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Research Article

Share of coffee market outlets among smallholder farmers in western Ethiopia

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Abstract

The study was aimed to investigate coffee market outlets exists and factors affecting choice of the outlets in West and Kellem Wollega zones of Western Ethiopia. It used quantitative data collected from 189 households of the two administrative zones. Descriptive and inferential statistics was used to analyze the data. Multinomial logistic regression model was an econometric model used to explore socio demographic, economic and institutional factors related to farmers' choice of market outlets. The result of the study revealed five main coffee market outlets on the study areas. Those include consumers, brokers, cooperatives, urban, and rural traders. Rural traders, urban traders and cooperatives controlled 40%, 26% and 24% of the buni (dry) coffee markets respectively. The result also showed 81% of respondents sold their coffee with full market and price information. However, the source of information for them was informal sources such as observation, telephone and discussions. The econometric result revealed that distance to nearest village market positively and significantly affects farmers' choice for rural traders as compared to urban traders. Households who didn't got market information and who have no or less donkey stock preferred brokers relative to urban traders. However, frequency of extension service has negative impact on choice of farmers for rural traders (p<0.05). Thus, formal and non-formal market information dissemination mechanisms for efficient coffee marketing has to be given due emphasis.

Keywords

Brokers,
Descriptive,
Econometric,
Inferential,
Multinomial Logistic

Introduction

Efficient marketing of agricultural products has huge contribution in stimulating production. It also 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 (Panda and Sreekumar, 2012). Most agricultural marketing channels in developing countries are long and complex which finally leads to high transaction costs and lower producers' share of the consumers price (Shiferaw, 2006).

Coffee production is dominated by smallholder farmers, and the market participation of those farmers is limited. Fragmented smallholders' coffee production accounts for approximately 95% of total coffee production (McMillan, 2003). This increases transaction costs and decreases farmers' incentives to produce for the market, thus results fragmented market shares. Different market channels have different magnitude of profit and costs. Hence, choice of a marketing channel is one of the key ingredients to successful marketing of both agricultural and non-agricultural products. Choosing the right mix of marketing channels includes consideration of sales

volume, risk, lifestyle preference and stress aversion, labor requirements, and channel-specific costs (Le Roux, 2010).

Several market outlets and market chain exist in different coffee producing areas of Ethiopia. Coffee market chain is long and complex as middleman and smugglers are common in the chain of this important commodity. The shares of the outlets and factors determine to choose the outlets has not been studied in the study areas. The main purpose of this study is to assess coffee marketing outlets exist in west and Kellem Wollega administrative zones and the specific objectives of the study are:

- To identify coffee marketing outlets exists and used by smallholder farmers of the study areas
- To investigate factors that affects smallholder farmers' choice of coffee market outlets
- To draw recommendation for concerning bodies the way coffee marketing and farmers' market price share will be promoted

Materials and Methods

Study Area Description

The data was collected from West and Kellem Wollega administrative zones in western part of the country. Haru and Lalo Asabi districts of west Wollega zone, and Seyo and Anfilo districts of Kellem Wollega zone were districts selected purposefully for the study.

Seyo is one of districts of Kellem Wollega Zone. Dembi Dollo is the capital of Kellem Wollega Zone which is found in Seyo district. The district is bounded by Gambella Regional State in the south, Illubabor Zone in the south east, Hawa Galan & Yemalogi Walal district in the north and east and Anfilo district in the west and North West. The district generally lies with in an altitude range of 1300-2000 m.a.s.l. The agro climate of the district constitutes temperate (2%), sub-tropical (77%) and tropical (21%).

Anfilo is also one of the districts of Kellem Wollega Zone. Mugi is the administrative capital of the district. Anfilo district is located in the south western part of Kellem Wollega Zone at a distance of 42 km away from zonal capital or Dembi Dollo town. The district is bounded by Gambella Regional State in the south and southwest, Seyo district in the east and southeast, Yemalogi Walal district in the north east, Gidami district in the north and North West. The district generally lies within an altitude range of 500-2500 m.a.s.l. The agro climate of the district constitutes temperate (27%), sub-tropical (8%) and tropical (65%).

Haru is one of the districts from west Wollega zone. Jitu is the capital of the district. It is located 464 km from Addis Ababa; capital city of Ethiopia and 25km from Ghimbi town. Based on agro ecological conditions, the district has mid land (83%) and low land (17%) in area coverage. The mean annual rainfall is estimated to be 1700mm. The annual average temperature ranges from 20^0c to 27^0c. The landscape of the area is characterized by steep, slightly steep, plain with an elevation of 1500 to 2050 m.a.s.l.

