Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.8, No.17, 2017

Farmers' Market Outlet Preference for Irrigation Agricultural Products: Survey Result at Lume District of East Shoa; Ethiopia

Kalkidan Fikirie
Melkasa Agricultural Research center, P.O. Box 436, Melkasa, Ethiopia

Abstract
The study was conducted to assess market outlet preference for irrigated agricultural products in Central rift valley of Ethiopia. To this end, a field survey was conducted at Lume district of East Shewa zone from January to March 2015. Multistage sampling method was used to collect primary data from 165 households who are potentially rich sources of information on market outlets for irrigated products at district level. Additional data were collected through group discussions and key informant interview. Descriptive statistics and multinomial logistic regression model were employed to analysis the collected data and to identify the major factors that affect market outlet preference of farmers for irrigation products. The results of the study revealed that, consumers, retailers, brokers and whole sellers were the main market outlets identified for irrigation products in the study area. About 61% of respondents are the whole sellers and 15% used brokers to vend their irrigation products. Low price at peak supply periods, lack of marketing chain, information gap and distance from production area to local market are the major market problems explored for irrigation products. The econometric result showed that female headed households used to sell their irrigation products to simply available market outlets like retailers, consumers and brokers. Credit access had significant negative impact on the choice of farmers to sell to farm gate consumers as compared to the whole sellers. On contrary, market information access had positive impact on the preference of farmers to sell their irrigation products to consumers, retailers and brokers as compared to sell the whole sellers. Using the above results, capacitating female headed households and accessing credit to the farmers are important to increase intensive utilization of irrigation lands and products.
Keywords: Farmers, irrigation, irrigated products, logistic regression, market outlet

Introduction

In current situation, high population pressure, widespread environmental degradation, recurrent drought, low productivity of agricultural crops and limited market access have greatly contributed to critical food shortages in Africa in general in Ethiopia in particular (Awulachew *et al.,* 2010). To alleviate this problem, increase productivity, efficient utilization of the existed land resources through small scale irrigation and water harvesting technologies are the best option to produce twice and/or three times per year from the same land. Besides, increasing cropping intensity in irrigated areas are also the most feasible options for sustain food security in the shortest time span (MANRM, 2011).

In most developed countries, the agricultural sector supported by irrigation are plays a significant role to increasing crop production within a limited land resource and availability of food throughout the year (Oates, 2015). In Ethiopia about 112 million hectares of land are cultivable, and varies between 30 and 70 million hectares (Awulachew *et al.,* 2010). Different reports also indicated, about 15 million hectares of land is under cultivation and of which only about 4-5% are irrigated (Awulachew *et al.,* 2010). Besides, from the total crops, cereals and vegetables are dominate irrigated agricultural crops in the country, of these, fruits, pulses, spice and oil seeds are also common crops produced by irrigation (Hagos *et al.,* 2009).

Consumers' preference and quality of agricultural food products is also changing over time. The market situation is also in dynamic process in supplying quality, safe and nutritious food products that can satisfy consumers' need and preference. In most cases buyers prefer high satisfaction with lower price and producers wishes to receive more buyers' price. To balance this mismatch preferences, efficient and low cost of marketing chain through achieving economies of scale, reducing harvest and post-harvest losses are essential (Dixie, 2005). According to Barret (2008) described that low market access is the prominent factor that affect the smallholder agriculture in least developing countries. Thus, choice of marketing outlet is one of the most crucial decisions to be made by the producer of the commodity especially for agricultural products. It is the choice of where to or not to sell the produces. The choice of market outlet is determined by different socio economic factors. In this regard Zuniga-Aria and Ruben (2007) noted that four factors are related to the choice of marketing outlets. That includes farm household, production system, price attributes and market context.

Irrigation agriculture is mainly dominated by horticultural crops (fruits and vegetables). The important feature of most of those irrigation produce are perishable and cannot stay for long period of time after maturity and harvest. They are susceptible to weight and quality losses and then finally lead to price losses (Dixie, 2005). Thus, right time of harvest and available market access are crucial for the producers and consumers. Thus, the detail analysis of market outlets and factors determine to choose the outlets for horticultural produced using irrigation has not been studied in Ethiopia. Cognizant of these facts, this study was designed to assess the

marketing outlets of irrigation produces, identify the main factors that affect farmers' choice of market outlets for irrigation produces and to draw recommendation for concerning bodies the way marketing and farmers' market price that existed in Lume district of East Showa zones of central rift valley of Ethiopia.

