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RESEARCH ARTICLE

THE EFFECT OF TRANSACTION COST ON CEREAL AND PULSE CROPS PRODUCER FARMERS IN SALALE (NORTH SHEWA ZONE), (ETHIOPIA)

[1,*]Teferi Girma Bekele and [2]Getamesay Bekele Meshesha

[1]Addis Ababa Road Traffic Management Agency, Addis Ababa, Ethiopia
[2]Debre Berhan University Department of Economics, Debre Berhan, Ethiopia

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ABSTRACT

This study provides empirical suggestion listed effect of transaction cost on cereal and pulse crops producer farmer households in Salale (North Shewa Zone), (Ethiopia). The purpose of this study is to provide empirical evidence on the transaction cost effects on farmer house hold in the area.To select sample size respondents multistage sampling technique is used. In addition to this, 2 Salale Union worker, 15 government employee and 15 merchant respondents were included on focus group discussion. To make the result more fruitful mixed research method was employed. To describe the data some descriptive statistic and probabilistic regression were used as econometric part. The result of the probabilistic model shows that transaction cost negatively affected the profitability of the farmer. Transaction cost happened because of malmarketing of agricultural products merchants on the small house hold farmers. Farmers use agricultural inputs from market cooperatives and buy their crops to the cooperatives have less transaction cost, highly productive and more profitable. Minimizing transaction cost and increasing road access to farmer by concerned local government institution and nongovernmental organization is recommended.

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INTRODUCTION

Transaction costs are found to be high on agricultural markets in developing countries and have a considerable influence on farmers marketing decisions. Several studies shows that transaction costs are closely relate to distance and that from markets negatively influences market participation and thus incomes (Alene, *et al*., 2008). Besides, Staal, *et al*., 1997, said that transaction costs raises more than proportionally to transportation costs because of factors like increasing costs of information and risk of spoilage of agricultural products. Many of developing countries' economies are challenged with changing commodity and food markets price, due to urbanization, economic liberalization and globalization. According to IPMS, 2010, study indicated the economies of developing countries are highly dominated by primary sector that is agriculture with tradition and semi modernized. In Africa transaction costs is arise from poor coordinated market or lack of necessary institutional support for least-cost information sharing, monitoring, and negotiation. In addition, market arrangements may increase risks for all market participants or shift risks to participants who are less able to manage them (Kirsten *et al*., 2009).

***Corresponding author*: Teferi Girma Bekele**
Addis Ababa Road Traffic Management Agency, Addis Ababa, Ethiopia.

Sub Saharan African countries like Ethiopia agricultural input market formal improved seed suppliers are largely controlled by the government and public organizations. Based on a monopoly of breeder seed the government forces seed companies to market all seed through one government-controlled distribution channel, and the prices has determined by the government. This limits profit margins and incentives to expand seed production. The only exception to this systems are the international seed companies that operate in Ethiopia as these produce their own varieties and are thus not dependent on the breeder seed provided by the public research institutions. Thus, especially the government bears high transaction costs to sustain a system that does not lead to satisfactory outcomes. However, direct marketing pilots have been started that allow Ethiopian seed companies to market their seed directly to farmers for the first time, which may indicate a first step towards market liberalization (Husmann, 2012). All most, in all kebeles farmer's cooperatives are established and contrast tothis they had no work with consumer's cooperatives, agro processing micro and small scale enterprise and agro processing industries. In all North Shewa Zone seasonal market difficulties were other major problem. This is because of during harvesting and collection crops farmers' have too many expense. Taxation, recreation, wedding and other ceremony are main challenges of the farmers after harvesting and collection

period. Farmers have the problem of financial access, road access, awareness of marketing and properly store their products. When we look at the cost of input like improved seed, Fertilizer, Pesticide, Insecticide supply chain with farmer is not enough, this increases cost to the farmer. Those problems are increase additional cost or loose of price to the farmer. These all farmers go toward unexpected low price sell for merchants, farmers do not get bargaining power for their product and all problems affect negatively the price of agricultural products, and it results the profit of farmer decline (Teferi *et al*., 2017). North Shewa Zone has large products of cereal and pulse crops and with high transaction cost. Farmers of the Zone are well known by different cereal like teff, wheat, burley, maize, sorghum, millet and different types pulse like Beas, pea, lentil crops production. Annually, many farmer of the Zone produced ones about 7,967,002 quintals of cereal and pulse are produced in the area; out of this 5,469,750 quintal is pulse and 1,801,903 quintals of cereals. In addition to this, farmers in North Shewa are very known by livestock breed and dairy production (ZFED, 2014). The main objective of the study are to assess the factors that affect transaction costs for agricultural inputs and products in the zone and to investigate factors that affect profitability of the farmers in the area. And the study answered the following questions;

- What are the main factors that affect the transaction costs for farmers' agriculture commodity in the Zone?
- What are the factors that affect profitability of the farmer in the area?

