Determinants of market outlet choices of pineapple producing farmers: A case of Chuko district, Sidama region, Southern Ethiopia

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ABSTRACT

Access to market and choice of a marketing outlet is one of the key ingredients to successful marketing of both agricultural and non-agricultural products. Though the study area has great potential of pineapple production, the farmers faced the marketing problems in choosing appropriate pineapple market outlets. This study was aimed at identifying determinants of market outlet choices of pineapple producing farmers in Aleta Chuko District of Sidama Region. Both qualitative and quantitative data were collected from primary and secondary sources. The Cross-sectional data were collected from a sample of 282 pineapple producing farmers. Descriptive statistics and Multinomial Logit model was used to analyze collected data. The result showed that, 64.5% of the total sample use formal private traders where 27.5% and 8.0% of respondents used informal private traders and cooperatives market outlets respectively. The parameter estimate of multinomial logistic regression model revealed that, the choice of both informal private traders and pineapple marketing cooperatives market outlets was significantly affected by age, education, access to market centre, access to market information, access to transportation service and access to credit service when compared to formal private traders category. In addition, the choice of pineapple marketing cooperatives outlet was significantly affected by amount of annual income compared to formal private traders' market outlet. The study has potential policy implication to improve the pineapple marketing performance and the welfare of the farmers.

Keywords: Chuko, Cooperatives, Cross-sectional, Market outlet choice, Multinomial logistic model, Pineapple.

INTRODUCTION

According to Food and Agriculture Organization, tropical fruit orchards in developing countries targeting export market earned 12.8 billion dollars in 2010. Small scale tropical fruit farmers have however been excluded from market channel due to lack of economies of scale, difficulty in complying with market access requirements, poor linkages to market and inadequate market information and dissemination (Abayneh and Tefera, 2013). Barrett argued that the smallholder farmers who engaged in subsistence and semi-subsistence agriculture have low marketable surplus causing them to be in low equilibrium poverty corner. Market participation in rural household is an important strategy for poverty alleviation and food security. It refers to the market actors' decision on whether to be involved or not in the flow of products from producers to end users. Majority of smallholder farmers in rural areas are trapped in a vicious circle of poverty and characterized by low economic returns due to low market participation. Poverty reduction and improving the smallholders' livelihood has strong relationships with their market participation. Increased market participation by the poor has been found to be vital as a means of breaking from the traditional semi-subsistence farming and a key factor to lifting up rural households from poverty. However, smallholders do not often participate much in food crops markets due to subsistence production and also higher costs associated with searching for markets.

Pineapple (Ananas) is one of the tropical fruit of the family Bromeliaceae originating from South America and is now grown in various parts of the world. In Ethiopia, substantial pineapple fruit cultivation is mainly practiced in Oromia region (Jimma), Sidama and Southwestern region (Bonga) (Abate, 2018). Small farmers are familiar to work with pineapples as a cash crop in a mixed farming system for decades. National consumption figures for pineapple are slightly rising as a result of general national growth in a public spending and tourist preferences. The consumption pattern of the Ethiopian population encourages the production of the pineapple *Smooth Cayenne* variety for processing purposes and is mainly appreciated as a fresh fruits variety in the regional markets and in the Arabic peninsular markets. In Sidama Region, the potential production areas of the pineapple fruit are Aleta Chuko, Dara and Aleta Wondo districts. Aleta Chuko is the most naturally endowed district in terms of capacity to grow different horticultural and other cash crops. More specifically, the district is witnessed by its potential production of pineapples. Despite its potential production, the economic activity and the decision of rural farmers to easily access and choose the proper market outlets for their products is not reactive (Akram and Haroon, 2008). Access to market in the form of different marketing channels for agricultural products is crucial for exploiting the potential production and marketing to contribute increased income of rural households in developing countries.

In an effort to identify involvements that could stimulate farmers' participation in markets, it is important to know the factors influencing their choice of marketing outlets.

Various empirical studies pointed out that, there are a lot of market outlets selected by smallholder farmers to sell their products and get maximum return. However, different factors can influence the 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 their benefits from agricultural production and marketing activities.

Hence, this study aimed to identify the factors affecting market outlet choices of pineapple producing farmers in the study district to narrow the information gaps between producers, different market participants. Therefore, understanding variables affecting market outlet choices of pineapple products can be of great importance in the development of sound policies with respect to agricultural marketing, prices and overall rural and national development objectives of the country (Asefa, et al 2016).

MATERIALS AND METHODS

Description of the study area

Aleta Chuko is one of the administration districts in the Sidama Regional State of Ethiopia.

The district shares the boundary Dara district at the south Wallame district of Oromia Region at the southwest, Loka Abaya district at the west, Dale district at the north and Aleta Wondo at the east. The administrative center is Chuko town which is on the highway international road of Addis Ababa to Moyale, the border city of Ethiopia and Kenya (Barrett, 2010). The woreda contains twenty six (26) rural kebeles and five (5) urban kebeles. In terms of the woredas climatic condition, it's situated across two agro ecological zones; Kola and Woyinadega with the altitude ranging from 1500-1800 m.a.s.l.

