

DETERMINANTS OF SMALLHOLDER CROP FARMERS' DECISION TO SELL AND FOR WHOM TO SELL: MICRO-LEVEL DATA EVIDENCE FROM ETHIOPIA

Mamo Girma¹, Assefa Admassie² and Degnet Abebaw²

Abstract

This paper attempts to explain the factors that influence market participation and choice of market channels among smallholder crop farmers in Ethiopia using a discrete choice framework. The study is based on a nationally representative survey of 987 rural households. The result shows that availability of storage and credit/loan facilities increases the probability of market participation by 40 percent and 13.9 percent, respectively. The result also indicates that farmers' decision to choose a particular market channel is influenced by different factors such as market information, time spent to finish one time sell, storage, educational level and age of the household head. The study underscores the need for designing appropriate strategies in the areas of market information, rural road networks, storage facilities, and access to credit to improve the performance of the crop markets in the country.

Key words: Crop market, Ethiopia, market participation, market channel, binary logit, multinomial logit

¹ Corresponding author: mg_mamo@yahoo.com; Addis Ababa Science & Technology University, P.o.box 26402/code 1000AA. Mobile: +251912 611744

² EEA/EEPRI; e-mail: eea@ethionet.et

1. Introduction

The majority of poor people in the world are farmers residing in developing countries with over 86 percent and 65 percent relying on agriculture as a source of livelihood and employment, respectively (World Bank, 2008). Poverty being mostly a rural phenomenon in Africa (including Ethiopia), the development of efficient agricultural marketing is believed to be vital to enhance the participation of smallholder farmers in the market and ensure the “poverty-reducing impacts of agricultural growth” (World Bank, 2008). Enhanced market access, chiefly through large investments in improved and extended road networks would reduce the national poverty rate to 22.7 percent. Therefore, market access and market development need to be integral parts of a national agricultural development strategy because more than 50 percent of the poor live in food-deficit areas where the availability of food staples per household is half the national average.

It is believed that the transition of the small-scale sector towards commercial production will ultimately be determined by its access to markets (Jooste, 2001; Fernando, 2006). This suggests that improving crop marketing practice in Ethiopia is vital for agricultural growth and transition of smallholder farming towards commercial farming, where agriculture provides livelihoods for 90 percent of the poor in Ethiopia. However, crop markets are far from being efficient in Ethiopia. Despite a long experience in crop production, the farming methods remain traditional. The role of intermediaries (farm gate and market traders) is still dominant in crop marketing, leaving the market inaccessible for smallholder farmers. Although the final consumer market generates better return for producers, the majority of smallholder farmers are not able to participate in the main regional and terminal grain markets where they can directly sell to consumers.

The choice of market outlets for the products of smallholder farmers in SSA countries has been broadened following the liberalization of agricultural markets in the 1990s. In most SSA countries these marketing outlets now consist of private traders, relatives or neighbors, vending at local markets (consumers), associations and cooperatives, private companies, as well as government grain trading enterprise. In the case of Ethiopia, market options for farmers have been opened up following the liberalization of the 1990s, albeit the choices are limited. Crop farmers can sell their produce at different

alternative market outlets. They may sell direct to consumers, sell to retail markets, sell to rural assemblers, and sell to wholesalers.

Despite the reforms, the performance of grain market in Ethiopia remains poor largely due to missing markets, poor infrastructure, and high transaction costs, Wolday (2001); Eleni (2001); Dereje and Abdissa (2001); Eleni and Goggan (2005) and Dender (2002). For instance, Eleni (2001) has noted that transaction cost particularly searching cost as well as transportation cost determines trading exchange in the grain market. The time spent in organizing means of transportation and road conditions can be used as attributes/proxies to estimate transportation costs. Furthermore, lack of storage and marketing facilities and less developed formal trading systems significantly increase farmers' transaction costs and force many smallholders back to the subsistence mode of farming.

Although there is a plenty of literature on crop/grain markets in Ethiopia, to the best of our knowledge, research on market participation taking into account the sequential nature of farmers' sales decision is not well documented. Based on Bellemare & Barret (2006), we hypothesize that farmers' sales decision is sequential in the sense that farmers first decide to sale and then decide where/for whom to sell. The purpose of the current study is, therefore, to examine the factors that influence the decision of smallholder farmers to sell or not and conditioned on sales, for whom to sell. The first decision variable is captured using a binary logit model and the second decision variable on the choice of marketing channels is explained using a multinomial logit model on a sample of 987 smallholder farmers drawn from 7 regions in the country. The findings of the study will provide some insights towards designing appropriate policy intervention mechanisms to enhance small-scale crop marketing in Ethiopia.

The rest of the paper is organized as follow: Section two presents a brief overview of the agricultural sector with a focus on crop production and marketing in Ethiopia. The third section will present the methodology. Section four discusses the estimation results. The last section presents the conclusions with some policy insights.

2. An Overview of the Agricultural Sector in Ethiopia

The practice of agriculture in Ethiopia has a very old history, albeit most of its practices have not shown much progress. Agriculture has still remained the mainstay of the national economy; contributing 55% of Gross Domestic Product (GDP), over 90% exports

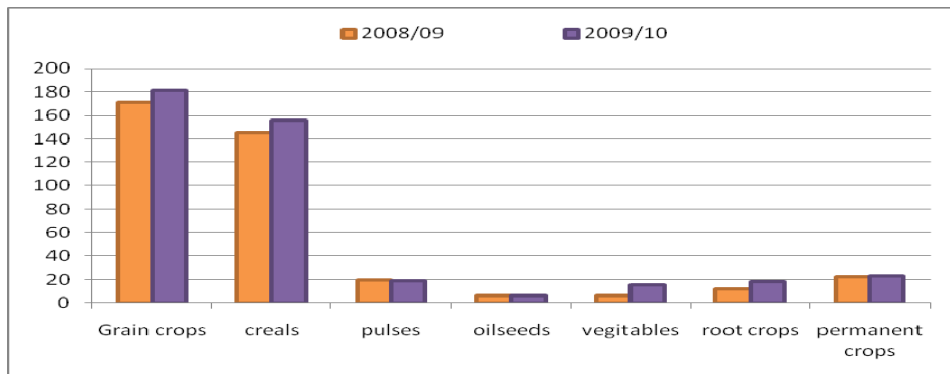
earning, and providing employment for over 85% population (RATES, 2003). The country has a great potential for agricultural development with total area of 113 million hectare of which 65% is estimated to be arable (RATES, 2003). The main foodstuffs produced are teff, maize, wheat, sorghum, barely etc. Besides food crops production, coffee, cotton, pulses, oil seed, fruit and vegetables are the main cash crops. Rural income continues to come primarily from agriculture, which is dominated by cereals production. Despite its importance and potential, however, agriculture had sluggish and widely fluctuating growth in its history and is highly dependent on rain-fed cultivation (RATES, 2003).

In addition, farmers are not organized in accessing inputs and marketing their products efficiently; thereby incurring high production costs and transaction costs that affect the competitiveness as well as profitability of their business. Given poverty in Ethiopia is a rural phenomenon, reducing these costs is imperative to improve sustained rural income and reduce poverty. This requires “a productivity revolution in smallholder farming” by increasing productivity, making food markets work better as well as reducing the transaction costs during exchange, World Bank (2008).

2.1 Crop Production

Crop production is a dominant agricultural activity in Ethiopia. Crop production shows an increase over the years. Figure 1 below shows the amount of crop produced over the last two years.