Lalo Asabi is also a district from west Wollega zone. It shares common boundaries with Ghimbi, Guliso, Bodji and Yubdo districts, and Benishangul Gumuz regional state. Enango town is its capital town which is about 23km away from the capital of the zone; Ghimbi. The altitude of the district ranges between 1500 and 1900 m.a.s.l. The district is classified in to tropical (2.2%) and sub-tropical (97.8%) agro climatic zones.
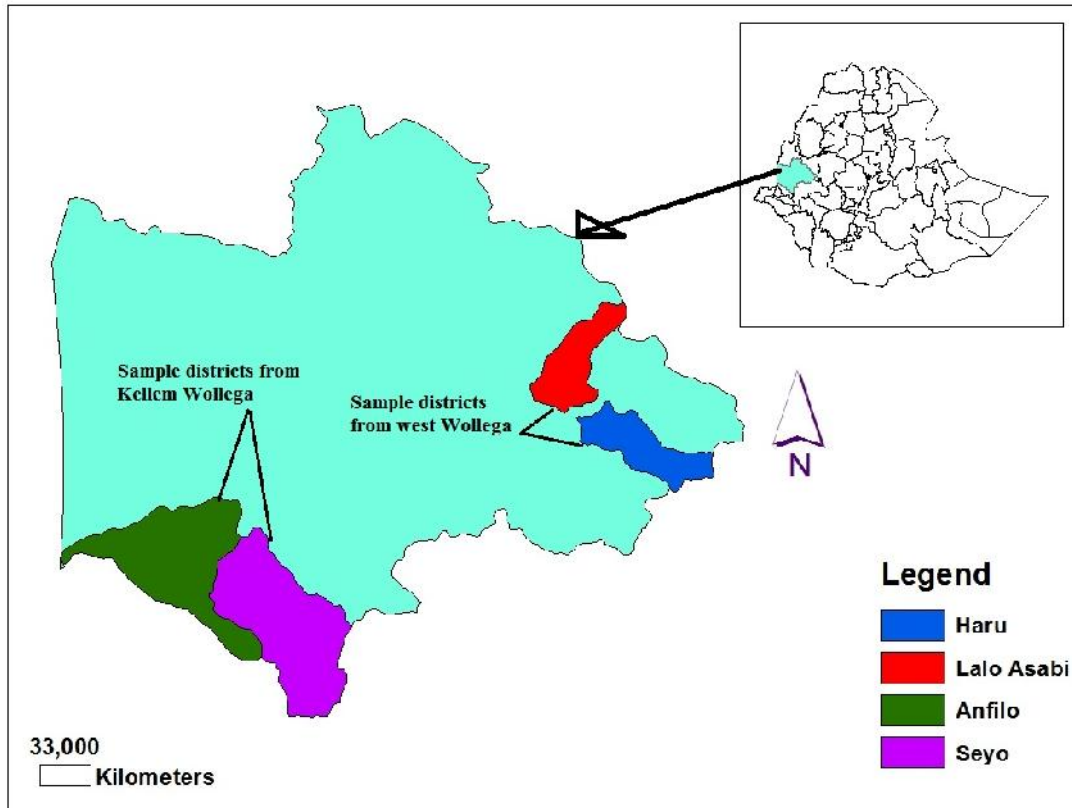
Figure 1: Map of the study areas

Sampling procedure

A three stage sampling procedure was followed to select sample households. In the first stage, coffee potential districts were identified in collaboration with Zone coffee experts and researchers from Jimma agricultural research center. In the second stage, four peasant associations were randomly selected from each district. Lastly, a random of rural households was identified with development agents of the respective peasant association. The total number of households (n) interviewed in each peasant associations was determined using simple formula:

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

(**Source:** Yemane, 1967)

Where: **n** is Sample size to be taken for the study, **N** is the total number of households living in the district and **e** is desired margin of error. Accordingly, a total of 189 households were interviewed for the study.

Data Collection

Primary data was collected from sampled households using well designed and structured questionnaire after provision of training for enumerators and pretest. Socio demographic and economic backgrounds as well as coffee and other crop production and marketing trends of the households were collected through personal interview. Secondary data was also gathered from zonal and district bureaus of agriculture and natural resource development.

