Determinants of Market Supply of Coffee (Coffee Arabica): The Case of Arsi Zone, Oromiya Region, Ethiopia

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Abstract

This study aimed to analyze factors affecting market supply of coffee (coffee Arabica) in selected districts of Arsi zone, Oromia, Ethiopia with specific objectives of with specific objectives of characterizing the production and consumption level of coffee and analyzing the factors affecting quantity supplied of coffee of the study area. Purposive sampling, stratified sampling and simple random sampling techniques were used to select the representative coffee producers. Descriptive analysis and Multiple Linear Regression Models (ordinary least squares (OLS) estimation techniques were used to analyze the data. The findings of econometric result revealed that, access to transport facility, access to credit, land size of coffee, distance to the nearest market center, family size and prevalence of disease and insects were determinants for quantity supplied of coffee that affect significantly. Policy aiming at increasing farmers' access to market information, training on pre and post-harvest management developing and improving infrastructure (roads), facilitating extension services is recommended to enhance the market supply of coffee in the study area.

Key words: Coffee Market Supply, Regression Analysis, Arsi

Introduction

Coffee is one of the most important commodities in the world economy and the production of this commodity varies across regions and Ethiopia's most important cash crop, with more than 15 million people directly or indirectly depending on it for their livelihoods and is deeply intertwined in the country's social, cultural and historical identity (GAIN, 2014). Coffee in particular is the backbone of the Ethiopian economy and is the leading commodity in generating foreign exchange for the country (Hassen, 2015; Mekonin, 2017).

Coffee is the most important crop in the national economy of Ethiopia and the leading export commodity and is well known not only for being the home of Arabica coffee, but also for it is very fine quality coffee acclaimed for its aroma and flavor characteristics (Anwar, 2010).

Coffee in Ethiopia, despite its importance, the performance of its sector has remained unsatisfactory and smallholder producers face a number of challenges in the form of low productivity and quality, lack of access to markets, little opportunities for value addition, lack of capital and access to credit to invest in machineries and to pay for transport to sell outputs (Seneshaw and Bart, 2016).

In Ethiopia, coffee is mainly produced in Oromia National Regional State and SNNPR of Ethiopia and these regions shares 2.64% and 1.24% respectively from total of 4% coffee produced in the country (CSA, 2016). Arsi Zone is one of the top ten coffee producing areas in Oromia region and nearly 70% of the districts (17 districts) of this zone have suitable agro ecology for coffee production (AZCTA, 2016). From all grains produced in this zone, coffee ranks 5th and the second most important cash crop next to oilseeds (CSA, 2016) where Gololcha (37.69%), Shenen Kolu (33.35%), Chole (17.92%)

Seru (3.81%), Amigna (2.18%), Aseko (1.67%) and Sude (1.06%) districts takes the line share in coffee production of the zone (AZCTA, 2016).

The existing and potential constraints of production, post-harvest handling and marketing such as input utilization, productivity, packing, warehousing and distribution have been played and will continue their deterring role on production, market supply, and consumption of coffee in and Arsi zone. As an enquiry, the importance of identifying the determinant factors and analyzing the effects of the coffee subsector has not been given much emphasis in the industry given its longstanding export performance in Ethiopia in general and Arsi Zone in particular. The two consecutive years of 2016 and 2017 annual reports of Arsi zone authority of coffee and tea showed that, from 10,530 tons and 5107 tons of coffee planned to supply to the middle market respectively, almost 50% of the demanded quantity was achieved on average indicating that the demand and supply of this commodity is not satisfied.

Moreover, the existing studies on factors affecting market supply the case of Arsi Zone were mainly focused on major grain crops ,however, the study on the coffee market supply is limited and empirical evidence on coffee market supply is lacking. A study which was conducted by Jima, et.al, (2017) was focused on constraints and opportunities of Coffee Production in Arsi Zone; however, they have not touched the factors affecting market supply of coffee in the area. As far as our knowledge concerned, there is no study has been made in the past to deal with this issue of factors affecting market supply of coffee in the study area and this study therefore intends to fill this gap in selected districts of Arsi zone, Oromia, with specific objectives of characterizing the production and consumption level of coffee and analyzing the factors affecting quantity supplied of coffee of the study area.