Methodology

Description of the study area

A study was conducted at Lume district of East Showa Zone of Oromia Regional state. The area is located 70km from Addis Ababa; the capital city of Ethiopia on 8^0 24'- 8^0 51' N latitude and 39^0 1'-39^0 17'E longitudes with an altitude ranged from 1500 to 2300 meter above sea level. The average rainfall of the district ranges from 750 to 1100mm and the minimum and maximum temperature of the study area is 11^0c and 29^oc respectively (Kassahun, 2008). The total population of the district is estimated to be 147,481 and out of which 51% are male and 49% female (CSA, 2013). The main farming system of the population of the study area is mixed farming (WIO, 2015). This area was selected for study based on strong tradition in cultivating various horticultural crops with irrigation, high production potential and market opportunities.

Data type and sources

They are two type of data were used for this study, Primary data was collected from farmers used irrigation on the study area. Secondary data was collected from Bureau of Agriculture at district level and published documents.

Sampling procedures

Multi-stage sampling procedure was followed to identify survey respondents. First, the district was selected from ten irrigation potential districts intentionally in collaboration with Oromia zone Agricultural experts. Then, potential peasant associations were identified deliberately and, farmers were stratified into irrigation users and non-users. Finally, irrigation user groups were stratified independently as male headed and female headed and selection was carried out randomly. Accordingly, 165 households consisting of 135 male headed and 30 female headed irrigation users were selected from four peasant associations.

Data collection

Cross-sectional data was collected from sampled rural households living in the selected district of Lume in East Showa; Ethiopia. Data on different issues of irrigation and institutional as well as socio economic factors affecting marketing outlet choice were collected through personal interviews using well structured questionnaire by the help of selected and well trained enumerators. Secondary data was also gathered from zonal and district bureaus of agriculture and natural resource development office.

Data analysis

Descriptive and inferential statistics were used for the analysis of the data obtained from the survey. Factors affecting market outlet preference of the farmers of irrigation users were analyzed using multinomial logistic regression model. STATA 12.1 software was used to run the model. The use of multinomial logistic regression model for these types of multi categorical dependent variable is consistent with Berhanu *et al.,* (2013), Magogo *et al.,* (2015) and Solomon *et al*. (2016).

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

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

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

$$\Pr ob(A_i = j) = \frac{e^{\beta' jXi}}{1 + \sum_{k=0}^{j} e^{\beta' jXi}} \quad j = 0,1 \ldots j, \beta_0 = 0$$

The log-odds ratio becomes:

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

The dependent variable is, therefore, the log of one alternative relative to the base alternative (Green, 2003).

Table 1: Variables hypothesized to affect market outlet choice

Variables	Description
SEX_HHH	Dummy of [1=Male ; 2=Female]
AGE_HHH	Continuous variable measured in number of years
EDU_HHH	Dummy of [1= non educated; 2=primary; 3=secondary and above]
FARMSIZE_HHH	Continuous variable measured in hectares
FAMILYSIZE_HH	Continuous variable measured in number of dependent family member
TLU_HHH (Total livestock unit of the head)	Continuous variable [Total number of livestock unity]
CART_OWNERSHIP	Dummy of [1=Yes ; 2=No]
CREDIT_ACCESS	Dummy of [1=Yes ; 2=No]
EXTN_ACCESS	Dummy of [1=Yes ; 2=No]
INFO_ACCESS	Dummy of [1=Yes ; 2=No]

Results and Discussions

Characteristics of survey respondents

The descriptive result of the study showed that out of the total sampled households, 81.8% were male headed and the remaining 18.2% are female headed households. This shows that the participation of female headed households in small scale irrigation agriculture is limited. The reason is that limited irrigation farmlands, shortage of family household labor, high price of agricultural inputs, lack of loans from formal and informal financial institutions.

The mean age of the sampled households is 41 years with minimum and maximum age of 21 and 70 years respectively. Of the total respondents, 19% exist in the age of 20-30 years and 66% exist between the age of 31and 55 years while 15% were above the age of 55 years. The average family size of sampled households was 5.67 (S.D= 0.199).