The altitudinal factor causes the temperature to vary from 22°C-28°C. The mean annual rainfall varies from 1400 mm to 2300 mm. Geographical location of Aleta Chuko Woreda is found: Longitudinal location between 38°13'0"E to 38°21'01"E and Latitudinal location between 6°27'0"N to 6°34'0"N (Figure 1). The total population of the woreda was 221,303 of whom 115,078 are men and 106,225 women; 4.7% of its population is urban dwellers and 95.3 are rural dwellers.

The average family size of the woreda is determined by the average fertility rate and which figuratively indicates 5.5 and 4.5 per household in rural and town kebeles respectively. The main economic activities in district are Chat and dairy farming as commercial businesses (Bravo, et al 2012). Other agricultural products include coffee, enset, pineapple, maize, teff, potatoes, mango, avocado, vegetables and banana.
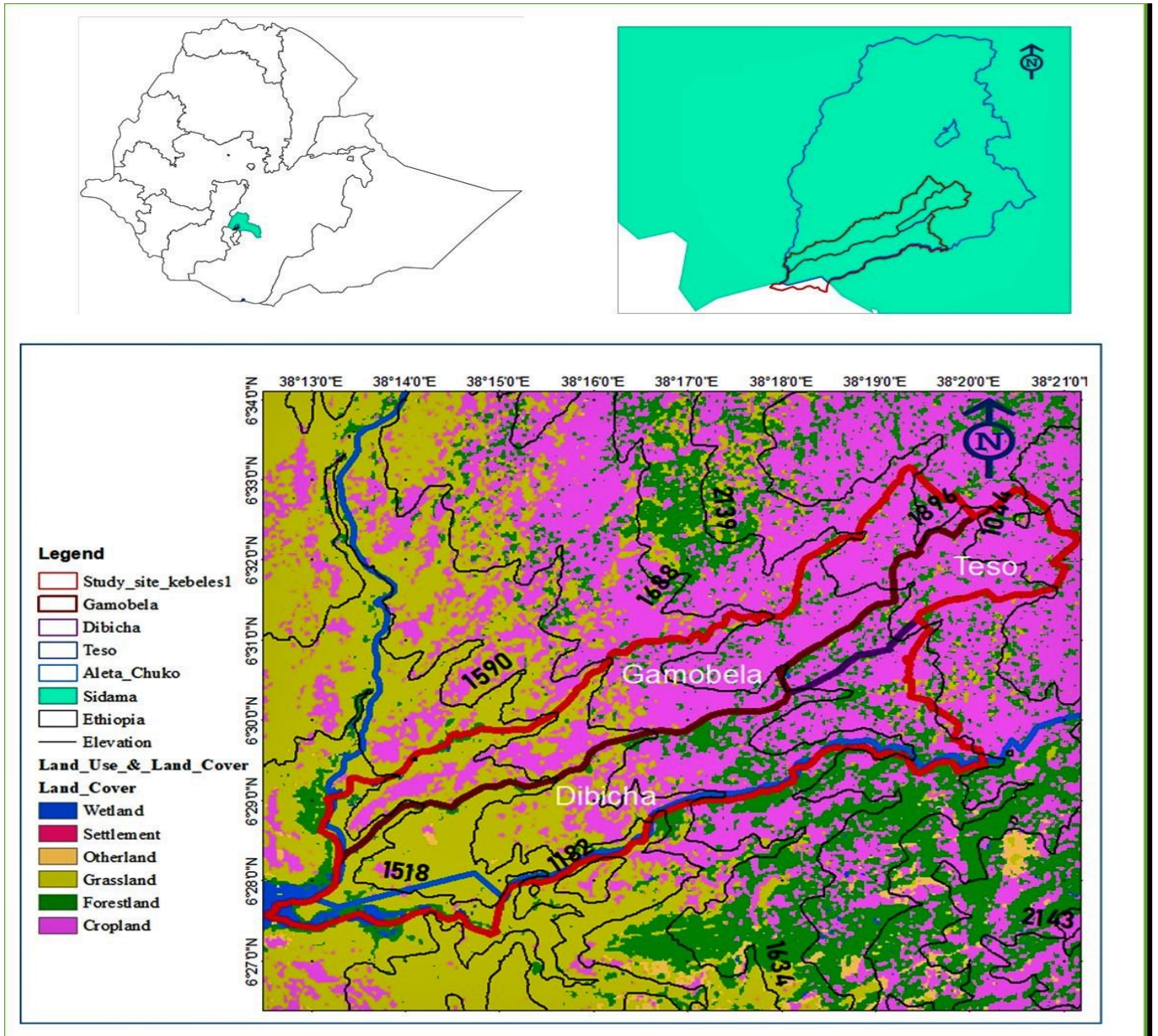
Figure 1. Map of the study area. **Note:** Legend: (▭) Study site kebeles; (▬) Gambela; (▭) Dibicha; (▭) Teso; (▭) Aleta Chuko; (▬) Sidama; (▭) Ethiopia; (——) Elevation. Land use & land cover: **(** ▬) Wetland; (▬) Settlement; (▬) Otherland; (▬) Grassland; (▬) Forestland; (▬) Cropland.

