
Determinants of Commercialization of Smallholder Red Pepper Farmers in Javiethenan District, Amahara Region, Ethiopia

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Abstract: The history of red pepper in Ethiopia is perhaps the most ancient than the history of any other vegetable product and it has been cultivated in many parts of the country. It is obvious that, commercialization is long run process that farming shifts from subsistence (non commercial) to semi-commercial farming, and then to fully commercialized agriculture. The purpose of this study was to analyze the determinants of commercialization of small holder red pepper farmers Javiethenan district, Ethiopia in 2012 E.C. Particularly, the study investigates the level of commercialization of red pepper production, and factors that affect household participation in the red pepper output market. Two stage sampling technique was applied to select sample kebeles and 214 respondents from five Kebles of the woreda household were selected based on proportionate random sampling technique. The descriptive analysis revealed the level of commercialization in the study area on average semi commercial one. Censored Tobit regression was applied to analyze the factors that affect market participation of households' in red pepper output market. The result revealed that from the total 12 explanatory variables, four variables were statistically significant. Of which, land size (land allocated for red pepper production), market information, extension service and previous year market price of red pepper were positively related with household market participation or quantity of red pepper sold. Thus, emphasis and intervention should be given for households to increase market participation and improve levels of commercialization.

Keywords: Commercialization, Households, *red pepper*, Market Participation, Tobit

1. Introduction

The Ethiopia government prepares plan and strategy in the development policy agenda in order to transform subsistence farming to commercial one. To do so; agriculture development led industrialization (ADLI) policy have been in practice since 1994. This policy integrate various ingredient that promote the growth of agriculture such as finance, market integrations (internal and external), private investment, rural infrastructures and technology. The focus of this policy has been commercialization of agriculture, provide access to credit service for stallholder farmers, improve food security and industrialization [17]. But the reality behind commercialization of smallholder farming currently is not too enough for farmer to benefit from income increase and to escape from subsistence

oriented agriculture due to the agriculture sector is highly dominated by small scale subsistence agriculture and low productive [5], and also the occurrence of market imperfection and high transaction cost hinders smallholders not to enjoy and benefit welfare from commercialization unless better environment is created.

Growth and transformation plan (GTP) of Ethiopia was aimed to increase productivity of dominant crops through good agricultural practice. Since poverty reduction strategy seeks growth that combine commercialization of smallholder agriculture [15].

According to [17] noted that four categories that represent potential complementary pathways for commercialization policy in Ethiopia. These are smallholder farmers (subsistence), small holder farm (market oriented), small investor farms and large scale agro business. on average

around 11.5 million Ethiopia farmers are found under the smallholder subsistence and smallholder market oriented. Likewise majorities of farmer who are engaged in red paper production of javiethenan Worreda are characterized under the categories of subsistence small farming and market oriented smallholder.

Pepper is also a national spice of Ethiopia and believed to be introduced to Ethiopia probably by the Portuguese in the 17 century [11]. The history of pepper in Ethiopia is perhaps the most ancient than the history of any other vegetable product and it has been cultivated in many parts of the country because it is the daily diet of most Ethiopian people and Ethiopian adult average daily consumption of hot pepper is estimated around 15 gram, which is better than tomato and other vegetables [9]. In Ethiopia, pepper is cultivated in many parts of the country. Areas like western Gojjam (Jabitehinan, Burie and Shindi districts), eastern and southern Shewa, western and northwestern Wellega, and the southern Ethiopia (Alaba and the Mareko) are potential producers of pepper in Ethiopia. Now the principal motive for researchers interested to deal with red pepper is that, it is the most marketed and highly demanded both cash and vegetable product in the studying area. But there is still unsatisfied demand in the market since the supply of red pepper is mainly seasonal. That implies farmers sold red pepper during the harvest season and rarely at summer to purchase agricultural inputs.

Cognizant of this fact, commercialization of red pepper that enhance productivity, food security, poverty reduction and rise of income can be affected by different socio-economic, political, environmental and institutional factors. Accordingly, commercialization can be affected both locally and internationally. Locally, it is affected by input market, institution, and price, level of production, infrastructures and access to information. But at the international levels, commercialization also affected by international trade, globalization, population growth, urbanization, growth of different economic sectors and infrastructure [16].