The education level of the respondents also shows that 38% are non-educated respondents and 58% exist on primary education level. Similarly, 4% of respondents exist in secondary and above level (college and others). Total livestock of the households was converted to tropical livestock unit (TLU) based on the standardization of Storck *et al.* (1991). Accordingly, the minimum and maximum TLU owned by the household heads was 4.3 and 37.6, respectively and on average 11.7 TLU was owned by a single household head. It was found that 72% of respondents had TLU of greater >10 and 22% of 6-10 TLU. The rest 6% had a TLU of less than five. The implication behind this finding is that the area is prominent in mixed farming; rearing aside crop production.

The minimum and maximum size of land owned by the respondents is 0.25 and 10.75ha respectively. The result also showed that 22.4% of respondents own less than a hectare of land and 43.1% of respondents own a land size of 1.25-3.0 hectares. The rest 34.5% of respondents operates on relatively large land size (>3 hectares).

Market outlets in the study area

The survey identified four main market outlets in the area for irrigation produces. Those include sale directly to consumers, sale to retailers, sale to brokers and sale to whole sellers. By applying a multinomial logit model, it is necessary to choose a base category for normalization. In this study, sale to whole sellers was used as a base category so that the model assessed the effects of various independent variables on the odds of the three market outlets versus sale to the whole sellers. Different variables such as household head sex, age, education level, farm experience, farm size, family size, extension visits, credit access and marketing costs are expected to influence market outlet choice of irrigation producers. According to the result from household survey, the production in the study area is mainly dominated by irrigation crops such as onion, tomato water melon, cabbage and kale. Irrigation users also produce green pepper, carrot and beet root but these are limited in terms of area coverage. It was found that out of the major crop produced by irrigation users', onion and tomato are the dominant as the existence of huge demand for the crops.

The study identified four main marketing outlets for irrigation products in the study district. Consumers, retailers, brokers and whole sellers were the outlets identified from the survey result. The study indicated that 61% of respondents used whole sellers and 15% used brokers or rural assemblers to vend their irrigation products. The rests of respondents used retailers and consumers to sell their irrigation products (see figure 1).

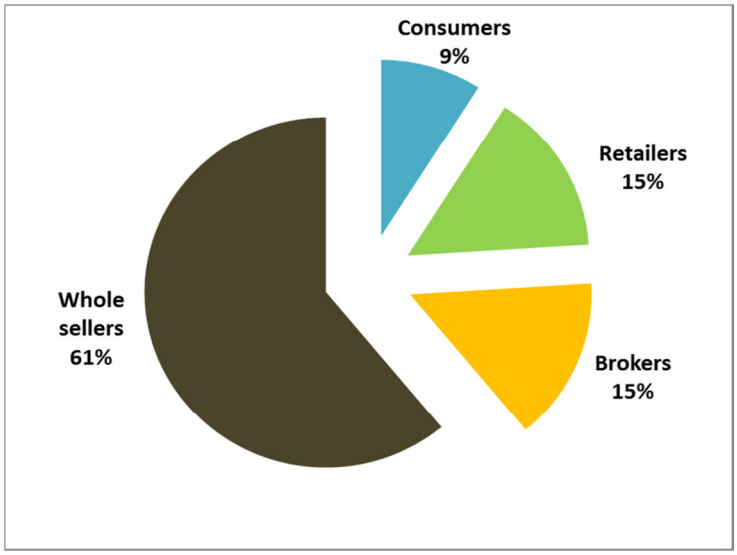

Figure 1: Farmers market outlet preference in the study area

Figure 2 indicates that identified market outlet preference of male headed and female headed households. It was explored that 79% of male headed households preferred to sell their products to whole sellers and only 10% of them used brokers. On other hands, 65% of female headed households opted to sell their irrigation products to retailers and only 15% of them used whole sellers. The reason is that male headed households produce the commodities relatively on large plot of land than the female headed counterparts. This gives male headed households high bargaining power. In contrary, female headed households have resource constraint (labour and equines to transport irrigation products to market places) which led female headed households to sell their produce to local and non-efficient markets such as local markets or retailers and road side.