Sampling design and sample procedures

An important decision that had taken while adopting a sampling technique is about the size of the sample. Appropriate sample size depends on various factors relating to the subject under investigation like the time aspect, the cost aspect, the degree of accuracy desire, etc. As sample size increases, the sampling distribution

of the mean decreases in variability (the standard error decreases). For this study in order to select a representative sample, multi-stage sampling techniques were implemented to select sample respondents from pineapple producer kebeles. To determine the sample households from districts, the following three stages were used. First, Aleta Chuko District was purposively selected as it is one of major potential area for pineapple production and marketing in the region (Chang, et al 2014). Secondly, three kebeles were selected from the total of 26 rural kebeles of the district based on their potential production of pineapple (Table 1). Pineapple producers were used as the sampling frame and the sampling unit householdheads.

The sample size was determined by following a simplified formula provided by Israel (Drost and van, 2011). Accordingly, considering estimate of expected significance and giving any particular outcome to be within 5% of marginal error and 95% confidence interval of certainty was used determine a sample size required to represent the study population. Based on this assumption the actual sample size for the study is computed us follows;

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

Where, n=sample size for the research use; N=total number of households in the three randomly selected kebeles which 960; e=margin of errors at 5% (the level of precision that assume e=0.05. Applying this formulathe sample size for this study is determined as follows: n=960/1+960(0.05)^2=282. In the 3rd stage, from the list of farmers producing pineapple, the sample producers were obtained by systematical random sampling to select appropriate representative and distributed across the sample house hold of pineapple farmers by using Probability Proportional to Sample Size (PPS) (Geoffrey, et al 2014).

Table 1. Sample pineapple producing farmers.

SN.	Name of the kebeles	Total pineapple producers in each kebele	Proportionate sampled house holds	% of the proportion
1	Dibicha	421	123	0.43
2	Tesso	234	69	0.25
3	Gambela	305	90	0.32
Total		960	282	01:00

Methods of data collection

For this study, data was collected from individual respondents and key informants by using structured questionnaires, and interviews, respectively. Prior to data collection six enumerators was purposively recruited and they have been given one day orientation and training regarding data collection. Then, tools were pre tested using Cronbach's Alpha test on selected 15 participants, which are not target respondents to determine the validity and reliability of questionnaires (Girma and Abebaw, 2012).

Data analysis

Both descriptive statistics and econometric analysis were used for analyzing the collected data. Chi-square test was employed to identify possible associations between each independent variable with the dependent variable (Webel and Greene, 2011).

Econometric analysis

The appropriate econometric models that can help to identify the factors affecting market outlet choices of the households are multivariate probit and multinomial logit model.

Multinomial logistic models are multi-equation model in which a response variable with K categories will generate K-1 equations (Ikeyi, et al 2013).

Each of these K-1 equations is a binary logistic regression equation comparing each category with the base or reference category (Israel, 1992).

The multinomial logit model is analogous to a logistic regression model; except that the probability distribution of the response is multinomial (categorical) instead of binomial (binary) and thus we have K-1 equations instead of one equation. In this particular study, pineapple producers are faced with the alternatives of selling their products to any of the available marketing channels in the study area (Kifle, et al 2015). Therefore, the most appropriate model to estimate farmers' decision to sell in one of different market outlet, where the choices are mutually exclusive is a MNL (Multinomial Logit Model) model (Berhanu, et al 2013).

Empirical studies on the model specification

A number of studies have been done about the factors influencing marketing channel choice decisions by using different econometric models. Geoffrey used multinomial logistic regression on factors affecting the choice of marketing outlets among small-scale pineapple farmers in Kericho country (Mekonen, 2015). The result of multinomial logistic regression revealed that gender, group marketing, pineapple produce, price information and vehicle ownership significantly influenced the choice of pineapple marketing outlets. Kifle employed multinomial logit regression model to analyze determinants ofthe choice of marketing channels among small-scale honey producers in Tigray region, Northern Ethiopia.

The study revealed that beekeeping experience, distance from market, access to market information, grading and access to credit significantly affect the choice of local market channel; while household head age, volume of honey sold; average price and access to market information significantly influence trader channel choice.

Mekonen, used multinomial logistic regression to assess determinants of market outlet choice and livelihood outcomes of coffee producing farmers in Lalo Assabi Woreda, Oromiya, Ethiopia (Negeri, 2017).

The study pointed out that factor such as: quantity of coffee sold, transportation access, access to price information, credit access, distance to nearest market and access to training were found to significantly affect the farmers" choices of marketing channels. Finally, Assefa used multinomial logit model to analyze factors affecting farmers" coffee market outlet preference in coffee potential districts of Jimma zone, South-western Ethiopia.

