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Factors Affecting Market Outlet Choice of Potato Producers in Eastern Hararghe Zone, Ethiopia

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Abstract
Selection of appropriate channel for delivering farm products is not an easy task. There are various constraints that limit households in choosing appropriate channels. In this regard, the current study was aimed at identifying factors affecting channel choice decisions of potato producers in Ethiopia. The analysis is based on primary data collected from 400 farm households selected from three randomly selected districts in eastern part of Oromiya region, Ethiopia. Multinomial logit model was employed for analyzing the data. The results indicated that farming experience, distance to the nearest market, access to market information, amount of potato sold, post-harvest value addition, and bargaining power of farmers affect channel choice decisions in one way or another. Putting in place and strengthening institutions that deliver timely and appropriate market information is among the major recommendations of this study.

Keywords: Channel choice decision, Ethiopia, Market outlets, Multinomial logit, Potato Value Chain

1. Introduction

Developing countries produce about 30 percent of the world's potato (Agiro 2011) and 70 percent is covered by industrial countries due to its use as a cheap food, livestock feed, source of starch and alcohol (Hourton 1987). Moreover, it was reported that between 1994 and 2008, potato production in sub-Saharan Africa has been more than doubled from 100 metric tons to 290 metric tons (FAO, 2010). Kenya, Uganda and Ethiopia are among the ten African countries with the largest area allotted for potato production (Gildemacher *et al*. 2009).

In Ethiopia, potato is produced on 66,746 hectares with an average national yield of 118 quintals or 11.8 tons per hectares in the main cropping season (CSA, 2014). Nevertheless, the country has suitable edaphic and climatic conditions for the production of high quality ware and seed potatoes (Endale *et al*. 2008; Tsegaw 2010). The major potato producing regions of Ethiopia are Oromiya, Amhara, SNNPR and Tigray states in that order of production levels. Fedis, Haramaya, Kombolcha, Kersa, Meta, Kurfa Chelle, Grawa, and Jarso districts are the major potato producing districts in eastern Oromiya (Emana and Gebremedhin 2007). Besides, the area under potato production in East Hararghe was 2,207 hectares with an average yield of 193 quintals per hectare (CSA 2014).

Potato has become an increasingly important crop and contributes for food security, employment, nutrition and development in the socio-economic status of producers. Like other vegetables, potato is produced and transported to the market by both men and women households through various marketing channels. The major marketing channels through which producers can deliver the product in the study areas, are cooperatives only, collectors only, wholesalers only, retailers only and any combinations of these. In order to maximize the benefits that they may earn, farmers have to make appropriate decisions as to where they should sell their product. However, there are various factors that affect households' decision to select appropriate channel for delivering their products to the market. Identifying these factors is very important in terms of pinpointing possible areas of interventions that may help farmers to maximize benefits out of their potato production and marketing activities.

Given the potential of Eastern Hararghe Zone for potato production, processing, marketing and consumption, results of the study is very essential in terms of providing vital and valid information in relation to the choice of appropriate market outlets. In doing so, the study attempts to analyze factors affecting potato channel choice decisions of potato producer households in eastern Hararghe zone, Ethiopia.

2. Methodology

2.1. Description of the study area

East Hararghe Zone is one of the 18 Zones in Oromiya National Regional State. The zone is located in the Eastern part of Oromiya, Ethiopia, sharing boundaries with Bale zone from the south, West Hararghe zone from the west, Dire Dawa Administrative Council from the north and Somali Regional State from the east and south east. It has total land area of 2,424,766 hectares (PEDO 2012). The geographical location of the zone lies between $7^0 32^{'}$ - $9^0 44^{'}$ North latitude and $41^0 10^{'}$ - $43^0 16^{'}$ East longitude (Figure 1). The capital town of the zone is Harar, which is located at a distance of 526 kilometers from national capital Addis Ababa. The zone comprises of 19 districts and three municipal towns having a total population of 3,039,680 (50.8 percent male). In the mean time, population density of the zone is 151.87% per km^2 and with an average of 5 percent per household. Of the total population of the zone, 87.4 percent, 12.6 percent, and 1.1 percent were of rural inhabitants, urban dwellers and pastoralists, respectively. Moreover, the three largest ethnic groups in the zone are Oromo (93.7%), Amhara (4.2%), and Somali (1.8%) while the other ethnic groups made up 0.3% of the population. About 95% of the inhabitants are Muslims, and 5% are Christians (CSA 2007).

The zone has three major climatic categories, temperate tropical highlands known as *dega* constituting 11.4 percent, semi-temperate (tropical rainy mid-lands) or *woinadega* constituting 26.4 percent, and semi-arid (tropical dry or arid) or *kola* constituting 62.2 percent. The average land holding in the zone is about 1.5 hectares per household with a range of 0.25 hectares to 8 hectares. From the total land of the zone, degraded land possess the highest share (46.7 percent) followed by shrubs and bush land constituting 19.4 percent, cultivated land constituting 19 percent and pastor (grazing) land constituting 4 percent (EH/ZAD 2012).