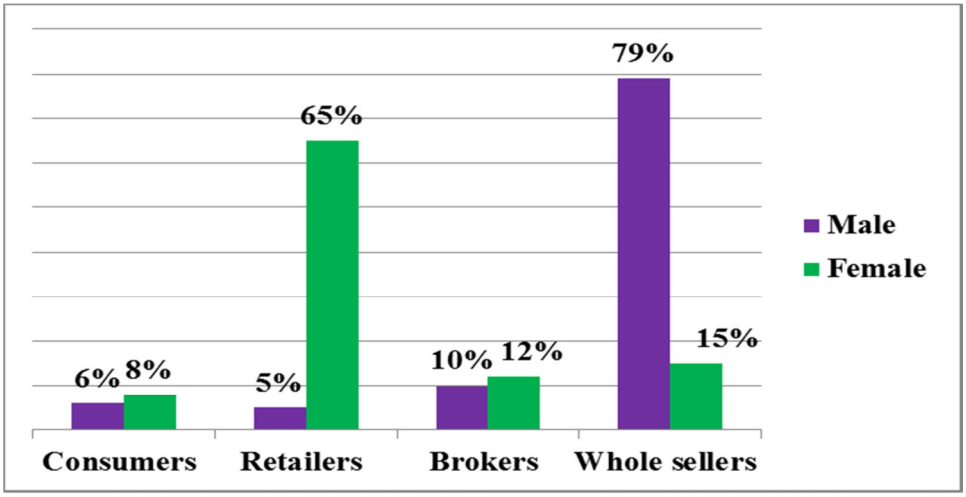

Figure 2: Market outlet preference for irrigation products by household type

The study was also tried to explore the relationship between education and market outlet preference of the farmers for the irrigation produces. The result showed that 49% of household heads completed secondary education level opted to sell their produce to whole sellers. However, 41% of non-educated respondents preferred retailers to sell the products (see figure 3). The result seems reasonable since educated farmers need to sell their product to efficient and relatively profitable markets.

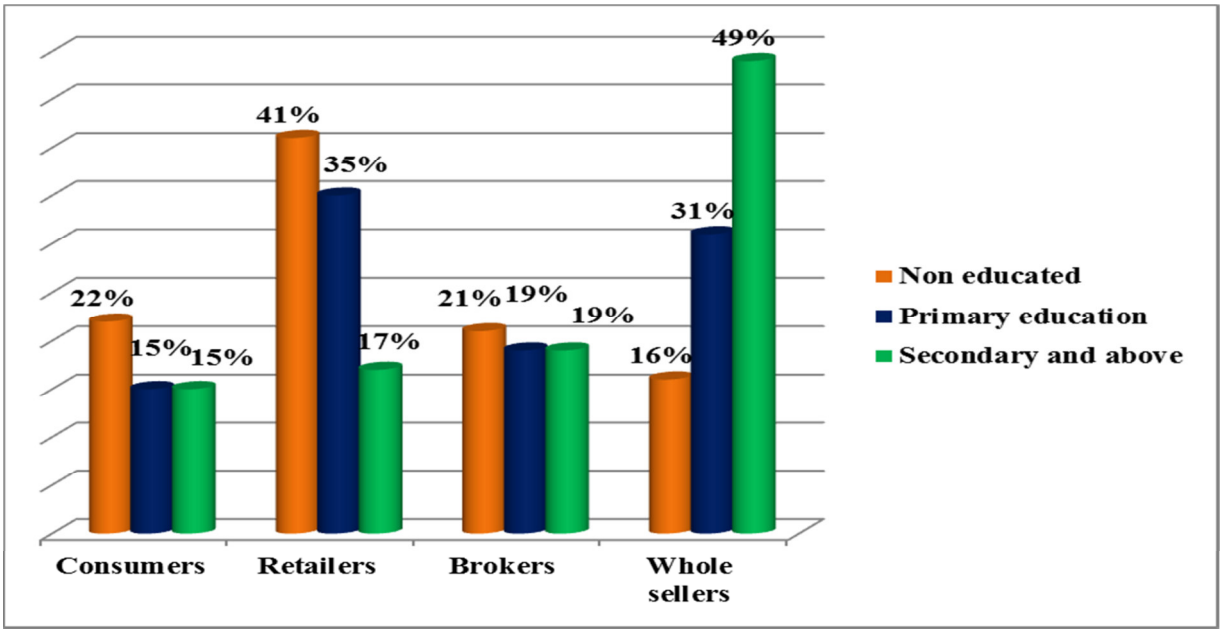

Figure 3: Market outlet preference for the products by education level

Market related problem for the products

The result of the survey showed that 40% of respondents raised price fluctuation as a main market problem for the products. Irrigation products are dominated by perishable vegetable crops on the area. Those perishable products are critically sensitive to quality loss which reduces farmers' bargaining power. This is the main major reason of the price fluctuation. Lack of good market chain, lack of market information and distance from the market are other problems affected the marketing situation of the products among 31%, 17% and 12% of respondents (see figure 4).