The result revealed that age of the household has negative and significant effect on the preference of farmers for formal markets and brokers and farm experience of the household has positive and significant effect on the preference of the farmer for formal market and brokers as compared to informal markets (Nyaupane and Gillespie, 2011). Therefore, based on the empirical studies reviewed Multinomial Logistic (MNL) regression model was adopted for this study to identify factors that affect pineapple producing farmers' market outlet choice decision. The marginal effects are used to measure the expected change in probability of a particular technique being chosen with respect to a unit change in an independent variable from the mean (Olwande and Mathenge, 2011).

Dependent and independent variables

Pineapple Market Outlet Choice (PMOC): The market outlet choices might be along farmers' decisions involving in the alternative markets.

The pineapple market outlet choice mostly used by small holder households in the study area were: 0=Informal private traders, 1=Pineapple marketing cooperatives and 2=Formal private traders.

Multinomial Logistic model was applied to estimate farmers' market outlet choice decisions to sell their produce in one of the alternative markets available markets available in study area (Walter, et al 2007). The description of both dependent and independent variables are indicated below in Table 2.

Table 2. Description of dependent and independent variables in the study.

Variables	Measurement	Value		
Dependent variable				
Market outlet choice	Ordinal	0=Informal private traders, 1=Cooperatives, 2=Formal private traders		
Independent variables				
Sex	Nominal	1=Male,	2=Female	
Age	Ordinal	1=18-25, 4=51-64	2=26-35, 5=above 64	3=36-50,
Education level	Ordinal	1=Not educated, 2=1-4 grade, 3=5-8 grade, 4= 9-10 grade, 5= certificate and above		
Family size	Ordinal	1=1-2,	2=3-5, 3=6-8 ,	4=above 8
Annual income	Ordinal	1=below 3000, 2=3000-5000, 3=5001-7000, 4=above 7000		
Access to market center	Ordinal	1=Strongly disagree, 2=Disagree, 3=Neutral 4=Agree, 5=Strongly agree		
Access to market information	Ordinal	1=Strongly disagree, 2=Disagree, 3=Neutral 4=Agree, 5=Strongly agree		
Access to extension service	Ordinal	1=Strongly disagree, 2=Disagree, 3=Neutral 4=Agree, 5=Strongly agree		
Access to transportation service	Ordinal	1=Strongly disagree, 2 = Disagree, 3=Neutral 4 = Agree, 5=Strongly agree		
Access to credit service	Ordinal	1=Strongly disagree, 2=Disagree, 3=Neutral 4=Agree, 5=Strongly agree		

RESULTS

Cross-tabulation on socio-demographic characteristics with pineapple market outlet choices

The main objective of this study is to trace out the influential factors that determine the marketing outlet choices of pineapple producing farmers in the study area. The association between each explanatory variables and the dependent variable (Pineapple Market Outlet Choice) was conducted by cross tabulation (Woldesenbet, 2013). Determining variables were categorized under different factors and they were analyzed one by one using Pearson Chi-square test in order to identify their independent effect on pineapple market outlet choice. The following Table 3 shows that the relationship between sex and market outlet choice in the study area describes as follow:

Table 3. Relationship between socio-economic characteristics and market outlet choice.

Variables		Market outlet choices								x^2 Cal P-Value
		Informal private traders		Cooperative		Formal private traders		Total		
		N	%	N	%	N	%	N	%	
Sex	Male	69	90.8	21	95.5	141	79.2	231	83.7	7.652 (0.022)
	Female		9.2	1	4.5	37	20.8	45	16.3	
Age	18-25	6	7.9	1	4.5	2	1.1	9	3.3	68.353 (0.000)
	26-35	38	50.0	7	31.8	20	11.2	65	23.6	
	36-50	29	38.2	8	36.4	98	55.1	135	48.9	
	51-64	3	3.9	4	18.2	53	29.8	60	21.7	
	Above 64	-	-	2	9.1	5	2.8	7	2.5	
Education	Not attended	55	72.4	16	72.1	75	42.1	146	52.9	26.210 (0.001)
	Grade 1-4	11	14.5	2	9.1	45	25.3	58	21.0	
	Grade 5-8	7	9.2	1	4.5	40	22.5	48	17.4	
	Grade 9-12	2	2.6	2	9.1	12	6.7	16	5.8	
	Certificate& above	1	1.3	1	4.5	6	3.4	8	2.9	
Family Size	Having 1-2	10	13.2	4	18.2	2	1.1	16	5.8	32.245 (0.000)
	>>3-5	58	76.3	12	54.5	116	65.2	186	67.4	
	>>6-8	8	10.5	6	27.3	58	32.6	72	26.1	
	Above 8	-	-	-	-	2	1.1	2	0.7	

According to the above Table 3, out of the total respondents who chose informal private traders, 69 (90.8%) of them are male and 7 (9.2%) are female pineapple producing farmers (Xaba and Masuku, 2013). Moreover, from total respondents who chose pineapple marketing cooperatives, 21 (95.5%) of them are male and 1 (4.5%) are female respondents. On the other hand, out of the total respondents who chose formal private traders 141 (79.2%) of them are male and 37 (20.8) are female pineapple producing farmers. In addition, the Chi-square analysis (x^2=7.652, p<0.05) revealed that sex of pineapple producing farmers and market outlet choice have statistically significant association.

