

The Effect of Cooperative Membership on Coffee Producer's Income in Anfillo and Sayo District of Kellem Wollega Zone, Western Ethiopia

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Abstract

This study was conducted to analyze the effect of cooperative membership on coffee producer's income in Anfillo and Sayo district, Western Ethiopia with specific objectives of assessing distribution of benefit among coffee value chain actors and identifying the role of cooperative on income of coffee producer's in the study area. The data were collected from both primary and secondary sources. Two stage sampling technique was employed to select coffee producer households for the study. The primary data for this study were collected from 216 (101 members, 115 non-members of cooperatives) coffee farmers. Descriptive statistics, value chain analysis and econometric methods were employed to analyze the data. Accordingly, from the total members of cooperative (101), only 12 (11.9%) were female headed; this indicated they could not actively participate in institutional and organizational activities and majority of the social work has been dominated by male household. Therefore, policy aimed to accelerate women participation in the area could be successful if these factors and problems are taken into consideration. Major coffee value chain actors in the district were input suppliers, producers, collectors, cooperatives, unions, wholesalers, coffee pot makers, retailers, exporters and consumers. As the result of marketing margin indicated, hence, they sell directly to consumer and there was no intermediately along the channel; best outlet channel for producers were channel I. As the result of OLS regression indicated, coffee produced and sold is positively influenced by area of land allocated to coffee, membership of coffee cooperative, total numbers of labor force in the family, education level positively and time of coffee sale negatively; while, revenue and net coffee income is positively influenced by membership of coffee cooperative, levels of education, numbers of labor force in the family, area of land allocated to coffee and access to credit service; but, negatively influenced by time of coffee sale.

Keywords: Anfillo, Coffee, Cooperative, OLS, Sayo

1. Introduction

Agriculture is still the backbone of the economy in most developing countries. It is the largest source of employment; often two-thirds or more of the population are dependent for their livelihood on farming which includes majorities of sub-Saharan Africa's population live in rural areas where poverty and deprivation are the most severe (JICA, 2005 as cited in Ahmedin, 2008; (Diao *et al.*, 2010). According to (Farming, 2010), since Ethiopia is one of the developing countries, where more than 85% of the population, residing in the rural area, is engaged in agricultural production as a major means of livelihood, and agriculture is still the most important economic sector of the country out of which coffee accounts about 4.5 percent of global coffee production. Although coffee is produced in many parts of Ethiopia most of the marketed coffee comes from Oromia (64%) and SNNP (35%) and the remaining (1%) from Gambela regional states (FDRE-MoT, 2012). According to Ethiopia's export statistical data 2014/15, coffee exports reached nearly 207,000 metric tons, valued at nearly about 812 million (Francom and Counselor, 2016). Coffee is not only a vital contributor to foreign exchange earnings, but also a significant proportion of the gross domestic product and livelihood for billions of people in many countries of the world. In Ethiopia it is the most important commodity which plays a prominent role in national economy (ICO, 2016).

According to (Bijman & Iliopoulos, 2014), cooperatives have been important institutions for strengthening the economic

position of farmers throughout the world. They are engaged in collective bargaining with sellers of farm inputs or buyers of farm outputs. Moreover, the role of cooperative in creating efficient and competitive agricultural marketing can be plausible through effective involvement in the marketing system. In addition, a cooperative as a representative of coffee farmers can be a stronger negotiator than an individual farmer in the international market. Coffee cooperatives have become more market-oriented; have provided higher profits to coffee farmers than have private traders and brought benefits to coffee farmers by providing a new marketing channel. So, the dividends are appreciated by farmers and have encouraged farmers to improve the quality of their coffee (Kodama, 2007). However, the studies conducted on the effectiveness of cooperatives in coffee value chain are scanty. Several problems in coffee value chain such as cooperative members have a minimum awareness regarding to coffee value chain and inadequate knowledge and skills on quality coffee production among value chain actors; hence, no attention is given for linking with actors (Karthikeyan, 2015. According to (Ahmedin, 2008), to create good performing primary cooperatives, it is essential to assess the performance of the already existing ones and draw practical lessons on the critical operational problems and constrains. To accomplish such an important task, empirical investigations have paramount importance in areas of coffee marketing cooperatives performance and level of members' satisfaction. However, he did not well identify factors that affect market outlet

choice between cooperative members and non-members. In Kellem Wollega Zone, both Anfillo and Sayo district have the lion share in coffee production and supply. Cooperative Union (Torban Anfillo) that found in Anfillo district has good potential to market the members output and provides different service to their members and non-members (KWZCPDO, 2019). Even though coffee is economically and socially crucial cash crop of both district, role of cooperative on income of coffee farmers have not yet been undertaken and assessed for the target

study area. Therefore, this study was initiated to identify the following problems by conducting the effectiveness of cooperative membership on coffee producer's income in the selected study area

2. Methodology

2.1. Description of study area

This study was undertaken in Anfillo and Sayo district of Kellem Wollega of western Ethiopia which is well known in coffee production. Their land scape and geographical location is illustrated as below.

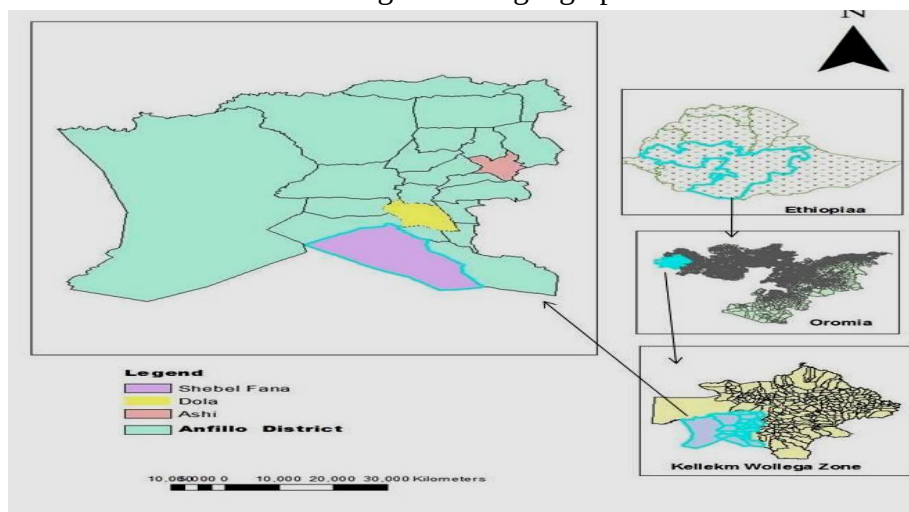


Figure 1: Description of Anfillo district, adopted from Ethiopian map (GIS)