Figure 1: crop production in quintal, 2008/09-2009/10



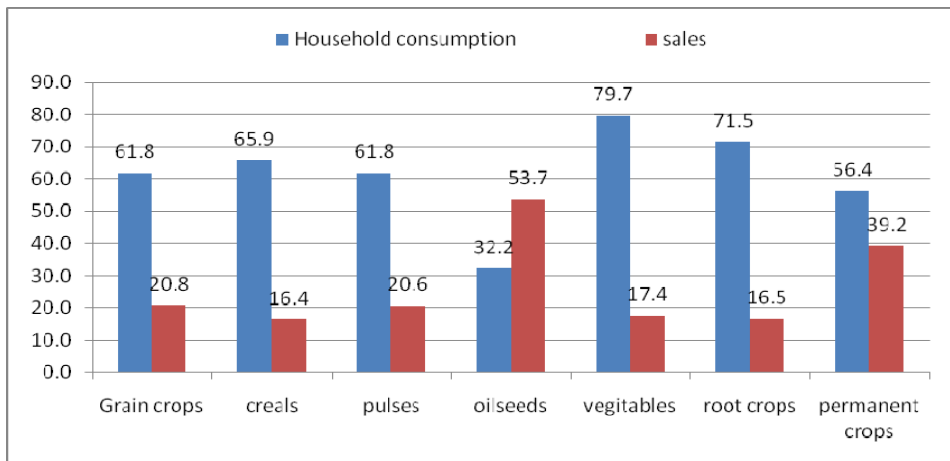
Source: CSA, 2009 and 2010

Agricultural production is still predominantly rain-fed, non-market oriented, and based on rudimentary technologies, and subsistence small-scale farming and the average farm size is 0.8 hectare (RATES, 2003). The small holders cover about 96% of the cultivated land. Compared to other Sub-Saharan African countries, agricultural production in Ethiopia is characterized by low technology and low production (RATES, 2003).

2.2 Crop Marketing in Ethiopia.

The subsistence nature of agriculture in Ethiopia may explain the low farmers' market participation. Empirical evidences on crop/grain marketing reveal that a very small proportion of food grain production is marketed. Figure 2 shows that a larger proportion of crop production went for household consumption and a small proportion for sales. During 2009/10 *meher* season, only 20.8 percent of total grain crops were marketed. The proportions for permanent crops and oilseeds happens to be relatively higher presumably due to the fact that they are cash crops and have high market demand (e.g. coffee, khat, sesame) (CSA, 2010). In terms of crop varieties, cereals have one of the lowest proportions of sales, albeit cereals constitute around 70 percent of total production.

Figure 2: Proportion of household consumption vs marketed by crop types in 2009/10, country level



Source: CSA, 2010

Regarding the nature of crops marketing channel in Ethiopia, previous studies have identified the following market participants.

Primary Crops/Cereals Producers: - As indicated earlier, small- scale subsistence farmers undertake the larger proportion of crop production. They put aside most of their produce for consumption and market the remaining small portion. Due to the prevailing high transaction costs, farmers sell their produce (either using carrying sacks themselves or using donkeys) across short distances (within 20 km distance) from the main regional markets (Eleni and Ian, 2005; RATES, 2003).

Rural Assemblers/Local Collectors: - They are also known as “farmer-traders” who assemble crop/grains from a large number of farmers in the village or farm-gate and transport it to regional markets using horse-driven carts, pack animals as well as small trucks (Eleni, 2001; RATES, 2003). The rural assemblers play an important role in collecting crops surpluses from small holder farmers, constituting 40% of producers’ total sales followed by wholesalers (35%), RATES (2003).

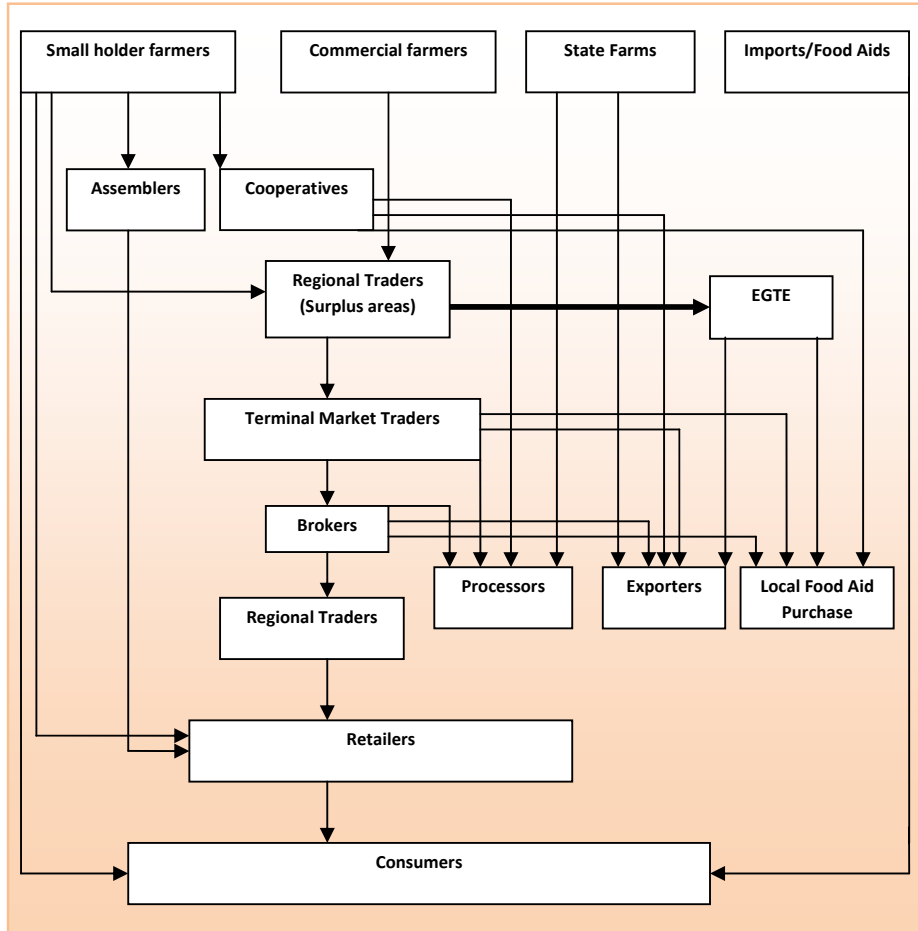
Private Wholesalers: - Following liberalization five types of wholesalers are identified in crops/cereals marketing: wholesalers in surplus areas, wholesalers in major terminal markets, wholesalers in deficit areas, private companies that perform various business activities, and EGTE. They usually engage in large volume of grain purchase from various sources such as smallholder farmers, rural assemblers and sell grains to the different markets including Addis Ababa (the central market), retailers, and consumers.

Retailers: - Retailers deliver the grains to the final consumers. Although license is required to enter into the business, most of the retailers are unlicensed where they cover 38% of the marketed volume of crops (RATES, 2003).

Grain Brokers: - An important feature of the Ethiopian grain marketing is the use of brokers by wholesalers and retailers. Having dominantly located in the central markets (Addis Ababa), brokers usually coordinate inter-market grain flow and provide information on market price of the day to traders.

The following figure depicts the evolving grain marketing channel structure in 2005.