Data Analysis

The data collected was analyzed using descriptive and inferential statistics. Multinomial logistic regression analysis was used to explore demographic, social, economic and institutional factors related to farmers' choice of coffee market outlets. The use of multinomial logistic regression model is consistent with Pace and Robinson, 2012; Berhanu et al., 2013; Mengistu, 2014; Davis, 2015; Magogo et al., 2015 and Solomon et.al. 2016.

To describe the multinomial logistic model, let A_i be a random variable representing the existing market outlets chosen by any farm household. We assume that each farmer faces a set of alternatives, mutually exclusive choices of the outlets. These measures are assumed to depend on different socio demographic, economic and institutional factors, X. The multinomial logistic model for the outlet choice specifies the following relationship between the probability of choosing option A_i and the set of explanatory variables X as follows (Greene, 2003):

$$\text{Pr} \, o \, (A_i = j) = \frac{e^{s' jXi}}{1 + \sum_{k=0}^{j} e^{s' j xi}} \quad j = 0, 1 .... j$$

Where $_j$ is a vector of coefficients on each of the independent variables X. The above equation can be normalized to remove indeterminacy in the model by assuming that $_o = 0$ and the probabilities can be estimated as:

$$\text{Pr} \, ob \, (A_i = j) = \frac{e^{s' jXi}}{1 + \sum_{k=0}^{j} e^{s' jXi}} \quad j = 0, 1 ... j, s_0 = 0$$

The log-odds ratio becomes:

$$\ln \left(\frac{p_{ij}}{p_{ik}} \right) = X'i (s_j - s_k) = X'_i s_j, if, k = 0$$

The dependent variable is therefore the log of one alternative relative to the base alternative (Green, 2003). To interpret the effects of explanatory variables on the probabilities, marginal effects are usually derived as (Greene, 2003):

$$\frac{\partial p_j}{\partial X_i} = p_j (s_j - \sum_{k=0}^{j} p_k s_k) = p_j (s_j - \bar{s})$$

The marginal effects measure the expected change in probability of a particular choice being made with respect to a unit change in an explanatory variable (Greene, 2003). The signs of the marginal effects and respective coefficients may be different, as the former depend on the sign and magnitude of all other coefficients.

Results and Discussion

Characteristics of respondents

Institutional factors are crucial factors that could affect the choice of the marketing channels. The survey result showed that farmers of west Wollega zone are significantly accessible to village markets and farmers' cooperatives than farmers of Kellem Wollega zone. On other hands, Kellem Wollega zone farmers are more accessible to district market with significantly list transportation cost to the markets than of the West Wollega zone farmers (table 1).

Table 1: Institutional characteristics

Variables	West Wollega		Kellem Wollega		P-Value
	Mean	S.D	Mean	S.D	
Distance to village market km	2.09	2.89	2.95	2.56	0.032[**]
Distance to district markets in km	10.97	7.44	10.29	6.92	0.514
Distance to farm cooperatives in km	2.10	2.70	3.05	3.40	0.035[**]
Distance to extension service in km	2.61	3.21	2.99	3.66	0.447
Transport cost to district market in Ethiopian Birr	15.81	10.16	13.51	6.12	0.061[*]

** = statistically significant at 5%; * = statistically significant at 10%

The socio economic condition of the respondents showed that both zones have the same average family size, area cultivated, coffee land size and total land.

However, significant difference between the zones was seen on coffee farming experience **(table 2).**

Table 2: Socio economic characteristics

Variables	West Wollega		Kellem Wollega		P-Value
	Mean	S.D	Mean	S.D	
Years lived in the area	37.94	11.54	36.95	12.16	0.571
Farming experience	21.12	11.23	18.06	8.99	0.041[**]
Family size	5.54	2.11	5.31	2.02	0.427
Age	38.07	11.38	38.17	11.24	0.953
Total cultivated land in hectares	0.73	0.81	0.57	0.79	0.184
Total coffee land in hectares	1.01	1.04	0.99	1.20	0.891
Total land in hectares	2.06	1.94	1.99	1.98	0.83

** = statistically significant at 5%

The farming system of both West and Kellem Wollega zones is mostly dominated by maize based coffee production. Thus, livestock is not common on the zones because of shortage of communal and private grazing lands. In spite, livestock ownership on the study area revealed that significant difference between the zones have been seen on number of cows and oxen only (**table 3**).

