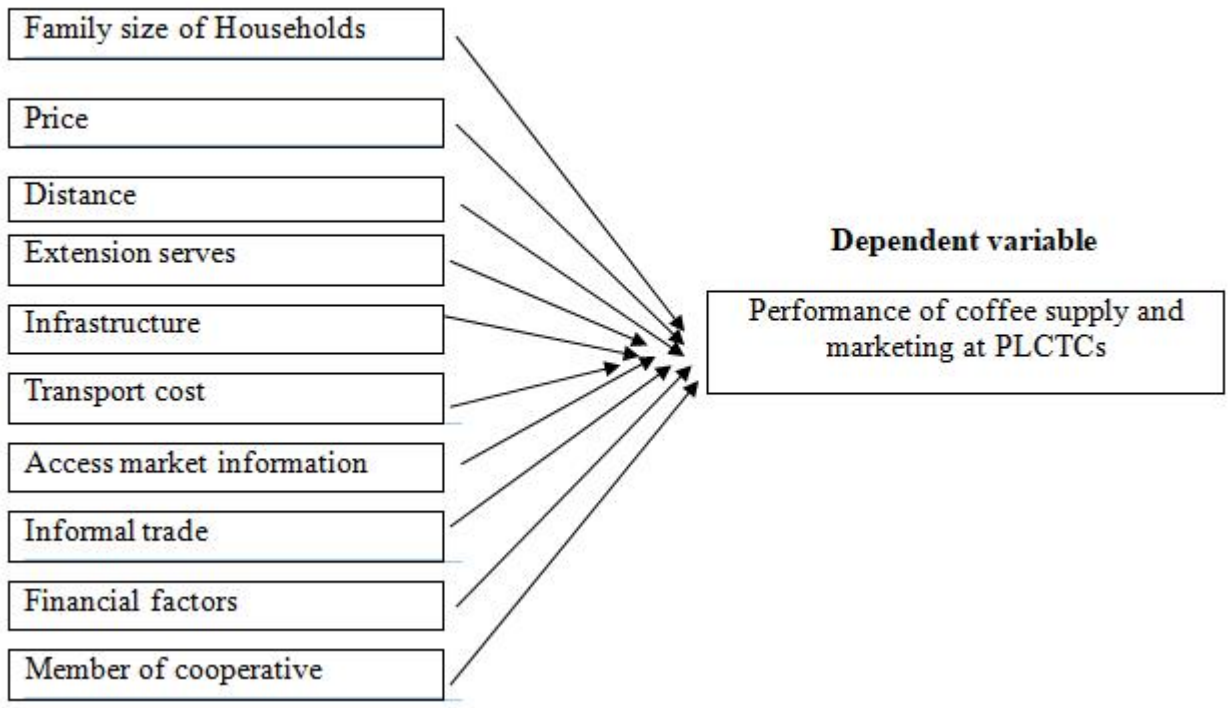


Figure 2.1. Conceptual frameworks [McMillan, et al, 2003] [8]

2.2. Data Types, Sources and Methods of Data Collection

Both primary and secondary data were used for this study. Data generated from both primary and secondary sources. Primary data were collected through questionnaire survey from smallholder coffee producers and through interview from primary coffee marketing cooperatives, Suppliers and relevant offices such as woreda administrator, Trade and market development office Management, cooperative development office Management, core process owners, and office head. The primary data were collected from farmers by focusing on factors affecting coffee supply and marketing at primary level coffee marketing centers on the local farm level based on demographic characteristics of the households, coffee price, distance to market, extension service, cooperative membership, transport access and cost, illegal trade and financial factors to further examine the problems that hinder the effectiveness of coffee supply and marketing at primary level coffee transaction center and the efforts of the government to achieve the planned goals . Secondary data were collected by reviewing documents of secondary sources like records, current performance evaluation reports, documents, strategy documents and policy notes were obtained from cooperative and marketing office, office of trade and industry, Bureau of agriculture. Economic, physical and geographic and production data were collected from pertinent regional, Woreda City administration offices. Beside to district offices information, websites were visited to generate relevant secondary information focusing on coffee Supply and marketing at production farm level.

2.3. Population of the Study

The target population for the purpose of this study was focus on coffee producers and coffee suppliers in Sidama national regional state four selected Woredas; Bensa, Aletawondo, Dalle and Shebedino.

2.4. Sample Size Determination and Sampling Technique

A multi-stage stratified sampling technique was used to select sample household heads in Sidama Region. Sidama Region is purposively selected based on the as it was one of the highest coffee producing region in Ethiopia. In the second stage, from a total of 11 highest coffee producing woredas of the region, 4 woreda namely Shebedino, Dale, Aleta wondo and Bensa were purposively selected based on a coffee production potential and coffee marketing intensity. In the third stage, from selected 4 highest coffee producing woreda of the region, 12 primary level coffee transaction centers were selected equally from each woreda randomly. In the second stage, from 123,491 coffee producer's smallholder farmers in Sidama region in study area, 399 samples of household heads were selected randomly by using Yemane (1967: 886) [9] formula, which is the most familiar and simplest as well as precisely represents the proportion of target population. To come up with correct finding, the formula is given by:

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

Where n, is the sample size, N is the population size, e is the level of error and given

(N =Y total youth population in the Region) (e = 0.05 level of precision at confidence level) then,

$$n = \frac{123,491}{1+123,491(0.0025)} = n = \frac{123,491}{1+308.7} = n = \frac{123,491}{309.7} = n = 399$$

Hence, the sample size is n =399. Thus the sample size determined b y the above given formula is 399. The sample size was distributed in each sample primary level coffee transaction centers based on the probability proportional to size method as follow

Table 1. Sample size determination and sampling technique

Sampling design	1st stage, Sidama region was purposely selected	2nd stage, 4 woreda were randomly selected	3rd stage, 12 PLCTCs were randomly selected	4rt stage, no of sampled producers selected from each PLCTCs
Sampling technique	Highest coffee producing selected woredas of the region= 123,491 registered coffee producers.	Shebedino	Sadeka	35
			Howolso	31
			Negasha	26
		Dale	Dagiya	41
			Ganne	33
			Masincho	31
		Aleta wondo	Gidibo	39
			wicho	29
			Halekana	31
		Bensa	Dongora	27
			Sada ware	40
			Bensa ware	36
Total size of sample				

2.5. Methods of Data Analysis

Both descriptive statistics and econometric analysis were used for analyzing the data. Descriptive statistics like: ratios, percentages, means and standard deviations in the process of examining and describing farm household characteristics, The econometric methods of data analysis refers to the use of different economic and statistical tools or models for testing hypothesis related to the objective of the study. For this study Ordered Logit Model was used to analyze the determining factors that affect coffee supply and transaction at primary level coffee transaction center. Since, coffee is a cash crop that all farmers decided to produce for selling purpose in order to earn cash. Therefore, all the sampled coffee farmers of the study area supply coffee to the market and the dependent variable which is performance of coffee supply and selling at PLCTC is a continuous variable. Hence, Ordered Logit Model was fitted to survey data to identify the determinants of the quantity of coffee supply and marketing at LCTCs.

2.6. Ordered Logit Model Specification

The dependent variable (Yi)

The ordered logistic regression technique is used when the dependent variable is ordered categorical in which case the events of dependent variable ordered. The dependent variable in this analysis is performance of coffee supply and Marketing at primary level coffee transaction center and it is a categorical variable as -low, medium and high- from which we are going to see what relationships exist with socioeconomic and institutional factors. Our response variable, performance of supply and marketing coffee at primary level coffee transaction center, is going to be treated as ordinal under the assumption that the levels of effectiveness status have a natural ordering (low to high), but the distances between adjacent levels are unknown. And it is categorized as follow.

a, Low performance (y0 =0 if the quantity of the coffee supply and marketing coffee at primary level coffee transaction center is below 50% based on stated criteria),
b, Medium performance (y1=1 if the quantity of the coffee supply and marketing coffee at primary level coffee transaction center is between 51% and 80% based on stated criteria),
c, High performance (y2 =2 if the quantity of the coffee supply and marketing coffee at primary level coffee transaction center is greater than 80% based on stated criteria),

For more than one independent variable, that is for K independent variables (X1 , X2 , …… Xk), the ordered logit model can be written as:

Derivation of the ordered logit model can be performed as follows:

Prob(yi=j\xi)

$$= \frac{e^{\beta ij^{xi}}}{1+\sum_{K=1}^{J} e^{\beta ikxi}} \text{ for } j = 0,1,2,\ldots..,J$$

Whereas Bi = B1, B2, B3…… Bn : are the regression coefficients.

Let y be an ordered response taking on the values {0, 1, 2. . . J} for some known integer J. The ordered logit model for y (conditional on explanatory variables x) can be derived from a latent variable model. Assume that a latent variable y* is determined by

$$Y^* = x\beta + e, \quad e\backslash x \sim Normal(0,1) \text{ ----------1}$$

Where is KX1 and, for reasons to be seen, x does not contain a constant. Let
$\alpha 1 < \alpha 2 < --- < \alpha J$ Be unknown cut points (or threshold parameters), and define
y=0 if y* 1

This log-likelihood function is well behaved, and many statistical packages usually estimate ordered logit model. For this study to determine values of coefficients Stata 11 was used