Figure 3: An Evolving Grain Market Structure in Ethiopia, 2005



Source: Eleni and Ian, 2005

3. Review of Related Literatures

Many developing countries have liberalized their agricultural markets since the 1990s with the intention to facilitate access to market for rural poor farmers. Despite this measure, however, development of efficient agricultural marketing in most African countries including Ethiopia has remained a major challenge due to the prevailing high transaction costs, lack of access to credit, poor market infrastructure, and lack of market knowledge. For instance, smallholder farmers usually prefer selling at the farm gate because they receive immediate payments and do not incur marketing costs such as

transportation costs and tax payments (Shiferaw *et al*, 2006). According to Makhura (2001), smallholder farmers have to first consider the costs associated with transportation, profits and brokers before they make decision to choose a certain marketing channel. Thus, smallholder farmers' market participation remains low among most smallholder farmers in developing countries.

Literatures on smallholder market participation show that the decision about market participation is done sequentially (i.e. two-stage process), the first being the decision to participate and once decided to sell, then the next decision is on volume of sales. In this respect, using an ordered Tobit model on livestock marketing in Kenya and Ethiopia, Bellemare and Barrett (2006) present the first theoretical justification for using a sequential approach to market participation. Their findings reveal that access to land and assets positively influences market participation while income negatively affects market participation. Using the same approach, a recent study by Francis (2011) also found that provision of inputs (fertilizer) enhances greater market participation and market volume supplied of both cash and food crop types.

Recent studies have extended the approach to consider farmer preference for different aspects of the marketing systems themselves (Abdulai & Birachi, 2008; Blandon, Henson & Islam, 2009). For instance, Mamo and Degnet (2012) have applied this sequential nature of decision making process in their study on market participation of smallholder livestock farmers in Ethiopia. Household head age and literacy level negatively influenced market participation while household size, off-farm income and access to modern inputs positively correlated with market participation in the livestock market. Nagassa and Jabbar (2008), and Moti *et al* (2009) have also investigated the degree of market participation by smallholder farmers in Ethiopia, although their emphasis is more on explaining what determines farmers' decision to sell or not leaving the issue of market channel choice decisions untouched. On the other hand, Getachew and Nuppenau (2009) and Mamo (2011) have made some efforts to explain the nature and determinants of market channel choice among smallholder farmers. Getachew and Nuppenau (2009) investigated the channel choice decision in the Ethiopian banana market using a transaction cost approach. They identified three market channels for banana producers in Southern Ethiopia, sales to wholesaler traders, sales to cooperatives and sales to local consumers. Another study by Mamo (2011) examined channel choice decision by maize farmers in one of the maize surplus areas of Southern Ethiopia using transaction cost perspectives. He found that smallholder maize farmers in

Shashemene area sell through different market outlets including sales to wholesalers, farm gate buyers, retailers and direct to consumers at the local market. Both studies have underlined the importance of transaction costs in influencing the decision of farmers in selecting a particular market channel to sell their produce.

Despite the aforementioned few studies on market channel choice and market participation in Ethiopia, research on market participation taking into account the sequential nature of farmers' sales decision is not well documented. Based on Bellemare & Barret (2006), we hypothesize that farmers' sales decision is sequential in the sense that farmers first decide to sell and then decide where/for whom to sell.

4. The Data and Research Methodology

4.1 The Data Source

The data used for this study was obtained from the rural household survey conducted by the Ethiopian Economic Association and the International Food Policy Research Institute (EEA/IFPRI) in 2009. The main objective of the survey was to understand the public services in agriculture and water that are provided to farmers, and the factors that can improve the services that farmers get. The survey covered 1117 sample household heads from seven regions in Ethiopia: Afar (138), Amhara (280), Benishangul-Gumuz (139), Gambella (140), Oromia (140), SNNP (140) and Tigray (140). The sampling design used was multistage stratified random sampling where in the first stage regions were classified and one zone was selected from each region with the exception of Amhara region, where two zones were selected. Then one woreda from each zone was classified and selected in similar way. From the selected woredas, four sample kebeles from each woreda were chosen to identify villages for the final survey. Finally, from the selected villages sample households were selected randomly for the interviews.

The survey covers a wide variety of issues related to household demographics, assets, agricultural and consumer assets, cooperatives, access to modern inputs, access to credit, household savings, output marketing, innovation and extension, community participation and information and water services. Farmers were asked to recall whether they have sold crops or not and if sold to indicate their preferred marketing channels during 1999/2000. Out of the total of 1117 household heads, only 987 provided the relevant information on their crop marketing behavior, which is the prime interest of

this study. Among these 987 household heads, 42.8 percent marketed some type of crops while 57.2 percent of them didn't sell any of their crops during 1999/2000.

4.2 Specification of the Empirical Model

Based on earlier studies on market participation (Bellemare & Barrett (2006), we hypothesize that farmers make sales decision sequentially; first they make decision either to sale or not and once they decide to sell then they decide for whom to sell. In this study we are concerned with both stages of decisions. This entails the application of two empirical choice models, a binary logit and a multinomial logit models. The logit model is used where market participation is assumed to be dichotomous, that is whether or not small scale farmers are participating in crop markets. The objective of the binary logit model is to estimate the probability of participating in crops market during 1999/2000 harvesting season. The second model is the multinomial logit model which intends to estimate the determinants of farmers' decision on market channels to sell their crops. The inverse mill's ratio is calculated from the first model and included in the second stage as one explanatory variable to control for selectivity bias. If the coefficient of the IMR is not significant, this indicates that the selectivity bias is not statistically significant.

The Binary Logit model for market participation decision

The binary logit model is used as the main analysis tool for explaining market participation decision. It is built on the notion that the dependent variable (market participation) is dichotomous (yes/no) variable, and most of the independent variables are categorical (Green, 2000). It is an extension of the linear probability model and takes the form:

$$y_i = X_i\beta + \varepsilon_i \quad (1)$$

Where

X_i = is the vector of independent variables representing a number of transaction costs and socio-economic variables related to i^{th} crop farmers.

y_i = dependent variable where it is equal to 1 if the farmer decides to participate in the market and zero otherwise.

β = measures the marginal impact of a unit change in the explanatory variables on the probability of the choice of market channels.

The above Equation (1) can be interpreted as describing the probability that a farmer is deciding to participate in the market. It can be transferred into a cumulative probability function as follow, mainly to avoid the potential errors of having the predicted values, γ_i falling outside the (0, 1) range.

$$P_i = F(X_i\beta) \quad (2)$$

If the cumulative probability function $F(.)$, is logistic, then we have the logit model of the form:

$$P_i = \frac{1}{1 + e^{-X_i\beta}} \quad (3)$$

The marginal effect of a particular variable X_k on the probability that a particular household decide to sell is given by:

$$\frac{\partial P_i}{\partial X_k} = f(X'\beta) \beta_k \quad (4)$$

Where $f(.)$ is the logistic density function given by:

$$f(X'\beta) = \frac{e^{-X'\beta}}{(1 + e^{-X'\beta})^2} \quad (5)$$

The Multinomial logit model for the choice market channels

The selection of marketing channel among smallholder farmers is modeled based on the random utility theory (Greene, 2000). It is assumed that each alternative marketing outlet choice entails different private costs and benefits, and hence different utility, to a household decision maker. Thus, for the i^{th} smallholder farmer faced with J alternative markets for crops, the utility of selecting market outlet j can be shown as:

$$U \text{ (Choice of } j \text{ for household } i) = U_{ij} = V_{ij} + \varepsilon_{ij} \quad (6)$$

Where, U_{ij} is the overall utility, V_{ij} is an indirect utility function and ε_{ij} is a random error term. The probability that household i selects alternative j can be specified as:

$$\begin{aligned} P_{ij} &= \Pr(V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik}) \\ &= \Pr(\varepsilon_{ik} < \varepsilon_{ij} + V_{ij} - V_{ik}), \forall k \neq j \end{aligned} \quad (7)$$

Assuming that the error terms are identically and independently distributed with type i extreme value distribution, the probability that a household chooses alternative J can be explained by a multinomial model (Greene, 2000) as follow:

$$P_{ij} = \frac{\exp(\beta_i \chi_{ij})}{\sum_{j=0}^J \exp(\beta_j \chi_{ij})} \quad (8)$$

where χ_{ij} is a vector of household of the i^{th} respondent facing alternative J and β_j is a vector of regression parameter estimates associated with alternative J .