Data and Methods

The study was conducted in four potential coffee producer districts of Arsi Zone .Gololcha, Chole, Aseko and Seru in Oromia National Regional State of Ethiopia

The figure 1 below shows map of the study area

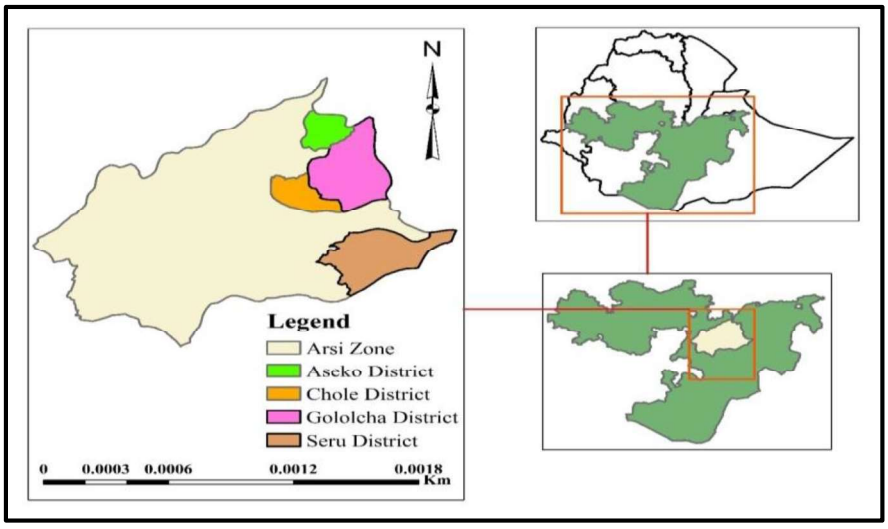

Figure 1: Study area map

Sampling techniques

To select representative coffee producers from the study areas; three stages sampling techniques were used. Firstly, four districts (Gololcha, Chole, Aseko and Seru) were selected purposively based on their production potential. Secondly, the existed kebeles from selected districts were stratified into two strata based on the volume of coffee production as high, and medium producer from selected districts and '11' kebeles from each stratum were selected using stratified random sampling and Finally, a valuable data were collected from 349 sample coffee producers those were selected randomly with proportional to the population size using Yamane (1967) sample size determination formula

$$\boldsymbol{n = \frac{N}{1+N(e)^2} - - - - - - - - Equ.(1).}$$

Where n= sample size,

N = number of population participated in coffee production,

e = the acceptable sampling error, hence 5% in this study;

$$\boldsymbol{n = \frac{5498}{1+6146(0.05)^2} = 373}$$

To reduce the sample size, adjusted sample size method were use as follows;

$$\boldsymbol{n = \frac{n_0}{1+\frac{(n_0-1)}{N}},\ n = \frac{373}{1+\frac{(373-1)}{5498}} = 349 - - - - - - - - - - - - - - - - Equ.2,.}$$

Sources of data, type of data and methods data collection

In this study, both quantitative and qualitative data types were used and were collected from both secondary and primary sources. Secondary data were collected from published and unpublished documents, reports, from different governmental offices found in the districts .i.e. from Agricultural and rural development office, CSA, ECX, Trade and Market Development office and zonal offices (Arsi zone Agriculture and rural development office, Coffee and Tea Authority, trade and Market Development office, Road and Transportation office, etc.) whereas the primary data were collected from coffee producers through household survey methods using tools like questionnaires. The household survey was focused on collecting quantitative data on production and marketing of farm produce, as well as socio economic factors, resource ownership, and farm activities using questionnaire. A semi-structured questionnaire (a combination of both structured and unstructured) was employed to collect primary data for the cropping season of 20018/2019 from the sample respondents of the study area. Before conducting the actual interview, the questionnaire was pre-tested and overseen on few coffee

producers (farmers) who were not included in the sample respondents. Pretesting of the questionnaire and interview schedule was carried out by pilot testing & adjustments were made depending on the obtained result. About 15 enumerators who have experience in data collection was recruited and trained on the details of the interviewing techniques and the contents of the questionnaire. The data collection activities were held for four months (from December 1, 2018 to March 30, 2019) with time schedule of the field work at different level of the value chain actors with critical supervision of the researchers.