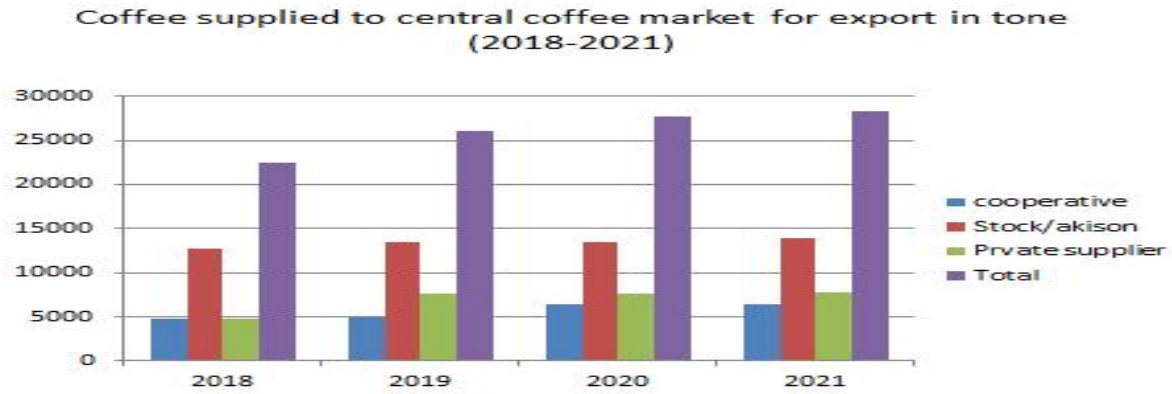
3. Results and Discussion

2.7. Coffee Production and Marketing in study area

The plant is grown on 161,056 hectares, with 131,544 of it giving yield. Out of 37 woreda and urban administration in sidama region 11 woreda and urban administration specialized coffee producing and 17 woreda and urban administration diversifying with other crops. According to Sidama region bureau of Agriculture total coffee producing households are 361,448. From 361,448 coffee producing households 18,979 are females and the remaining 342,469 are males. Out of these 80,011 farmers are primary cooperative members. These coffee producers organized in 64 primary cooperatives and one Sidama coffee unions, which provide financial, marketing, and various infrastructure support to the member farmers.

The structure of coffee marketing system in the study was characterized by the presence of individual coffee farmers to the production side and coffee marketing cooperatives, Unions, suppliers and Exporters to the marketing side was the member of the coffee marketing structure. There are total 450 coffee industries in sidama region. Out of 450 coffee industries, 104 primary coffee farmers cooperatives coffee industries, 217 private and 129 stock (akisyon) and there also 242 specialty coffee exporter farmers in the region. There are 592 PLCTCs in the region in the industries and out the industries. The potential for coffee export washed and unwashed coffee to international market 60,000 ton. But only 26,389 tone export last four years.

Coffee export 2018-2021



Source: Sidama Regional state bureau of cooperative union, 2021 [10]

2.7.1. Coffee Marketing Channels

New coffee marketing regime enforced producer's direct sale their coffee at PLCTCs to cooperatives and legal suppliers by controlling illegal activities and actors. Farmers sell red cherry and dry cherry coffee either for co-operatives, private suppliers and illegal traders. The study revealed that there are different coffee market actors such as illegal traders, cooperatives and suppliers. Coffee marketing channels in which coffee was passing from producers to exports may be sketched like:

Figure 3.1. Different Coffee Marketing channel producers to end

1. Producers → primary Cooperatives → Cooperative Union → Export.
2. Producers → Collectors → primary cooperative → Union → Export.
3. Producers → Collectors → Suppliers → Auction. → Export
4. Producers → Suppliers → Auction center → Export
5. Producers → Illegal trade → Illegal market or routes.

Source: survey result, 2017

The result on (**Table 2**) indicates that 218(54.60%) sampled farmers reported as they were sold their coffee in village to illegal traders and collectors. Based on the sample survey, the dominant purchasers of red cherry were the collectors.

Table 2. Distribution of sampled households by to whom they sold their coffee produce

Particulars	n=399	
Where and to whom did you sell your produce?	Frequency	Percentage
Primary Cooperatives & Suppliers at PLCTC	181	45.60
Illegal traders and collectors in village	218	54.40
Total	399	100.00

Source: survey result, 2017

The result on **(Table 3)** indicates that above fifty percent coffee producing farmers sale their coffee to local collectors and illegal traders in informal village market because of the reason were inappropriate location and inaccessibility of PLCTCs for producers (80.00%), long distance to take PLCTCs to sell cooperatives & Suppliers (71.40%), high coffee transport cost (60.00%), to sell on cash term to meet urgent cash needs (58.00%) and when cooperatives and suppliers were faced shortage of capital to purchase on cash(55.64%). On the other hand, producers took their coffee to cooperative or suppliers need long time and high cost.

Table 3, Distribution of sampled households by the reason why sold their coffee in village to illegal traders.

Particulars	n=399	
The reason were sold coffee to illegal traders and collectors	*Frequency*	percentage
Inappropriate location and inaccessibility of PLCTC to producers	*321*	80.00
Long distance to take coffee to PLCTCs to cooperatives & Suppliers	*285*	71.40
Require high transport cost to take coffee to PLCTCs	239	60.00
To sell on cash terms to meet urgent cash needs to the illegal traders	231	58.00
Cooperatives and suppliers were faced financial shortage(credit sold)	222	55.64

Source: survey result, 2017

According to **Table 4** regarding of the marketing problem when producers were sold their produce to illegal traders on village, out of the sampled respondents, on average 255(64.1%) of them reported that there were coffee marketing problem such as unfair price and low price, cheat on coffee scale (weight) in kg, poor market information, and transact low quality coffee were subsequent marketing problem in selling illegal traders. These results in, among other things, excessive transaction costs, deterioration of quality as it changes hands, which have had reduce income of coffee producers and enabling producers to get reasonable price for their coffee and hurts national income.