In the zone, mixed crop and livestock farming system is dominantly used by almost all households. From the total area in the zone 461,723 ha is covered by all different annual and perennial crops; cereal crops cover 300,798 ha which includes pulses (18.2%), oil seeds (4%), vegetable and others (1.4%), while coffee and chat cover 15.4 percent. The total livestock holding in the zone was 4,989,159 animals of which cattle constitute 45 percent, sheep 14 percent, goats 29 percent, asses 9 percent, and camels 3 percent (EH/ZAD 2012).

2.2. Sampling procedure, types of data and methods of data collection

A multi-stage random sampling procedure was used to select districts, rural kebeles and sample household heads. In the first stage, within the East Hararghe zone of Oromia region, three rural districts (*i.e.* Kombolcha, Kersa and Haramaya) were selected purposively based on their better potato production potential. In the second stage, 12 potential kebeles (the smallest administrative units) were randomly selected from the selected districts. The

sample size was determined using a simplified formula provided by Yamane (1967) and sample frame of the kebele's was updated accordingly. In the third stage, 400 household heads were randomly selected where gender representation was considered based on the proportion of male and female-headed households. Accordingly, 372 male headed households and 28 female headed households were included in the sample. The sample households were drawn randomly from each kebele based on probability proportional to size sampling techniques.

$$n = \frac{N}{1 + N(e)^2} = \frac{96,368}{1 + 96368(0.05)^2} = 398.4 \qquad (1)$$

Where, n is the sample size,
N is the population size,
e is the level of precision assumed to be 5 percent

Both qualitative and quantitative data were collected from primary and secondary data sources. Primary data were collected from sample farm households using pre-tested structured interview schedule and observations. Besides, relevant secondary data sources like government and non-government reports, statistical figures and bulletins were reviewed to supplement the survey data.

2.3. Data analysis

Descriptive statistics and econometric models were used to analysis the data collected from the households. Multinomial logit is used to identify factors affecting channel choice decisions of households. This is because a choice decision by farmers is inherently a multivariate decision. The dependent variable (choice of market channel in potato value chain) is discrete variable with J alternatives (j= 0, 1, 2,….J).

Multinomial Logistic Model (MNL) also assumes independence across the choices, that is, it does not allow correlation or substitution between the alternatives (Wooldridge, 2006). It is the most frequently used model for nominal outcomes that are often used when a dependent variable has more than two choices. Besides, the multinomial logit model has been widely used by researchers (e.g. Schup *et al.* 1999; Ferto and Szabo 2002; Kuma *et al.* 2013; Bongiwe and Micah 2013). Following Greene (2003), the multinomial logit model for multiple-choice problem takes the form:

$$\Pr(y = j) = \frac{\ell^{\beta_j x_i}}{\ell^{\beta_o x_i} + \ell^{\beta_j xi} + \ldots + \ell^{\beta_j xi}} \qquad \text{Or}$$

$$\Pr ob(y = j) = \frac{\ell^{\sum_{k=1}^{k} \beta_{jk} x_k}}{1 + \sum_{j=1}^{J-1} \ell^{\sum_{k=1}^{k} \beta_{jk} x_k}} \qquad (2)$$

Given $\Pr ob(y = 1)$ where j=1, 2, J-1.

Parameter β has two subscripts in the model, k for distinguishing x variables, and j for distinguishing response categories. The subscript j indicates that there are J-1 sets of β estimates. In other words, the total number of parameter estimates is (J-1) k. This implies that the sample size should be larger than (J-1) k.

Dependent variable

Marketing channels or outlets are those pathways where agricultural products pass through to reach consumers. In this regard, producers are expected to choose the best channels through which they sell their products depending up on various criteria. The alternatives of producers for the marketing channels in this specific study

include wholesaler only (WS), cooperatives only (COOP), collector only (COL), retailer only (RT), and any combination of the above four channels (ACMB). The base category for this study is any combination of the four channels (ACMB). Therefore, the dependent variable for the model is discrete variable taking a value of 1, 2, 3, 4 and 5 representing the choices, where 1 represents selling through wholesaler only channel (WS); 2 represents selling through cooperative only channel (COOP); 3 represents selling through collector only channel (COL); 4 represents selling through retailer only channel (RT); and 5 represents selling through any combination of the above channel choices (ACMB).

Independent variables

Based on some of the earlier works (Baltenweck *et al.* 2006; Shilpi and Umali 2007; Sirak and Bahta 2007) and observations during field survey, the households' decision to choose a particular potato channel depends on demographic, institutional and socio-economic variables. The expected effects of each of these variables are summarized as follows.

Education of the household head (EduHH): It assumes a value of 1 if the household head attained formal education and 0 otherwise. It is believed that if a farmer attained formal education of any level there is a possibility that the farmer would choose appropriate channels. This is supported by Girma and Abebaw (2012); Bongiwe and Micah (2013) and Emmanuel and Charles (2012). As a result, education is hypothesized to make better decisions in channel choice.

Gender of the household head (GenderHH): It is a dummy variable which takes a value of 1 if the household is headed by male and 0 otherwise. Both men and women participate in selling potato using different channels to generate income. Male household heads have been reported to have a better tendency in searching market alternative for the sale of potato than female household heads. This is supported by Girma and Abebaw (2012). As a result, male household heads have more chance to choose appropriate channels than female household heads.