Data analysis

Descriptive analysis were used to analysis the demographic factors, human capital, institutional support serves, physical assets, social capital and other related factors of coffee production in the study area.

Econometric Analysis

Econometric model (multiple linear regressions Model) was used to analyze the factor affecting quantity supplied of coffee to the market in our study. The dependent variable analyzed in this paper is quantity supplied of coffee to market by producers as detailed above. Hence, we use multiple linear regression models and ordinary least squares (OLS) estimation techniques to analyze the determinants of quantity supplied coffee in the study area since all farmers are participated in the market and expressed as follows:

$$\boldsymbol{Y_i = B_0 + B_i X_i + E_i ------equ.3}$$

Where

Yi= quantity supplied of coffee to the market

B0= constant term

βi= parameters to be estimated capturing the effect of explanatory variables on quantity supplied of coffee

Xi = the explanatory variables influencing quantity supplied of coffee to the market and

Ei = the disturbance term.

Test for Multicollinearity and Heteroscedasticity Problems

It is important to check variables used in the model for Multicollinearity and heteroscedasticity problems before running the model. Multicollinearity problem arises due to a linear relationship among explanatory variables; and becomes difficult to identify the separate effect of independent variables on the dependent variable because of existence of strong relationship among them (Gujarati, 2003).

A variance inflation factor (VIF) technique (Appendix Table 1) and Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated to detect Multicollinearity in explanatory variable. According to Gujarati (2003), VIF (Xj) can be defined as:

$$VIF(X_{J)} = \frac{1}{(1 - {R_j}^2)} - Equ(4)$$

Where, RJis the multiple correlation coefficients between Xjand other explanatory variables

Hypothesis, Variable Selection and Definition

Definition of Variables: Quantity Supplied of coffee which is the amount of coffee actually supplied by households to the market is considered as dependent variable for the above mentioned econometric model and measured in quintal (qt) in 2018/19 production year. Concerning the

explanatory variables, the definition and expected influence of the explanatory variables used in the econometric model along with measurement and expected signs is summarized in table 1 below.

Table 1: The definition and expected influence of the explanatory variables

Variables	Measurement	Category	Expected sign
Sex of the household head	1= Male, 0= Female	Dummy	+ve
Age of the household head	Years	Continuous	+ve
Literacy status of the household head (Education level)	1= can read and write 0=cannot read & write	Dummy	+ve
Family size of household head	Number	Continuous	+ve
Area under coffee production	Hectare	Continuous	+ve
Access to credit service	0 = No , 1= Yes	Dummy	+ve
Distance to the nearest market	Minutes	Continuous	-Ve
Extension contact	Frequency/year	Continuous	+ve
Access to transportation facility	0 = No , 1 = Yes	Dummy	+ve
Access to market information	0 = No,1 = Yes	Dummy	+ve
Prevalence of diseases and insects	0=No , 1=Yes	Dummy	-Ve

Result and discussion

Coffee production and supply in the study area

Table 2: Area of coffee and volume of production and supply

District	Average production (qt)	Average coffee consumed (qt)	Average soled(supplied) (qt)	Average Productivity (qt/ha)	Average total land (ha)	Average selling price (Birr/qt)
Aseko	4.78	0.43	3.89	10.39	1.59	2955.185
Chole	5.42	0.43	3.95	11.06	1.58	3038.427
Gololcha	6.69	0.47	4.82	12.16	1.82	3188.646
Seru	4.48	0.44	2.75	10.93	1.47	2972.788
Mean	5.88	0.45	4.22	11.6	1.69	3100.115

Source; own computation from survey result, 2018/19 of the study area

The investigation made in the study area showed that, all the sample farmers handled for the study are coffee producers and they also participants in the market. The average value of coffee production in 2018/19 production year was 5.88 quintal from 0.51 hectare of land used in coffee production in average with average productivity of 11.6quintal per hectare (5.44quital when it is converted in to marbush or qishir) according to the investigation result. From total produced (2052.12quintal), about 71.77% (1472.7quintal) of coffee was supplied to the market and sold to different buyers including local consumers, local collectors and wholesalers in the study area with average price of 3100.115 Birr per quintal or 6200.23 Birr of Marbush coffee whereas 7.65% of the commodity was used for household consumption of the coffee growers by themselves during the production year.