Table 4. Distribution of sampled households by the marketing constraints in illegal coffee market route

Particulars	n=399	
Marketing Constraints in illegal coffee market route	*Frequency*	Percentage
Unfair Pricing and low price	*309*	77.40
Cheat on scaling/weighting	274	68.70
The quality of coffee were deteriorated	245	61.30
Disseminate false coffee price information	239	60.00
Purchase low quality coffee	211	53.00

Source: survey result, 2017

2.7.2. Coffee marketing at Primary level coffee transaction centers

Primary Level Coffee Transaction Centers (PLCTCs) is a place where only coffee farmers and suppliers (legal suppliers and primary cooperatives) transact coffee on farm level. Based on the sample survey, as described in the above **(Table 5)** 45.30% coffee producers sold their coffee on PLCTCs. out of the sampled respondents, on average 290(73%) of them reported that the reason they prefer to sell their produce were proximity of PLCTCs to the coffee farms, there were competition based transaction, there were fair Scaling/weighing/ without cheating, transport and transaction cost were low, transparency on marketing and availability of market information which enable farmers to get reasonable price for their produce and create incentive to improve their future production, in a way, these increase income of producers and national economy in general.

Table 5. Distribution of sampled farm house holds by reason for selecting to sell coffee at PLCTCs

Particulars	n=399	
Reason for selecting to sell coffee at PLCTCs	Frequency	Percentage
Proximity of PMCs to the coffee farms	336	84.30
There was competition based fair price	334	83.70
There was fair Scaling/weighing/ without cheating	318	79.70
Transport and transaction cost were low	276	69.30
Availability of market information	232	58.30

Source: survey result, 2017

3.2. Factors Affect Coffee producers' Market Outlet Choice:

Different factors determine supply and a choice of market outlets based on the commodity to be marketed. Demographic, socio economic, institutional and technical factors affects supply and the choice of the marketing channels. This study used ordered logistic regression model to identify factors related to the coffee supply and marketing through a PLCTCs on farm level. A total of thirteen variables; ten continuous and three dummy variables were used on the model. The result of the model is elaborated below.

3.2.1. Demographic and Socio-economic characteristics of Coffee Producers

This section begins by discussing demographic characteristics sample respondents with regard to sex of the household head, household size, cooperative membership of the household head and education level of coffee producing households.

As shown in **Table 6**, out of the total sample respondents, 326(81.82%) were male-headed households and 73(18.18%) were female-headed. Regarding cooperative membership, 221(55.37%) of the sampled households were members of coffee cooperatives and 178(44.63%) were not organized under coffee cooperatives.

Table 6. General Characteristics of sampled coffee farm households (Continuous variables).

Variables	n=399	
Sex	*Frequency*	percentage
Male	*326*	81.82
Female	73	18.18
Cooperative membership		
. Yes	221	55.37
No	178	44.63

Source: survey result, 2017

With respect to educational level of the sample households the average number of years of schooling completed was 4.25 years with a standard deviation of 3.03. The average household size of respondents was 5.87 with standard deviation of 2.21. Regarding the distance from home to the nearest coffee market place where they sold their product (coffee), sampled coffee producing farmers reported that they have to travel an average of 3.58km (approximately) with corresponding standard deviations of 1.72. The minimum and the maximum distance that sampled coffee producing respondents have to travel to nearest market centers were 0.5km and 7 km, respectively. Extension contact: Extension service provision was expected to have direct influence on the marketing behavior of the farmers. The mean extension contact frequency provided for coffee producing farmers was found to be 1.82 day/month with standard deviation of 0.84 as mentioned in **Table 7**.

Table 7. General Characteristics of sampled coffee farm households (Continuous variables).

Particulars		n=399	
Variables	Observation	*Mean*	Std.dev
Household size(number)	399	*5.87*	2.21
Education(years of schooling)	399	4.25	3.03
Distance to market(km)	399	3.58	1.72
Extension contact frequency.	399	1.82	0.84

Source: survey result, 2017

3.2.2 Results of Ordered Logistic Regression Model

Table 8 below shows Ordered logit regression results checks whether quantity of coffee supply and marketing at primary level coffee transaction center on farm level depends on socioeconomic and institutional variables. Ordered logit model regression results showed that 11 out of 14 variables were statistically significant at influencing quantity of coffee supplied and marketing at PLCTCs coffee marketing channels. In order to determine the effect of factors on quantity of coffee supplied and marketing at Primary Level Coffee Transaction Centers and test the study hypotheses, the combined independent variables (Sex of the household heads, age of the household heads, family size of the household heads, education of the household heads, Distance of the farmer's residence to the PLCTC, access of Extension Services, membership to coffee cooperative, access to market information, amount of coffee produced, income of household heads, mode of payment, transport cost, price of coffee and infrastructural factors were regressed on the dependent variable quantity of coffee supplied and marketing at Primary Level Coffee Transaction Centers. And only age, family size and infrastructural factors were insignificant. The overall model is significant (LR chi2(14) = 83.23, Prob > chi2 = 0.0000), and consistent with prior studies, the model's explanatory power is high. The study LR- test value shows statistical significance at level of 1%, indicating that the relationship between the dependent and independent variables is meaningful.