Table 3: Livestock ownership on the study zones

Variables	West Wollega		Kellem Wollega		P-Value
	Mean	S.D	Mean	S.D	
Cows	0.88	1.17	0.48	1.33	0.028[**]
Oxen	0.57	0.69	0.34	0.76	0.032[**]
Bulls	0.24	0.54	0.22	0.83	0.855
Heifer	0.36	0.73	0.22	0.72	0.203
Calves	0.09	0.29	0.23	0.91	0.160
Donkey	0.55	1.02	0.44	0.89	0.567
Chicken	1.39	2.35	1.16	3.10	0.523

** = statistically significant at 5%

Market outlets exist

Five main coffee market outlets were identified on the study areas. Those include consumers, brokers, cooperatives, urban, and rural traders. Rural traders, urban traders and cooperatives controlled 40%, 26%, and 24% of the buni or dry coffee markets respectively (**figure 2**). The study conducted in Jimma zone of southwestern Ethiopia witnessed that 73% of respondents used formal coffee traders and 15%, 9% and 3% of respondents used informal buyers, cooperatives and brokers respectively. This implies that farmers of west and Kellem Wollega prefer to sell their dry coffee to cooperatives relative to Jimma zone (Solomon et.al. 2016).
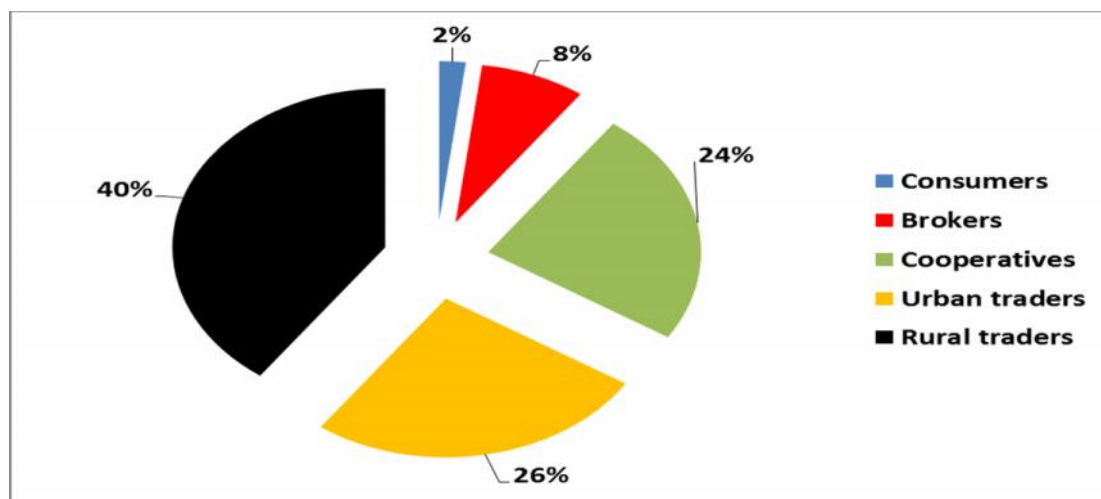

Figure 2: Buni coffee market share

The study was also tried to show farmers' market outlet preference for red cherry coffee. Accordingly, 44% of respondents used rural coffee traders as a market outlet. Concomitantly, 31% of the farmers choose farmers group or cooperatives to sell red cherry coffee. Only 3% of respondents preferred brokers to sell their red cherry coffee produce (**figure 3**). Solomon et.al., (2016) also found red cherry coffee market outlets preferred by the farmers in Jimma zone. The result revealed 48% of red cherry coffee was sold to cooperatives and 30%, 15% and 5% of the coffee was sold to formal traders, informal buyers and brokers respectively. This shows that the market share of cooperatives on red cherry coffee in Jimma zone is higher as compared to west and Kellem Wollega zones.
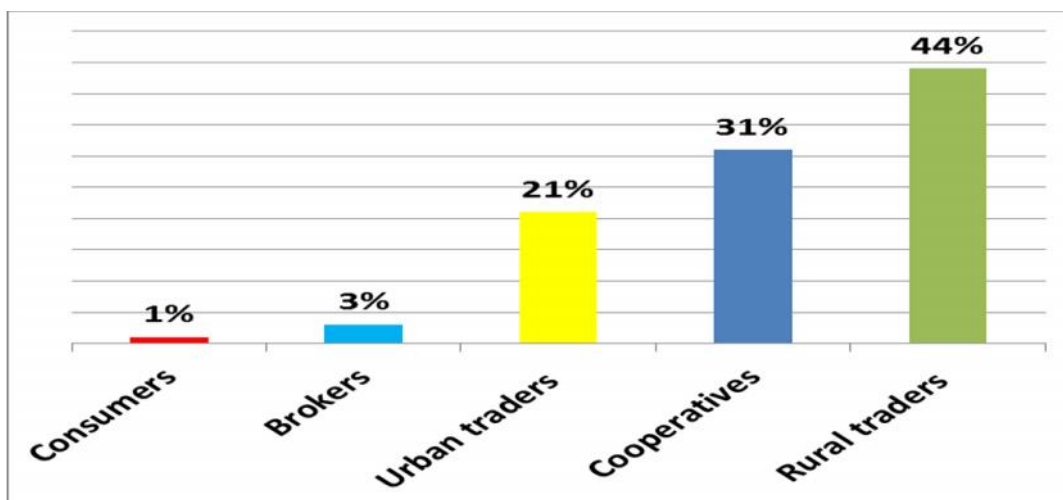