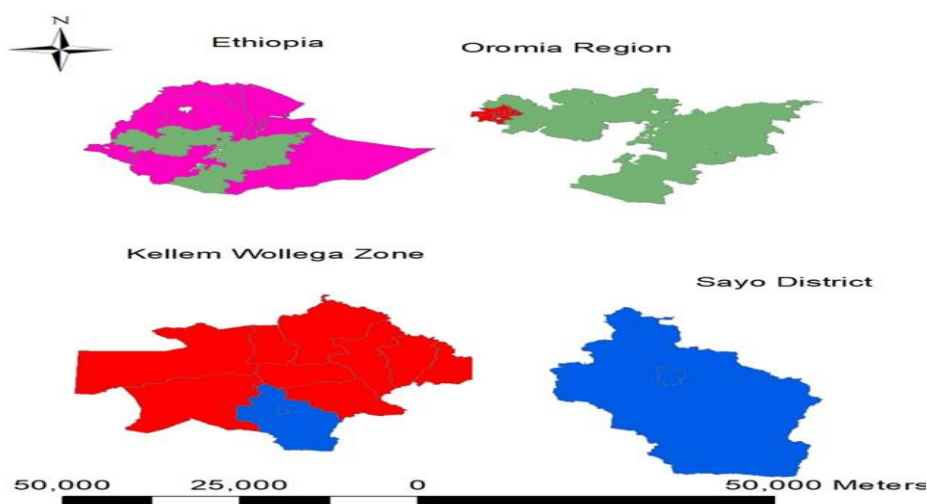


Figure 2: Description of Sayo district, adopted from Ethiopian map (GIS)

2.2. Source, type and method of data collection

To achieve the intended objectives of the research both primary and secondary sources of data was employed in addition to study both qualitative and quantitative data. Primary information were collected from randomly selected cooperatives members and non-members using structured questionnaire used for sampled farmers and traders', semi structured interview for key informant conducted with *kebeles'* Developmental Agent, committee members of selected cooperative and the district cooperative promotion office workers and focus group discussion taken place with influential farmers in the selected kebeles (6-8 people). Furthermore, secondary information were collected from different offices such as Zonal Cooperative Office, Cooperative Union, and District Agricultural Office, District Cooperative Office, District Trade and Development Office, research papers, internet, CSA and other relevant publications and documents were used to supplement the primary data. Descriptive statistics, inferential statistics and econometric analysis were used to analyze the data collected from cooperatives members and non-members, traders, cooperative managers, union managers.

2.3. Sampling technique and sample size determination

The detail of sampling technique employed to select coffee producer households for the

study were at the first stage, since out of 25 *kebeles* in the Anfillo district, only 21 *kebeles* produce coffee and cooperatives members are evenly distributed in all *kebeles*, then the sample frame is limited to those 21 *kebeles* and these *kebeles* are further classified in to 3 strata (9 high coffee producer *kebeles*, 7 medium coffee producer *kebeles* and 5 low coffee producer *kebeles*. In the second stage, from each three strata's one *kebeles* was randomly selected. In Sayo district, out of 26 total *kebeles* in the district, only 11 *kebeles* produce coffee and cooperatives members are evenly distributed in all *kebeles*. Hence, the sample frame is limited to those 11 *kebeles* out of which only 2 *kebeles* were purposively selected based on their production potential. The sample size for this study was determined using Yamane, 1967 formula which is a simplified formula for proportion at 93% confidence level and tolerable precision error of 0.07.

$$n =$$

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

Where N is total population size
e is level of precision
n is sample size

Accordingly, by using probability proportional to size the total of 216 sample size were selected from both cooperative members and non-members of coffee producer households from both districts as summarized in the following table.

Table 1: Sample distributions of coffee producers in Anfillo and Sayo district

District	Selected kebeles	Total households	Cooperative members		Non- members		Total sampled households		
			Total	Proportion	Total	proportion	Member	Non-	Tota

								members	1
Anfillo	Ashi	395	257	0.3	138	0.1	26	10	36
	Dolla	472	224	0.3	248	0.3	26	29	55
	Shebel	959	379	0.4	580	0.6	34	58	92
	Total	1826	860	1	966	1	86	97	183
Sayo	A/Sanaga	21	10	0.6	11	0.5	8	9	17
	Badesso	19	8	0.4	11	0.5	7	9	16
	Total	40	18	1	22	1	15	18	33
Total of both districts		1866	878	1	988	1	101	115	216

Source: Own computation from both districts cooperative data, 2020

2.4. Analysis of profit margin among actors

Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$\text{TGMM} = \frac{\text{Consumer Price} - \text{Producer}}{\text{Consumer Price}} * 100 - 1$$

It is useful to introduce the idea of coffee producer's portion or farmer's gross marketing margin (GMMp) which is the share of the price paid by the consumer that goes to the producer. The producer's margin is calculated as:

$$\text{GMMp} = \frac{\text{Consumer Price} - \text{Gross Marketing Gross}}{\text{Consumer Price}} * 100 - 2$$

The net marketing margin (NMM) is the percentage of the final price earned by the coffee trade intermediaries as their net income after their marketing costs are deducted. The percentage of net income that can be classified as profit i.e. return on capital depends on the extension to such

factors as the intermediaries own (working capital) costs.

$$\text{NMM} = \frac{\text{Gross Margin} - \text{Marketing Cost}}{\text{End Buyer Price}} * 100 - 3$$

The share of benefit of each actor the same concept will be applied with some adjustments. In analyzing margins, first the Total Gross Marketing Margin (TGMM) will be calculated. This is the difference between coffee producer's (farmer's) price and coffee consumer's price (price paid by final consumer) i.e.

$$\text{TGMM} = \text{Consumer's Price} - \text{Farmer's Price} - 4$$

Then, marketing margin at a given stage 'i' (GMM_i) will be computed as:

$$\text{GMM}_i = \frac{\text{SP}_i - \text{PP}_i}{\text{TGMM}} * 100 - 5$$

Where, SP_i is coffee selling price at ith link and

PP_i is coffee purchase price at ith link

The Total gross profit margin also is computed as: $TGPM = TGMM - TOE$

Where, TGPM is total gross profit margin,

TGMM is total gross marketing margin and

TOE is total operating expense. Similar concept of profit margin that deducts operating expense from marketing margin is calculated. Then profit margin at stage "i" is given as:

$$TGMM = \frac{GMM_i - OE_i}{TG} * 100 \text{ --- 6}$$

Where, GPM_i is gross profit margin at i^{th} link

GMM_i is gross marketing margin at i^{th} link

OE_i is operating expense at i^{th} link

TGPM is total gross profit margin

2.5. Econometric Model

Ordinary Least Square (OLS) Regression

The Ordinary Least Square (OLS) Regression Model is well suited for studying the relationship between a quantitative or qualitative outcome variable and one or more or multiple predictor variables. The probability of impact of cooperative membership can be analyzed using the OLS regression model that may be used for the comparison of the two or more members and non-members based on the selected outcome (performance) variables. A series of t-tests on a number of variables for conducting simple comparisons on household characteristics between members and non-members will be done. The indicators of dependent variables that we use for performance evaluation were gross margins

and profit. The OLS regression model can be extended to include multiple explanatory variables by simply adding additional variables to the equation. The form of the model is the same as above with a single response variable (Y), but this time Y is predicted by multiple explanatory variables (X_1 to X_n).