Literature Review

Definition and Concept of Transaction Costs

Transaction Cost:-The type of cost that deserved when swapping goods/services on the market, such as: contract enforcement costs, search and information costs, commissions to intermediaries (Williamson, 2002). The world's growing population, the increasing integration of the global economy has provided the opportunity to achieve significant prosperity gains. For developing countries, the globalization of manufacturing industry has opened up new prospects of upgrading their industrial and service sectors. It also holds the promise of higher incomes, increasingly differentiated final products and a greater availability of quality goods. Most notably, free trade agreements had created new export opportunities, mainly for food products, as the demand for variety continues to grow in developed countries. This issues creates new cost incurs by either producer or consumer that is transaction cost (Husmann, 2012). Different scholars categorize transaction costs in to two main branches. These are identified by proportional and fixed transaction. Some literature had divided transaction costs into tangible costs such as: transportation, communications and legal costs and intangible costs such as: levels of uncertainty and moral hazard. Proportional and fixed transaction costs can be separately identified, even when they share the same determinants, through the estimation of a minimum threshold level for the transactions, as implied by the presence of fixed transaction costs. The last study provided a measure for proportional transaction costs, but only revealed the presence and determinants of fixed transaction costs, without taking them into account within the calculation. Finally, one can choose between different markets with different transaction cost structures to reveal the role these costs play in the making of market choices for the cattle market in the USA (Okay *et al*., 2016). Since Williamson (2002) examine on theory of Transaction Cost Economics, different scholars start to apply transaction cost economics to explore a variety of economic relationships, ranging from lateral and vertical integration to market channel selection, make-or-buy decision, as well as contract arrangement. However, unlike production costs, transaction costs are difficult to assess as they represent the potential consequences of alternative decisions. Several studies focus on measuring the magnitude of transaction costs associated with the implementation of various public policies, and the comparison between different contractual relations. Given the increasingly important role in rural areas played by cooperatives, our study specifically focus on the comparison of two distinct transactional mechanisms by evaluating the magnitude of transaction costs (Lijia *et al*., 2014).

Empirical Literature

There are few empirical studies concerning the transaction cost for different types of crops and others productions in Ethiopia. So, different scholars looked discourage smallholder farmers by adding unnecessary cost made farmer price taker in the market. There are also a few studies that are discussed the transaction cost with in agricultural inputs. Among these:

To better understand, the influence of transaction costs on household production and marketing behavior different study is done. Different scholars' articles have slowly clarified the role of transaction costs in household market participation patterns and discuss some country literature. When we look milk production marketing failure in Kenya and Ethiopia it is caused by high transaction cost. Transaction cost has heavily impact and impede commercial production of milk in these countries. When institutions are effectively managed they can reduce the toll of transaction costs for both the producers and buyers. Different studies investigated the reasons for inter-cropping versus efficient cropping in East Africa. In the market transaction costs represent a barrier to more efficient cropping in East Africa. The impact of transaction costs in the coarse grain market in Senegal and finds that better information raises the probability of market participation. The effect of transaction costs on grain trading in Ethiopia and concludes that searching costs canconsiderably as constrain of grain traders (Maltsoglou *et al*., 2005).