Women empowerment (WomenEmp): It is a dummy variable that takes 1 if woman are empowered in the households and 0 otherwise. When individuals are empowered and have access and control over different resources in the households, they might think of comparing the existing alternatives to deliver the product through appropriate channels as well as to secure better price than disempowered women. Therefore, it is hypothesized that women empowerment affects the choice of channels to sale their products.

Family size (FamSize): **I**t is a continuous variable measured in man equivalent Storck et al., (1991). Availability of active labor force in a household is assumed to affect farmers' decision in choosing a given market channel in potato value chain. Those households who have active labor are obviously expected to choose better market outlet than others who do not have active labor force. This is supported by Baltenweck *et al.,* (2006). Hence, family size is hypothesized to affect channel choices.

Farming experience of the household head (FarmExper): It is a continuous variable measured in years. A household with better farming experience supplies more potato to the market to gain reasonable price and hence chooses channels that meet the quality of the product. Therefore, it is expected that farm experience affects market channel choice decisions.

Distance to the nearest market (DisMkt): It is a continuous variable measured in kilometer that producers are required to travel in order to sell their product in the market. In addition, those households who are close to market are assumed to have more probability of choosing better market channel. The study by Shilpi and Umali (2007) and Sirak and Bahta (2007) also indicated the relationship between distance to market and choice of channels.

Extension contact (ExtCont): It is a continuous variable which refers to the frequency of contact a producer has with an extension agent during the survey year. If producers have frequent contact with DAs, there is an opportunity of obtaining important market information as well as other related agricultural information which helps to increase the farmer's ability to choose the best market outlets for his/her product. The study made by Girma and Abebaw (2012) also indicated the relationship between extension contact and choice of channels. Therefore, extension contact is hypothesized to have relation with channel choice to sell their product.

Access to market information (AccMktInf): It is a dummy variable assuming 1 for a household that has access to market information and 0 otherwise. The better information that the farmers have about the product market, the better would be the choice he/she makes on the channel selection. This is supported by Jeffrey *et al.,* (2009). As a result, access to market information is hypothesized to affect outlet choice decision by potato producers.

Quantity of potato sold (QtySold): It is a continuous variable measured in quintals. The more quantity of potato sold, the higher would be the chances of using different market alternatives. Farmers producing small quantities are likely to sell their products to retail market within a village rather than selling to wholesale market. The study of Chalwe (2011) also indicated the relationship between quantities sold and channel choice. Thus, in this study, quantity sold is hypothesized to affect channel choice decision of the household.

Price offer (SellPr): It is the price offered by a buyer where a farmer gets money from the sale of a product (Birr/Qt). When the price of the product is promising, farmers are motivated to sell their product to a particular actor. This makes the supply to be directly related with a price offer. A study by Staal *et al.,* (2006) also indicated the relation between price offer and channel choice.

Post-harvest value addition (VAdd): It is a dummy variable, which takes a value of 1 if a household practices value addition and 0 otherwise. Grading, sorting, cutting, packaging in standard weights and processing of products are some of value addition activities that the households implement to improve the product to be offered to customers. As a result, this variable is hypothesized to affect decisions in channel choices.

Off/Non-farm activities (OffNonFarm): It is an income obtained by male headed households from off/non-farm activities. Increased availability of opportunities in off/non-farm employment has some relationship with the choice of channels. Furthermore, producers who gain more income from off/non-farm employment want to supply their agricultural products to the nearest marketing channel with fewer prices than searching for other channels. Hence, off/non-farm income is hypothesized to influence the decision of producers on channel selection.

Membership to cooperatives (MembCoop): This is a dummy variable that takes the value 1 if a household is a member of cooperatives and 0 otherwise. Households who are members of cooperatives are supposed to sell their potato to their cooperative rather than retailing to other market channels. The study by Girma and Abebaw (2012); Zivenge and Karavina (2012) and Kuma *et al.,* (2013) also indicated the relationship between members of cooperative and channel choice. Therefore, membership to cooperative is hypothesized to influence channel choices of the households.

Bargaining power of producers (BargPower): This is a dummy variable that takes a value of 1 if the households have power to influence the setting of prices of potato and 0 otherwise. The negotiation power of producers increases the probability of selling their product to better market outlets. As a result, bargaining power is hypothesized to make better channel choice decision.

3. Results and Discussions

3.1. Demographic characteristics

The sample households in the study area comprise 93 percent male headed households and 7 percent female headed households. The mean age of the sample household heads was 39 years with the minimum and maximum age of 25 and 70 years, respectively. The average age of male household heads was 38 years compared to 42 years for female headed households with the mean age difference between the two groups being statistically significant at 10 percent level. This indicates that most of the household heads were within the vibrant age category. Male headed households have almost similar farming experience (27 years) with female headed households (26 years) which shows that household heads have rich experience on potato production and marketing in the zone with no significant difference between the genders of the household heads (See Table 1).
The mean household size of the total sample households was 5.90 persons ranging from 2 to 13. On average, male headed households have relatively larger household sizes (5.93) than the female household heads (5.50) with mean difference of 5.90 persons (See Table 1).

Labor availability or active labor force is a prominent input for potato production as well as marketing. The average man equivalent in the zone was 2.66 with standard deviation of 1.20, where male headed households have better active labor availability than female headed households. The dependency ratio mean values were 1.28 and 2.79 for male and female household heads, respectively, with significant mean difference at 1 percent significance level (See Table 1).