The explanatory variables hypothesised to influence producers coffee supply and marketing though a PLCTCs were the following.

Sex of the household heads: It is a dummy independent variable where (1) represent for male and (0) represents for female. It was hypothesized that male headed households are more likely to coffee supply and marketing at PLCTCs more than females headed households. The result of the study also confirms this and showed that it has positive and significant influence on quantity of coffee supplied and marketing at PLCTCs at 1% level of significance. It also showed being male household head increases the quantity of coffee supplied and marketing at PLCTCs by 47.2% as compared to female household head, controlling for other independent variables. If male of producers increases by one 1 percent level , his ordered log-odds of being in a higher performance category would increase by 0.47 while the other variables in the model are held constant. Thus, based on odds ratio, for a one percent level increase, the odds of high performance versus the combined middle and low performance categories are 1.59 times greater, given the other variables are held constant in the model. Female individuals were relatively less efficient in quantity of coffee supply and marketing through PLCTCs than male. Therefore, the sex of the household head (being male) was expected to affect the likelihood of coffee supply and marketing through PLCTCs positively, and supply and marketing through illegal traders or informal markets negatively. The logic behind this could be male farmers have more resource for transportation and time to sell their coffee product to markets even when the markets are far away from their residence [11]. However, female farmers prefer to sell their products to farm gates markets or informal markers to immediately serve their family needs.

Education of the Household Heads: It is a continuous variable that refers to the number of years of formal schooling the household head attended. Quantity of coffee supplied and marketing at PLCTCs was significantly and positively influenced by education level of coffee producers at 5 percent level. Thus, based on odds ratio, for a one-year increase in education level, the odds of higher performance level categories are 1.041 times greater, given the other variables are held constant in the model. It means that as the educational attainment of coffee producers increases the probabilities of supply coffee and marketing at PLCTCs increases. Educated household heads are expected to have better skill, better in adoption of technology and coffee

production management, better access to information and to make better use of their available market outlets. It also enhances the capability of farmers when making decisions with regard to the choice of market outlet based on the marketing margin and marketing cost. This might help them to increase production and thereby quantity supply and help farmers to adjust to new market requirements. This finding is consistent with Medeksa (2014) [12] who reported that educational level provides positive predictive power, whether or not the household chooses a cooperative as the market outlet for their coffee. Therefore, it was expected to affect the likelihood of amount of coffee supplied and marketing through PLCTCs significantly and positively.

Distance of the farmer's residence to the PLCTC: It is a continuous variable and is measured in kilometers which farmers spend time to coffee supply and sale their product to the market. The model result showed that distance of farmer's residence from market center negatively related and statistically significant influenced amount of coffee supplied and marketing through PLCTC at 1% significance level. Based on the proportional odds ratio of comparing farmers who are relatively nearer to the PLCTCs with farmers his/her residence is far from the marketing center; farmers who are relatively nearer to the PLCTCs their odds of high performance versus the combined middle and low performance are greater than farmers his/her residence is far from the marketing center, given the other variables are held constant. Based on the proportional odds ratio of comparing those farmers who are relatively nearer to the PLCTCs with farmers his/her residence is far from the marketing center; have more probability to high amount of coffee supplied and marketing through the PLCTCs . As the farmer's residence is far from the marketing center, the probability of coffee supply and marketing through PLCTCs decreases by 0.48 have market access to do not have market access on performance; coffee producers who have market access, their odds of high performance versus the combined middle and low performance are 1.188 times greater than coffee producers who do not have market access, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance is 1.188 times higher for farmers who is near PLCTCs compared to those farmers far from PLCTCs, given the other variables are held constant in the model. The marginal effect of distance to PLCTCs is statistically significant with negative sign on amount of coffee supplied and marketing through PLCTCs and shows that a one kilometer increase in distance to PLCTCs decreases the a preference of farmers to use PLCTCs by 48%. Distance to nearest PLCTCs has positive and significant relation to the amount of coffee supplied and marketing through PLCTCs as compared to informal traders. This implies that farmers choose to sell their coffee through PLCTCs when they are near to the markets. The closer to the market the lesser would be the transportation cost and time spent. A study conducted by Tesfu (2012) [13], identified that distance from the nearest market affected quantity of coffee supplied and marketed significantly and negatively. The proximity of the market places from the farmer residence reduces the cost of time and labor that the farmer spent in searching for a buyer for his coffee and mainly will not be exposed to illegal traders. Due to this factors farmer's probability amount of coffee supplied and marketing through PLCTCs increases. The other advantage is that as the farmer is close (near) to these marketing centers, they will have more knowledge about the market condition, behavior and its benefits. Therefore, in this study, the distance of farmer residence from the market places is expected to influence the amount of coffee supplied and marketing of coffee through the PLCTC negatively.