Following Equation (8) above, we can adapt the Multi Nominal Logistic Model (MNL) fitting to this study as follow:

$$P (CHOICE_{ij} = j) = \frac{\exp(\beta_j \chi_{ij})}{\sum_{j=1}^4 \exp(\beta_j \chi_{ij})}$$

Where

i represents i^{th} farm household, and $i = 1, 2, \dots, 987$;

j represents different marketing channels, $j = 1$ for sales to farm gate buyers at the farm gate (FARMG), $j = 2$ for sales to market traders (MKTRAD), $j = 3$ for direct sales to consumers at the local market (CONSUMER), and $j = 4$ for sales to other markets (OTHERMK).

P represents the probability of a crop marketing channel j to be chosen by farm household i ;

$CHOICE_{ij} = j$ means that crop marketing channel j is chosen by farm household i ;

χ_i = a vector containing explanatory variables (sex_i , age_i , $education_i$, $farmsize_i$, $spent_i$, $meetings_i$, $mcoop_i$, $inform_i$, $option_i$, $loan_i$, $storage_i$)

It is a common practice in econometric specification of the MNL to normalize Equation (8) by one of the response categories such that $\beta_j = 0$. The coefficients of explanatory variables on the omitted or base category are assumed to be zero. The probability that a base category will be chosen can be calculated as follow:

$$P_{ij} = \frac{1}{1 + \sum_{j=1}^{J-1} \exp(\beta_j \chi_i)} \quad (9)$$

For better understanding the values attached to the coefficients, it is recommended to compute the marginal effects, Green (2000:859). The marginal effects of the attributes on probability of choice are determined by differentiated Equation (8):

$$\delta_j = \partial P_j / \partial \chi_i = P_j = P_j \left[\beta_j - \sum_{j=0}^J (P_j)(\beta_j) \right] \text{ for } j = 1, 2, \dots, J \quad (10)$$

where:

P_j is the probability for farmers choosing market channel j .

β_j is a vector of regression parameter estimates associated with alternative j .

In our case, farmers have four channels to sell crops $J = 4$, and the alternatives $j = 1, 2, 3, 4$ represent sale in the outlets, to farm gate buyers at the farm gate, to market traders, directly to consumers at the local market, and to other markets respectively.

The model predicts the relative probability that a producer would choose one of the four categories. For this analysis, selling to market traders/wholesalers (MKTRAD) was used as the comparison group because this marketing channel was chosen by the majority of crop farmers in trading their product. The marginal effects were calculated using the STATA command- mfx- for the four categories.

The dependent variables (the marketing channels (CHOICE) chosen) in the analysis is measured by the probability of selling crops to any of the four markets. Some households may favor one outlet while others may not be using the same outlet due to market conditions and household characteristics.

Taking into account economic theory, previous studies, and the nature of the study, we included the following independent variables into our model.

Access to Market Price Information (mkinfom): it is assumed that crop farmers try to first determine the price that they expect to receive before making a decision about to market a product and to whom to sell it. Smallholder farmers would only be able to

influence their buyers if they have access to relevant information about prices, products, marketing opportunities and trends. The variable (*mkinfom*) was measured by asking them whether or not they obtained relevant information about the market price before selling their crops.

Cost of Transportation (trspcost): Among other things, good transport coordination effort by producers is vital to transport products to the market with relatively lower costs. In this study farmers were asked about their transportation cost required to take their product to the preferred market outlet. We hypothesized that higher cost of transportation is negatively related to farmers' decision to move to market and positively related to the decision to sell to the farm gate buyers/ collectors.

Total Time Spent to finish one time sales (spent): the longer the time to accomplish a onetime sales at a particular market channel the lesser will be the probability of this market outlet to be chosen by producers as it implies high transaction costs. In this study farmers were asked to indicate the total time (hrs) they required to reach their most preferred market outlet to sell their product. The variable SPENT was used in the model.

Attending meetings with agricultural extension agents (meetings):- It is expected that availability of meetings that discuss issues related to agricultural marketing increases the probability of market participation as well as choosing the market channel that maximizes farmers' return/utility. Farmers were asked whether or not they got the opportunities to attend any meetings with agricultural extension agents in their localities during the past one year.

Access to credit/loan (credit):- provision of credit facility for rural community is believed to be vital means to eradicate poverty. Access to credit or loan facility increases the adoption of market oriented activities among rural poor farmers. The money obtained from credit can be used by farmers to buy modern inputs (i.e. fertilizers and improved seeds) which boost production and provide surplus for market. Farmers were asked if they got any chance of accessing credit/loan facilities from any source, be it government or other institutions.

Storage facility (storage): Adequate storage facility enables producers to reap the benefit of higher price by restricting sales during high supply season. We hypothesized that availability of storage facility increases the probability of market participation.

Non-farm activities (offincm):- It is noted that as opportunities for non-farm employment increases, the probability of market participation may decrease. Given other things constant, this may be because off-farm employment tends to lower crop productivity associated with time constraints in farm activities as well as due to the fact that these farmers would go for non-farm employment because of capacity limitations to accomplish own farm activities.

Sex of the household head (sex):- Male households tend to be more likely to adopt innovations (market participation) than female households. It is also well documented that women in poor countries (such as Ethiopia) are marginalized and have lower access to critical resources such as land, labor and are also deprived of educational opportunities. The inherent inequalities in resource ownership between men and women diminish female household heads' ability to participate in the market.

Age of the Household head (age): age is measured as a continuous variable and is measured in years. The age of producers was obtained by simply asking them their present age. It is expected that the effect of age on market participation and channel could be positive. This means older age could shorten time horizon to think about investing on market oriented activities (negative) or experience about trading opportunities that may encourage market participation (positive).

Level of Household Head Education (educ): education enhances the ability of the household to make appropriate decisions by enabling them to think critically and use information sources efficiently. It is expected that farmers with more education could be aware of more sources of information and more efficient in evaluating and interpreting information related to price as well as other marketing issues.

Household Size (hsize): household size could influence market participation through its effect on labor in the area of cultivated land and on the volume of production that could be consumed and sold. However, a study by Gastao (2005) found that larger household size also meant that more food was needed to feed and the larger the consumption requirement meant the less a household could sell. Thus, household size may positively or negatively influence farmers' decision to choose a particular marketing outlet.

5. Results and Discussion

5.1 Characteristics of Sampled Households (Descriptive Analysis)

The descriptive statistics for the variables used in this study is presented in Table 1. It shows that sex composition of the household heads shows that 79.3 percent are male and 20.7 percent are females. This is a typical characteristic of rural communities in developing countries where male households dominate major decisions including marketing. Household head's age ranges from 18 and 106 years of age (mean 42.8). Household size ranges from 1 to 15 family members (mean 5.8). The literacy level of respondents is very low, the majority of these (60.6 percent) did not complete any school level, be it religious or secular. Only 39.4 percent of them are able to write and read. Among these respondents who completed some level of education, 36.9 percent of them completed first cycle primary (1-4 grades), 38 percent second cycle primary (5-8 grades), 4.9 percent high school (9- 10 grades), 1.8 percent preparatory (grade 12), 0.8 percent TEVT (10+1, 10+2), 0.5 percent university/college, 6.7 percent adult literacy and other literacy program, and 6.9 percent some religious education (church/mosque schools). Among sampled households, a relatively larger proportion (35.2 percent) of the households belong to orthodox Christians while about 31.8 percent of them are non-orthodox Christians, 29.6 percent are Muslim and the remaining 2.9 percent have no religion and 0.4 percent some form of traditional religion.