Coffee production is highly practiced in selected districts since the selected areas were the major potential areas of Arsi Zone in coffee production. The survey result of the study shows that, Gololcha district takes the line share in coffee production (59.2%) and productivity (12.16qt/ha) followed by Chole district (23.5%), (11.06qt/ha) whereas Seru district (11.5% and 10.93qt/ha) and Aseko district (5.8% and 10.39qt/ha) took the third and fourth rank in both production and productivity respectively. .

Coffee is the major source of income in the study area. As it was shown on Table 2 above, the average value of sale of coffee in the study area was found to be 13,082.49 birr. The average value of sale of coffee (15941.72 birr) in Gololcha Distract is much larger as compared with the average value of sale of chole (12,001.79 Birr), in Seru district (8,175.17 birr) and that of Aseko district (11,495.67birr). In addition to the difference on the volume of production, the larger difference in the value of the sale of coffee in the four districts attributed to the differences in the producers' selling price of the products. Producers in Gololcha district sell their products with relatively

better price as compared with producers in the rest three districts and this price difference in the four areas can further be associated with the difference in access to market information.

Econometric analysis

Independent Variables Used in the Econometric Model

Table 2 below illustrates the variables used in under OLS regression model in order to observe the effect of those variables on quantity supplied of coffee to the market in 2018/19 production year at the study area which are classified in to demographic factors, human capital, institutional support serves, physical assets, social capital and other related factors which were decided by the researcher to be a factor for factors affecting volume of supply.

Demographic factors: These factors describe the age of the household head, sex of the household head and family size of the household in the study area. Accordingly, from 349 sample respondents handled during the survey year, about 94.84% of the sample households were male headed household whereas the rest 5.16% were female headed households according to the investigation or survey result of the study area. The average age and average family size of the respondents was found to be 44.15 years and 7. 32 people respectively with minimum and maximum years of 24 and 80 years and 2 and 17 persons respectively. Larger family size in a given household decreases the quantity of supplied of food crops directly while cash crops indirectly through minimizing the land allocated for such specific cash crops like coffee.

Table 3: Summary statistics of the independent variables used in the model

Continuous Variables	**Measurement**	**Mean**	**Std. Dev.**	**Min**	**Max**
Age of the household head	Years	44.15	11.36	24	80
Family size of the household head	Number	7.32	3.38	1	17
Area of coffee	Hectare	0.51	0.31	0.125	2.5
Frequency of extension contact	Frequency/year	2.31	1.06	1	6
Distance to the nearest market	Minutes	77.82	59.18	10	240
Dummy Variables	Measurement	Category		Freq.	Percent
Sex of the household head	1=male 0=female	Female		18	5.16%
		Male		331	94.84%
Literacy status	1= read and write 0=not read and write	Not read & write		252	72.21%
		Read & write		97	27.79%
Access to transportation facility	0 = No	No		13	3.72%
	1 = Yes	Yes		338	96.28%
Access to market information	0 = No	No		186	53.30%
	1 = Yes	Yes		163	46.70%
Access to credit service	0 = No	No		247	70.77%
	1= Yes	Yes		102	29.23%
Prevalence of diseases and insects (CBD, Dieback)	0=No	No		171	49.00%
	1=Yes	Yes		178	51.00%

Source: result of the survey 2018 from the study area

Human capital: Education of the household is included under human capital and it influence production and productivity of producers through adoption of newly introduced technologies and innovations. The survey result reveled that about 72.21% of them were illiterates those cannot read and write while the rest 27.79% received formal education and can read and write. Hence, literate producers are expected to be in a better position to get and use information which contributes to improve their farming practices and in production of coffee in the study area.