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + u_i \text{ --- 7}$$

Where, Y_i is the outcome variables (Gross margins and profit), α is constant term, β_i is coefficient terms, X_i is independent variables and u_i is error term

2.6. Definition of Variables

Dependent variable

Gross margin and profit is a dependant variable to represent the total influence of members' characteristics on their economic enterprises that measured in birr (ETB). It is a quantitative dependent variable used in Ordinary Least Square regression model.

Independent variables

- a) **Age of household head (AGE):** It is a continuous variable measured in years. According to (Olujeny, 2006 cited in Ukamaka *et al.* 2015), considered the determinants of agricultural production and profitability, age positively related to output. In the current study, age of household head is expected to influence gross margin and profit positively or negatively.
- b) **Sex of Household Head (SHH):** this shows the members biological characteristics. It is dummy variables, if male score one and zero otherwise. It is expected that male headed coffee producer's households have more chances of participation in different

information and marketing networks than female headed one. So this variable affects gross margin and profit negatively for female and positively for male.

c) Education level of household head

(EDUC): It is a continuous variable and refers to the number of years of formal schooling a household attended. (Olujenyo, 2006 as cited in Ukamaka *et al.* 2015), the determinants of agricultural production and profitability using the Ordinary Least Square (OLS), education is positively related to output. In current study, this variable is expected to have positive influence on gross margin and profit of the producers.

d) Family size (FMSIZE): This is a continuous variable and refers to the total number of members of the household. In this study, as more labor supplied, gross margin and profit will be affected positively, if there is high numbers of adults in the household and vice-versa.

e) Membership in to coffee cooperative

(MCOOP): It is a dummy variable and takes the value 1 if the household is member of any cooperatives, and 0 otherwise. (Ojiagu & Onugu, 2015), suggest that membership of cooperative society has significantly improved members' total income and increased the success of farming for members. Therefore, cooperative membership is expected to have positive impact on gross margin and profit.

f) Land size allotted to coffee production

(COFLANDSIZE): It is a continuous variable and it represents the total area

of land for coffee a household had in hectare. As the land of household allotted to coffee increases, the yield proportionally may increase, so that the amount of coffee sold increases or decreases based on the market efficiencies. (Izekor and Olumese, 2010) examined the determinants of yam production and profitability using Ordinary Least Square (OLS) and showed that farm size found to be positively related to output. In current study, land allotted to coffee production is expected to influence coffee gross margin and profit positively.

g) Distance from the nearest market

(MKTDIS): It is a continuous variable measured in hours. It refers to the distance of the nearest market from the farmers' house. If the distance to the nearest market increases, the transportation cost is also increase. This variable is expected to have negative effect on coffee the gross margin and profit that obtained from coffee product.

h) Transportation access (TRANSP): It is

a dummy variable which takes a value 1 if the household owned transportation facility and 0 if do not own any form of transportation facility. The availability of transportation facilities helps to reduce long market distance constraint, offering greater depth in marketing choices (Jagwe *et. al.*, 2007). Transportation access is expected to have positive influence coffee market outlet choice and gross margin and profit of coffee producers.

i) Time of coffee sale (TIMSEL): This

variable is a dummy variable that would

take the value of 1 if the producer sales their coffee soon after harvest and 0 other wise. Producer that supplies their coffee to the market soon after harvest is assumed to get lower prices than a farmer supplies lately, because soon after harvest due to high supply, the price is low. In current study, time of sale is expected to affect the gross margin and profit of coffee positively or negatively.

- j) **Access to price information (INFOACC):** It is dummy variable that takes a value 1 if obtained price information and 0 otherwise. According to (Geoffrey, 2015), access to price information had positive influence on the choice of local market outlet in the marketing of pineapple. Therefore, access to price information is hypothesized to have positive influence on the gross margin and profit positively.
- k) **Access to credit (ACRDT):** This is a dummy variable which takes a value 1 if the farmer obtains credit from rural financing institution operating in the area, 0 otherwise. According to (Kadigi, 2013), access to credit had a positive influence on the choice of neighbor milk market outlet. Access to credit is hypothesized to have positive influence on gross margin that obtained from coffee product.
- l) **Access to extension service (EXTSER):** This is a dummy independent variable takes the value 1 if a household had access to agricultural extension services and 0 otherwise. Agricultural extension services are

expected to enhance households' skills and knowledge, link households with technology and choice of markets (Lerman, 2004). Access to extension service is hypothesized to have positive influence on amount of gross margin and profit collected.

3. Result and Discussions

3.1. Demographic and socio-economic characteristics of sample households

From the collected sample data, descriptive statistics of the household characteristics, socio-economic and institutional variables which were believed to influence decision making were assessed and the following results were obtained. Accordingly, age of a household head plays a role in household decision on use of different agricultural technologies. The age of the head of the household is considered as a crucial factor since it determines whether the household benefits from the experience of an older person or has to base its decisions on the risk taking attitudes of younger farmers. As shown in table 2 below, the overall mean age of members and nonmembers of cooperative were about 45 and 38 years respectively and members are headed by older persons, as compared to non-members. On the bases of their educational background, members and nonmembers of cooperative accounts 7 and 4 mean of schooling respectively. The result demonstrates that, aged and more educated households understood benefits and services that provided from cooperative and being members than young households which are consistent with the finding of (Chagiwza *et al.*, 2016).

According to survey result of Appendix table 1, total family size of the respondents (216) were 1034; of these male and female dependents (between 0-14 years) were 155(15%) and 114(11%) respectively and male and female independents (between 15-64 years) were 372(36%) and 311(30%), whereas male and female dependents (above 65 years) were 41(4%) and 41(4%). Generally, sampled households were characterized by the presence of large number of independent family members (66%), having age of between 15-64 years; according to table 2 below, the average

mean of labor force among members and nonmembers of cooperative were 5.64 and 3.19 respectively; which further implied presence of active labor force to undertake various agricultural operations to increase net coffee income, improve their livelihood and prefer cooperative outlet than selling their coffee to collectors and retailers in neighbor market. In addition, an average livestock (TLU) per members and nonmembers of cooperatives in study area were 4 and 2.8 respectively represented in table 2 below.