Farmer faces different transaction costs during selling agricultural product or purchasing agricultural inputs. High transaction cost made farmers to be subsistence that means producing crops only for home consumption purpose. This made farmer less producer due to market failure for his/her production. Commercializing agricultural production, made prices guiding resource allocations are endogenous "shadow prices," shaped by the household's characteristics affecting supply and demand, whereas in the other market, they are exogenous, market prices (Salami *et al*., 2010). Lijia *et al*., 2014, studies explained that different scholars look transaction cost as traditional analysis of marketing costs. However, they can also be a part of transaction costs if they are specific to that market channel. The distance to the sales point was used as a measurement of transportation cost (Hobbs, 1997). Therefore, transportation cost is regarded direct transportation cost includes the cost of labor use and vehicle use transporting products from farm gate to trading sites and indirect transportation cost refers to the product loss caused by the bad

road condition and poor storage condition. The lack of adequate infrastructure for cold storage and transportation result in the waste/loss of products in developing countries. It is thus expected to be higher for conventional growers than cooperatives growers because part of apple loss related to poor storage can be avoided by cooperatives growers. The storage service provided by cooperatives can be as the explanation. With the storage facilities, it can not only solve apple rotting problem, but also help growers to store apples at harvest season and sell apples at off-season with high price. Okay *et al*., 2016, studies found that high transaction costs discourage market entry of smallholder farmers. Smallholder cassava farmers in Central Madagascar are not successful to commercialization their agricultural production. Native of community and farming experience, have a direct relationship with decision to participate in the market and road condition to the nearest town has positive relation to decide market participation. Transaction costs incurred duringparticipation and sales could be reduced by the existence of improved information and transportation infrastructure and the deeper penetration of reputable input distributors, and also the promotion of institutional innovations such as production and marketing cooperatives.

The benefit for rural farmers of higher output prices depends on the marketable surplus they produce and take to nearby grain markets. Coupled with the limited surplus output, high transaction costs and inadequate market information limit the commercialization level of rural farmers. Although there exists variation across different regions of the country, commercialization of smallholder farmers is generally limited. About 20% of smallholder grain production is marketed whereas above 60% is used for home consumption. The remaining is set aside for seed or used as animal feed and for in-kind-payments.The market focus study showed that in Asaita, the goat market composition was a loose oligopoly with a concentration ratio of 44.81, subjugated by a small number of formal and informal male traders and butchers. This analysis of market margins and performance revealed that, because medium-scale traders are well connected to markets offering good prices, most producers are obliged to sell their goats through the channels they control. The study analyzed that if the producers organise into cooperatives, they could gain greater collective control over the supply of goats to tradersand markets (Teferi, *et al*., 2017) From these arguments there are few studies on the transaction cost in Ethiopia. While studying the transaction cost there is a need to check the profit maximization of the farmer with transaction cost, impact to unobserved selection bias using maximum likelihood procedure (based on the nature of the outcome variable).

Methodology and Data Description

Research Design

Research design is a master plan specifying the methods and procedures for collecting and analyzing the needed information. It ensures that the study would be relevant to the problem and that it uses economical procedures. From the types of research design this research was employed descriptive and empirical research. Moreover, the study utilized cross-sectional data in the sense that all relevant data were collected at a single point in time. The reason for preferring a cross-sectional study is because of getting organized long year data was difficult in the area.

Obtaining information from a cross-section of a population at a single point in time is a reasonable strategy for pursuing many descriptive researches (Janet *et al*., 2006). Mixing qualitative and quantitative approaches gives the potential to cover each method's weaknesses with strengths from the other method. In this study, a combination of qualitative and quantitative research method of doing researches were employed, which were practiced, as recommended by (Creswell, 2009).

Study Area

Geographically North Shewa located in Oromia which is by default becomes central of Ethiopia in Oromia Regional State. It is bounded by Amhara National Regional State and three Oromia regional state zones, which are North shewa of Amhara National Regional State in the North and East direction, in the Western, West Shewa zone of Oromia regional state, Oromia special zone surrounding Finfinne in the south, and in the South East Shewa. Astronomically, the Zone foundbetween $8^0$55'N and $10^0$23'N latitude and $37^0$56'E and $39^0$32'E longitude (and 112 km north west from capital of the country Addis Ababa (Teferi *et al*., 2017). Since the zone found in the north of the rift systems, it has its own geographic entities. The highlands of the zone gradually increase in elevation toward central parts from the northern and north western of the zone. The lowlands include flat plains, river valleys and gorges broken up by hills and ridges. Similar to the high plateau the majority of the lowland is characterized by agricultural and semi-nomadic activities (pastoralist) (ZFED 2014).

Methods of Data Collection

The data were collected from primary source and secondary sourcesto finalize the study.