Physical assets: The physical assets owned by the household and included in the study as a determent for quantity of supplied of coffee in the study area. These are land size allocated for coffee production from the total and owned

by a farmer and access to transport facility. Resource endowment especially availability of land for coffee production is one of the most important factors that influence coffee production in the study area. Land is the basic asset of the sample farmers in the study area. The survey revealed that the mean land size of sampled households was 1.69 hectares and ranges from 0.5 to 5 hectares in the case of sample households. The result also shows that, the average land allocated for coffee production per household was 0.5 hectares with minimum and maximum of 0.125 to 2.5 hectares implying that is 29.59% from the total land is covered with coffee. In addition to the land, the sample responders also have access to transportation facilities including donkey, horse and mules. Even though the number of livestock used for transport for sample households is small and varied form farmer to farmer, more than 96% of them have access for transport facility in which they are using for transporting their produce from home or farm to market area.

Institutional factors: This section refers to different institutional services that respondent has in the study area. These include; extension services, access to credit, and access to market information, and as well as distance from production area to nearest market. The extension services access particulate the number of contacts that a development agents or district experts with that of producers with respect to coffee production , management practice and others has great contribution for volume of coffee production which directly affects the quantity supplied of coffee in the study area. The survey result showed that, all the sample respondents had access to extension service in the production year. However, number of contacts that a farmer gets the development agents is not such longer which is 2.3times in a year with minimum of 1 times and maximum of 6 times. Office of agriculture and rural development through its development agents is the major actor who provides extension service and advisory service on coffee production and

management practices in the study area. Regarding credit access, the survey result showed that, only 29.23% of the sample respondents had access to credit service while majority of them (70.77%) were suffered from this service in the area. The low availability of credit could be explained by lack of information regarding procedures for accessing credit, collateral requirements and lack of commitment by the small-scale farmers to take risks. Lack of credit for the small-scale farmers to buy farm inputs (fertilizers and chemicals) that are required to increase the production could be a major limiting factor to increasing coffee production which was also the major determents factors of volume or quantity supplied of coffee in the study area.

Moreover, regarding to access to market information, 46.7% of the sample household had market information services including price information and market place information in the study area whereas almost 53.3% of them did not get any access to market information during the production year. According to the response from interviewee, different stake holders were the main source of information including development agents of the *kebeles*, experts, brokers, traders and from farmers. Distance from producer's house to nearest market center was also the factor which determines quantity supplied of coffee to the market in the study area. The survey result showed that, the average distance that a farmer travels from home to nearest market was about 77.82 minutes which is more than an hour with minimum of 10 minutes and maximum of 240 minutes or 4hours. Other factors such as prevalence of disease and insects are also the major limiting factors of coffee production in the study area during production year of coffee. The result showed that, about 51% of the respondents were faced difficulties to their coffee production in the study area where majority of them faced with coffee berry disease (CBD) and dieback that limits the production and productivity.

Determinants of quantity supplied of coffee in study area

Table 3 below shows the econometric result of OLS regression with robust standard. Since, coffee is a perennial and cash crop, coffee farmers' primary decision to produce it for sales purpose in order to earn cash as well as for household consumption purposes. According to the result of this study, all sample households are suppliers of the coffee to the market. Therefore, multiple linear regression model was employed to identify the factors affecting market supply of coffee. For the parameter estimates to be efficient, unbiased and consistent assumptions of Classical Linear Regression (CLR) model should holds true. Hence, multicollinearity and heteroscedasticity detection test were performed using appropriate test statistics.

Test of multicollinearity: we used Variance Inflation Factor (VIF) and hence, all VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent variables (Appendix Table 1). If there is presence of multicollinearity between independent variables, it is impossible to separate the effect of each parameter estimate in the dependent variables. It is thus, important to test multicollinearity between explanatory variables. Test of heteroscedasticity: Since there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated. To examine factors affecting quantity supplied of coffee producers in the study area, a total of twelve (12) explanatory (independent) variables were used in the model and about seven variables were found significant factor for quantity supplied of coffee.