Educational background of the sample households is essential to compare and contrast the existing marketing channels and to choose appropriate channel to deliver their product to the market. The chi-square result revealed that difference in education is statistically significant between the households at 1 percent level of significance. About 65.1 percent and 28.6 percent of sample male and female headed households, respectively, attended formal education (they can read and write). The female headed households are characterized by higher proportion of illiterate than their male counterparts.

3.2. Farm land allocation

Based on the survey results, the average land holding of the sample households was found to be 0.53 hectares, and ranging between 0.06 and 2.88 hectares. The mean land holding owned was 0.54 ha and 0.44 ha for male and female headed households, respectively. In the year 2012/13, the mean average land used for vegetable crops was 0.18 hectares with standard deviation of 0.13, where there is no statistically significant difference between male-headed and female-headed households. Specifically, land under potato was 0.14 hectares, where there is no statistically significance difference among male and female headed households. Moreover, major cereal crops like sorghum, maize, wheat and *khat* were dominantly grown on the farm of the households in the study districts. The data discloses that 0.29 hectares of land are allocated for cereal crops with no statistically significant difference among households. In addition, the land owned by 56 percent of the sample households has medium fertility level and the difference between male-headed and female-headed households is statistically significant at 1 percent level of probability. Given the fertility status of the land and other production inputs, households obtained average yield of 267 quintal potato per hectares in 2012/13 cropping season.

3.3. Institutional characteristics

Market information is among important components for the timely supply to available channels to satisfy the demand. The sample households have different access to market where the benefits and the choices of channels also vary. In the study areas, access to market information shows statistically significant difference between male headed and female headed households at 5 percent level of probability. On average, 48.5 percent of the sample households have at least potato price information from the nearby local market. In addition, more than half of the

sample male headed households have access to market information by using different means of communication like mobile phone.

The average distance to travel to sell their product to the nearest market was about 6.7 kilometers, where it is 6.6 and 6.8 kilometers for male and female headed households, respectively, with no statistically significant mean difference between the two. Actually, the majority of the households (87.8 percent) sell their product on-farm gate and the remaining 12.2 percent transport their product to the nearby market. Moreover, on average, 29.2 percent of the households have bargaining power while selling potato but the remaining 70.8 percent accept the price set by traders.

3.4. Potato production and income sources

The average quantity of potato produced by the households is 37.2 quintals per season where male-headed households had better chance to produce and supply potato to the market (38.7 quintals) than female headed households (17.7 quintals). From the total quantity produced, on average, 30.7 quintals were supplied to the nearby market by the sample households *i.e.,* 32.1 quintals and 11.5 quintals by male and female headed households, respectively.

Rural farm households earn cash income from different sources where sales of potato product and off/non-farm activities are among them. The survey result (See Table 2) shows that the income that is generated from sale of potato was 10,097 Birr which is equivalent to (504.8 USD) in 2012/13 with standard deviation of 10671.7 Birr. Male-headed households had much better income (10,575 Birr) equivalent to (528.8 USD) as compared to female- headed households (3,749 Birr, equivalent to 187.5 USD), where the difference is significant at 1 percent level of significance. Furthermore, on average 1,136 Birr (56.8 USD) was generated from off/non-farm activities where female-headed households had better income (2,661 Birr, equivalent to 133.1 USD) than the male-headed households (1,021 Birr) with a significant mean difference at 10 percent level of probability.

3.5. Factors affecting channel choice decisions: Results from multinomial logit model

Potato producers in the study areas have different market alternatives to sale their product. There are various factors that determine their choices of potato market outlets. The choice of a particular channel is determined by socio-economic, institutional, and other factors. The channel alternatives in potato value chain which are available to potato producers include wholesaler only, cooperatives only, collector only, retailers only and any combinations of the above marketing channels (wholesaler and retailers, cooperative and retailers *etc*) (See Table 3).

Literature on multinomial logit indicated that, any category of the response variable can be chosen to be the baseline or reference category and the model fits equally well irrespective of the category selected as a base. It results in the same likelihood and producing the same fitted values, only the coefficient values change and hence interpretations of the parameters also change. Moreover, the highest frequency among the variables may be taken as a base category (Schafer, 2006; EL-Habil, 2012; Kassa, 2014). Therefore, for this particular study, the category with the highest frequency of occurrence *i.e.* any combination for the above channels was selected as a base category.

Multinomial logit model that we specified in equation (1) was estimated to describe determinants of market outlet choice decision of the households and it has been estimated using the maximum likelihood. Prior to running the model, all the hypothesized explanatory variables were tested for the existence of multicollinearity and heteroscedasticity problems. The result shows that there is no serious problem. The model fitness test shows that it explained 39.7 percent of the variation in market choices among potato producers in the study areas (See Table 4). The log likelihood and chi-square statistics indicate that the model is adequate to explain the

relationship between explanatory variables and producers' decision to choose among the available market outlets.

Out of fifteen explanatory variables included in multinomial logit model, five variables significantly affected collector only market outlets; five variables significantly affected retailer only outlet; and three variables significantly affected wholesaler only market outlet choices at 1, 5 and 10 percent probability levels as compared to the base category of using any combination of the market outlets simultaneously. In addition, for ease of interpretation, marginal effects were computed for each outcome in the dependent variable (See Table 4). The marginal effects show that there is a change in probability of a particular choice of market outlets for a unit change in the independent variable, other independent variables being equal.