As survey result depicted, males are more likely to sell directly to the cooperative and informal private traders than to the formal private traders. Females on the other hand are also more likely to sell directly to the formal private traders and the informal private traders as compared to the cooperative. Key informants argue that male house head pineapple producing farmers mostly choose cooperatives to sell their products.

Because, they mostly constitute in cooperatives and their cooperatives supports by offering services. With regard to age of pineapple producing farmers, out of total respondents who preferred informal traders, 38 (50%) of them fall in the age category of 26-35 and 29 (38.2%) are from 36-50 age group.

However, out of total respondents who preferred pineapple marketing cooperatives, 8 (36.4%) of them in the age category of 36-50 and 7 (31.8%) are from 26-35 age group. On the other hand, out of total respondents who chose formal private traders, 98 (55.1%) of them fall in the age category of 36-50 followed by 53 (29.8%) are from 51-64 age group and 20 (11.2%) are from 26-35 age group. Furthermore, the Chi-square analysis (x^2=68.353, p<0.01) revealed that age of pineapple producing farmers and market outlet choice have statistically significant association. The result indicates that, matured pineapple producing farmers choice formal private traders market outlet. Key informants also informed that those matured pineapple producing farmers who are more effective to sells their products easily to formal private trader's market outlet. They are agreed with the empirical findings.

With regard to educational level of pineapple producing farmers, out of the total respondents about 52.9% of pineapple producing farmers did not attended formal education, while 47.1% of them attended formal education. On the other hand, out of the total respondents who preferred informal private traders 55 (72.4%) of them are not attended formal education and 11 (14.5%) are attended formal education from grade 1 up to 4. Whereas, out of the total respondents who chose pineapple marketing cooperatives 16 (72.1%) of them are not attended formal education and 2 (9.1%) are attended formal education from grade 1 up to 4. On the other hand, out of the total respondents who preferred formal private traders 75 (42.1%) of them not attended formal education followed by 45 (25.3%) are attended formal education from grade 1 up to 4 and 40(22.5%) attended grade 5 up to 8.

Furthermore, the Chi-square analysis (x^2=26.210, p<0.01) revealed that educational level of pineapple producing farmers and market outlet choice have statistically significant association. The result indicates that, non-educated pineapple producing farmers' chose informal private traders' market outlet. The key informants also informed that those non-educated pineapple producing farmers who were less effective than educated pineapple producing farmers to sell their products at formal private traders' market outlet choice. This means as one's level of education increases the farmers tend to sell their products more to the formal private traders and cooperative relative to other marketing outlet.

Concerning to family size of pineapple producing farmers, out of total respondents who preferred informal private traders, 58 (76.3%) lies in the having family size of 3-5 and 10 (13.2%) lies in having 1-2 family size. On the other hand, out of total respondents who preferred pineapple marketing cooperatives, 12 (54.5%) fall in family size group 3-5 and 6 (27.3%) are lies in having 6-8 family size group. Moreover, out of the total respondents who preferred formal private traders, 116 (65.2%) fall in the family size group 3-5 and 58 (32.6%) are from group having the family size 6-8. Furthermore, the Chi-square analysis (x^2=32.245, p<0.01) revealed that family size of pineapple producing farmers and market outlet choice have statistically significant association. The result demonstrates that, the respondents who having the middle number of family size chose informal private traders' market outlet choice. According to the above Table 3, income level of pineapple producing farmers, out of total respondents who chose informal private traders, 56 (73.7%) of them in the range of earning 3000 up to 5000 birr followed by 20 (26.3%) are range of earning below 3000 birr.

Whereas, those respondents who chose cooperative, 11 (50%) of them earns in the range of 3000 up to 5000 birr. However, out of those respondents who chose formal private traders, 167 (93.8%) of them are earns in the range of 3000 up to 5000 birr followed by 8 (4.5%) of them also earns below 3000 birr. Besides, the Chi-square analysis (x^2=50.513, p<0.01) implies that income level of pineapple producing farmers and market outlet choice have statistically significant association. The result demonstrates that, the respondents who having the middle income level chose formal private traders market outlet.

The information collected from key informant's interview revealed that those pineapple producing farmers were earned the middle income level more effective to sell their products to the nearest market center.

Factors affecting the pineapple market outlet choice

Institutional factors affecting the pineapple market outlet choices: In this study the researcher pick out the determinants of pineapple market outlet choice such as approach to market center, access to market information, access to extension service, access to transportation facility and access to credit service are the most important access to be more profitable from production and marketing of pineapple (Table 4).

Table 4. Institutional factors of pineapple market outlet choice.

S.N	Variable	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	Access to market	56 (20.3)	218 (78.9)	-	2 (0.7)	-	276 (100)
2	Access to market	44 (15.9)	231 (83.7)	-	1 (0.4)	-	276 (100)
3	Access to extension	50 (18.1)	222 (80.4)	2 (0.7)	2 (0.7)	-	276 (100)
4	Access transportation	58 (21.1)	216 (78.2)	-	2 (0.7)	-	276 (100)
5	Access to credit	4 (1.4)	141 (51.1)	101 (36.6)	26 (9.4)	4 (1.4)	276 (100)

Table 4 showed that majority 218 (78.9%) and 56 (20.3%) of the respondents were disagree and strongly disagree to delivering the access to market center, where the rest 2 (0.7%) of the respondents reported that they were agreed to getting the access to market center.