The model F- tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the OLS model is statistically significant at less

than 1% significant level. This shows that the independent variables included in the OLS model regression explain the determinants for quantity supplied of coffee producers in the study area. The coefficient of multiple determinations (R2) with robust estimation was found to be 0.4492 implies that the explanatory variables had a significant influence on quantity supplied of coffee to the market in the study area. This indicated that, 44.92% of the variation in quantity supplied of coffee producers is explained by the explanatory variables.

Table 4: Regression analysis with robust standard result for determinants of quantity supplied in the study area

Explanatory variables	Coefficient	Robust std. Err.	t-ration	P>t
Sex of the household head	0.301	0.438	0.69	0.492
Age of household head	0.014	0.013	1.08	0.281
Education level of HH	0.275	0.287	0.96	0.339
Family size of HH	-0.095	0.033	-2.89	0.004***
Distance to the nearest market	-0.004	0.002	-2.7	0.007***
Access to market information	0.374	0.248	1.51	0.133
Access to credit service	0.616	0.295	2.09	0.038**
Number of extension contact	0.005	0.083	0.06	0.953
Prevalence of disease and insects	-0.758	0.286	-2.66	0.008**
Access to transport facility	0.660	0.327	2.02	0.045**
Land size of coffee production	6.633	1.283	5.17	0.000***
Constant	0.300	0.946	0.32	0.751
R-squared =0.4492				

Source; Regression result from the survey data, 20018/19

Note; ** and *** signifies significance at 5% and 1% level respectively.

Market distance to the nearest market: this variable has negative relationship with quantity supplied of coffee in the study area at 1% level of significance implying that as the market distance increases by one minute, the quantity of coffee supplied to the market decreases by 0.4% percent remaining other factors constant. This also in line with the general principle which implies as the market is far from the production area or the home of the producers, the quantity supplied is decreased. This study also in line with a study conducted by Mohammed (2013) identified that distance from the nearest market affected quantity of coffee marketed significantly and negatively. It is also in line with Wondmagegn (2014) reported that market distance affecting volume of coffee market supply negatively. According to the investigation, the average distance needed for producers to travel to nearest market place took an average of 77.82 minutes which is more than an hour with 10 and 240 minutes of minimum and maximum respectively.

Family size of the household: this variable also has negative relationship with quantity supplied of coffee in the study area and was significant at 1% level of significance. As the family size increases by one person at household level; the market supply of coffee decreases by 9.5% remaining other factors constant. This could be due to the fact that since coffee is perennial crops, the family owners use majority of the land for food crop production (mainly cereal crops) in order to use for house consumption. The survey result showed that, the average family size of the producers was 7.28 persons per a household that ranges from 1 to 17 persons indicating that there is larger family number per a single household which needs larger proportion of food requirement at the study area.

Prevalence of disease and insects: this variable also has negative relationship with quantity supplied of coffee in the study area and was significant at 1%

level of significance. As the coffee growers faced with problems of disease and insects it affects the volume of supply of the market to be lowered. The regression result showed that, the prevalence of disease and insects decreases the quantity supplied of coffee by 75.8% as compared to farmers whose production is not affected by such diseases and pests in the study area remaining other factors constant.

Farm or Land size allocated for coffee production: this variable was found to be positive and important in explaining the factors affecting quantity supplied of coffee to the market at 1 % level of significance indicating that a unit increase in land size of coffee affects and increases the volume of coffee supply by 6.633 units keeping other factors constant. This is in line with Dilebo (2019) who reported as "Land covered by coffee, affected market supply of coffee positively and significantly at 1% significance level ". It is a known fact that as land size increases the total amount of production increases and then market supply increases.