Table 1: Descriptive statistics

Variable	Obs	Min	Max	Mean	Std. Dev.
sex	985	0	1	0.792893	0.405439
age	985	18	106	42.83046	14.67433
hhsz	985	1	15	5.798985	2.486999
literacy	984	0	1	0.394309	0.48895
nonfarm	985	0	1	0.348223	0.476649
storage	984	0	1	0.831301	0.374676
option	422	0	1	0.433649	0.496166
mkinfom	421	0	1	0.532067	0.499564
spent	418	0	720	85.56938	97.1472
trspcost	388	0	600	19.1134	60.54607
meeting	982	0	1	0.37169	0.483503
loan	986	0	1	0.366126	0.481989

Source: IFPRY/EEA Household survey 2009

Agriculture is the dominant economic activity and source of livelihood for households in the study areas, with 74.2 percent of them relying on own farm cultivation and 12.1 percent of them on livestock rearing. Domestic work, casual labor and other activities were identified as main occupation for the remaining sampled households. Opportunities to diversify income from off-farm employment is limited for most (65.2 percent) of the households while some (34.8 percent) seem to have some sort of access to non-farm income generating activities; and spent nearly 34.3 percent of their time in non-farm income generating activities.

The majority (63.4 percent) of them reported that they did not get any form of credit/loan from any sources, be it government or others. Most (79.9 percent) of the respondents have not been a member of any cooperatives in the past or today while very few (20.1 percent) of them indicated as a member. This implies that the role of agricultural cooperatives in facilitating access to markets for smallholder crop farmers is missing or insignificant.

Households marketing behavior

About 42.7 percent of sampled farmers sold some form of crop during 1999/2000. In terms of the degree of market participation by region, it is observed that nearly all (92.9.percent) of the sampled farmers in SNNP sold their crops followed by Benishangul-Gumuz (64.7 percent), Tigray (53.3 percent), Gambella (51.6 percent), Amhara (26.5 percent), and Oromia (24.4 percent). Among those who sold crop, SNNP accounts for 30.9 percent followed by B-G (17.8 percent), Amhara (14.5 percent), Gambella (15.4 percent), Tigray (13.3 percent), Oromia (7.8 percent) and Afar (0.2 percent). The study found that sampled households from Afar region had the lowest market participation practice in crop marketing, with only one household (0.75 percent) reported sales of crop during 1999/2000. In fact another study on livestock marketing (Mamo and Degnet, 2012) reveals that Afar households dominate in livestock marketing than in crop marketing. Most crops traded include coffee (26.9 percent) followed by maize (20 percent), sesame (15.2 percent), wheat (7.9 percent), sorghum (7.4 percent), teff (5.2 percent) and barely (4.5 percent).

The volume of crops marketed per household was very small ranging from 0.5kgs to 980kgs, with the overwhelming majority (90.2 percent) of the households selling below 50kgs (half quintal) while others (5 percent) sold between 50kgs to 100kgs (half to one quintal), and 4.8 percent of them sold 100 and 100kgs. On average, farmers sold nearly 20kgs of crops during 1999/2000. It is important to note that the role of female-headed

households in crop markets is very limited (18.3 percent). Perhaps this reflects a typical characteristic of rural life in most developing countries of SSA.

Producer characteristics by market channel

In this study four major crop market outlets are identified as alternative markets to farmers to sell their crops. These are market traders which account for 58.9 percent of total sells followed by consumers (26.6 percent), farm gate buyers (9 percent) and other farmers (5.5 percent). Other farmers' market channel refers to cases where crop transaction is conducted among farmers themselves presumably for breeding/seeding. The overall marketing behavior shows that the role of intermediaries (traders) in crops market is still dominant. Although the role of agricultural cooperatives in smallholder farmers marketing is recognized as vital, no single household reported cooperatives as option in their crop marketing. Perhaps this may indicate some insight for concerned bodies to work more on strengthening agricultural cooperatives in these areas. This should be a serious policy concern for the concerned stakeholders in this sector.

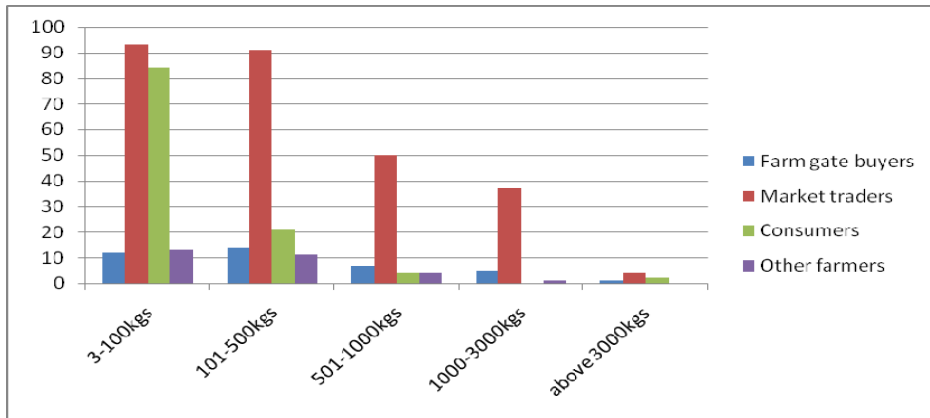
Table 2: Variations across market channels for selected variables

Variables		Market channels				Total	
		Farm gate buyers	market traders	consumers	other farmers		
Gender	female	2	32	40	3	77	
	male	36	216	71	20	343	
	Total	38	248	111	23	420	
Regions	Afar	0	1	0	0	1	
	Amhara	1	33	20	7	61	
	Benishangul-Gumuz	28	32	8	6	74	
	Gambella	3	28	31	3	65	
	Oromia	1	17	11	4	33	
	SNNP	5	119	4	2	130	
	Tigray	0	18	37	1	56	
	Total	38	248	111	23	420	
	Non-farm income	no	29	163	79	14	285
		yes	9	85	32	9	135
total		38	2489	111	23	420	
Free aid	no	38	242	108	22	410	
	yes	0	6	4	1	11	
	total	38	248	112	23	421	

Source: Author's computation based on EEA/IFPRI Household Survey, 2009.

We observe that SNNP farmers dominated crop sales to market traders, accounting 48 percent of total sales at this market channel. All of the farmers who sold at the farm gate and nearly all of those who sold to other farmers didn't receive any form of free aid be it free food aid or free cash aid from the government's Food Security Program (FSP).

Figure 4: Volume of crop sales (horizontal) by market channels and number of farmers (vertical) during 1999/2000 E.C.



Source: Author's computation based on EEA/IPPRI Household Survey, 2009.