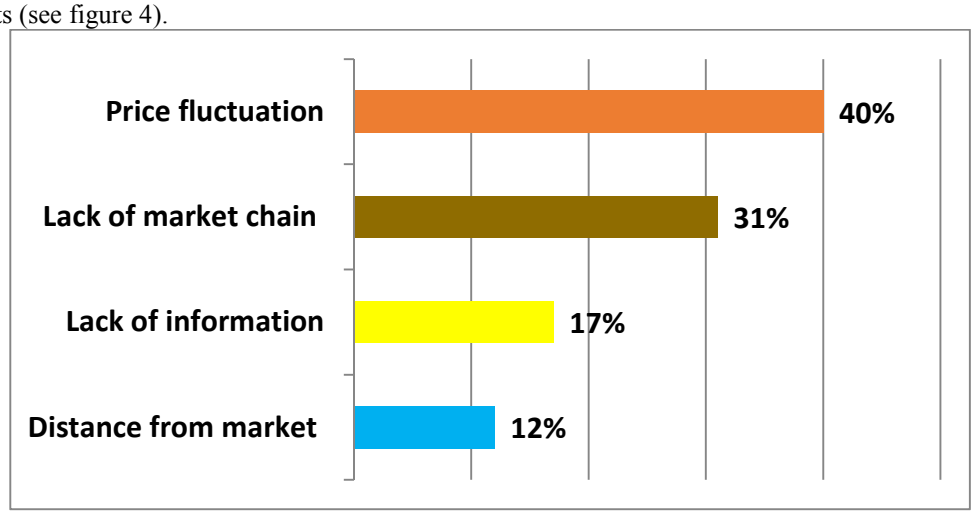

Figure 4: Market related problems on irrigation products

The survey was also tried to investigate the crops most affected by market problems. Accordingly, 25% respondents raised onion as a crop affected by market problems. On other hands tomato and kale are irrigation products encountered market problems among 17% and 13% respectively. Water melon, green pepper, cabbage, beetroot and carrot are other irrigation crops faced market problem in the study area (see figure 5).

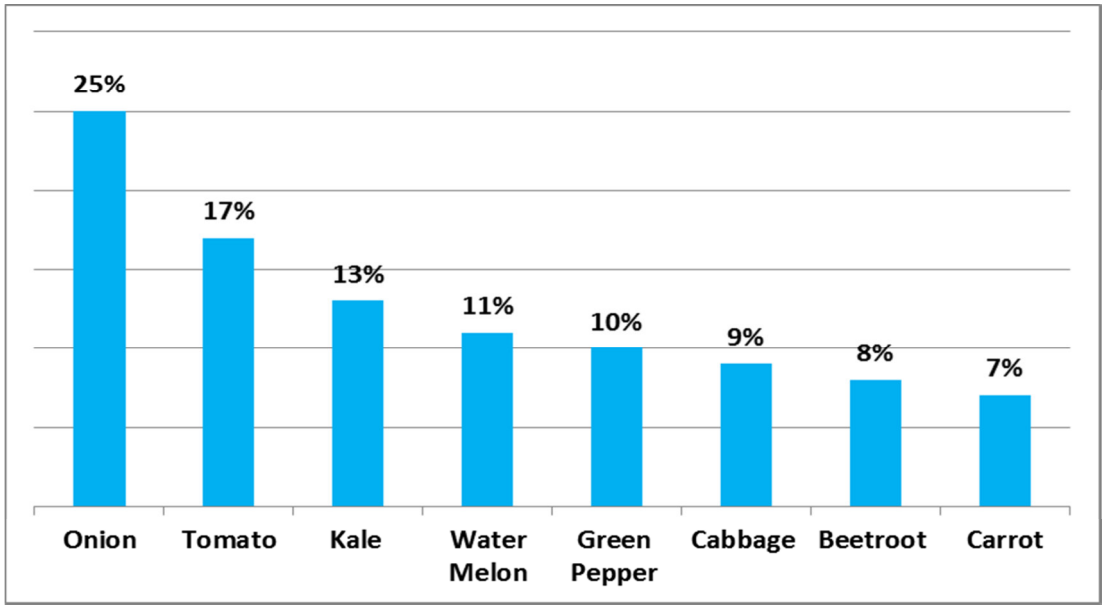

Figure 5: Irrigation product most affected by market problems

Factors affecting farmers' choice of existing market outlets

The model used ten independent variables to explore those factors that determine the market outlet choice for irrigation produces on the study area. The result of the coefficients is interpreted below for each market outlets relative to the base category (sell to whole sellers).