Figure 3: Red cherry coffee market share

Coffee marketing on the study area

Coffee is the major cash crop for the study areas. On average a farmer produces 1191.1 kg and 898.2 kg of buni coffee in west and Kellem Wollega zones respectively. In spite of the production, commercialization level was high at Kellem Wollega than west Wollega. Out of the coffee produced, 77.8% was sold in West Wollega and 80% was sold at Kellem Wollega (**table 4**). Chelkeba et.al, (2016) conducted a study to assess coffee commercialization level in Manna, Gomma and Limu Kosa of Jimma zone. The result showed that overall mean commercialization level was 68%. Manna district farmers sold more coffee (74% of their total production) and Gomma and Limu-kosa farmers sold 64% and 63% of their coffee produce respectively. The result implies that commercialization level in Jimma zone is lower than west and Kellem Wollega administrative zones.

Table 4: Coffee production and marketing trends in kg

Description	West Wollega		Kellem Wollega		Overall	
	Mean	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**
Coffee produced	1191.1	850.97	898.2	1036.38	1044.6	944.65
Coffee sold	927.2	653.52	717.7	1287.21	822.48	998.07
Commercialization level		**77.8%**		**80%**	**79%**	

Market information

Better information can improve farmers' bargaining position, reduce search costs, and give them the choice to travel to farther markets if prices there are higher. However, farmers relying on informal networks for market information are at risk of getting biased information due to opportunistic behavior of the more informed group. The result showed 81% of respondents sold their coffee with full information about the price. However, the source of farmers' market information is dominated by informal sources. The major source of information for them was observation, telephone and discussions which accounts 34%, 22% and 18% respectively (**figure 4**). Solomon et.al. (2016) also found that discussion was the main source of information for 48% of respondents. Telephone, observation and extensionists were also information mode for 30%, 15% and 7% of respondents respectively.
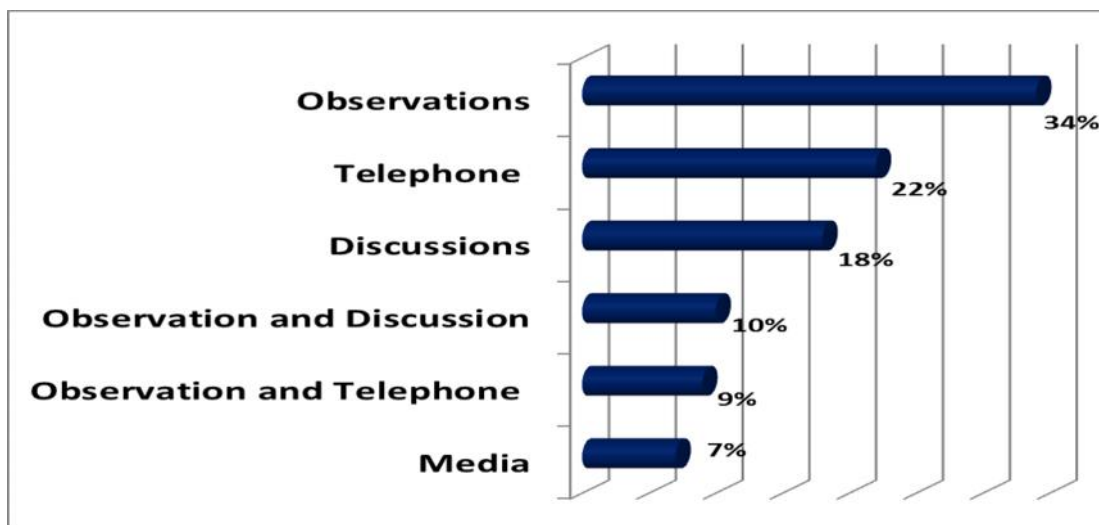