There are related literatures on commercialization of smallholder agriculture. For instance [4] in his study commercialization of smallholder farming indicates that the role of commercialization on household welfare and measure household participation in the output market by using multiple linear regression. likewise, [17] in their study commercialization of smallholder agriculture in selected red pepper growing area in Ethiopia also measure household participation in the output market two stage least square method. But this method simply shows the linear relationship between market participation and other explanatory variables. Therefore, the researcher determine households participation in the output market by using Tobit regression models since the output variable can be censored in to commercial (high participant), semi commercial (medium participant and subsistent (low participant). Moreover, the researcher new independent variable that is not considered by former researchers.

Finally the researcher is interested to deal with

commercialization of red pepper since there is no scientific and systematic research work conducted in the study area by the title with determinant of commercialization of red pepper. Therefore, the researcher likes to clearly show the issue of level of commercialization and factor that determines household's participation in the red pepper market in the studying area.

The general objective of the study is to explore the determinant of commercialization of red pepper in the javiethenan Worreda and specifically to examine the current levels of commercialization of red pepper production and to analysis the factor that affect households participation in the red pepper output market.

2. Materials and Methods

2.1. Description of the Study Area

This research was conducted in Jabi Tehinan woreda of west Gojjam Zone located in the Amhara National Regional State. Jabi Tehinan is one of the 15 woredas of West Gojjam administrative zone. It is found 374 kms Northwest of Addis Ababa and 171.7 kms south west of Bahir Dar, the Regional State capital.

The woreda covers a total of 117,020 hectares. Currently, the woreda is divided in to 37 rural Kebele administrations (KAs) and 3 towns Finote Selam, Mankusa and Jiga are the major towns in the woreda. According to [3] report, human population of the woreda is 270,147 of which 253,348 live in rural areas while the rest 16,799 live in urban areas. The climate of the woreda is in general 88% Weina Dega and 12% Kola. The average annual rainfall of the woreda is 1250 mm. The Western and Northern parts of the woreda receive relatively higher rainfall compared to other parts of the woreda. The woreda has mono-modal rainfall distribution and extends from May to September pepper, Maize, teff and wheat are the major crop in the woreda [3]. Topographically, the woreda is classified as plain land (65%), terrain (15%), valley (15%) and unclassified land (5%). Altitude of the woreda ranges from 1300 to 2300 masl. The mean annual temperature ranges from 14°C to 32°C. Three soil types, namely black (15%), red (60%) and brown (25%) are predominant in the woreda. When the soil fertility is considered, it is classified as 27% fertile, 71% of medium fertile and 2% degraded land [2]. Given the above, information is an important force that makes assessment of the value chain of red pepper in the woreda more crucial.

2.2. Data Type and Source

Data is important inputs that enable researchers to conduct research and solve specific societal problems. The nature of the research determine the types of data (cross sectional or time series) required by the researchers. To conduct the study, the researcher would use cross sectional data types since it covers a point at a time. Besides, the nature data that would be used is only quantitative data.

The other important part of this section is data source. The

researcher would use both primary and secondary source of data in order to carry out the study. Primary data is fresh and first hand data and would obtain from rural household survey of jabiethenan woreda.

2.3. Data Collection Procedure

Data can be collected by different procedures such as; questionnaire (structured vs. non structured), interview, direct observation, key informant interview and focus group discussion (FGD) and others. For this study, to collect the desired data, the researchers applied mainly structured questionnaires that would be distributed for the sample rural households.

2.4. Sample Size and Sampling Procedure

Sampling procedure (technique): It is important to identify the appropriate respondents so as to undertake the study. Basically there are two types of sampling technique which have been applied in research work that is probability and non probability sampling procedure. The researchers would apply only probability sampling technique which is two stage sampling.

A two-stage sampling design was employed in order to select sample unit. In the first stage five major kebeles were select purposively based level of producing potential and second stage among households that exist five kebele will select using Proportionate random sampling technique was use to decide numbers of sample from each kebele.