The above figure reveals that as volume of crop sales increases, farmers are more likely to select the market traders to sell their crops. The decision to sale at the farm gate and to other farmers is characterized by small volume of crop sales. Presumably this implies that wealthier farmers are not interested in small quantity sales as compared to resource poor farmers. As stated in Figure 4, the volume of crop transaction can indicate the type of markets (i.e. farm gate, primary, secondary or terminal) where the transaction is made. About 56.6 percent of the households indicated that they didn't have the option to choose from different opportunities while the remaining households have the option to choose from before selling their crops. The latter noted that the main reasons for selecting one outlet over the other is due mainly to better price (88.5 percent), convenient location (10.4 percent) and loan arrangement for a negligible proportion (1.1 percent) of them. Nearly half (53.2 percent) of farmers were aware of the market price of crops offered by other buyers while 46.8 percent of them didn't have it. However, access to original market price information is a big problem. This is because the overwhelming majority (91.9 percent) of farmers noted that they knew about market prices from their neighbours and friends and only very few of them from

radio (5 percent). This is a typical problem in most rural areas where provision of market information by relevant institutions such as, Development Agents (DA), cooperatives and commodity exchange is limited.

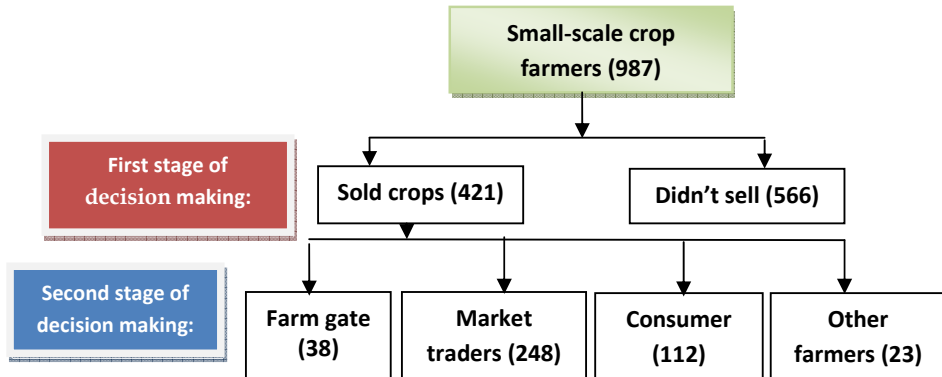
Lack of access to transportation facilities for crop market is highly prevalent in the study area. The majority (79.4 percent) of the sampled farmers moved to the markets on foot while very few (12.6 percent) of them used animals (horse/mule/camel). Using this type of transportation, farmers need to spend 1:25 hours to reach the nearby local market. The average transportation cost for a single trip was around 19 birr. On top of this, farmers spent on average 16 birr per single day to handle other non-transportation marketing costs such as broker fees, lunch, tea etc. Around 63 percent of the households in the total sample reported that they were not attending any community meetings that were held to discuss agricultural issues in the past two years. The reasons why most farmers were not attending such meetings include the fact that these kind of meetings were absent in their villages (49.5 percent), they got some other work to do (17.9 percent), due to old age (4.1 percent); some of them have never been called for such meetings (4.5 percent) and such meetings are not so useful to them (4.3 percent). Those (37.1 percent of the total sample) who attended community meeting in relation to agriculture, participated on average three times during the past two years.

Farmers have encountered a variety of constraints in their crop production and marketing activities. The five most important problems in order of their impact include high prevalence of crop pests (14.2 percent), low rainfall (11.7 percent), scarcity of land (6.9 percent), shortage of oxen (6.2 percent), and too many wild animals that destroy crops (4 percent). It is very apparent to see the effects of such problems on the ability of farmers to provide crops for market where farmers may lose their crops due to diseases and damage caused by wild animals. Any effort by any form of intervention towards minimizing such constraints can enhance participation of crop farmers in markets.

5.2 Econometric Estimation Results.

It is a common practice among researchers in agricultural marketing to model farmers' sales decision as a hierarchical structure in which the first step involves the decision to sale the product for various purposes (to meet unforeseen expenses, to purchase inputs, to pay taxes, etc), and the second is the subsequent decision for whom to sale among the existing possible marketing channels (farm gate buyers, traders, consumers or other markets). This is because the decision is viewed as a series of decision-making strategies employed in stages over time.

Figure 5: illustration of two-stage decisions of market participation and the choice of marketing channels among small-scale crop farmers.



Source: Own compilation.

5.1.1 Market Participation Decision

A binary logit model was applied to estimate the determinants of smallholder crop market participation. The overall significance of the model is measured by the Wald statistics which follows a chi-squared distribution and the hypothesis that all the coefficients except the constant are zero is rejected at the 1 percent level of significance.

The command *robust* in (Stata version 10) was used to correct for heteroscedasticity. The authors also checked for potential multicollinearity problems. The Variable Inflation Factor (VIF) method was used to detect for multicollinearity (see Table 3). The VIF for each variable was found to be less than 10 implying that multicollinearity was not a problem.

Table 3: Results of multicollinearity test: Variance Inflation Factor (VIF)

Variable	VIF
Sex	1.28
Age	1.21
Literacy	1.36
Hhsize	1.12
Storage	1.12
Offinc	1.17
Loan	1.05
Meeting	1.06

Table 4 presents the regression results as well as the elasticity (marginal effects) from the binary logit model on the decision of market participation.

Table 4: Results of binary logit estimation for market participation decision

Variables	Coefficients	z-values	dy/dx
Sex	-.068507	-0.35	-.0164552
Age	-.0111093	-2.16**	-.0026577
hhsiz	-.0890537	-2.95**	-.0213047
Offincm	-.2417317	-1.50	-.0573105
literacy	.4614673	2.85**	.1110184
Storage	2.249965	7.36***	.3970837
meeting	.1476485	1.00	.0354457
loan	.578308	3.98***	.1394986
Cons	-1.612675	-4.14	-

*= significant at 10%; **= significant at 5%; *** = significant at 1%,

Log likelihood = -585.08151, LR chi2 (8)= 109.69, Probability > chi2= 0.0000,

Pseudo R2 = 0.1236, N= 977

The most important factors that encourage market participation decisions among sampled household heads are literacy, availability of storage facility and access to credit/loan. On the other hand age of the household head and family size negatively influence farmers' decision to sell. Farmers' ability to obtain adequate and relevant storage facility positively and significantly influences their market participation decision. The result of the marginal effect (Table 4) indicates that access to storage facility increases the probability of market involvement by about 40 percent. Adequate storage facility enables producers to reap the benefit of higher price by restricting sales during high supply season. Access to credit/loan strongly and positively influences market participation decision by crop farmers. It is found from the marginal effect that credit/loan availability increases market participation by 13.9 percent. Access to loan has the possibility of widening farmers' financial resources and the ability to use modern crop seed varieties and enhance productivity. This implies that provision of rural credit facilities could be seen as a vital means to improve the livelihoods of poor farmers through ensuring their market participation. We also found that the ability of farmers to read and write in any language (farmer's literacy level) increases market participation by about 11 percent. As compared to non-literate farmers, literate farmers are better off in gathering and identifying relevant market information that could influence their final decision to sell.

The household head age has been found to be negatively correlated with market participation decision of small-scale crop market. The older the farmer, the less likely the farmer will participate in any formal crop marketing scheme. This could be because; as farmers are getting older they would become physically weak to access distant markets and move here and there. Other possible explanation could be that younger farmers tend to have a longer planning horizon and appear to be more likely to invest in market oriented activities. Family size negatively and significantly affects the ability of farmers to participate in the market. The marginal effects reveal that the probability of market participation decreases by about 3 percent as family size increases. Given the subsistence nature of production, this may explain the fact that larger family size demands more quantity of crop production for household consumption leaving insignificant amount for sale. In fact evidence shows that farmers in Ethiopia usually take small quantities of their products to the market while keeping larger proportion for own consumption (CSA, 2010).