Figure 4: Source of market information

Factors affect farmers' market outlet choice

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

Outlet one (Consumers)

Distance to nearest marketing cooperative has positive and significant relation (coefficient=2.391) to the choice for consumers as compared to urban traders. This implies that farmers choose to sell their coffee to cooperatives when they are near to the organization. On other hands, transportation cost to district market has positive and significant impact on the choice for consumers as compared to urban traders, which is logical. In addition to this, both total land and coffee land holding has positive and significant impact on choice of farmers for consumers. The reason could be those farmers who have large total and coffee land harvests more yield and supply the products to fair and efficient markets.

Outlet two (Rural traders)

The study also tried to explore socio economic characteristics of the farmers who choose the rural coffee traders. The result showed that Kellem Wollega zone farmers chooses rural traders (coefficient=0.895) as compared to urban traders. The result is consistent with the finding on the descriptive result which pointed out low accessibility of Kellem Wollega farmers to urban markets relative to west Wollega farmers. Its marginal effect was also significant at 10% significance level. The result also revealed that distance to nearest village market has negative and significant impact on farmers' choice for rural traders as compared to urban traders. Its marginal effect is also significant at 10% significance level.

Frequency of extension visit has negative and significant impact on farmers' choice for rural traders as compared to urban traders. Its marginal effect is also significant at 5% significance level. The reason could be those farmers who got frequent extension service prefer profitable and convenient market channels such as cooperatives and urban traders as compared to rural traders.

There was a negative relationship between total land holding and choice of farmers for rural traders as compared to urban traders. The logic behind could be the large the land, the more the production and the less the supply to informal and non-profitable market such as rural traders.

Market information has negative and significant impact (coefficient = -2.061) on the choice farmers for rural traders as compared to urban traders. The marginal effect is also significant at 10% significance level.

Outlet three (Brokers)

The study has also tried to assess determinant factors that drive the farmers to choose brokers as compared to urban traders. The result revealed that positive and significant relation between choice for brokers and family size (coefficient = 0.656) which is significant at 1% significance level. The logic behind this is those farmers who have large family size choose to sell their coffee to nearby markets to serve the family member. On other hands, those farmers who have less donkey stock prefer brokers to sell their product which is directly related to product transportation to the market. Concomitantly, market information declines farmers' choice for brokers (coefficient = -2.565) as compared to urban traders as informed farmers choose formal and fair markets to sell their products.

Outlet four (Cooperatives choice)

The regression result showed that Kellem Wollega farmers prefer cooperatives as a marketing channel for coffee as compared to west Wollega farmers. The marginal effect of sex is also positive and significant which implies that male farmers prefer cooperatives to sell their coffee as compared to female farmers. 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. However, female farmers prefer to sell their products to farm gates markets to immediately serve their family needs. On other hands, those farmers who have large land prefer cooperatives

(coefficient = 0.463) as compared to urban traders. The reason could be the large the land, the more the production which inclines farmers to choose profitable markets such as cooperatives. Another important finding was the positive and significant relation between choice for cooperatives and market information. Those farmers who received market information choose cooperatives to sell the product as compared to sell to urban traders. The implication behind this is the believes and trust the farmers have to the cooperatives.

Conclusion and Recommendations

The study was aimed to identify coffee market outlets and determinant factors for the choice of the outlets among smallholder farmers in west and Kellem Wollega zones. The result of the study revealed urban traders, rural traders, cooperatives, consumers and brokers as coffee market outlets for both red cherry and dry coffee types. The results of this study affirm that farm size, family size, distance to cooperatives, distance to village and district markets, transportation cost to the markets and access of market information were found to influence choice of household coffee market outlet significantly. Households who are accessed to market information were more likely to sell through cooperatives as opposed to urban traders. Farmers who have large land preferred cooperatives as compared to urban coffee trades which affirm the notion that extension advice and information mostly targets households with large land holdings and relatively rich farmers. On other hands, farmers who have low family size, few or null donkey stock and no information preferred brokers relative to urban traders. Based on the main findings, the study draws the following important recommendation.

- Market price information dissemination should be done through mass media, extension officers, and development agent and other concerning bodies.
- The governments need to increase access of the farmers to marketing cooperatives so that producers share of consumers price would raise.

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