In addition, it can be discussed in terms of significance and signs on the parameters. The result indicated that farming experience, farmers' bargaining power, quantity of potato sold, access to market information, and distance to the nearest market are among the significant variables in affecting choice selections. Similar findings explained the direct or positive relation between market channel choice decisions of different products with quantity sold, access to market information, and distance to the nearest market (Chalwe 2011; Jeffery *et al.* 2009; Shilpi and Umali 2007).

Bargaining power has significant and negative relationship with the likelihood of choosing collector only, retailer only and wholesaler only at 1 percent level of significance. Compared to the base category, a unit increase in bargaining power would decrease the probability of choosing collector, retailer, and wholesaler only channels by 0.045 percent, 0.010 percent, and 0.021 percent, respectively. This is because negotiation on price makes producers to be empowered on price decision making and enable them to use combination of channels to sell their product as compared to focusing just on a single channel. Hence, bargaining power is considered as an important factor to engage more actively in the marketing system using diverse channels.

Post-harvest value addition has significant and positive relation with the likelihood of choosing collector and wholesaler only channels at less than 1 percent level of significance and it has also significant and negative relation with the likelihood of choosing retailer only channel outlets at 5 percent probability level (See Table 4). This result indicated that producers who have practiced post-harvest handling chooses single channel than others who have not practiced post-harvest handling. Relative to the base category, using post-harvest handling practice will increase the probability of households' decision to use collector and wholesaler only marketing channels by 0.024 percent and 0.056 percent, respectively. Moreover, using post-harvest handling practice will decrease the probability of households' to choose retailer only channel outlet by 0.007 percent. The possible explanation might be related with quality of the product *i.e.* collectors and wholesale market outlets seeks better quality potato to sell to immediate actors and secure better market price than retailer market channel. Such relationship motivates producers to produce quality potato and also search better market outlets. The findings of Tegegn (2013) hinted that post-harvest handling is negatively and significantly related with collector market outlet, thus, households preferred wholesaler market.

The likelihood of choosing collector and retailer only market outlet was negatively and significantly affected by quantity sold at 5 and 1 percent levels of significance, respectively. This result indicated that those households with large volume of potato mostly prefer to use any combination of market outlets that existed in their vicinity than delivering only to single channel outlet. In reference to the base category, a unit increase in quantity sold will decrease the probability of the households' choice decision for collector and retailer only channel outlets. This may be explained by the fact that large volume of sale motivates households to prioritize the channels and decide to use the best alternative.

Access to market information has a positive and significant effect on households' market channel choice decision of collector and retailer only channels at less than 10 and 1 percent probability levels, respectively.

Compared to the comparison market outlets, having access to market information would result in 0.019 and 0.010 percent increase in the probability of use of collector and retailer only channels, respectively.

The likelihood of choosing collector and wholesaler was also negatively and positively affected by farming experience at 10 and 5 percent levels of significance, respectively. This result shows that those households with many years of experience in farming are more likely to choose wholesaler outlets than other market alternatives. In reference to the base category, an increase in farm experience by a year decreases the probability of a household to choose collector only channel, but, on the other hand, will increase the probability of households to choose wholesaler only market outlet. The computed marginal effect depicts that a unit increase in farming experience would lead to 0.004 percent decrease and 0.003 percent increase in the probability of choosing collector only and wholesaler only marketing outlets, respectively. This could be explained by the fact that more experienced households are directly linked with wholesalers who have better price for the good quality product than other market alternatives. The finding of Kuma *et al.* (2013) also showed that the number of years a household spent in dairy farming, positively and significantly affected using cooperative milk market outlet as compared to accessing individual consumer milk market outlet.

The likelihood of choosing retailer only channel was statistically and negatively affected by distance to the market at 10 percent level of significance. This result shows that a unit increase in distance to the market would decrease the probability of choosing retailer only channel by 0.002 percent. This is due to the fact that most producers prefer to sell their products at farm gate without incurring transaction costs. Delivering potato product to retailers requires transporting the product to urban market to meet retailers. As a result, producers' prefer to select any combination of available channels to deliver their product at the farm gate as compared to selling to retailers only.

4. Conclusions and Implications

The study was undertaken with the objective of identifying factors affecting potato market outlet choices in eastern Oromiya, Ethiopia. Data were collected from 400 farm households and analyzed using descriptive statistics and Multinomial Logit Model. As potato is a commercial crop, producers have various market opportunities to deliver and benefit from their products. Various households have different accesses and alternatives to choose among the existing market outlets. However, to choose the best appropriate channel, producers should always be aware of the constraints and act wisely to deliver potato through appropriate and feasible channel.

The results of the study indicated that program designers and implementers need to work towards building the capacity of producers in order to increase their skills on choosing appropriate channel for their product. Improving the households' educational background and equipping them with some technical skills through extension education would help to increase delivery of quality products across potato value chain. Therefore, extension education should be redesigned and strengthened its implementation strategies to train and qualify more producers with appropriate modern skills that help to sustain production and marketing.