Access of Extension Services: It is a continuous variable, measured in terms of number of visits per year made by the extension service to the sampled households. It affected the amount of coffee supplied and marketing through PLCTCs positively and choice of informal or illegal traders negatively at a 1% level of significance. This might imply that extension agents advise farmers to sell their coffee to cooperatives and suppliers

through PLCTCs rather than illegal traders or collectors in village market. Based on the proportional odds ratio of comparing farmers who have more trained in coffee marketing to lower trained in coffee marketing; the odds of high performance versus the combined middle and low performance are 1.298 times greater than for non-users, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance i s 1.298 times higher for service users compared to non-users, given the other variables are held constant in the model. This implies that farmers who have more trained in coffee marketing have experienced highly participate on coffee marketing through PLCTCs and less coffee marketing participation than those who have the lower trained in coffee marketing. Extension service helps in making information available regarding technology, which improves production. Those producers who were closer to extension services; on coffee marketing skill, coffee production and marketing management could correct misconception concerning formal coffee market and coffee supply. Therefore, building the capacity of the coffee producers' exiting training centers and expanding their coverage as well as strengthening the field level training programs are highly demanded to improve the amount of coffee supplied and marketing through the PLCTCs. The finding of the study is in line with Tadese (2015) [14], who found that frequency of extension contact had a negative and significant effect on choice of illegal traders or collectors in village market and positive and significant effect on cooperatives and suppliers. Hence, it was hypothesised to affect the amount of coffee sold positively and the likelihood of choosing coffee marketing through PLCTCs positively, and illegal traders or collectors negatively.

Membership to coffee cooperative: It is a dummy variable and takes the value of 1 if the household is member of coffee cooperatives, and 0 otherwise. Membership in coffee cooperative affects the amount of coffee supplied and marketing through PLCTCs is positively at 1% significance level. The reason is that members are required to supply their coffee as the norm of cooperatives. Based on the proportional odds ratio of comparing a producer that member of coffee cooperatives to a producer who not a member of coffee cooperatives on performance; producers who a member of coffee cooperatives, their odds of high performance versus the combined middle and low performance are 1.195 times greater than a producer who not a member of coffee cooperatives, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance is 1.195 times higher for producers who have member of coffee cooperatives compared to a producer who not a member of coffee cooperatives, given the other variables are held constant in the model. This positive influence was attributed to the fact that obtains high income allows producers to sell their produce to cooperative through PLCTCs, in way, and quantity of coffee supplied increases. This indicates that a producer who a member of coffee cooperatives prefer to sell their coffee to cooperative through PLCTCs while a some producers who are non-member prefer illegal traders or collectors. Thus, cooperatives improve understanding of members about market and strengthen the relationship among the members. Those who were members of cooperatives might be motivated with the expectation future benefit from double payment (profit dividend payment besides actual price of commodity) than non-members. As compared to those household who are not a member of coffee cooperatives, those household who are a member of coffee cooperative were sold their produce through PLCTCs. Therefore, this variable was expected to be associated to amount of coffee supplied and marketing through PLCTCs positively. The finding is consistent with Engida (2017) [15], who showed that cooperative membership has a significant and positive relationship with the likelihood of choosing a cooperative to sell to.

Access to market information: The result of the model indicated that access to market information had positively and significantly affected the amount of coffee supply and marketing through PLCTCs at a 1% significance

level. The positive and significant value of coefficient under access to market information implied that access to market information increases the quantity of supply and marketing through PLCTCs by 22.2%, keeping other variables constant. The rationale behind this could be access to market information might enable farmers to receive accurate price level and encourage selling more and thereby increase their profit. The result of the study is in line with Wendmagegn (2014) [16], who found that access to market information had significantly and positively influenced coffee market supply. Information on markets is a determinant factor for coffee marketing. Information on market prices and channels is one of the important aspects for livelihood improvement of rural farm households. In addition to this, market information is crucial to producers to know the price of the product in relation to its quality, to know the demand of their product (number of suppliers) this helps them to adjust their way of Marketing. Access to market information encourages farmers to produce more in quantity and in a quality of the produce because access to market information has positive influence in order to households to market coffee at the right time without loss of quality. Therefore, market information results to high return in production and marketing.

Amount of coffee produced: It was hypothesized that amount of coffee produced has positive and significant effect on quantity supplied and marketing through PLCTCs. As the hypothesis, it was predicted that the quantity of coffee produce was positively related and statistically significant with the amount of coffee supplied and marketing through PLCTCs. The amount of coffee supplied and marketing through PLCTCs was significantly influenced by quantity of coffee produce of respondent at 10 percent probability level. Based on the proportional odds ratio of comparing a producer that obtains high yield coffee produce to a producer who had fewer yields on performance; producers who have obtains high yield coffee produce, their odds of high performance versus the combined middle and low performance are 1.368 times greater than a producer who had fewer yields, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance is 1.368 times higher for producers who have obtains high yield coffee produce compared to a producer who had fewer yields, given the other variables are held constant in the model. This positive influence was attributed to the fact that obtains high yield coffee produce allows producers to supply high amount of coffee and marketing through PLCTCs and thereby increase quantity of coffee supply. This indicates that a producer who have obtains high yield coffee produce prefer marketing through PLCTCs while a producer who had fewer coffee yields prefer informal marker or illegal traders.