Table 2: Descriptive statistics of continuous variables among groups (t-test)

Variables		Total (N=216)	Members (N=101)	Non members (N=115)	Difference	t-value
Age	Mean	41.34	45	38	-7***	-5.26
	SE	0.72	0.9	0.98	1.34	
Education	Mean	5.76	7	4	-3.57***	-9.86
	SE	0.22	0.26	0.25	0.36	
Livestock holding	Mean	3.37	4	2.8	-1.3*	-2.37
	SE	0.27	0.38	0.37	0.54	
Area of land allocated to coffee	Mean	1.11	1.5	0.74	-0.8**	-7.89
	SE	0.05	0.1	0.03	0.1	
Numbers of labor force in family	Mean	4.34	5.64	3.19	-2.4***	-12.75
	SE	0.13	0.15	0.12	0.19	
Distance from nearest market in km	Mean	0.23	0.12	0.33	0.18***	13.54
	SE	0.07	0.06	0.07	0.1	

*** P<0.01; ** P<0.05; * P<0.10; Mean with Standard error in parentheses;

Source: Own survey result, 2020

Table 3: Descriptive statistics of categorical variables among coffee producers groups (χ^2 - test)

Variables	Members (N=101)		Non members (N= 115)		Total(N= 216)		χ^2 - value
	N	% age	N	% age	N	% age	
Sex of HH	76	88.37	83	85.57	159	86.89	0.315
Time of sale	82	95.35	30	30.93	112	61.20	79.67***

Off/non-farm activities	36	41.86	36	37.11	102	55.74	12.67***
Access to credit	73	84.88	47	48.45	120	65.57	48.02***
Access to coffee market information	80	93.2	37	38.14	117	63.93	25.67***
Access to transport	84	97.67	43	44.33	127	69.40	61.08***
Services provided from cooperative	81	94.19	44	45.36	125	68.31	50.19***

*** $P < 0.01$; ** $P < 0.05$ Note: Percentages in table indicates; Gender-Male; Time of sale- sale after sometime storage; Off-farm and non-farm participation, access to credit participation; have access of market information; have transport animal; cooperative provides marketing services

Source: Own survey result, 2020

According to the survey result shown in table 3 above, of the total members of coffee cooperative (86 respondents), majority of them 76(88.4%) were male household and only 10(11.6%) was female; while, male and female nonmembers were 83(85.6%) and 14(14.4%) respectively. This result indicates that majority of the respondents in study area were male headed households (86.9%) while females headed were only 13.1%. In addition, marital status of members of cooperatives indicated that from the total sampled members of cooperatives, 70 (81.4%) were married, 4(4.65%) single, while 7(8.14%) and 5(5.81%) were widowed and divorced respectively; while from nonmembers of cooperatives married, single, widowed, divorced accounts 74 (76.29%), 13(13.4%), while 6(6.19%) and 4(4.12%) in Appendix table 2). According to the survey result, Appendix table 3, protestant religion followers dominate in the study area 110 (60.11%); followed by orthodox 53(28.96%), Muslim 17 (9.29%) and others 3(1.64%).

As displayed in Appendix table 4 , majority of the respondents described that their main source of income was coffee (65.6%) while, livestock, other crop and other sources accounts 20.2%, 8.7% and 5.5% respectively. Although, their major means of generating

cash income is coffee, some of them practiced mixed farming activity (raring of livestock and crop productions). Major crop productions in the area were maize, sorghum, wheat, vegetables and barley, while Cattle, sheep, goat, mule and donkeys were major livestock in the study area. Livestock are farmers' important sources of income, food and drought power for crop cultivation and transportation. Off-farm activity is considered as a crucial factor since it is important for the household economy and it is also a critical survival strategy for rural farm household. Off-farm income provides farm households with insurance against the risk, in farming. In addition, non-farm activities offer cyclical and seasonal employment, to supplement meager farm incomes in many drought prone areas. As displayed in table 3 above, in the study area, from the total members sampled (86), 36(41.9%) participate in different off farm work wage payment and off farm business activities and different money transfer, while 50(58.1%) are non-users of off farm activities rather than coffee production and marketing activities; whereas, 66(68%) and 31(32%) of nonmembers have access and non-access of off farm activities.