Post-harvest handlings (value addition) like sorting, grading, transporting *etc* are affecting the choice decision of the farm households. Most of the value additions are implemented by traders. However, producers also implement some value addition activities like sorting and packaging to attract appropriate buyers for their products. Though appropriate storage is one of the essential activities in potato value addition, producers lack modern storage facilities that are mandatory for perishable products like potato. Therefore, extension workers should have strong demonstration site to teach and encourage producers to build individual or communal storage in farmers' vicinity so that households can be saved from selling potato at lower prices and face lots of losses.

Providing appropriate market information is another essential component for potato producer households to choose appropriate channel for the delivery of potato to the market. Therefore, putting in place and strengthening

reliable institutions for conveying timely and adequate market information for potato producers is very essential so that the households perform activities timely and benefit more from the involvement in potato value chain.

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6. References

Agiro, B. (2011). Analysis of Socio-Economic Factors Influencing Potato Production at Household Level. The Case of Shashemene, Shalla and Siraro Counties in West Arsi Zone; Ethiopia. Master's in International Development Studies, Wageningen University, The Netherlands.

Baltenweck, I. L., Njoroge, R., Patil, M. Ibrahim & E. Kariuki. (2006). Smallholder Dairy Farmer Access to Alternative Milk Market Channels in Gujarat. Contributed paper IAAE Conference, Brisbane, Australia.

Bongiwe, G. Xaba & Micah, B. M. (2013). Factors Affecting the Choice of Marketing Channel by Vegetable Farmers in Swaziland. *Sustainable Agriculture Research,* 21(1), 112-123.

Chalwe, S. (2011). Factors Influencing Bean Producers' Choices of Marketing Channels in Zambia. M.Sc thesis. University of Zambia.

CSA (Central Statistical Authority). (2007). Agricultural Sample Survey 2006/2007 (1999 E.C) (Sep.-Dec. 2006) Report on Area and Production of Crops (Private peasant holdings meher season). Addis Ababa Ethiopia, The FDRE statistical bulletin Vol. 01-388.

_____ (2014). Agriculture Sample Survey 2013/2014 (2006 E.C) (May, 2014). Report on Area and Production of Major Crops (Private Peasant holdings, meher seasons). Addis Ababa Ethiopia, The FDRE statistical bulletin Volume 01-532.

EH/ZAD (East Hararghe Zone Agricultural Office). (2012). Annual Report of the Office, December, 2012.

EL-HABIL M.A. (2012). An Application on Multinomial Logistic Regression Model. *Pak.j.stat.oper.res, 8 (2), 271-291.*

Emana, B. & Gebremedhin, H. (2007). *Constraints and Opportunities of Horticulture Production and Marketing in Eastern Ethiopia.* Dry Lands Coordination Group (DCG) Report No. 46.

Endale, G., Gebremedhin, W., Bekele, K. & Lemaga, B. (2008). Post Harvest Management. In Root and Tuber Crops: Ethiopian Institute of Agricultural Research, 113– 130pp. Addis Ababa.

FAO (Food and Agriculture Organization of United Nations). (2010). Strengthening Potato Value Chains: Technical and Policy Options for Developing Countries. PP. 43-55.

Ferto, I. & Szabo, G. (2002). The Choice of Supply Channels in Hungarian Fruit and Vegetable Sector. In: Economics of Contracts in Agriculture, Second Annual Workshop, Annapolis, MD, 21-23 July.

Gildemacher, P. R, Kaguongo, W., Ortiz, O., Tesfaye, A., Woldegiorgis, G., Wagoire, W. W, Kakuhenzire, R., Kinyae, P. M, Nyongesa, M. & Struik P. C. (2009). Improving Potato Production in Kenya, Uganda and Ethiopia: A System Diagnosis. *Potato Research, 52, 173-205.*

Girma, M. & Abebaw, D. (2012). Patterns and Determinants of Livestock Farmers' Choice of Marketing Channels: Micro-level Evidence. EEA/EEPRI working paper, January, 2012 Addis Ababa.

Greene, W. (2003). Econometric Analysis. Fifth Edition. Prentice Hall, New Jersey.

Hourton, D. E. (1987). Potatoes: Production, Marketing, and Programs for Developing Countries. Colorado, West view press, Inc.

Jeffrey, R., Alwang, M. E, Christie & Taylor, D. B. (2009). Effects of Access to Information on Farmer's Market Channel Choice: The Case of Potato in Tiraque Sub-watershed Cochabamba, Bolivia. M.Sc Thesis Agricultural and Applied Economics, Virginia Polytechnic Institute and State University.

Kassa, Y. (2014). Integrated Soil and Water Conservation Program and Livelihood of Farm Households in the Highlands of West Hararghe Zone, Ethiopia. PhD dissertation. Haramaya University.

Kuma, B., Derek, B., Kindie, G. & Belay, K. (2013). Factors Affecting Milk Market Outlet Choices in Wolaita Zone, Ethiopia. *African Journal of Agricultural Research, 8 (21), 2493-2501.*

PEDO (Planning and Economic Development Office) (2012). Zonal Atlas of Eastern Hararghe. Harar Printing Press. Harar.

Schafer, J.L. (2006). Multinomial Logistic Regression Models. STAT 544- Lecture 19.