Sex of the household head

The result of the study showed sex of the head is negatively related to retailers and brokers at 10% significance level. This implies that male headed households are not willing to sell their products to retailers and brokers as compared to sell to whole sellers. In contrast, female headed households used to sell their irrigation products to simply available market outlets. The result is consistent with the finding on descriptive result which stated most of women prefer to sell their irrigation products to local and farm gate markets relative to male headed households. The logical reason behind this is that female headed households produce on small plot of land so that they sell their products immediately to nearby available markets. Similarly, female headed households usually face resource scarcity like labour and means of transportation such as donkey and carts. Thus, they sell to nearby market outlets.

Age of the household head

The result shows that negative and significant relation between age and sell of irrigation products to retailers relative to the whole sellers (coefficient = -1.327). The coefficient is interpreted as a one year increase in the age of the farmer decreases the likelihood to sell irrigation products to the retailers by 1.327 quintiles holding all other predictor variables constant. The result is consistent with the finding of Anteneh *et al*., (2011) who found the negative relationship between age and the proportion of coffee sold to cooperatives by non-members.

Education level of the household head

The econometric result shows that non educated farmers opt to sell their irrigation products to brokers and consumers as compared to sell to whole sellers. The positive and significant sign observed on both outlets shows that being non-educated drove the farmers to sell to consumers and brokers which are significant at 5% significance level. The implication behind this might be non-educated household heads could not access market information through modern technologies such as cell phone, TV and radio. The result is in line with Magogo *et al*., (2015) who found negative relationship between education level and farmers preference to sell their the vegetables for farm gate buyers. Anteneh *et al.,* (2011) also found that negative relationship between education level and proportion of coffee sold to private traders by members.

Ownership of donkey/horse pulled cart

Donkey and horse pulled carts are common in the study area among smallholder farmers. The result of the study revealed that ownership of cart has negative and significant impact on the irrigation products supplied to retailers and brokers as compared to that of sold to whole sellers. The reason could be those farmers who have carts can transport and supply their products to fair markets or whole sellers so that they collect attractive incentive and buyer's price.

Credit access

Credit is crucial for rural poor households to overcome resource constraint and scarcity. It is especially very essential for farmers who have large farm size and few resources to invest on the land. Credit access has negative

and significant impact on the irrigation products sold to farm gate consumers as compared to the whole sellers. The logical reason might be those farmers who have access to credit produces more and sell their products to the market with fair price.

Market information access

Market information access has positive and significant impact on the preference of farmers to sell their irrigation products to consumers, retailers and brokers as compared to sell to whole sellers. This implies that those farmers who have access to market information are indifferent of choice of market outlets since they evaluate the cost-benefits of each outlet.

Table 2: Factors affecting market outlet preference for irrigation users

Multinomial logistic regression — Number of obs =165
LR $chi^2(30)$ = 91.31
Prob > chi^2 = 0.0000
Log likelihood = -107.50967
Pseudo R^2 = 0.2981

Variables	Consumers		Retailers		Brokers	
	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E
SEX_HHH [Male]	-1.117	0.745	-1.996*	0.411	-1.819*	0.549
AGE_HHH	-0.404	0.602	-1.327**	0.543	-0.224	0.703
EDU_HHH [Non educated]	0.637**	0.353	0.141	0.349	0.930**	0.395
FARMSIZE_HHH	0.393	0.480	-0.115	0.405	0.722	0.625
FAMILYSIZE_HHH	0.125	0.114	-0.125	0.131	0.075	0.152
TLU_HHH	0.834	0.898	0.096	0.777	1.561	0.514
CART_OWNERSHIP [Yes]	-0.285	0.289	-0.541*	0.296	-0.730*	0.398
CREDIT_ACCESS [Yes]	-1.491*	0.821	0.612	0.849	4.063	0.855
EXTN_ACCESS [Yes]	1.359	0.432	0.405	0.880	5.039	0.656
INFO_ACCESS [Yes]	1.409*	0.776	1.988***	0.665	3.753***	0.976
Constant	-20.75	0.769	17.98	0.414	-66.57	0.888

Conclusion and Recommendations

In this study, there are four main marketing outlets (consumers, retailers, brokers and whole sellers) for irrigation products are identified. Most male headed households (61%) preferred to sell their products to whole sellers and most female headed households opted to sell their irrigation produce to retailers probably due to resource constraints. The survey also found price fluctuation, lack of good market chain, lack of market information and distance from the market as a main market problem in the study area.