Primary Source

The author took primary data as best instrument to collect data from respondent by usingwell-designed questionnaire and discussing with focal group in the area.This was done by preparing), interviewing with focal group and key informants respondents. Not only this, the author used open-ended questionnaires (semi structured questionnairesfrom farmers) us a major data gathering. The focal group discussion is with educated farmer and key informant interviewing with government workers, merchant and nongovernment workers participating in the area. Semi structured questionnaires are necessary for more explanation of some wanted data.

Sample Size Estimation and Sampling Method

Multistage random sampling technique uses to get information from different sizes of the population specially land plough farmers. According to Janet (2006), this step increases the probability that the final sample represents in terms of the multistage clustering is necessary. After pass three stages technically sample elements were selected step by step and finally, 418 farmers household were selected as sample units by random sampling. Out of the 418 household 394 respondents take the answer. According to Dawson (2009) the correct sample size in a study is dependent on the nature of the population and the purpose of the study. The sample size selected here is considered as representative of small

households who participate in farming specially producer of cereal and pulse crops in the area. To determine sample size the study used sample size formula.

Where n= sample size
p= probability of farmers profitable
q= probability of farmers not profitable
z=standardized normal value
α= level of significance

$$n = \frac{z2*p*q}{\alpha 2} \quad (1)$$

According to ZFED, 2014 45 percent of the North Shewa Zone are profitable from agricultural production.Here to estimates sample size depend on 45percent of the farmers in the area are profitable and the left 60% farmers are not profitable. The study set z= at 95% and its standardized normal value is 1.96, P=0.45 and q=0.55 α= 0.05

By using above formula minimum sample sizes of 380 is calculated. So from total population the researcher collected only 418 that are expected to represent wide population by considering 10% i.e. 38 for non-respondent households.

Data Analysis

This is further transformation of the processed data to look for patterns and relationship between and/or among data groups by using inferential analysis. Specifically, descriptive and inferential statistics (regression) are taken for this study. And also, profit is dependent variable and factors affecting profit like costs of inputs, awareness of the farmer, road access to the house hold dweller market information, fixed cost of house hold, family size, interest (cost of capita) and etc are independent variables. Since profit is a difference function of revenue and cost, can put

Π=TR-TC +u (2)

Where Π= Profit of the firm TC =total cost
TR= Total Revenue u = error terms

Econometrics Model Specification

Economics model is precise in assessing the relationship between the explained and explanatory variables and predicts its significance. According to Greene, 2003, multiple regression equation can be stated as follows:

$Y= \alpha+\beta_1 x_1 +\beta_2 x_2 +\cdots+\beta_7 x_7 +e_i$ (3)

Here "Y'' stands for vector of "n" observations of dependent (X's) variable and β's is the coefficient vector of X's represents the explanatory variables and e_i represent stochastic error term Finally, the model of the study can be specified as;

profit=f (Education ll head, family size ,Wage, awareness, distance, cost of land, improved Seed, financial Access, interest) (4)

Econometrics Model Estimation

After selecting probabilistic model for the analysis, the dependent variable is assigned a value of 1 or 0, representing profitable or not profitable, respectively.

Since the method of OLS does not make any assumptions about the probabilistic nature of the disturbance term e_i in probabilistic regression, the parameters of the model were estimated using the maximum likelihood (ML) method (Gujarati 2003). Due to the non-linearity of the probabilistic regression model, an iterative algorithm is necessary for parameter estimation. The ML method is a very general method of estimation that is applicable to alarge variety of problems. ML method involves choosing the values of the parameters thatmaximize the likelihood function. Probabilistic model estimation: Probabilisticregression is a nonlinear regression model that forces the output (predicted values) to be either 0 or 1. Probabilistic models estimate the probability of dependent variable to be 1 (Y=1). This is the probability that some event happens. Logistic model express as,

$$P=\phi(x'\beta) = \int_{-\infty}^{x'\beta} \phi(Z)dZ \quad (5)$$

Where:

P= probability the farmer may profitable
Φ= The standard normal of cumulative distribution function (CDF)
β = coefficient of probabilistic function
The model is defined by derivative of ϕ(Z) with respect to Dz

$$P= f(x) = \frac{1e^{-\frac{x2}{2}}}{\sqrt{2x}} \quad (6)$$

Where:

P=F(x)= probability
X= predicted dependent variable
e =base of natural logarithm, Cameron *et al*., 2005)

Diagnosis Tests

Multiple regression models has many problem of autocorrelation, multi co linearity and the other. So it is necessary to test multi-co-linearity problem among continuous variables and check associations among discrete variables, Ramsey regression specification error for omitted variable, information criteria test and manage some outlier by using semi logline model is needed. These are: Variance Inflation Factor (VIF) for association among the continuous explanatory variables and Contingency Coefficients (CC) for dummy variables.

$$VIF(X_j) = \left[1 - R_j^2\right]^{-} \quad (7)$$

Where, $R^2_j$is the multiple correlation coefficients between explanatory variables, the larger the value of R_j^2 is, the higher the value of VIF (X_j) causing higher co-linearity in the variable (X_j). Contingency coefficient is used to check multi-co-linearity of discrete variable. The decision criterion (CC < 0.75) is that variables with the contingency coefficient is computed as follows

$$CC=\sqrt{\frac{\chi^2}{N+\chi^2}} \quad (8)$$

Where, CC is contingency coefficient, χ^2 is chi-square test and N is total sample size.

Stata 12 and Statistical package SPSS version 20 help to compute both VIF and CC. In order to explain farmers' profitability from cereal and pulse crops production, continuous and discrete variables are identified based on economic theories and the findings of different empirical. In table both tests show us no multi-co-linearity between independent. Another problem is hetroschedasticity: According to Gujarat, 2003, heteroscedasticity, that is, diverse variances between residual terms. To detect heteroscedasticity problem the study uses Breusch-Pagan / Cook-Weisberg test. The result shows that even variance is constant at H_0Prob>chi^2 =0.000 tells us reject H_0, that means there is problem of heteroscedasticity. To minimize this problem the researcher regressed by robust probabilistic.

DATA PRESENTATION AND ANALYSIS

Marketing Problem in the Study Area

In the study area retailer merchant cheat farmers by measurement materials because, from small market to large market or/and in the same market traditional as well as modern scale measurement materials are very different. Even farmer's cooperatives are established and they have no strong relation with consumer's cooperatives, agro processing micro and small scale enterprise and agro processing industries. The other problem investigated by researcher was seasonal market difficulties; this is during harvesting and collection time farmers' expense is too many.

Taxation, recreation, wedding and other ceremony are main challenges of the farmers after harvesting and collection period. These problems add transaction cost on the farmer and made them loss full. Beside, farmers had the problem of market, marketing, financial problem, road accessibility and awareness. When we look the cost input like improved seed, fertilizer, pesticide, insecticide supply chain with farmer were so poor that increase cost to the farmer (Figure 1). Additionally, the structure of the market in the study area looks neither perfect competitive market nor imperfect competitive market. When we seen producer small holder farmer they have no perfect information in the market; they produce homogeneous product and sell in different price in the same market. They take price sated by the merchant they have not bargaining power in the market (Table 1).

Cereal and Pulse Crops Market Channels

Marketing channel analysis is useful tool to examine the series of intermediaries and their systematic linkage in performing marketing functions and information flow in the market chain to facilitate the flow of goods and service from the point of production to the end users. Fig.1Presents varies marketing channels used in the flow of birds and egg from their point of production to the end users (consumers) in the study area. The most important routes (channels) involve in the transfer in the study area cereal and pulse crops are listed below.

Figure 1. Channel –I Producer-Village collector-Urban assembler-Broker-Whole- Retailer-Consumer

Table 1. Descriptive statistics

	Obs	Mean	Std.Dev.	Min	Max
Size	393	6.068702	2.871013	1	12
Education	393	2.386768	1.219747	1	5
Interest	392	158.4733	348.007	0	1500
Cost	391	213.017	699.7091	0	3890
Market info.	392	.859335	.3481211	0	1
Financial	393	.4452926	.4976316	0	1
Distance from Road	393	2.374444	1.852501	.1333333	6.166667
Awareness	393	1.424936	.5393581	0	2
Market pro	393	6.023281	2.116998	0	7.703008
Fertilizer	393	7.022491	.6416653	0	7.258412
Age	393	3.770101	.2645096	3.218876	4.382027
Production	393	3.093576	.8604147	.9162907	4.60517
Wage	393	2.923138	3.965629	0	8.987197
Imp. seed	393	133.028	445.7529	0	1800