Sample size: according to [12] the representative sample size must be optimum. This means samples should neither be too large nor too small. Therefore, so as to determine the optimum level of sample in any study, researchers must consider the following four prominent factors such as: level of confidence (α), margin of error (e), variability of the population(s) and the number of groups within the samples. Moreover, method of analysis, objective of research, cost, and time determine the type and size of the sample to be employed. Agriculture and rural development office of buie woreda report reveals that the total numbers of population for the woreda at the household levels are 6794. For finite

population, the best sample size determination have been used [20]. Generally the model can be specified as:

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

Where n is sample size which target population is less than 10000

N is population size which is 6794

e is the level precision i.e. the level confidence limit is 93%

$$n = \frac{6794}{1+6794(0.07^2)} = 204.02$$

The overall sample size of the survey will also increase by 5% for non-response. $204.02 \times 5\% = 10.20$. Hence, the total sample size of the study will be, $204.02 + 10.20 = 214.22 \cong 214$.

Hence, 214 respondents from five Kebles of the woreda household will be selected based on proportionate random sampling technique.

2.5. Methods of Data Analysis

So as to analyze the collected data, the researcher has used both descriptive and econometrics analysis.

2.5.1. Descriptive Analysis

This ways of data analysis is important to explain or illustrate demographic and socio economic variables by using maximum, minimum, mean and standard deviation. For this research, to answer the first (levels of commercialization) and the second specific objectives, descriptive analysis has applied.

The first specific objective of the study is determining the levels of commercialization of red pepper in the study area. According to [18] level of commercialization at household level can be measured as the ratio of gross value of all crops sold in a year per gross value of all out put produced by the same year. Since this study only concerned on red pepper, household level commercialization can be drawn as follow:

$$\text{Household commercialization index (HCI)} = \frac{\text{gross value of red papper sold by hh inthe markrt}}{\text{gross value of red papper produced by hh}} \times 100$$

Based on the commercialization index developed above, the value ranged between 0 and 100%. Thus, If the HCI become zero, the household is subsistence or not commercial. But if it is approached to 100% it is commercialized. According to [13] also have developed the three fundamental levels of commercialization as subsistence (non commercial), semi commercial and highly commercial. For this study, levels of commercialization can be also categorized into three based on the cut off developed by [6]:

- 1) Non commercial (low level) - if the households sale less than 25% of output they produced
- 2) Semi commercial (medium levels)- if the households sale b/n 26% -50% of output they produced

- 3) Highly commercial (high levels) – if the households sale above 50% of output they produced

2.5.2. Econometrics Analysis

The third specific objective of the study is about factor that affects household participation in the red pepper market. This objective requires econometric analysis to examine the relationship and impact of explanatory variables on outcome variable. The dependent variable for this study is market participation of households in the red pepper market. It is the ratio of gross value of output sold per gross value of all output produced multiplied by one hundred and its valve ranged between zero and one.. Therefore, market participation of households can be determined by using censored Tobit

regression models since the dependent variable is censored from true zero value. According to [19] the general form of the model can be specified as follow:

$$Y_i = \beta X_i + \epsilon_i \dots \dots \dots \text{from this equation,}$$

$$Y_i \leq 0 \dots \dots \text{For households don't participate in the market (zero sales)}$$

$$Y_i > 0 \dots \dots \text{For household do participate in the market}$$

Where: Y_i = the limited dependent variable, represent index of market participation.
 X_i = vectors of explanatory variables
 B_i = vectors of unknown parameters
 ϵ_i = represent the disturbance term
 $i = 1, 2 \dots n$ (numbers of possible observation).

3. Results and Discussion

3.1. Socio-Demographic Characteristics of Sample Farmers

Table 1. Sex, marital status, and education of the sampled households.

Variables	N ₂	%
Sex Male	186	13.0
Female	28	8
Marital status Married	163	86.92
Single	23	76.2
Divorced	20	10.7
Widowed	8	9.3

Results of the survey revealed that both male and women household's were engaged in production and market participation of red pepper with the highest percentage 86.9% of the respondents being male and the remaining 13.1% were female producers. With regard to marital status 76.2, 10.7,

Table 3. Off farm income of house hold.