Thus, this result implies that almost all respondents were not getting the market center access to sell their pineapple products to the market center. In addition to that, most 231 (83.7%) and 44 (15.9%) of the respondents were disagree and strongly disagree that they have no access to marketing price information.

This result depicted that the majority of the respondents were lack of access to marketing price information to sell their pineapple products. With regard to access to extension service, the above Table 3 reveals that, the majority 222 (80.4%) of the respondents were disagree that they didn't get access to the extension services where, 50 (18.1%) were strongly disagree. Therefore, the result implies that most of the respondents have no access to extension services from supporting governmental organizations such as agricultural development extension agencies. Respondents were requested whether the farmers have access to transportation facilities, majority 216 (78.2%) of the respondents were answered disagree to getting the access to the transportation services followed by 58 (21.1%) were strongly disagree. Correspondingly, the rest few 2 (0.7%) of the respondents were agree to getting the transportation service. Therefore, this result demonstrates that the most of the respondents were lack of transportation facilities they sells their pineapple products to at fewer prices in their farm gate to available traders. Key informants were indicating agreed with the empirical findings of inadequate means of transport, inadequacy of transport service in an important determinant that hinders agricultural marketing areas, seasonality of transport service, high charges due to inadequacy, lack of all- weather roads and transport vehicles and unsuitability of the existing transport facilities. As can be seen on table 4 above, about 141 (51.1%) of the respondents were disagree with access to getting credit services from the loan lenders followed by 4 (1.4%) respondents were strongly disagree. Whereas, out of total 101 (36.6%) of the respondents were neither agree nor disagree to getting the credit

services. Contrarily, the rest of few 26 (9.4%) and 4 (1.4%) of the respondents were agree and strongly agree to getting the access to credit services, respectively. This result revealed that, most of the respondents were have no access to credit services to produce and supply the quality and quantity products of pineapple. Key informants informed that pineapple producing farmers did not have an access to credit facilities either from formal or informal financial institutions, absence of credit services the farmers were not supply the quality and quantity products to the market center.

Socioeconomic factors affecting the pineapple market outlet choice: The Multinomial Logistic (MNL) regression model was used to identify the factors that affect pineapple producing farmers" market outlet choices with three categories, formal private traders, informal private traders, and cooperatives in the study area. Several variables were hypothesized to factors affects that market outlet choices by sampled pineapple producer farmers. Before running the MNL regression model data analysis, all the hypothesized explanatory variables were checked for the existence of multi-collinearity and independence of irrelevant alternative problems. The study used Hausman specification test to detect independence from Irrelevant Alternatives (IIA), Variance Inflation Factors (VIF) and Hetroskedasticity test were done to investigate the degree of multi-collinearity among variables. The IIA assumption is most likely to be problematic when the alternatives are similar to one another, so that unobserved factors affecting one alternative may as well affect another alternative. The IIA assumption was tested based on the Hausman specification test. The results of VIF analysis was found below 6.0 for

all variables. Hence, multi-collinearity was not a serious problem (Appendix I). For the regression output of the model Breusch-Pagan/Cook-Weisberg test for Heteroskedasticity was conducted on STATA to test for homogeneity of variance and a p-value of greater than 0.05 were acceptable. As results revealed, p-value for the model is greater than 0.05 the critical value, shows homogeneity of variance across the model, since a probably is not equal to zero, there is no problem of Heteroskedasticity (Appendix II). In terms of goodness of fit, the likelihood ratio Chi^2 226.867 and the pseudo-R^2 measures were 0.689. Further, the probability of Pearson Chi^2 of 0.11 and that of Deviance Chi-square of 1.000 confirmed that the model fit the data well. These measures were statistical significant at less than 1 percent level (Table 3) depict that the coefficients from multinomial logit regression model on the existing alternative marketing outlet in the sample and the marginal effect. According to Greene, the sign of the coefficient shows the direction of influence of the variable on the logit. It shows that a positive value indicates an increase in the likelihood that a household will change to the alternative option from the reference (formal private traders) category.

The results show that six of the variables were significant at both market outlets; while the other one variable was significant in cooperative market outlet choice, compared to the base category, variables such as age, educational level, access to market center, access to market information, access to transportation service and access to credit service were statistically significant in both informal private traders and pineapple marketing cooperative market outlets while annual income level has significantly affected the main choice of cooperative market outlet (Appendix III). The results of the estimated marginal effects were discussed in terms of the significance and signs on the parameters. The positive estimated coefficients of a variable indicates that the probability of the producers being in either supplying to informal private traders or cooperative market outlet relative to supplying to formal private traders market outlet increases as these explanatory variables increase. The implication is that the probability of the producers to be on these outcomes is greater than the probability of being formal private traders (base category). The negative and significant parameter indicates the probability of using formal private traders market outlet is higher than the probability of being in the two alternatives. Estimates not significantly different from zero indicate that the explanatory variable concerned does not affect the probability of the producers decision to use formal private traders market outlet category than in the other two categories.