5.2.2 Determinants of the Choice of Market Channels

The multinomial logit model explains about 24 percent of the variation in market choice among smallholder crop farmers in rural areas. The hypothesis that all the coefficients except the constant are zero is rejected at the 1 percent level based on the Wald test. The result shows that some of the variables are significant in one marketing channel but not in the other channels. It was also observed that two variables (access to market price information and time spent to complete a one time sale) are significant at both market outlets (farm gate & consumer), albeit they bear opposite sign. The market channel of market traders (MARKTRAD) is used as a base category because it is the most widely preferred market channel during 1999/2000 cropping year. The possible heteroscedasticity problem was checked using the command *robust* in (Stata version 10). The author also checked for potential multicollinearity problem. The Variable Inflation Factor (VIF) (see Table 5) method was used to detect for multicollinearity. The VIF for each variable was found to be less than 10 implying that multicollinearity is not a problem.

Table 5: Results of multicollinearity test: Variance Inflation Factor (VIF)

Variable	VIF
sex	1.19
age	1.41
educ	1.22
offincm	1.18
hysize	1.42
trspcost	1.07
mkinfom	1.06
loan	1.80
meeting	1.09
spent	1.03
imr	2.75

Table 6 below presents the coefficients from multinomial logit regression on the existing alternative marketing channels in the sample.

Table 6: Results from multinomial logit model for the choice of marketing channel[§]

Variables	Farm gate		Consumer		Other farmers	
	Coef.	Z-value	Coef.	Z-value	Coef.	Z-value
Age	.0171137	0.73	.0021735	0.20	-.0041722	-0.22
Sex	1.488751	1.03	-1.510641	-4.42***	.2426135	0.36
Educ	-.0328174	-0.51	.0755821	2.72**	.0446969	1.07
Hysize	.1233898	1.14	-.0471545	-0.77	-.1824985	-1.65*
Offincm	.0791583	0.12	-.4842135	1.54	-.1448339	-0.30
Trspcost	-.041698	1.52	-.020588	-3.00**	-.0190547	-0.99
mkinform	-1.528448	-3.11**	.7092032	2.61**	.75017	1.56
Spent	-.0953106	-1.94*	.0027629	2.01*	-.0024493	-0.87
Meeting	.383387	0.81	.4682322	1.65*	-.3040866	-0.61
Loan	-.7772127	-0.92	.2590807	0.75	.1818562	0.27
Imr	-6.539719	-0.65	5.042357	1.62	4.396805	0.89
Cons	2.594152	0.58	-3.632108	-2.29	-4.444044	-1.92

*= significant at 10%; **= significant at 5%; *** = significant at 1%

[§] (Choice==MKTRAD is the base outcome), Log likelihood = -305.93975, N= 383

LR chi2 (33)= 105.94, Prob > chi2= 0.0000, Pseudo R2 = 0.2353

The market trader market outlet (MRKTRAD) is used as a reference market outlet to explain the factors that influence farmers' choice of the other alternative market channels (i.e. farm gate buyers, consumers, and other farmers). As compared to the base category (MRKTRAD), we found that the choice of FARMG market channel is negatively influenced by access to market information and the time spent to finish one time sell. The decision to sell directly to consumers as compared to market traders is influenced positively by education level, availability of relevant market information, attending meetings, and time spent to accomplish one time sell; while it is negatively influenced by household head sex and costs of transportation. Finally, compared to market trader (reference), determinants of other market (OTHRMK) outlet include only household size. Other factors are found to be insignificant may be because this kind of marketing channel is very rare.

We found that only two of the variables explained why farmers preferred the market trader outlet (reference market channel) to farm gate buyers. These are availability of market information and the longer time spent to accomplish a one time sale. Access to market price information induces farmers to go for market traders than farm gate collectors. This implies that the collected information on market price enabled farmers to learn that market traders/wholesalers offer better price than farm gate buyers/assemblers. The higher the time required to finish a one time sale at the farm gate (due to payment delay, waiting for collectors to come to their foot doors etc) increase the probability of choosing market traders.

Table 7: Elasticities of multinomial logit model for the choice of crop market channels

	Market channels			
	Farm gate Choice=1	MARKTRAD Choice=2	Consumer Choice=3	Other farmers Choice=4
age	7.41e-07	-0.00065	0.0006006	0.0000442
sex*	0.0000477	0.287463	-0.319895	0.0323841
hhsz	6.16e-06	0.012381	-0.003505	-0.008827
educ	-2.10e-06	-0.01277	0.0116433	0.0011336
nonfarm*	7.95e-06	0.070666	-0.071334	0.0006606
mkinform*	7.55e-05	-0.14383	-0.109288	-0.0346207
spent	-3.92e-06	-0.00037	0.0004446	-0.0000753
trspcost	-1.44e-06	0.004266	-0.003811	-0.0004539
meeting*	1.31e-05	-0.05533	0.078559	-0.0232418
loan*	-3.51e-05	-0.02631	0.0260741	0.0002759
ivmil~1	-6.01e-05	-0.11496	0.0965938	0.0184274

*dy/dx is for discrete change of dummy variable from 0 to 1

Sex of the farmer is an important determinant of market channel choice to choose between the consumers and market traders. The result shows that male household heads tend to prefer market traders over consumers compared to female household heads. The marginal effects (Table 7) imply that being male household head increases the probability of selecting market traders (i.e. wholesalers) for large quantity sales by 28.7 percent. Higher cost of transportation to reach the final consumers at the local market induces farmers to go for market trader's scheme. Although the final consumer market option could offer relatively better price for their product, higher transportation costs accompanied with the subsistence nature of production makes it highly costly for farmers to go away from their yardstick carrying small quantities to sell to final consumers. As a result, they rather prefer middlemen (i.e. assemblers) to meet them somewhere in between the local main market and their farm. This is because the higher the cost of transportation to travel to final consumer market increases the transaction costs of market exchange. This problem is further exacerbated by the absence of coordinated actions among farmers to organize means of transportation and increase their economies of scale.

On the other hand, farmers' decision to sell to the final consumer at the local market is positively and significantly influenced by increasing level of education; acquiring market information; and involving in various meeting to discuss on issues related to agricultural marketing. As education level increases, crop farmers choose the final consumers as their market destination in the nearby local markets compared to market traders. Education increases the ability of farmers to gather and analyze relevant market information for their products and choose the market for better price (i.e. final consumer). The ability to acquire relevant information on market price increases the probability of selecting consumer market channel as this outlet is associated with relatively better return for farmer's product. Similarly attending and involving in meetings held to discuss agricultural issues increases the probability of direct sales to consumers by 7.8 percent as compared to sales to market traders (i.e. wholesalers). However, the result on the time spent to accomplish a one time sell at the consumer market outlet seems to be contradictory.

The most important factor that influences farmers' decision to choose other market option is family size. It negatively and significantly affects the choice of other markets such as sales to other farmers, relatives and neighbors compared to market traders.

6. Conclusion and Policy Implications

This paper examined the factors that determine the decision of smallholder crop farmers to participate in the market or not and if participate for whom to sell. Although the Government of Ethiopia has identified the agricultural sector as a vital tool towards improving the livelihood of smallholder farmers, the sector remains being subsistent with one of the lowest market participation in SSA.

Still a significant number of poor farmers are excluded from the market and those who participated sold only very small proportion. In this study 57.3 percent of smallholder farmers did not sell any crops during 1999/2000. We found that the majority of them sold less than 50kgs. The role of agricultural cooperatives in enhancing smallholder market participation as well as serving poor farmers as optional outlet is still limited. The most important factors that influence the decision of crop farmers to participate in the market are age of the household head, family size, availability of storage facility, membership in cooperatives, and access to loan. The decision to sell crops is still dominated by male household heads implying that females have less entitlement of resource ownership in rural Ethiopia. Access to better market opportunities in the secondary and tertiary market in the regional towns is absent. The finding clearly explains the current state of affairs in rural Ethiopia where farmers don't participate in agricultural/crops markets due to the prevailing multifold problems including lack of access to market information and higher transportation costs.