Off farm income	N ₂	%	T value	P value	
Yes	154	28.04	-4.9527	0.0000	
No	60	71.96			
Two-sample t test for participant and non participant of household					
Off farm income	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]-
no	60	25.33333	1.852417	14.34876	21.62665 29.04001
yes	154	37.61688	1.368991	16.98873	34.91232 40.32145
combined	214	34.1729	1.173963	17.1736	31.85882 36.48697

Source: Survey result, 2018.

Table 4. Land, lag price of farm household.

Variable	Mean	Std.dev	Min	Max
Land	2.11	0.74	0.5	3.5
Lag price	34.08	9.43	21	61

Source: survey result 2018.

The local unit of measurement for land size in the study area is *timadi* which is equal to 0.125 hectare. Sample farm households owned an average of 2.11 ha of farm land. A producer who owns a large area of land for red pepper production than a producer who owns less area of land under the same input utilization condition can produce more and participate more.

The average last year market price of pepper is 34.08 and

9.3 and 3.7 of total sample respondents are married, single, divorced and widowed. From this married has taken the highest percentage which involved in production and market participation of red pepper.

As table indicated below the average age of the respondents was 46.05 years. The result further indicated 58.9 percent of the producers were within the age range of 25 and 45 years where as 41.1 percent of them were between 46 and 74 years. It is believed that age of the household head determines whether the household benefits from the experience of an older person or base its decision on the risk taking attitude of the younger farmers.

The majority (53.8%) of the household heads had a family size ranging from 5 to 8. Only 46.2% had a family size of less than 5. The average family size is found to be 4.43.

Table 2. The age and family size of household.

Variable	Obs	Mean	Std. Dev.	Min	Max
Family size	214	4.43	2.58	0	8
Age	214	46.05	11.52	25	74

3.2. Socio-Economic Characteristics Sampled of Farm Household

Based on survey that obtained from respondent about source of income other than farming, 72% of the respondents indicated that they were involved in off-farm activities in addition to farming activities There is statistically mean difference among participant off farm income and non participant of off farm income at 1% significance difference on quantity supply of red pepper as the result of two sample t test indicated below.

the households are influenced by lagging price to determine the future land size of pepper output production. That means higher lag price highly related with more household participation in the red pepper market as a the table above indicated.

3.3. Access to Service

About 74.3% of the sample households had access to extension service. On average they obtained 3.16 times within a year, ranging from 1 to 5 times. The extension advice they have been receiving focuses on technical aspects of improving pepper production and during harvest management such as about seed preparation, chemical applications and space selection.

It also helps farmers in selecting high yielding varieties

and also prevention of pepper diseases.

There is statistically mean difference among user extension

service and non user extension service at 1% statistical difference.

Table 5. Extension service of households.

Two-sample t test or user of extension service and non user of extension service						
Extension service	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
no	55	20.16364	1.25978	9.34278	17.63793	22.68934
yes	159	39.01887	1.317077	16.60771	36.41752	41.62022
combined	214	34.1729	1.173963	17.1736	31.85882	36.48697

Source: survey result 2018.

As table below presented About 78.33% of sampled household had access to credit around 53.8%. from credit institutions and remaining 20.47 and 25.43 credit were obtained from government bank and cooperative. Credit is one way of improving smallholder farmers' production and productivity.

Farmers' ability to purchase inputs such as improved seed,

rent land and fertilizer is tied with access to credit and the farmers' uses 75% of credit more about purpose of purchasing fertilizers and the remaining for others. Farmers having better access to credit can minimize their financial constraints and buy inputs more readily than those with no access to credit.

Table 6. Credit access, source of credit and purpose of credit.

Variable	N _e	%	T value	P value	
Credit access	Yes	168	78.5	0.8235	0.4112
	No	46	21.5		
Source of credit	Government banks		36	20.1	
	Cooperatives	49	27.4		
	Credit Institutions	94	52.5		
purpose of credit	Fertilizer	135	75.4		
	To rent in land	40	22.3		
	To purchase Seed	4	2.2		

Source: survey result 2018.