The alternative "formal private traders" was used as a base category (bench mark alternative). This implies that the discussion of the results focuses on the impact of the explanatory variables on a use of informal private traders and cooperative pineapple market outlet category relative to use of formal private traders (the base category) market outlet (Table 5).

Table 5. Coefficients and marginal effects of MNL model for choice of pineapple marketing outlets.

Variable	Informal traders			Cooperatives		
	Coef	P>z	Dy/dx	Coef	P>z	Dy/dx
Intercept	35.858	0		23.634	0	
Sex	-0.514	0.466	-0.036	-1.376	0.207	-0.112
Age	-3.155	0.000***	-0.298	-1.291	0.003***	-0.077
Level of education	-1.321	0.000***	-0.121	-0.898	0.002***	-0.063
Family size	-0.439	0.561	-0.043	-0.013	0.988	0.003
Average of annual income	1.682	0.153	0.138	2.719	0.036**	0.214
Access to market center	17.456	0.008***	1.553	13.466	0.048**	0.963
Access to market information	-6.005	0.003***	-0.541	-4.976	0.033**	-0.361
Access to extension service	-6.12	0.058*	#####	-1.914	0.597	-0.989
Access to transport service	-26.781	0.001***	-2.448	-18.708	0.025**	-1.312
Access to credit service	-2.491	0.000***	#####	-1.949	0.001***	-0.139
Reference category	Formal traders					
LR chi^2(20)	226.867					
Pseudo R^2	0.689					
Log likelihood	-215.64					
LR sig.	0					

Note: ***, ** and * indicates statistically significant at 1%, 5% and 10% probability level, respectively; dy/dx is marginal effect.

The coefficients from multinomial logit can be difficult to interpret because they are interpreted relative to the base outcome. To better evaluate the effect of a unit change in covariates on the dependent variable, the marginal effects are examined. Table 5 presents the marginal effects of factors affecting farmers' choices of different market outlet to pineapple marketing. Accordingly, the multinomial logit regression model was

significant at 1% and 5% significance level indicating that all the independent variables jointly influenced the dependent variable.

Age of the household head: Age of the household heads had a negative and significant influence related to the likelihood participation of selling their product for informal private traders and cooperative market outlet at 1% significance level, respectively. The result depicted that a one year increase in household age reduced the probability of participating informal private traders and cooperative market outlet choice by 29.8% and 7.7% relative to participation of selling their pineapple product to formal private traders, respectively. Matured farmers have stronger networks with formal private traders as compared to the younger farmers, due to many years of trade and repeated visits creating trust, they preferred formal private traders because they had developed a long term relationship. This result consistent with Xaba and Masuku, Girma and Abebaw and Walter who confirmed the age of household is an important determinant of market participation decision by small farmers. Among the studies, Girma and Abebaw, confirmed the age of household had negatively and significantly influence market participation decision of farmers on the livestock market.

Level of education: Educational level of the household heads had a negative and significant influence on the selling the products to informal private traders and cooperative market outlet compared to formal private trade at 1% significance level. This shows a negative relationship between the level of education and informal private traders and cooperative choice of market outlet as compared to formal private trader market outlet. The result shows that a one unit increase in level of education by the household head level reduced the likelihood of his/her ability to sell the products through informal private traders and cooperatives market outlet as compared to formal market outlet by 12.1% and 6.3%. The negative relationship between education level and selling to informal private trader and cooperative market outlet can be explained by the fact that, being educated enhances the capability of farmers in making decisions with regard to the choice of marketing outlets. Formal education enhances managerial competence and successful implementation of improved production, processing and marketing practices. The study by Nyaupane and Gillespie on factors influencing producers' marketing decisions in the Louisiana Crawfish Industry found that farmers with college degrees are more likely to sell their product *via* wholesalers and less likely to market *via* processors.

Amount of annual income: The annual income has positive and significant effect on selling their pineapple products to cooperatives comparing to formal private traders market outlet choice at 5% significant level. This indicated that better income farmers sell their pineapple products for cooperatives than formal private traders. The result shows that a one birr increase in level of annual income of the farmers increases the likelihood of farmers' to sell their products through cooperatives market outlet as compared to formal market outlet by 21.4%. The result is consistence with Girma and Abebaw, who found an income, had statistically significant effect on the market outlet choices of small holder farmers.