The econometric result also showed that female headed households choose to sell their products to locally available markets with unfair price due to their problem of resource constraints. Thus, capacitating them in training and accessing them credit is a fundamental effort that should be considered by concerning government and non-government organization. On other hands, credit access positively affects farmers' choice for fair price markets. It encourages intensification, diversification and commercialization. Hence, concerning bodies should facilitate the way credit is accessed to the farmers.

Acknowledgment

I would like to thank International Livestock Research Institute (ILRI) LIVES project for the financial support provided for this research. I would also like to thank Lume district government officials and development agents for their support during data collection phase.

Reference

Anteneh, A., Muradian, R. and Ruben, R. (2011). Factors Affecting Coffee Farmers Market Outlet Choice. The Case of Sidama Zone, Ethiopia. Centre for International Development Issues; Nijmegen, Radboud University, the Netherlands.

Awulachew, S. (2010). Irrigation potential in Ethiopia; Constraints and opportunities for enhancing the system. International Water Management Institute (IWMI).

Barret, C. B. (2008). Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa. *Journal of Food Policy*. 34, 299-317.

Berhanu, K., Baker, D., Kindie, G. and Belay, K. (2013). Factors affecting milk market outlet choices in Wolaita zone, Ethiopia. *African Journal of Agricultural Marketing*.1 (2):24-31.

CSA (2013). Population Projection of Ethiopia for all Regions at Woreda Level from 2014-2017.Federal Democratic Republic of Ethiopia Central Statistical Agency. Addis Ababa.

Dixie, G. (2005). Food and Agricultural Organization. Horticultural marketing. Marketing extension guide, Rome, Italy.

Greene, W. H. (2003). Econometric analysis. Fifth edition. Prentice Hall, New Jersey.

Hagos, F., Makombe, G., Namara, R. E. and Awulachew, S.B. (2009). Importance of Irrigated Agriculture to the Ethiopian Economy: Capturing the Direct Net Benefits of Irrigation. IWMI Research Report 128, Colombo, Sri Lanka: International Water Management Institute.

Kassahun, M. (2008).Characterization of milk products consumption pattern, preference and Compositional quality of milk in Ada'a and Lume Woredas of East Shewa Zone, Central Ethiopia. M.Sc. Thesis. Hawassa University, Ethiopia. 134p.

Magogo, J., Mshenga, P., Mlongo, S., Mwanarusi, N., Agnes, O. and Shem, I. (2015) Determinants of Choice of Marketing Outlets for African Indigenous Vegetables among the Agro-Pastoral Maasai of Narok and Kajiado Counties of Kenya. *Journal of Economics and Sustainable Development.*Vol.6, No.8, 2015.

MANRM (2011). Small-scale irrigation situation analysis and capacity needs assessment. Addis Ababa, Ethiopia.

Oates, N., Jobbins, G., Mosello, B. and Arnold, J. (2015). Pathways for irrigation development in Africa-insights from Ethiopia, Morocco and Mozambique. Future agriculture. Working paper, 119.

Solomon, A., Wondaferahu, M. Jibril, H. and Samuel, D. (2016). Factors Affecting Farmers' Coffee Market Outlet Preference in Southwest Ethiopia: Survey Result of Coffee Potential Districts of Jimma Zone. *Journal of Marketing and Consumer Research.* 1: (23):11-22.

Storck, H., Bezabih, E., Birhanu, A., Borowiecki, A. and Shimeles, W. (1991). Farming Systems and Farm Management Practices of Smallholders in the Hararghe Highlands: Farming systems and resources economics in the tropics. Wssenshaftsver lag vauk, Kiel, Germany. 11: 41-48.

WIO. (2015). The District Irrigation Office, 2006 E.C Yearly Report. Un published Report. Lume.

Zuniga-Arias, G., and Ruben, R. (2007). Determinants of Market Outlet Choice for Mango Producers in Costa Rica. In Van Boekel, R. M.,Van Tilburg, A. and Trienekens, J. (Eds.), Tropical Food Chains: Governance Regimes for Quality Management (pp. 49-67). Wageningen Academic Publishers.