Based on the table below access to timely and accurate market information is the basic element not only in pepper market but also in other commodity marketing. For farmers, knowing where and when to sell their output is one of the most difficult challenges. If they have no knowledge of current market prices, they can easily be exploited. But gathering current information about markets may not be easy, especially for people living in very remote areas.

The study results revealed that 71.5% of the sample households had access to market information and then remaining 28.5% did not have market information and most farm household around 64.41% had obtained market information from traders and remaining 21.47, 10.17 and 3.95 households were obtained from development agent, radio and television and from all agents respectively.

Table 7. Sample households' market information, source of information.

Variable		N _e	%	T value	P value
Market information	Yes	153	71.5	-6.0101	0.0000
	No	61	28.5		
Source of information	Development agent		18	10.17	
	Traders	114	64.41		
	Radio and television	38	21.47		
	From all	7	3.95		

Source: survey result 2020.

3.4. Levels of Commercialization

According to (13), households have three different levels of commercialization that operates as subsistence (non-commercial), semi-commercial and commercial.

The above table depicts that the levels of commercialization of sample households that participate in the red pepper production and selling activity are strongly vary across their levels. From the table 8, 56.06% of sample respondents are

categorized under semi commercial levels, 30.30% of the sample households are categorized under non commercial levels (subsistence) and only 13.55% of the sample respondents are commercial one. Generally, from the table the researcher could conclude that on average the sample respondents in the study area are semi commercial one.

The levels of commercialization also vary across households based on sex and the following tables show that levels of commercialization based on sex.

Table 8 Levels of commercialization of red pepper production for the respondents.

Levels of commercialization	Frequency	Percentage
Commercial	29	13.55%
Semi-commercial	120	56.06%
Non-commercial (Subsistence)	65	30.30%
Totals	214	100%

Source: survey of own computation 2018.

Table 9. Levels of commercialization of households based on sex.

Sex of the households heads	Levels of commercialization		
	Commercial	semi commercial	Non commercial
Male	24 (10.9%)	85 (38.63%)	48 (21.81%)
Female	11 (5.01%)	35 (15.91%)	17 (7.73%)
Totals	35 (15.91%)	120 (54.54%)	65 (29.54%)

Source: survey of own computation 2018.

From the above tables, 71.63% of respondents are male households head. Of which, 10.9% of the sample respondents are commercial one, 38.63% are semi commercial and 21.81% are non commercial (subsistence). On the other hand, 28.37% of the sample respondents are female head. From the total female respondents, 5.01% of respondents are commercial, 15.91% are semi commercial, and lastly 7.73% of respondents are non commercial (subsistence). Generally commercial males' heads covered 17.5% from the total male households (24 of 137) and female commercial heads (17.4%) from the total sample female respondent (11 of 65). this indicates that males are more commercial than females.

3.5. Factor That Affect Market Participation

To analyze the factors that affect households' participation in the red papper output market, the researcher used censored Tobit regression model. Households' participation in the red papper market or commercialization of red papper could be affected by both demographic and a socio economic variable as it was explained in the descriptive analysis. The dependent variable is market participation of households in the red papper market. It is a continuous variable that ranges between zero and one. Therefore, the researcher use censored Tobit regression model.

There are numbers of demographic and socio economic variable that affect households participation in the red papper market. The factors includes; age, educational levels, access to market information, access to credit, access to extension service, family size, participation in the off farm activity, livestock holding or endowment, family size, land size (land allocated for red papper production), distance to the nearest market and market price of red papper (previous year).

The above table [8] depicted the Tobit estimation of determinant of market participation of households in the red papper output market. The F value indicates that the overall significant of the model. Prob> chi2 = 0.000 indicate that the model was accurately predicted by the explanatory variables.

Moreover, the Tobit regression model shows that from 11 independent variables, 4 explanatory variables were statistically significantly at 1%, 5% and 10% levels of significance. Of which, participation in the off farm activities

(1%), land allocated for red papper (1%), last year price of red papper (10%), access to credit (5%).

Table 10. Tobit estimate result of determinants of market participation.