3. 2. Coffee value chain map

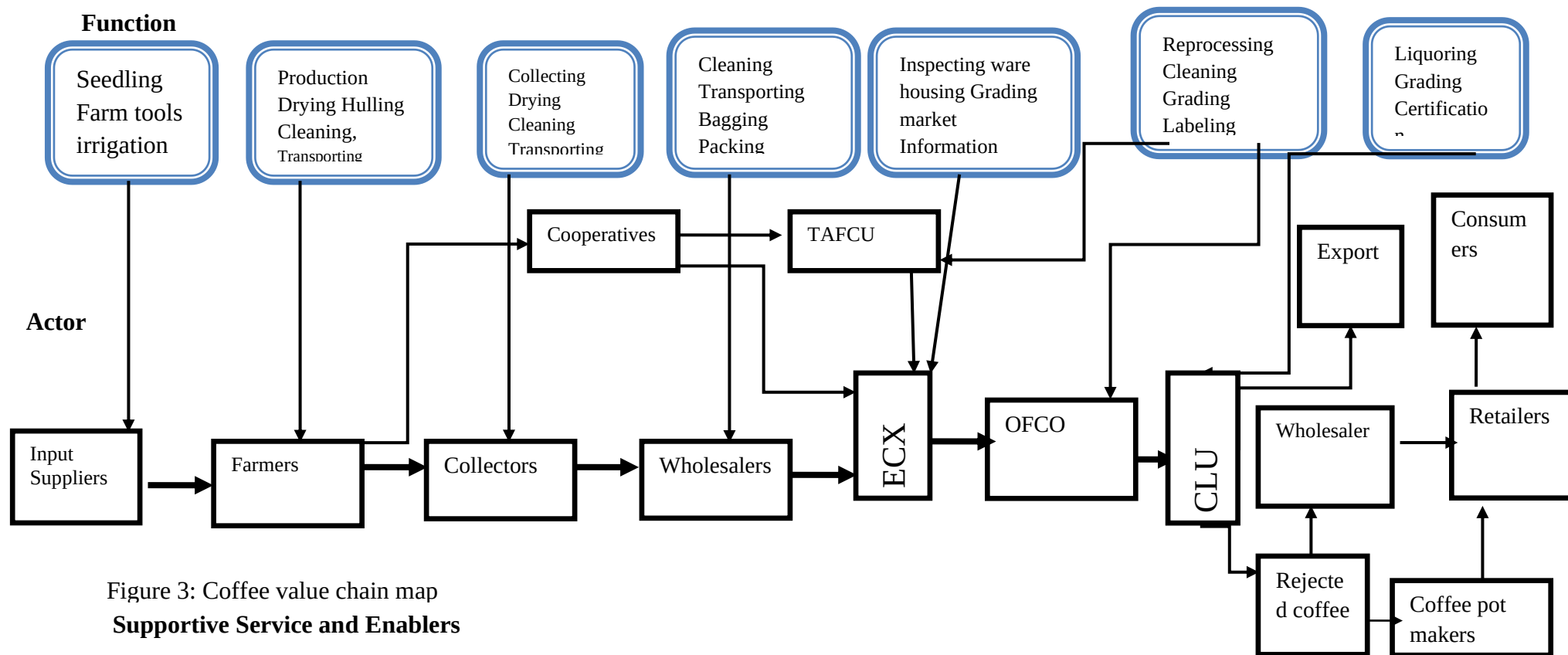


Figure 3: Coffee value chain map
Supportive Service and Enablers

Researchers

- New technology
- Improved seeds

MOANRM

- Extension
- Regulation

Transporters

Transport services

Packaging services

- Sacks
- Bags
- Rope

Financial service

- Bank
- OCSOC

Equipment suppliers

- Farm equipment

3

.3. Coffee Marketing Channels and Performance Analysis

Major coffee marketing channels in the study area

The analysis of coffee marketing channels is intended to provide a systematic knowledge of the flow of the coffee from coffee producer to the final destination consumer. Total coffee produced and sold in the study area. Of total coffee produced by members of cooperative (282252 kg) about 259,896 kg were sold, while 22,360 kg were

consumed. Similarly, of those of non-member coffee produced, sold and consumed were 102461 kg, 85942kg and 16515 kg respectively. As it was already revealed in below, the average household coffee produced and sold in 2019/20 was 3282 kg and 3022 kg respectively for members and 1056.3 kg and 886 kg respectively for nonmembers of cooperatives. The major coffee marketing channel known in the study areas can be described in the following ways.

1. Members of cooperative (259896 kg)

- I) Producer → Consumer 3.15% (8186.72 kg)
- II) Producer → Retailers → Consumers 7% (18192.72kg)
- III) Producers → Cooperatives → OCFCU 29.85 % (77578.96 kg)
- IV) Producers → Cooperatives → TAFCU → OCFCU 36.75 % (95511.78 kg)
- V) Producers → Cooperatives → TAFCU → OCFCU → Urban wholesalers
Retailers → Consumers 14.65% (38074.76 kg)
- VI) Producers → Collectors → Rural Wholesalers → Retailers → Consumers 6.5%
(16893.24 kg)
- VII) Producers → Collectors → Rural Wholesalers → Retailers → Coffee pot makers →
Consumers 2.1% (5457.82 kg)

2. Non-members of cooperative (85942 kg)

- I) Producer → Consumer 13.75%(11817.03 kg)
- II) Producer → Retailers → Consumers 17% (14610.14 kg)
- III) Producers → Cooperatives → OCFCU 12 % (10313.04 kg)
- IV) Producers → Cooperatives → TAFCU → OCFCU 8.25 % (7090.22 kg)
- V) Producers → Cooperatives → TAFCU → OCFCU → Urban Wholesalers
Retailers → Consumers 9.25% (7949.64 kg)
- VI) Producers → Collectors → Rural Wholesalers → Retailers → Consumers 36.5 %
(31368.83 kg)
- VII) Producers → Collectors → Rural Wholesalers → Retailers → Coffee pot makers →
Consumers 3.25% (2793.12 kg)

Performance analysis of actors among coffee value chain

In recent years, many researchers have been concerned with the concept of price

transmission and price shares in coffee markets (i.e. diminishing share of retail prices received by low income country producers with large retailers and middle-

men taking more than their fair share of the final price (Fair-trade Foundation, 2012) and asymmetry of price transmission (both upstream and downstream) (Cudjoe *et al*, 2010; McLaren, 2013). This disproportionate share of benefits is the reflection of power relationship among actors. As the result of marketing margin analysis shown in table 4 below, each of the coffee value chain actors adds value to the product as the product passes from one actor to another. In a way, the actors change the form of the product through improving the grade by sorting, cleaning, processing, packaging or create space and time utility. Although, coffee producers (members and nonmembers) doing all the work of producing coffee and bearing all the coffee associated risks, they took marketing margin of 12.75 and 12 and share of margin 13% and 12 % respectively; while they got profit margin

of only 7 and 6 with profit share of 12.5% and 10.7% respectively. Hence, those members of cooperative got different marketing information than nonmembers of cooperatives; they sell their product with better price. On the other hand, since they do different processing activities and perform different reprocessing activities, primary cooperative got highest share of profit (around 16%). In contrast, collectors buy the product and directly sell to next (to wholesalers) with some value addition, they got lowest marketing margin (around 2%). Generally, the value addition among coffee value chain actors in the study were collectors, rural wholesalers, cooperatives, TAFCU, OCFCU, urban wholesalers, retailers and coffee pot makers were responsible for 2%, 9%, 16%, 11%, 11.5%, 14%, 13.5% and 9%, respectively.

Table 4: Marketing margin of coffee value chain actors

Item in birr/1kg	Producers	Collectors	Rural Wholesalers	Cooperative	TATCU	OCFCU	Urban Wholesalers	Retailers	Coffee pot makers	Horizontal Sum
Purchase price	0	17.5	20	19	35	40	40	40	46	257.5
Production cost	5	0	0	0	0	0	0	0	0	5.0
Marketing cost	0	0	0	0	0	0	0	0	0	0.0
Labor	0.2	0.125	1	0.2	0.3	1	0.5	0.5	1	4.8
Transport	0.1	0.25	2	1.125	1	2	0.25	0.25	0.5	7.5
Packaging	0.15	0.25	0.25	0.25	0.25	1	0.3	0.25	0	2.7
Loading and unloading	0.2	0.125	0.25	1	1	1.5	0.2	0.5	0.125	4.9
Loss	0.125	0.1	1	0.25	1	1	0.1	0.3	0.2	4.1
Overhead cost	0	0.01	0.5	0.125	1	1	0.25	0.25	0	3.1
Processing cost	0	0	3	2	1	1	0.125	0	2	9.1
Commission	0	0	0.25	0	0	0	0.15	0.125	0	0.5
Tax	0	0	0.15	0	0	0	0.15	0.15	0.15	0.6
Total marketing cost	0.775	0.86	8.4	4.95	5.55	8.5	2.025	2.325	3.975	37.4
Total cost	5.775	0.86	8.4	4.95	5.55	8.5	2.025	2.325	3.975	42.4
Sale price(members)	17.75	19.5	33.5	33	47	55	50	50	55	360.8
Marketing margin (members)	12.75	2	13.5	14	12	15	10	10	9	98.25
% share of margin (members)	12.98	2.04	13.74	14.25	12.21	15.27	10.18	10.18	9.16	100
Profit margin (members)	6.98	1.14	5.10	9.05	6.45	6.50	7.98	7.68	5.03	55.89
% share of profit(members)	12.48	2.04	9.13	16.19	11.54	11.63	14.27	13.73	8.99	100.00
Sale	17	19.5	33.5	33	47	55	50	50	55	360.00