Income of household heads: It is continues variable measured in amount of birr that income in thousand obtained from different activities by the household head. The amount of coffee supplied and marketing through PLCTCs was significantly influenced by quantity of coffee produce of respondent at 10 percent probability level. Based on the proportional odds ratio of comparing a producer that obtains high income to a producer who had low income on performance; producers who have obtains high income, their odds of high performance versus the combined middle and low performance are 1.141 times greater than a producer who had low incomes, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance is 1.141 times higher for producers who have obtains high income compared to a producer who had low income, given the other variables are held constant in the model. This positive influence was attributed to the fact that obtains high income allows producers to prefer marketing through PLCTCs and increase quantity of coffee supplied. This indicates that a producer who have obtains high income prefer to marketing through PLCTCs while a producer who had low income prefer informal marker or illegal traders to sale their coffee. Getting income from different activity is assumed to have direct or inverse relation with prefer market outlets.

Transport Cost of coffee Marketing: Transport cost of coffee marketing has a negative and significant at 1 percent level with probability of participation of Coffee marketing experiences. The odds-ratio of 0.586 for transport cost implies that other things equal, the odds-ratio in favor transport cost increase. The negative association implies that for a unitary increase in distance between the farmers' farm and the nearest market centers, there will be less chance for participation in coffee marketing experiences. When farms are far from the market, the transaction cost for acquiring input and sale of output will be high and this will, in turn, reduce the relative advantage of participating in participation in coffee marketing experiences. If the farmers farm was not near to the market, that might increase costs of marketing the products. This implies that distance to the nearest market in different localities had similar influence on the adoption of technology or participation decision. The marginal effect of transport cost to formal market was statistically significant with negative sign. The implication is that a one Birr increase in transport cost to the formal market decreases the likelihood to use formal market by 1% as compared to informal markets. Transport cost to the main market has negative and significant impact on formal traders' preference of farmers relative to informal buyers which is consistent with the hypothesized sign. The marginal effect of transport cost to cooperatives was also positively and statistically significant; meaning as transport cost to formal local market increases by one Birr, the preference for cooperative increases by 58.4 % as compared to informal markets.

Mode of payment: As the hypothesis, it was predicted that the Terms of payment was positively related and statistically significant with preference of producers to marketing through PLCTCs and the amount of coffee supplied. It influenced negatively at significance level of 1%. It means payment style of either in cash or credit terms. Based on the proportional odds ratio of comparing producers who sale on cash to on the credit sale on performance; producers who sale on cash, their odds of high performance versus the combined middle and low performance are 1.288 times greater than producers who sale on the credit, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle performance versus low performance are 1.288 times higher for producers who sale on cash compared to producers who sale on credit, given the other variables are held constant in the model. This positive influence was attributed to the fact that sale on cash allows producers to follow prefer marketing though PLCTCs and increase quantity of coffee supplied.

Price of coffee: This is a dummy variable taking a value 1 if the PLCTC offered for the farmer's coffee a price similar or better than other marketing agents in the area and, 0 otherwise. The pricing techniques are one of the most marketing strategies in order to capture more of the market share. Therefore, if the PLCTCs charge competitive price for coffee in the area, the farmers market their coffee through the PLCTCs. Therefore, price influence the marketing of coffee through the PLCTCs positively. Presence of traders who offers competitive price was expected to adversely affect the amount of coffee marketed through the PLCTCs . However, the opposite has been observed in the result. The presence of traders who offers competitive price significantly and positively affected the amount of coffee marketed through the PLCTCs at 5% significance level. On an average, the change in the availability of traders on the quantity of coffee marketed through the PLCTCs was 1.689 qts among members who marketed through the PLCTCs. The presence of traders who offers competitive price increases the probability of coffee marketing through the PLCTCs among members by 0.017%. The implication behind the result is that, the presence of traders who offers competitive price has forced the PLCTCs to follow different marketing strategies so as to stay in the market.

Table 8: ordered Logistic regression Result

Variables	Coefficient	Standard Error	Z-Value	P-Value	Odds Ratio (e^{coef})
Age of the household heads	0.1432263	0.5715215	0.23	0.49004	0.769806
Sex of the household heads	0.4794373	0.1122515	2.69	0.001***	1.599265
Education of the households	0.1412211	0.0164515	2.09	0.0012**	1.041265
Family size	0.2364769	0.9554517	2.67	0.961	0.654548
Membership of cooperative	0.2446043	0.1271732	2.04	0.0001***	1.195406
Dist. of market center	-0.484534	0.1566563	2.21	-0.0050***	-1.188233
Income of the household	0.0408130	0.0152089	2.68	0.007*	1.141657
Transport cost	0.586890	0.0042342	-3.84	0.000***	1.522884
Access Extension Service	0.3016111	0.1631230	5.42	0.000***	1.298427
Amount of coffee produced	0.2136713	0.1336241	1.92	0.055*	1.368427
Price coffee	0.0178877	0.7341232	2.29	0.0011**	1.689453
Access market Information	0.2212314	0.9962353	1.92	0.055*	2.297427
Infrastructure	0.2936713	0.1933241	1.92	0.655	0.908427
Mode of payment	0.3136616	0.1631240	2.32	0.005***	1.288427
Ordered logistic regression					
Number of obs = 399					
Log likelihood = -39.022613					
LR chi2 (14) = 83.23					
Pseudo R2 = 0.6243					
Prob > chi2 = 0.0000					