Makpr	Coefficients	T	P>t	Marginal effects
FAM_SI	.2338035	-1.11	0.267	.2102434
EDU	.4142454	0.91	0.362	.4531953
Accrt	.0053734	0.40	0.687	.0053734
AGE	.009247	0.72	0.469	.009247
Fasize	-.009343	-1.60	0.112	-.009343
Mktinfo	.1263949	2.73	0.007	.0463454
MA_ACS	.0183965	0.10	0.924	.1926346
Accext	4.15168	3.03	0.003	1.368662
OFF_INC	.934938	0.62	0.538	.1517372
Lansize	.0356661	6.27	0.000	.0356661
Pyprice	.0003676	1.79	0.074	.0003676
Livsize	.0019229	0.92	0.358	.0019229
_cons	-.4381305	-0.81	0.362	

Source: based on survey of own commutation.

Extension service (EXT_SER): The other significant variable was extension contact, which affected market participation of households in the red papper market positively and statistically significant at 5%. This suggests that access to get extension service avails information regarding technology which improves production that affects the marketable participation. Similarly [1] also identified factors that extension access had significantly affected marketed supply of fruit.

Last year price of red papper: last year market price of red papper affect market participation of households in the red papper market positively and statistically significant at 10%. This implies that the higher last year market price leads the households to participate more in the red papper market. From the Tobit estimation, as last year price of red papper in the market increased by one birr ($\beta=0.003$), households participation in the market increased by 0.3%. This indicated that since price is incentives to household's to supply and sale more. Households more likely participate in the market as last year price of red papper were higher. This finding is consistent with the fining of Edward [10].

Market Information: As the model indicated, the market Information statistically significance at 1% and positively affect market participation of households in the red papper market. Thus, access to market information influence decision making households through providing information about price, demand and supply of outputs and affect market participation of households in the red papper market positively [7].

Land size (% of land allocated for red papper): land allocated for red papper production was statistically significance at 1% and positively affect market participation of households in the red papper market. Higher Land size enhances households for surplus production through economies of scales and increase crop diversification (partly cash crop and partly food crops). Thus, market participation of households increased by 35.6% as land allocated for red papper increased by one hectare. This finding is consistent with the finding of [10, 7] that implies households with larger land allocated for red papper able to produced marketable surplus and more likely participate in the market.

4. Conclusion and Recommendation

Commercialization enhance the farm households maximize welfare, smooth consumption through increasing agricultural productivity, reduction of poverty, increase household income, and strength market linkage. It is also the prior development agenda and poverty reduction strategy of Ethiopia government to transform smallholder farmer from subsistence to profit maximizing (commercial).

This research addressed the determinants of commercialization of red papper in javitenan Woreda, Amahara Region, and Ethiopian. Particularly, the research analyzed the levels of commercialization of red papper production at household levels, examined the factor that affect household participation in the red papper output market or commercialization.

The descriptive analysis also depicts that the levels of commercialization of red papper production in the study area is characterized as semi commercial level. On average, 56.06% of sample respondents are semi commercial, 13.55% of respondents are commercial one and the remaining 30.30% of the respondents are subsistence. Based on sex, male household heads are more commercial one as compare to female heads.

The censored Tobit regression result revealed that from the total 12 explanatory variables, only four variables are statistically significant at 1%, 5% and 10% levels of significance and determine market participation of households. Land allocated, Extension service, market information and previous year market price were positively and significantly affect market participation of households. Therefore government should consolidate fragmented farm structure and functioning land reform policy and government should control and monitor unnecessary intervention of broker or intermediary that benefit with the expense of farmers and should avail the necessary information to the households. Moreover, government price regulation policy should consider not only manufacturing good but also agricultural output to solve seasonal fluctuation in price.

The level of commercialization of red pepper production of households in the study area was semi commercial levels. This indicates that households produce half for consumption and half for sale. Thus, to achieve high welfare, reduce poverty and increases income, government should strongly support the rural farm household to transform from semi commercial to commercial level through creating market linkage and short term agricultural training. Generally, the levels of commercialization of red pepper producing rural farm households in the study area were lower.

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