The findings of this study also confirm that the role of intermediaries is still dominant in crop markets across the country. Large proportion of crop sales was made by traders (58.9 percent) and only small volumes are sold directly to final consumers (26.6 percent), to farm gate buyers (9 percent) and to other individuals (5.5 percent). The existing market opportunities in the study areas are very thin where most of the transactions are conducted in the local/rural markets and some at farm gate. The possibility of accessing relatively better market opportunities at the secondary and tertiary market channels remains one of the big challenges. Even within the existing thin marketing situations, many of smallholder farmers don't directly sell to final consumers at the local markets due mainly to high transaction costs and lack of additional income generating schemes. The absence of loan also negatively influences the choice of consumer market while attending community meetings on agricultural issues increases farmers' probability to go for better price outlet.

Some relevant policy implications can be drawn from the findings that can help design appropriate intervention mechanisms to improve the efficiency of crop marketing in Ethiopia and enhance smallholder farmers' market participation as well as benefiting from the relatively lucrative market channel. These include:

Providing market information: - Enabling poor farmers to access up-to-date information on market prices and others through various mechanisms will reduce farmer's dependence on traders and relatives as source of price information and increase their bargaining powers for higher prices from traders. In this regard, the government and farmer organizations can play a meaningful role in collecting and disseminating relevant market information to smallholder farmers. One possible way of doing this could be through informing/training farmers on how to use information (e.g. price determination and market requirements and/or product specifications) and also to supply information to the smallholder crop farmers.

Strengthen existing Farmers' Cooperative and encouraging the establishment of Producer Organizations (POs). Properly managed cooperatives and POs have the potential to increase farmers' collective action so as to reduce transaction costs and marketing costs. They can also enable farmers to walk through the market chain and establish smooth contact with traders as well as processors.

Developing road/market infrastructures: - improved road networks enhance farmers' connectivity to the markets by reducing the time and cost of taking the produce to market. This entails both building more roads to connect rural areas with the main road/towns/markets and repairing the existing roads. Furthermore, developing market infrastructure in the form of establishing sheds and collection points across rural areas would assist poor farmers who don't have access to transportation means.

Developing storage and processing infrastructure: - Adequate storage facility enables producers to reap the benefit of higher price by restricting sales during high supply season. Access to processing possibilities also enables farmers to add value to their products and hence increase incomes.

Developing access to credit/loan services: - efforts should be made to expand the services of financial institutions in rural areas so as to enable poor farmers to get access to loans.

References

- Abdulai, A. and Birachi, E. A. 2008. Choice of Coordination Mechanism in the Kenyan Fresh Milk Supply Chain. *Review of Agricultural Economics* 31 (1): 103-121
- Bellemare, M. F. and Barrett, C. B. 2006. An ordered Tobit model of market participation: evidence from Kenya and Ethiopia. *American Journal of Agricultural Economics* 88(2): 324-337.
- Blandon, J., Henson, S., and Islam, T. 2009. Marketing Preferences of Small-Scale Farmers in the Context of New Agri-food Systems: A Stated Choice Model. *Agribusiness*, 25(2): 251-267
- CSA (Central Statistical Authority of Ethiopia). 2010. Agricultural Sample Survey, 2009/10 (2002EC), Report on Crop and Livestock Product Utilization, Statistical Bulletin 468. FDRE: Addis Ababa.
- _____. 2009. Agricultural Sample Survey, 2008/09 (2001EC).
- Dender Woldemariam. 2002. Maize Export Possibility from Ethiopia to Some Potentially Importing Neighboring Countries. Proceeding of a Policy Forum in Addis Ababa, IFPRI. PP. 92-102.
- Dereje Bacha and Abdissa Gameda. 2001. Maize Marketing in Ethiopia. A Review. Proceeding of the Second National Maize Workshop of Ethiopia.
- Eleni Z. Gebremadhin. 2001. Market Institutions, Transaction Costs, and Social Capital in the Ethiopian Grain Market. Research Report 124. International Food Policy Research Institute, Washington, D.C.
- Eleni Z. Gebremadhin and Ian Goggin. 2005. Does Ethiopia Need a Commodity Exchange? An Integrated Approach to marketing Development. EDRI-ESSP Policy Working Paper. No.4.
- Fernando Balsevich. 2006. Essays on producers' participation in, access to, and Response to the changing nature of dynamic domestic Markets in Nicaragua and Costa Rica. PhD dissertation, Michigan State University, Department of Agricultural Economics.
- Francis M. Muamba. 2011. Selling at the Farmgate or Traveling to the Market: A Conditional Farm-Level Model. *The Journal of Developing Areas*, Volume 44, Number 2, Spring 2011, pp. 95-107 (Article).
- Gastão Lukangu. 2005. Factors Influencing Smallholders Participation in Agricultural Markets In Southern Niassa, Mozambique. PhD dissertation, University of KwaZulu-Natal PIETERMARITZBURG
- Getachew A. Woldie and E. A. Nuppenau. 2009. Channel Choice decision in the Ethiopian Banana Markets: A Transaction Cost Economics Perspective, *Journal of Economic Theory* 3 (4): 80-90, 2009.
- Green W. H. 2000. *Econometric Analysis*. 4th edition, Englewood Cliffs, NJ: Prentice Hall.

- Jooste A. 2001. Economic Implications of Trade Liberalization on the South African red meat industry. PhD dissertation, University of the Free State, Bloemfontein.
- Makhura, M. T. 2001. Overcoming transaction costs barriers to market participation of smallholder farmers in the Northern Province of South Africa. Unpublished PhD thesis, University of Pretoria, Pretoria.
- Mamo Girma. 2011. The choice of channel choices among smallholder maize farmers in Bura-Borama, Southern Ethiopia. Proceeding paper, 8th international conference on the Ethiopian Economy, Volume III. Addis Ababa, Ethiopia.
- Mamo Girma and Degnet Abebaw. 2012. Patterns and Determinants of Livestock farmers' Choice of Market Channels in Ethiopia: Micro-level Survey Data. Working Paper, Ethiopian Economic Association (EEA). Addis Ababa, Ethiopia.
- Moti Jaleta, Berhanu Gebremedhin and Hoekstra D. 2009. Smallholder commercialization: Processes, determinants and impact. Discussion Paper No. 18. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project, ILRI (International Livestock Research Institute), Nairobi, Kenya. 55 pp
- Negassa A and Jabbar M. 2008. Livestock ownership, commercial off-take rates and their determinants in Ethiopia. Research Report 9. ILRI (International Livestock Research Institute), Nairobi, Kenya. 52 pp.
- RATES. 2003. Maize Market Assessment and Baseline Study for Ethiopia. Nairobi, Kenya.
- Shiferaw, B., Obare, G. & Muricho, G. 2006. Rural Institutions and Producer Organizations in Imperfect markets: Experiences from Producer Marketing groups in semi-arid Eastern Kenya. IFPRI Working paper 60, International Food Policy Research Institute, Washington DC.
- Wolday, Amaha. 2001. Agricultural input and output marketing in remote areas: Ethiopia. A study submitted to the policy analysis unit in Harare, FAO.
- World Bank. 2008. World Development Report: Agriculture for Development. Washington DC.