Source: Own computation, 2017

Table 2. Probit and marginal effect for profit determinant

Name of independent variable	Logistic coefficient	Marginal effect dy/dx	z	P>/z/
Family size	-.0583954	-.0231461	-1.97	0.049**
Education	.2544485	.1008554	2.78	0.005***
Interest rate	-.0010932	-.0004333	-3.83	0.000***
Cost of land	.0003027	.00012	3.15	0.000***
Financial access	-.1223056	-.0484112	-0.63	0.502
Distance from road	-.3959974	-.1569609	-5.77	0.000***
Awareness	.1365459	.0541225	0.67	0.528
Wage	.2936854	.1164077	10.10	0.002***
Improved seed	.0012121	.0004804	5.98	0.000***
constant	-.4826775			
Pseudo R^2	0.5296			
Prob>chi^2	0.0000			
Wald chi^2	169.06			
Log pseudo likelihood	-127.573			
No. of Observation	392			
Y		.45470806		

*** indicates 1% significant level and ** indicates 5% significant level

Source: Own computation, 2017

Channel–II Producer-Consumer

Channel – Cooperative channel of distributing input

Channel –I Producer- Federation – League- Union- farmer Cooperative-Farmer

From the above figure we can conclude that large market channel transaction cost on both producer and consumer. Long channel decreases farmer income and increases consumers cost of food. The commodity should flows from producer to either final consumer, farmer cooperative or processors. And also the channel of the input market is long with many market actors. This is another problem of the farmer. Unnecessary market actors have been collapsed and direct marketing system is more favorable for the farmers.

Empirical Data Analysis

Diagonisis Test

Test for multicollinearity: Mean VIF value is less than 5[1]. The result indicate that there is not multicollinearity problem among independent continuous variables. Contingency coefficient result is also less than 0.75[2] and it prove that absence of serious multicolliniarity problem among the independent dummy variables. Since there is heteroscedasticity[3] problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be constant variance. Therefore, to overcome these problems, robust probabilistic regression analysis is used. Nine explanatory variables are selected to determine the household profit of cereal and pulse crops. The variables are selected by top down selection strategy approach based on their coefficients and p-values. Among these variables, seven variables namely (family size, education, Interest rate, fixed cost, road access, wage, and improved seeds) are found significant variables. While two variables (financial access, awareness) are statistically insignificant which have no impact on dependent variable.

Probabilistic Regression Model Interpretation

The result of probabilistic model analysis indicates that family size coefficient is negative and statistically significant at 5% (table 1).It shows that household with large family size is less likelihood to be profitable as compared to households with small family size. This is due to a family with more size are expected to consume more crops. In contrast to family size, the coefficient of education indicates that positive and statistically significant at 1%. This result shows that household with higher education level of the head are more likelyto be profitable relative to households whose head is at lower level of education. This is because of when the head of household education level is gone to postsecondary school, he/she come to more productive, more awareness of marketing, minimize transaction cost and more profitable. The coefficient of wage expense in the area is positive and statistically significant at 1%. It indicates that households who hire more labour pay more wage and the house hold who have more labour are more likely to be profitable than those who have less labour access. That means, higher using of labour made households to more produce at seeding and collect season. This drives the farmer to high productivity and profitability. The coefficient of interest rate is goes with family size impact that is negative and statistically significant at 1%, it shows that less likelihood for household head non-profitable to profitable households. This is because of very much money or crops are back paid for village money lender and add some transaction cost between house hold borrower and village money lender. The positive coefficient cost of land indicates that households with large investment are more likely to be profitable than households limited farm land. This is probably because households with large farm land have high production and get relatively high profit. The cost of land is statistically significant at 1%. However, the coefficient of road access is negative and statistically significant at 1%. It indicates that households who have less road access is less likely to be profitable than those who have more road access. That means, higher road distance by households from market implies that less opportunity to sell his/her product. They take low local price set by the village crops collectors. In addition, the coefficient of improved seed cost is positive and statistically significant at 1%. It indicates that households who uses more improved seed are more likely to be profitable than those who uses less improved seed. That means, using more improved seed by households implies that high opportunity to get high production. This leads farmer to get high profitable from large quantity production.