price(nonmembers)

Marketing

margin(nonmembers)	12	2	13.5	14	12	15	10	10	9	97.50
% share of										100.00
margin(nonmembers)	12.3	2.1	13.8	14.4	12.3	15.4	10.3	10.3	9.2	
Profit										
margin(nonmembers)	6.23	1.14	5.10	9.05	6.45	6.50	7.98	7.68	5.03	55.14
% share of										100.00
profit(nonmembers)	11.29	2.07	9.25	16.41	11.70	11.79	14.46	13.92	9.11	

Source: Own computation of survey result, 2020

3.4. Econometric Results

Cooperative was found to be an important institution that could improve the income of coffee producers in the study area. So the outcomes variables were total coffee produced and sold (measured in kilogram per household from hectare of land in 2019/20); coffee income, that measured as the log of net income from coffee production (i.e., this is net coffee income, calculated as the difference between coffee revenue equal to coffee produced times coffee price minus coffee-related variable costs (hired labor, transportation, certification, seedling material and seedling transportation). The income variables are log-specified in order to reduce the impact of potential influential observations and to be able to interpret results directly in percentage terms.

For the parameters estimation to be efficient, unbiased and consistent; assumption of linear regression model should hold true. Hence, multicollinearity, endogeneity and Heteroskedasticity detection tests were performed using appropriate test statistics. VIF value greater than 10 indicates severe colinearity among regressors. Similarly, Contingency Coefficient (CC) test uses a correlation coefficient of 0.75 as its tolerable critical value in which CC value more than 0.75 indicates co linearity problem (Gujarati, 2004). Hence, the value of VIF is between 2 and 3 that are less than 10, CC value less than 0.75 and R^2 is 78%; all hypothesized twelve variables were included in the final model estimation.

Based on the OLS estimation result, among total of twelve explanatory variables

included in the OLS regression model, five variables were found to have significant relationship with total coffee produced and sold of coffee producers; it was affected by area of land at 1% significance level, total numbers of labor force in the family and membership of coffee cooperative at 5% significance level and education level at 10% significance level positively; but affected negatively by time of sale of coffee at 10% significance level. In the same manner; six variables were found to have significant relationship with total revenue and net income of coffee producers. Accordingly, it was highly affected by education level, area of land allotted to coffee from total land and total numbers of labor force in family size at 1% significance level; similarly, being membership of coffee cooperatives and access to credit use of household significantly influence coffee producers' net income at 5% significance level. But, time of sale of coffee affects negatively coffee net income of farmers at 5% significance level.

Table 5: Result of OLS on outcomes variables (total coffee produced and sold; revenue and net income of coffee) in 2019/20

Explanatory variables	Total coffee produced				Total coffee sold				Coffee Revenue				Net coffee income			
	Coef.	SE	t	P> t	Coef.	SE	T	P> t	Coef.	SE	t	P> t	Coef.	SE	t	P> t
AGHH	13.2	11.28	1.17	0.24	4.175	9.931	0.42	0.67	-33.35	207.	-0.16	0.87	-73.32	191.	-0.38	0.70
SEHH	8	277.64	0.03	0.97	214.7	244.4	0.88	0.38	3362.0	5108	0.66	0.51	3219.48	4721	0.68	0.49
EDHH	100.7*	51.143	1.97	0.05	133.6*			0.00				0.00				0.00
TNFSIZ	294.3**	108.36	2.72	0.00	287.6*	45.02	2.97	0.00	3780***	941	4.02	0	3614***	870	4.16	0
TLVHH	0.9	26.571	0.03	0.97	*	95.40	3.02	0.55	8067***	.	4.05	0	7847***	1843	4.26	0
ALAC	1187***	157.07	7.56	0.00	1088**	23.39	0.59	0.00	170.95	9	0.35	7	286.56	8	0.63	0.52
MCOOP	629.6**	273.85	2.3	0.02	529.6*	138.2	7.87	0.02	25023**	2890	8.66	0	17713**	451.		0.00
				0.02	*	241.1	2.2	0.02	*	.	5038	0.00	*	2671	6.63	0.00
				0.06	-			0.03	-	.	2.76	6	14331**	4656	3.08	2
TIMESL	-711.7*	378.28	-1.88	0.06	703.7*			0.03	-			0.01				0.01
NOFAC				0.23	*	333.0	-2.11	0.39	17052**	6960	-2.45	5	-15828**	6432	-2.46	5
T	-233.3	197.52	-1.18	0.13	-148.4	173.9	-0.85	0.26	-5811.7	3634	-1.6	2	-4863.1	3359	1.45	0.14
USCRE				0.13				0.26				0.04				0.03
DI	279	187.10	1.49	0.71	182.9	164.7	1.11	0.86	6995**	3442	2.03	4	6623**	3182	2.08	9
ACMIN				0.71				0.86				0.77				0.70
F	-107	290.59	-0.37	0.23	-44.39	255.8	-0.17	0.75	-1517.3	5347	-0.28	7	-1863.8	4941	-0.38	6
DFMKT	67.1	201.90	0.33	0.74	54.51	177.7	0.31	0.02	770.12	3715	0.21	6	64.24	3433	0.02	0.98
				0.06				0.02		1490		0.00		1377		0.00
_cons	-1524.	810.15	-1.88	2	-1618.	713.3	-2.27	5	-46116	7	-3.09	2	-39242	5	-2.85	5

No of obs = 183, Prob> F= 0.0000, R²= 77.94%, Adj R² = 76.38%, Root MSE = 22330, ***, **, * are statistically significant at 1%, 5% and 10% respectively. Source: Model output result, 2020

Membership of coffee cooperative

(MCCOOP): As proposed, cooperatives improve understanding of members about market information, providing financial services, providing different inputs, facility of storage services and strengthen the relationship among the members. The output of the regression analysis revealed that, as the coffee producers being members of coffee cooperatives, coffee produced and sold would increase by 629.6 and 529.6 kg respectively at 5% significance level, while their revenue and net income from coffee would increase by 13903 and 14331 ETB at 5% error probability than nonmembers of coffee cooperatives. The result is a line with the result of Ojiagu & Onugu (2015), that suggest membership of cooperative society has significantly improved members' total income and increased the success of farming for members. On the other hand, Poole and de Frece (2010) summarized that, the roles of cooperatives as economic inclusion (i.e. managerial economies of scale (cost reduction of inputs, transformation and transaction functions, increased production volumes, improved quality and timing of services, and deliveries to market); improved market power, and improved performance.