Schup, A., Gillepsie, J. & Reed, D. 1999. Consumer choice among alternative red meats. *Journal of Food Distrib. Res. 29(3),35-43.*

Shilpi, F. & Umali-D, D. (2007). Where to sell? Market Facilities and Agricultural Marketing. Policy Research Working Paper series 4455, The World Bank.

Sirak, T. B. & Bauer, S. 2007. Analysis of the Determinants of Market Participation within the South African Small-Scale Livestock Sector. Tropentag paper, October 9-11, 2007.

Staal, S. J., Baltenweck, I., Njoroge, L., Patil, B. R., Ibrahim M. N. M., & Kariuki, E. 2006. Smallholder Dairy Farmer Access to Alternative Milk Market Channels in Gujarat. IAAE Conference, Brisbane, Australia.

Storck, H., Bezabih, E., Berhanu, A., Borowiccki, A. & Shimelis, W. H. 1991. Farming Systems and Resource Economics in the Tropics: Farming System and Farm Management Practices of Small Holders in the Hararghe Highland. Vol.11.

Tegegn, A. 2013. Value Chain Analysis of Vegetables: The Case of Habro and Kombolcha woredas in Oromia Region, Ethiopia. M.Sc Thesis Presented to the School of Agricultural Economics, Haramaya University.

Tsegaw, T. 2010. Potato Value Chain Analysis in Eastern Ethiopia: A study Conducted as part of a Project Entitled "Value Chains for Poverty Reduction in the Agri-Food Sector-Problem-Based Learning in Higher Education" which is within the Edulink program of Europe Aid", coordinated by Humboldt Universität zu Berlin, Germany. December, 2010.

Wooldridge, J. 2006. Introductory Econometrics. A Modern Approach. 3rd Edition. South Western College publishing.

Yamane, T. 1967. Statistics: An Introductory Analysis. 2nd Edition. Harper & Row, Publishers, New York, 1967. pp 919.

Zivenge, E. & Karavina, C. 2012. Analysis of Factors Influencing Market Channel Access by Communal Horticulture Farmers in Chinamora Districts, Zimbabwe. *Journal of Development and Agricultural Economics, 4(6), 147-150.*