***, ** and * indicate level of significance at 1, 5 and 10 percent, respectively.
Source: Model output (2017).

4. Conclusion and Recommendations

In this article, we assessed and analyzed factors affecting amount of coffee supplied and marketing through PLCTCs by smallholder farmers. The PLCTCs are coffee marketplaces at farm level to put producers directly in contact with suppliers (akrabies), thereby cutting out collectors (sebsabies), who became outlawed. It is a place where only coffee farmers and suppliers transact coffee, in a way, enabling the farmers to get reasonable price for their produce and create incentive to improve their future production. While the success of PLCTCs was subject to debate, it is clear they have not displaced collectors. Many producers reside too far from PLCTCs and so have to sell to collectors. The sampled farmers reported that only 45. 60 % producers were sold their coffee to coffee cooperative and suppliers though PLCTCs while 54.40% were sold their coffee to illegal traders on village. The study identified poor accesses to market, long market chains, unfair and low price, cheat on coffee scale (weight) in kg, poor market information, and transact low quality coffee were subsequent marketing problem. These results in, among other things, excessive transaction costs, deterioration of quality as it changes hands were among the major constraints of coffee marketing which have had reduce income of coffee producers and enabling producers to get reasonable price for their coffee and hurts national income.

The reason of producers sold their coffee to illegal traders due to the long distance to sell through PMCs to coffee cooperatives & Suppliers, required high transportation cost, to sell on cash term when coffee cooperatives and suppliers faced financial shortage and inappropriate location of PLCTCs.

In this study, out of the sampled respondents, 91% of them reported they faced poor price information, no transparency on transaction, unfair price, Unfair scaling/weighting and low quality coffee were subsequent marketing problem in selling illegal traders. The study revealed that larger average net profit was obtained by the intermediaries than the producers and producers ware less beneficiaries in the coffee market chain than the other illegal coffee actors. The result of the study revealed that 45.60 % producers sold their produce through PLCTC to coffee cooperative and suppliers. The results of this study affirm that these producers get reasonable price for their produce in lower transport cost, fair and competitive price, fair scaling/weighing/of produce without cheating, transparency on market, availability of market information and accessible market(reduce distance) for producers. Therefore, PLCTCs were played significant roles in providing efficient and effective marketing system that can develop strong market linkage between producer and coffee suppliers in capacitate producers bargaining power, lower market distance and transaction costs, avail fair price and market information, shortening market chain, in increasing coffee quality and supply.

Econometric result indicated that sex of the household head, their level of education, their level of income, access to information, distance(access) to market, access of extension services, membership to coffee cooperative, amount of coffee produced, mode of payment(capital), transport cost and price of coffee were significantly and positively influenced amount of coffee supplied and marketing through PLCTCs, whereas distance(access) to market and transport cost were significantly and negatively affected market coffee supply and marketing through PLCTCs of producers. Households, who are accessed to market information, accessed to extension advice, membership to cooperative, produced high amount of coffee and obtained high income were more likely to supplied high amount of coffee and marketing through PLCTCs as opposed to illegal traders. On the other hands, farmers who have low income, non-member of cooperative, no information, far to market, preferred illegal traders or collectors.

Agricultural markets play a key role in the lives of poor people in developing countries. Coffee is currently an important agricultural export commodity for Ethiopia. Developing efficient agricultural markets has a large impact on the economic development and improves livelihoods of coffee producers. Econometric result indicated that sex of the household head, their level of education and income, access to information, distance(access) to market, access of extension services, membership of cooperative, amount of coffee produced, mode of payment(capital), transport cost, price of coffee were significantly influenced quantity of coffee supplied and marketing through PLCTCs.

Based on above conclusion the following recommendations are forwarded.

- Strengthening extension support services, emphasis should be given on empowering women and encouraging farmers to learn adult education and providing short and intermediate practical based training. Building farmers' exposure through trainings and creating a conducive environment to share their experience with other farmers shall be effective on coffee production and marketing. Encouraging the existing cooperatives members and persuading nonmember of cooperatives to become member of cooperatives. Promoting and strengthening of rural institutions, (cooperatives and unions) shall be effective for good marketing achievement. Effective coordination shall be established between the different institutions to support facilitation of credit for legal coffee market actors (cooperatives and suppliers).

- Consistent and reliable coffee market information shall be established. Strengthening the existing means of transport and expanding the existing rural roads that connect different rural kebeles with market. Especial attention shall be given to relocate PLCTCs that centered all producing farmers and establish new

additional PLCTCs to access market to all producers.

- Fostering the linkage Coffee production and marketing is essential to increase the production and marketing participation of Coffee producers. Large quantity production might be important to bargain and transport during selling, and helps to reduce transaction costs. Diversifying the income source for coffee producers shall be effective to use formal coffee market.

- Strong measure should be taken in controlling and prevent informal traders not to participate in the market and eventually convince them to join the formal and legal market. Besides, due attention should be given to improve communication networks in different coffee production sites and marketing centers of the study area. These, calls innovative and comprehensive intervention from responsible bodies were needed to change the existing coffee marketing problems at production levels.

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