Educational level of households (EDHH):

- As expected education level of farmers make wider performance of farming activities intelligently, accuracy and efficiently. Moreover, better educated farmers tend to be innovative and are therefore more likely to adopt the marketing system. Similarly, Yalew (2011), show that educated farmers get more skill and knowledge to adopt new technologies

which in turn increase their farm productivity. Therefore, this variable is hypothesized to influence positively net income from coffee production. The model output predicted that as the household education level for coffee production and marketing increases by one formal school, their total coffee production and sold would increase by 100.7 (at 10% significance level) and 133.6 kg (at 5% significance level) respectively; while, revenue and net income from coffee would increase by 3780 and 3614 ETB respectively at 1% significant level.

Total numbers labor force in the family

(TNFSIZE): As proposed, as more labor (more adults in the household) was supplied, net income of household would affect positively. So, the result of OLS regression described that, as one more labor forces (adults) were added to coffee farm (for coffee production and marketing purpose), total coffee produced and sold would increase by 294.3 and 287.6 kg respectively at 5% significance level; while revenue and net income of households from coffee would increase by 8067 and 7847 ETB at 1% significant level. This results in line with Kamuzora and Mkanta (2000), as total family size increases, income increase that in turn poverty level would decrease.

Area of land allocated to coffee production (ALAC):

-As expected, the variable was significant at 1% significant level. The result of model output revealed that as the household allocation of land for coffee production increases by one hectare, total coffee produced and sold would increase by 1187 and 1088 kg respectively at 1% significance level; while, revenue and

net coffee income of household would increase by 25023 and 17713 ETB respectively at 1% significance level. This result is in line with, Alemnew (2010) found out that total land owned has significant effect to amount supplied. DNIVA (2005) explained, expanding the area under crop increased the marketed surplus of the crop. And also Aikaeli (2010) confirmed that increasing acreage of farm land is more effective to earn more income.

Time of sale (TIMSEL): As expected, the producer that supplies their coffee to the market soon after harvest is assumed to get lower prices than a farmer supplies lately, because soon after harvest due to high supply, the price is low. But, the results of the regression falsify that, as coffee producers' sale their coffee after sometimes storage, rather than immediate sale after harvest, their revenue and net income from coffee would decrease by 17052 and 15828 ETB at 5% significance level. This is due to fact that, if coffee is not sold a soon after harvest and stored, it add different costs (i.e. storage cost, transport cost, processing cost etc.) that in turn deteriorate the quality of producer's coffee; so selling wet cherry coffee is more economical than dry cherry coffee. The result is in line with Daniels (2009), due to aversion to the risk of storing the coffee (since it may become infested with coffee berry borer and lose weight), and the risk that the price may go down, coffee producers sell their coffee immediately after harvest. In the same manner, since their net income from coffee would decreases due to storing their coffee, their total coffee produced and sold would

also decrease by 711.7 and 703.7 kg at 10% and 5% significance level respectively.

Access to credit service (USCREDIT): -

As proposed, it is positively and significantly influenced coffee producers' net income at 5% significance level. The result conveyed that one unit increase in access to credit, their revenue and net income of coffee farmers would increases by 6995 and 6623 ETB. The implication is that access to credit would enhance the financial capacity of the farmers to purchase the agricultural inputs, thereby increasing the coffee production and market share size. The result obtained is in line with Arega *et al.* (2014) who noted that access to credit has positive and significant correlation with total annual income. Farmers with access to credit may minimize the effect of financial constraints and able to buy the necessary inputs which improves their coffee productivity more readily than those with no access to credit. Therefore, it is expected that access to credit can increases the production of agricultural crops in general and coffee in particular.

4. Conclusion

The objective of this study was to identify role of cooperative in coffee value chain in the study area. In view of tested research hypothesis, the main findings of the study are indicated as follows. Among all hypothesized twelve explanatory variables included in the OLS regression model, five variables were found to have significant relationship with total coffee produced and sold of coffee producers; it was affected by area of land at 1% significance level, total numbers of labor force in the family and membership of coffee cooperative at 5%

significance level and education level at 10% significance level positively; but affected negatively by time of sale of coffee at 10% significance level. In the same manner; six variables were found to have significant relationship with total revenue and net income of coffee producers. Accordingly, it was highly affected by education level, area of land allotted to coffee from total land and total numbers of labor force in family size at 1% significance level; similarly, being membership of coffee cooperatives and access to credit use of household significantly influence coffee producers' net income at 5% significance level. But, time of sale of coffee affects negatively coffee net income of farmers at 5% significance level.

5. References

- Ahmedin Sherefa, 2008. Performance of coffee farmers marketing cooperative in Yirgacheffe and Wonago Woreda, SNNPRS, Ethiopia
- Aikaali, J. 2010. Determinants of rural income in Tanzania, research on poverty alleviation. An empirical approach, Research report 10/4.
- Arega Bezazew, Woldeamlak Bewket and Nicolau, M. 2014. Rural households' livelihood assets, strategies and outcomes in drought-prone areas of the Amhara Region, Ethiopia: Case study in Lay Gaint District. *African Journal of Agricultural Research*, 8(46): Available online at <http://www.academicjournals.org/AJAR>. Accessed on October 22, 2014
- Bijman, J., & Iliopoulos, C., 2014. Farmers' cooperatives in the EU: Policies, strategies, and organization.
- Chagiwza C., Muradian, R. and Ruben, R., 2016. Cooperative membership and dairy performance among smallholders in Ethiopia; *Food Policy*, 59, pp.165-173
- Cudjoe, G., Breisinger, C., & Diao, X. (2010), Local impacts of a global crisis: Food price transmission, consumer welfare and poverty in Ghana. *Food Policy*, 35, 294-302. doi: 10.1016/j.foodpol.2010.01.004
- Development Network of Indigenous Voluntary Associations (DNIVA), 2005. Report on Opportunities and Challenges in the Cotton Sector and Poverty Reduction in Kasese district. <http://www.deniva.or.ug/files/programm-agriculturetrade>. Accessed on 12 October 2006.
- Diao, X., Hazell, P., & Thurlow, J., 2010. The Role of Agriculture in African Development.
- Enterprise, E. C. D. G., & Economics, L., 2008. Study on the Impact of Co-operative Groups on the Competitiveness of their Craft and Small Enterprise Members.
- Fair-trade Foundation (2012), Fair-trade and Coffee (Commodity Briefing) Retrieved from Fair-trade Foundation: http://www.fairtrade.org.uk/includes/documents/cm_docs/2012/F/FT_Coffee_e_Report_May2012.pdf
- FAO (Food and Agriculture Organization of the United Nations), 2012. Agricultural cooperatives: Key to feeding the world. World Food Day leaflet. FAO, Rome, Italy