Access to credit service: this variable also has positive and significant influence on volume of coffee supplied of coffee producers at 5% significance level. The model result indicated that compared to those households who did not use credit to produce and supply coffee, the volume of coffee supplied to the market increases by 61.6% for those who use credit. The estimates show that, farmers who have access to credit are more likely to use the money sourced from different credit institution to purchase chemicals , insect pests and others for production of coffee which directly leads to the amount of produce or productivity to increase and that contributes to the quantity supplied of coffee. This result also in line with Dilebo (2019) who reported as; "credit use affected the volume of coffee supplied to the market positively and at 1% significance level.

Access to transport facility: this variable also has positive and significant influence on market supply (quantity supplied) of coffee producers at 5% significance level. The model result indicated that compared to those households who did not have access to transport facilities to supply coffee to the market, the volume of coffee supplied to the market increases by 66% for those who has access to transport facilities. This study also in line with a study conducted by Agete (2014) who found that ownership of transportation means significantly enhance market supply of households in red bean market. The availability of transportation facilities helps farmers to supply their product from long distance and remote area to the available market easily.

Conclusion and Recommendation

Conclusion

This study was aimed at analyzing the factors affecting market supply of coffee (coffee Arabica) the case of Arsi zone of in Oromia national regional state of Ethiopia (evidence from Gololcha, Chole , Seru and Aseko districts). The coffee produced in arsi zone is known by its organic nature of coffee which is known by commercial name of Harar'c'. The investigation made in the study area showed that, all the sample farmers handled for the study are coffee producers and they also participants in the market. The average value of coffee production in 2018/19 production year was 5.88 quintal from 0.51 hectare of land used under coffee production in average with average productivity of 11.6quintal per hectare (5.44quital when it is converted in to marbush or qishir) according to the investigation result. From total produced (2052.12quintal), about 71.77% (1472.7quintal) of coffee was supplied to the market and sold to different buyers including local consumers, local collectors and wholesalers in the study area with average price of 3100.115

Birr per quintal or 6200.23 Birr of Marbush coffee whereas 7.65% of the commodity was used for household consumption of the coffee growers by themselves during the production year.

Generally, coffee is a commercial crop in the study area and the major sources of income in the study areas. However, there is need to focus attention on improving the quality of coffee supplied to the market in the study area through improving the post-harvest management practices in the study area.

The coefficient of multiple determinations (R2) was found to be 0.4492 implies that the explanatory variables had a significant influence on quantity supplied of coffee to the market in the study area. This indicated that, 44.92% of the variation in quantity supplied of coffee producers is explained by the explanatory variables. Regarding relationship of the variables ; access to transport facility, access to credit and land size of coffee had positive relationship with quantity supplied of coffee and affects positively and significantly whereas distance to the nearest market center ,prevalence of disease and pests and family size of the household head had negative relationship with coffee producers` market supply and affects negatively and significantly at different level of significance according to the investigation made in 2018/19 production year. Hence, these significant factors need to be intervening to enhance the amount of coffee supplied to increase the possible gain that could be drawn from coffee production in the study area.

Recommendation

Improving input supply system will protect farmers from purchasing low quality inputs by high inputs cost. Thus, the role of research institutes and universities should be focused on identifying high yielding and disease

resistant varieties to improve production of coffee to meet the demand of coffee in the country for commodity.

Strengthening the existing means of transport and creating conducive environment for transport is important to enhance production capacity of producers and market supply. Therefore, strengthening and expanding the existing rural roads that connect different rural kebeles with market through encouraging rural road construction worker.

Establishing market place near to the production areas will be best methods to reduce the market distance and increases the market supply of coffee which could be delayed by longer distance from production area to market place.

Increasing the size of land may not be an alternative for increasing the quantity supplied of coffee since land is a limited and fixed resource. Therefore, implementing process upgrading strategy by government and non-government organization as well as private enterprises through promoting and provision of improved technology packages and better practices would increase the productivity of coffee which can be increase the farmers` attitude in toward production of coffee in the study area which directly increases the quantity supplied of coffee to the market.

Facilitating Training to smallholders on disease/pest control method, Strengthening credits service provider's institutions, improving storage facility, increasing the extension service (market information) for the producers and designing process upgrading strategy should be implemented by respective government bodies and other concerned bodies to enhance the market supply of coffee in the study area.

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