Results of Marginal Effect Estimation from Table 1

- **Family size**: Marginal effect associated with family size is -0.023which means, as the number of family size increases by one, the probability of being profitable decreases by 0.023(holding all other explanatory variablesconstant at their average values. The marginal effect results is statistical significant at 5%. This is because of many family size in the rural area are dependent on their parents. Many times mother and father work and feed their family members.
- **Education level of HHH:** Education shows positive effect on profitability of farmer at 1% level. This is due to educational level of household head increases one level up then profit increases by 0.10 unit at average level. The result further indicates that, education improves the producing household ability to acquire new idea in relation to market information and improves production, which in turn enhances productivity and thereby increases profitability of cereal and pulse crops production. Study of Teferi *et al*., (2017) illustrated if house hold headed farmer is educated the probability to be profitable is increased compared to illiterate house hold headed farmers.
- **Cost of land**: The other significant variable is cost of land at 5% level, which affects positively the profitability of farmer. When the additional land cost is increase by 1%the profitability of the farmer who produce cereal and crop is increase by0. 0001% at average level. Lijia *et al*., (2014), who study on pepper market analysis found that cost of land positively affects the quantity supply of the producer.
- **Improved seed:** The marginal effect shows improved seed has positive and statistically significant effect at 1%. The study shows only a few farmer uses improved seed are profitable. The amount of improved seed used by farmer increases by 1%averagely reveals by the

[1] MEAN VIF= 1.33
[2] CC=0.66
[3] chi2(9) = 128.69 (Prob> chi2 = 0.0000)

increase profit of the household by 00005% unit. This is because of using improved increase the productivity of the farmer that has direct relation with profit of farmer. Okaye, *et al*,. 2016, who illustrated an increase of mango, avocado and papaya production by farmer household has augmented marketable supply of the commodities significantly.

- **Interest:** Since a farmer borrow from village money lender its interest is to high, that is about 20% per month. This negatively affects profit of the farmer.If the interest rate increase by one birraveragely the profitability of the farmer decrease by 0. 0004 %. The farmer may borrow money to purchase input or borrow seed this all leads a farmer to low profit. Abreham, 2013, who illustrated value chain for vegetable production by farmer household should get enough credit to minimize the cost of capital.
- **Road access**: Having good road access positively affects the profitability of rural household. Poor road acces negatively affect the profit, that is when distance of house hold increase by one hour walk on foot[4] the profit of house hold decrease by 0.216 at average level. This is in line with the World Bank (2004) report that better road density in the study area i.e. 117 km per 1000 square km which is by far better than the national road infrastructure i.e. 30 km per 1000 square km with significant difference between the three locations at one percent level of significance.
- **Wage**: Wage is expects to adversely affect the profit of farmer household. Marginal effect results show, this variable is negatively related profit of the farmer and statistically significant at 10%.The result implies that farmer how have any types of marketing problem increase by one unit decreases profit of the farmer by 0.116 unit at average level. This is because of any cheating or distance of the market decrease the price of the cereal and pulse crops. Decrease of the price reveals by decrease of the profit of the farmer.

Conclusion and Policy Implication

Conclusion

There is a complex relationship between profitability of the rural agriculture and welfare of rural farming households. The aim of this study was to investigate the effect of transaction cost on cereal and pulse crops in Salale (North Shewa Zone), Ethiopia. On top of this, the study attempted to analyze the relative impact of mal marketing problem and low awareness of farmers in the study area. Primary data was used for the study. Multi-stage random sampling method was used to select the sample respondents. The data were collected from each sample respondent through structured questionnaire. The 418 questionnaire was pre-tested and some regression was made before the actual survey was conducted. The questionnaires were administered to the sample respondents through personal interviews by well-trained enumerators under close supervision of the researcher. Descriptive statistics and probabilistic models were used to analyze the survey data. Marginal effect was computed to see the relative impact of the independent variables on profitability of farmer in the area. The probabilistic model result depicts that among the nine explanatory variables that were hypothesized to influence farmer profitability either positively or negatively, seven variables were found to be statistically significant at least at 10% probability. Absence of organized institution and system group marketing has made traders in a better position to dominate the roost in pricing. The longest market chain holds five chain and the shortest takes from producers-Consumer channel. The producers-Consumer channelis important to producers and consumers to get acceptable prices; while Producers-Local collector-Wholesaler-Terminal market channel and Producer-Wholesaler-Retailer-Consumer channel are the most important channels in terms of total volume marketed for cereal and pulse crops.Besides, the input supply has also six channels that is increase service cost in all channels. Educational level, has vital role solution to solve the general problem concerning new technology and marketing system of the farmer household. Training farmers by governmental institution and nongovernmental Organization works with agricultural sector have also positive impact on profitability of farmers. Additionally, having good road access and financial institution are also the clue to solve farmer constraint and made farmers more profitable. Even if farmer cooperative is established in all kebeles farmer, do not serve well from the cooperative in the area. Lack of knowledge among the farmer, less access of road, unstandardized measurement material and less market information are the problem of the farmer. The result of the study generally confirms the well organizes market and marketing through farmer cooperative leads farmer to welfare improvement of farming communities.