- Farming, S., 2010. A Review of Ethiopian Agriculture :, (December), 1–55.
- Federal Democratic Republic of Ethiopia Ministry of Trade (FDRE-MoT), 2012. A Report on Coffee Opportunities in Ethiopia” Addis Ababa, Ethiopia, February 2012.
- Francom, M.G. & Counselor, A., 2016. Ethiopia Coffee Annual Coffee Production and Exports Remain Steady
- Geoffrey, S.G., 2015. Factors influencing the choice of marketing outlets among small-scale pineapple farmers in Kericho country; Egerton University, Kenya
- International Coffee Organization (ICO), (2016), International Coffee Council, 116th Session, 9-11 March 2016, Addis Ababa, Ethiopia
- Izekor, O.B. and Olumese, M.I., 2010. Determinants of yam production and profitability in Edo State, Nigeria. African Journal of General Agriculture, 6(4), pp.205-210.
- Jagwe, J., E, Ouma and C, Machethe. 2007. Transaction costs and smallholder farmers’ participation in Banana markets in the Great Lakes Region, Pretoria, South Africa.
- Japan International Cooperation Agency (JICA), (2005), Reports on Ethiopian Agricultural production and Eradication of poverty, Addis Ababa
- Kadigi, L.M., 2013. Factors influencing choice of milk outlets among smallholder dairy farmers in Iringa municipality and Tanga city, M.Sc. thesis submitted to Sokeine University of Agriculture. Morogoro, Tanzania.
- Kamuzora Lwechungura and William Mkanta, (2000), Poverty and household/family size in Tanzania: Multiple responses to population pressure?
- Karthikeyan, M., 2015. Effectiveness of Cooperatives in Coffee Value Chain: An Analysis in Sasiga District of Oromia Region, Ethiopia
- Kellem Wollega Zone Cooperative Promotion and Development Office(KWZCPDO), 2019. Annual Cooperative work evaluation report and promotion.
- Kodama, Y., 2007. New Role of cooperatives in Ethiopia: The case of Ethiopian coffee farmers cooperatives
- Lerman, Z., 2004. Policies and Institutions for commercialization of subsistence farms in transition countries. J.Asian Econ., 15:461-479.
- McLaren, A. (2013). Asymmetry in price transmission in agricultural markets. University of Geneva Economics Department Working Paper Series, 13-10-2. Retrieved from <http://www.unige.ch/ses/dsec/research/wps/13102> pdf
- Mendoza, G., 1995. A Primer on Marketing Channels and Margins. In Price Products and People, eds. Scott, 254-275. International Potato Center, Lima, Peru.
- Noah Daniels, 2009. Variations in Coffee Processing and Their Impact on Quality and Consistency. MSc thesis. Michigan Technological

- University. Houghton, Michigan, United States.
- Ojiagu, N.C. & Onugu, C., (2015), Effects Of Membership Of Cooperative Organisations And Determinants On Farmer- Members ' Income I n Rural Anambra State , Nigeria. , 4(08).
- Olujenyo, F., 2006. Impact of Agricultural Development Programme (ADP) on the Quality of Social Existence of Rural Dwellers in Developing Economies: The Ondo State Agricultural Development Programme Experience. *International Journal of Rural Management*, 2(2), 213–226.
- Poole, N., de Frece, A., 2010. A review of existing organizational forms of smallholder farmers' associations and their contractual relationships with other market participants in the East and Southern African ACP Region AAACP Paper Series, No. 11.
- Supply, I., 2010. College of Development Study, Input Supply and Output Marketing Role of Multipurpose Cooperatives in Increasing Cereal Production in Bale Zone
- Ukamaka, T., & Okoli, M., 2015. Socioeconomic Factors Influencing Agricultural Production among Cooperative Farmers in Anambra
- Yamane Taro, 1967. Statistics: An Introductory Analysis, 2nd Ed., And New York: Harper and Row.
- Yalew, M., (2011), the Impact of Education on Farm and Off-Farm Income in Rural Households of Ethiopia. Doctoral Dissertation, Addis Ababa University, Addis Ababa, Ethiopia.

6. APPENDICES

Appendix table 1: Classification of sample household based on their age

	Male >14	Female >14	Total	M ale 15-64	Female 15-64	Total	Male <65	Female <65	Total	Total		
										Independen t	Depende nt	Tota l
Total	155	114	269	372	311	683	41	41	82	683	351	1034
%	15	11	26	36	30	66	4	4	8	66	34	100

%=percentage, Source: Excel output result 2020

Appendix table 2: Distribution of sampled household by marital status

Marital status of HH	Members		Non members		Total	%
	N	%	N	%		
Single	4	4.65	13	13.40	17	9.29
Married	70	81.40	74	76.29	144	78.69
Divorced	5	5.81	4	4.12	9	4.92
Widowed	7	8.14	6	6.19	13	7.10
Total	86	100	97	100	183	100.00

N=frequency, %=percentage, Source: Authors survey result, 2020

Appendix table 3: Distribution of sampled household by religion

Religion of HH	Members		Non members		Total	%
	N	%	N	%		
Orthodox	30	34.88	23	23.71	53	28.96
Protestant	44	51.16	66	68.04	110	60.11
Muslim	10	11.63	7	7.22	17	9.29
Others	2	2.33	1	1.03	3	1.64
Total	86	100	97	100	183	100.00

N=frequency, %=percentage, Source: Authors survey result, 2020

Appendix table 4: Main sources of income for households

Sources	Number HH (N)	Percentage (%)
Coffee	120	65.6
Other crop rather than coffee	16	8.7
Livestock and related income	37	20.2
Others	10	5.5
Total	183	100

N=frequency, %=percentage, Source: Authors survey result, 2020