Access to market center: Access to market center has a positive and significant effect on selling their products to informal private traders and cooperatives market outlet choice at 1% and 5% level of significance,

respectively. The marginal effect shows that, other things being constant, the likelihood of choosing informal private traders and cooperative market outlet increased by 0.15% and 9.6% relative to formal private trader market outlet. The implication is that households located far away from the nearest market center faces difficulty in delivering pineapple to formal private traders' market outlet due to poor infrastructure and hence, sold to available market outlets in their locality. Moreover, the positive relationship between distance and likelihood of choosing a cooperative and informal private traders' was due to the fact that cooperatives have pineapple collection centers in each kebeles/nearby kebeles to collect pineapple at farm gate which in turn reduces the transportation cost of pineapple producers. Likewise, informal private traders purchase pineapple at farm gate from pineapple producing farmers by going door to door. The result obtained is contradictory with the finding of Assefa distance from the market has negative and significant effect on the preference of farmers for cooperatives and has positive and significant impact on preference of farmers.

Market information: Market information had a negative and significance influence on the likelihood of selling their products for informal traders and cooperatives at 1% and 5% significance level, respectively. Informed farmers about pineapple market in the study area had lower probability of selling their pineapple products to informal private traders and cooperatives relative to formal private market outlet. Keeping other variables constant, having market information decreases the likelihood of choosing informal private traders and cooperative outlets by 54.1% and 36.1%, respectively. The reason is that

farmers those having market information would appropriately choose pineapple market outlet with high market information which fulfills their needs and which reduces transportation expense. The result is consistence with Kuma who found that access to milk market outlet price negatively affected accessing cooperative milk market outlet as compared to individual consumer milk market outlet.

Access to extension service: Access to extension service is negatively and significantly associated with the likelihood of choosing informal private trader market outlet at 10% level of significance. Farmers' access to extension service increases the ability of farmers to acquire important market information as well as other related agricultural information which in turn decreases farmers' ability by 58.4% to choose the formal private market outlet for their products. This is in line with Woldesenbet who found negative impact of agricultural extension service on the probability of choosing collector and retailer outlets compared to wholesale outlet in vegetable market outlet choice.

Transportation service: Access to transportation service had a negative and significance influence on the likelihood of selling their products for the informal traders and cooperatives at 1% and 5% significance level respectively. The marginal effect result shows that keeping other variables constant, having transportation service decreases the likelihood of choosing informal private traders and cooperative by 0.24% and 0.13%, respectively. For this study, high transport cost would favor formal private traders than informal private since formal private traders bought high volumes, which could enable farmers to cover the higher transport costs.

This result is contradictory with the finding of Mekonen who found that owning transportation facility positively related to the choice of end consumer and cooperative outlet in market outlet choice of coffee.

Credit service: The effect of credit service on market outlet choice of pineapple producing farmers was negatively and statistically significant at 1% level for informal traders and cooperatives. The marginal effect result indicates that other things being constant, having credit service decreases the likelihood of choosing informal private traders and cooperative outlets by 22.6% and 13.9%, respectively. The implication is that if a farmer has access to credit he/she can purchase pineapple inputs to improve production and increases volume of pineapple. It also enables them to easily access transportation facility which assists to greater depth of choosing market. This is contradictory with the study of Girma and Abebaw that explained the availability of credit or loan services positively and significantly influences the choice of private markets.

DISCUSSION

Understanding marketing outlets is important for achieving marketing integration and inclusion for smallholder farmers. Farmers are attracted to a particular marketing channel based on a mix of personal and socio-economic attributes and other marketing enabling factors. The majority 83.7 percent of sampled pineapple producing household were male headed households compared to female headed. This implies that the women have an insignificant role in pineapple production and marketing activities in the study area. Education status of pineapple producing farmers has statistically significant effect on the pineapple market outlet choice. The survey

result revealed that formal private traders were found to be the most patronize outlet in the study area. The primary reason for this is farmers need money during summer season and so that they made informal contractual agreement with private traders to take a loan. Result showed that, neighbor farmers and informal traders around the village are the only sources of market information. Having no access to reliable market information, negatively affect farmers' power in negotiating selling price for their products. The informal traders make the price margin at the expense of producers by reducing the farm gate price or cheating weighting scales. Absence of access to credit service from formal financial institutions makes the farmers to borrow from local money lenders with high cost of interest for a short period of time. The parameter estimate from multinomial logistic regression shows that, age of respondents, level of education, access to market information, transportation facility and access to credit services were negatively and significantly influence farmers' choice of marketing outlet, whereas, access to market center and amount of annual income level was positively and significant influence their choices.

CONCLUSION

Based on the findings, expanding equal accessibility of infrastructures, formal financial institutions to provide long term loans and marketing information for farmers are the key points which need the government intervention to promote the effective marketing of pineapple through all outlets. Thus, concerned bodies should create the awareness of households about the importance of education and be able to disseminate market price information at the appropriate time for the farmers in which they

can equally get the accessibility. Moreover, the study recommends that for holistic market outlets among pineapple farmers, proper marketing infrastructure like pineapple hub must be put in place and the government should take action to protect the legal traders from unfair competition with informal traders either by preventing informal traders not to participate or convincing them to become legal.

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AUTHORS' CONTRIBUTIONS

Both authors played crucial role during the study period. The corresponding author, DB help performing statistical analysis and design to draft the manuscript, while the second one collected data, performed statistical analysis and wrote the manuscript. Finally, both authors read and approved the final manuscript.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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