Policy Implication

Based on the above findings, the following policy recommendations are made.

- Better access to credit will also facilitates the adoption and diffusion of the agricultural input as it helps farmers to purchase the required inputs. Hence, targeting credit interventions for credit constrained farming households improves the use of fertilizer, improved seed and others inputs.
- Access to education and information serves the farmer to get the ability to perceive, interpret and make informed decisions about the new technologies and marketing system. Thus, committed efforts towards the adoption of improved agricultural technologies can possibly realized the green revolution in developing countries like Ethiopia which ultimately enhances the welfare of poor rural farming communities.
- The long chain of agricultural market input increases transaction cost government has to look again and decrease unnecessary actor. .
- Ethiopian Commodity Exchange should be widespread information displayer board in all woredas and should take information by display daily price to the farmer.
- Local government (trade and market development office) should monitor and manage measurement material and made regulation for block cheater merchant.

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Appendex I

```
. estat vif

    Variable |       VIF       1/VIF
-------------+----------------------
     roadac  |      1.50    0.664564
   FINANCIAL |      1.50    0.668531
   education |      1.43    0.740726
       wagee |      1.37    0.731475
   Awareness |      1.31    0.761360
interestbir  |      1.25    0.800838
       costF |      1.23    0.811102
        size |      1.23    0.812496
     impseed |      1.17    0.858051

    Mean VIF |      1.33
```

Appendex II

Probit regression — Number of obs = 392; Wald chi2(9) = 169.06; Prob > chi2 = 0.0000; Log pseudolikelihood = -127.573; Pseudo R2 = 0.5296

profit	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
education	.2544485	.0919879	2.77	0.006	.0741554	.4347415
size	-.0583954	.0295004	-1.98	0.048	-.1162152	-.0005756
wagee	.2936854	.0295744	9.93	0.000	.2357207	.3516501
impseed	.0012121	.0002024	5.99	0.000	.0008153	.0016089
Awareness	.1365459	.2032879	0.67	0.502	-.2618911	.5349829
roadac	-.3959974	.0697624	-5.68	0.000	-.5327293	-.2592655
FINANCIAL	-.1223056	.1941792	-0.63	0.529	-.5028898	.2582786
costF	.0003027	.0000971	3.12	0.002	.0001125	.0004929
interestbir	-.0010932	.0002864	-3.82	0.000	-.0016544	-.0005319
_cons	-.4826775	.5011732	-0.96	0.335	-1.464959	.4996039

Appendex III

Marginal effects after probit
y = Pr(profit) (predict)
= .45470806

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
educat~n	.1008554	.03625	2.78	0.005	.029797	.171913	2.3852
size	-.0231461	.01176	-1.97	0.049	-.046187	-.000106	6.06122
wagee	.1164077	.01153	10.10	0.000	.09381	.139005	2.93059
impseed	.0004804	.00008	5.98	0.000	.000323	.000638	133.367
Awaren~s	.0541225	.08062	0.67	0.502	-.103886	.212131	1.42602
roadac	-.1569609	.02721	-5.77	0.000	-.210298	-.103624	2.37753
FINANC~L*	-.0484112	.07676	-0.63	0.528	-.198855	.102033	.446429
costF	.00012	.00004	3.15	0.002	.000045	.000195	213.017
intere~r	-.0004333	.00011	-3.83	0.000	-.000655	-.000212	155.051

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

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