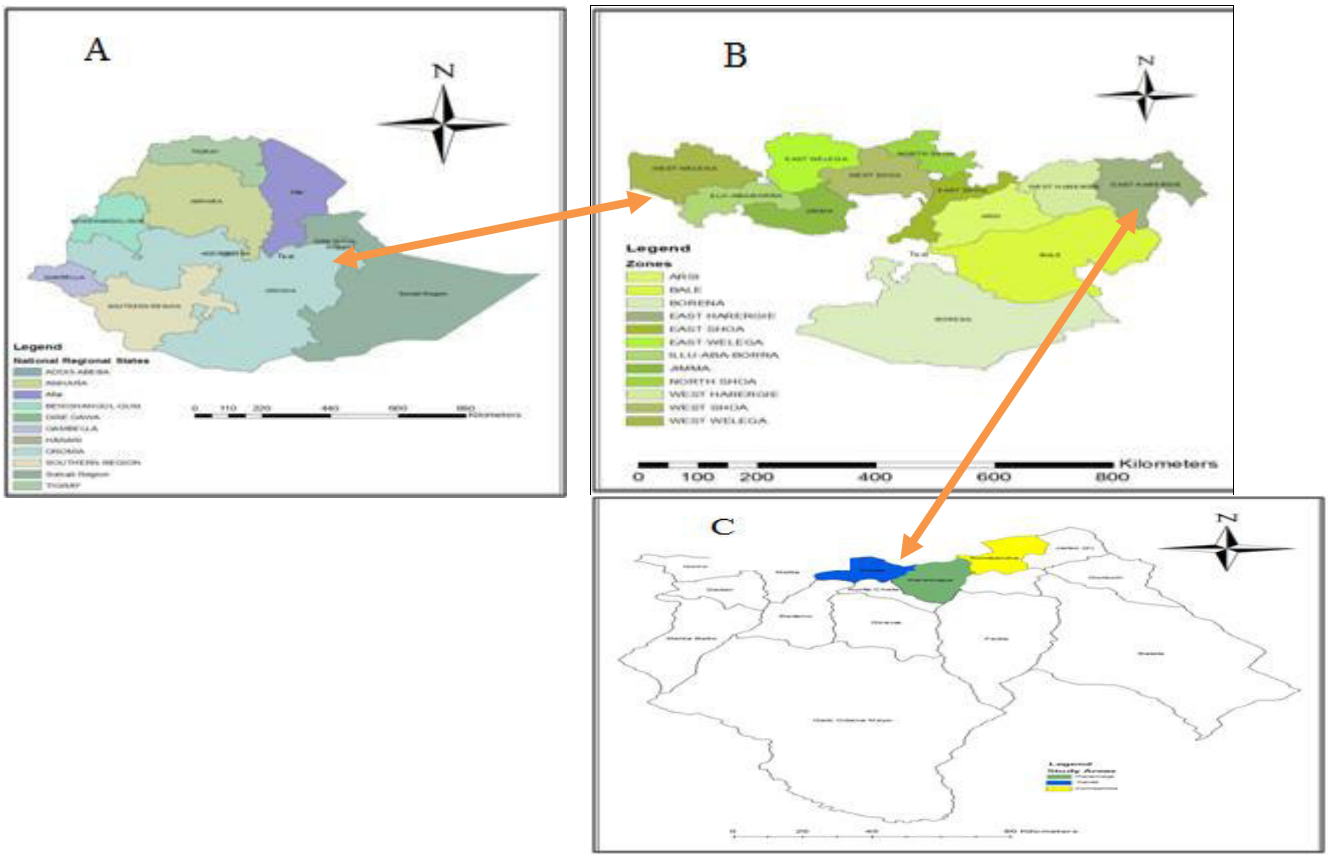

Figure 1. Physical Map of Ethiopia and East Hararghe zone

Source: Planning and Development Office of East Hararghe Zone (2012).

Table 1. Demographic characteristics of sample producers

Variables	MHHs*		FHHs*		Total		t- value
	Mean	SD*	Mean	SD	Mean	SD	
Age (Years)	38.8	8.59	42.0	6.50	39.0	8.49	2.62***
Farming experience (Years)	27.29	1.93	26.93	1.86	27.26	1.92	-0.95
Household size	5.93	2.19	5.50	2.25	5.90	2.20	-1.60
Dependency ratio	1.28	0.91	2.79	1.13	1.39	1.00	8.29***
Economically active labor force (ME)	2.73	1.21	1.74	0.59	2.66	1.21	7.69***

* MHH= Male headed household; FHH= Female headed household; SD= Standard deviation
*** indicate the level of significance at 1 percent

Table 2. Income sources of the households

Variables	MHHs		FHHs		Total		t- value
	Mean	SD	Mean	SD	Mean	SD	
Sales of potato product	10575	10900.0	3749	2275.9	10097	10671.7	9.611***
Off/non-farm activities	1021	3614.3	2661	4949.8	1136	3739.0	1.719*

*** and * indicate the level of significance at 1 and 10 percent respectively

Table 3. Marketing channels used to supply potato to the market

Channel choices	Frequency	Percent
Collectors only	93	23.2
Wholesalers only	73	18.2
Cooperatives only	45	11.2
Retailers only	40	10.0
Any combination of the above channels	149	37.2
Total	400	100.0

Source: Computed from survey data

Table 3. Multinomial logit model result for market channel choice decision

Variables	Collectors			Retailers			Wholesalers			Cooperatives		
	Coeff.	Z	Marginal effect	Coeff.	Z	Marginal effect	Coeff.	Z	Marginal effect	Coeff.	Z	**Marginal effect**
Education	-0.19	-0.62	-0.006	0.13	0.31	0.001	0.39	1.03	0.006	67.75	0.01	**0.000**
Gender	-0.49	-0.61	-0.017	-0.97	-1.00	-0.004	-0.63	-0.69	-0.014	-145.70	-0.01	**-0.000**
Empowerment	0.17	0.22	0.006	-0.08	-0.09	-0.001	-0.19	-0.22	-0.003	-183.54	-0.01	**0.000**
FamilySize	-0.84	-0.71	-0.003	0.07	0.49	0.000	-0.14	-1.00	-0.002	-8.53	-0.00	**0.000**
FarmExper	-0.14*	-1.78	-0.004	-0.02	-0.23	-0.000	0.17**	1.97	0.003	10.77	0.01	**0.000**
DistanceMkt	0.06	0.45	0.002	-0.32*	-1.65	-0.002	0.05	0.32	0.001	-9.35	-0.00	**0.000**
ExtensionCont	-0.15	-1.38	-0.004	-0.02	-0.14	-0.000	-0.11	-0.94	-0.002	-20.80	-0.01	**0.000**
AccessMarket	0.59*	1.77	0.019	1.41***	3.10	0.010	0.17	0.44	0.002	5.95	0.00	**0.000**
QuantitySold	-0.13**	-2.17	-0.000	-0.09***	-4.57	-0.001	-0.00	-0.78	-0.000	-0.46	-0.01	**0.003**
SellingPrice	0.00	0.24	0.000	-0.01	-0.74	-0.000	0.01	0.77	0.000	-1.11	-0.01	**0.000**
PostHarvest	0.81***	2.68	0.024	-0.95**	-1.98	-0.007	2.47***	5.91	0.056	2.20	0.00	**0.000**
OffNonFarm	0.00	0.79	0.000	0.00	0.79	0.000	-0.00	-0.75	0.000	-0.00	-0.00	**0.001**
BargainingPow	-1.87***	-5.02	-0.045	-2.02***	-3.28	-0.010	-1.55***	-3.87	-0.021	36.12	0.00	**-0.000**
MemberCoop	-23.43	-0.00	-0.311	-21.21	-0.00	-0.055	-22.21	-0.00	-0.152	247.41	0.00	**0.000**
_Cons	3.66	1.23		6.49	1.60		-7.86	-2.20		90.86	0.00	

Number of obs	**400**
LRChi^2 (60)	**474.27**
Prob> Chi^2	**0.0000**
LogLikelihood	**-360.27**
Pseudo R^2	**0.3969**

***, ** and * indicate the level of significance at 1, 5 and 10 percent, respectively

Base category: Any combination of the existing channel.

Source: Own computed survey data

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