Journal of Applied Agricultural Economics and Policy Analysis, 2020, Vol. 3, No. 1, 15-19
Available online at http://pubs.sciepub.com/jaaepa/3/1/3
Published by Science and Education Publishing
DOI:10.12691/jaaepa-3-1-3

The Extent of Smallholder Farmers Cereal Crops Commercialization in Ethiopia: The Case of Sinana District, Bale Zone, Ethiopia

Gemechu Mulatu*

College of Business and Economics, Madda Walabu University, Bale -Robe, Ethiopia
*Corresponding author: geme.chu@yahoo.com

Received October 07, 2020; Revised November 09, 2020; Accepted November 15, 2020

Abstract Cereal crops commercialization plays a vital role in transforming the agriculture from subsistence orientation to market oriented production. In this study, it was attempted to identify factors that affect the extent of cereal crops commercialization in Ethiopia. The study used 384 sampled households from sinana district. Tobit regression model was used to identify the covariates of the extent of cereal crops commercialization. Accordingly, sex, education, family size, extension visit, livestock ownership, disease infestation of crops, access to market information, access to training, access to credit and non- farm income were found to be significant variables affected the extent of cereal crops commercialization up to 10 percent significance level. The implication of the results of the study is that improving extension services, enhancing of information channel and family planning issues need to be prioritized to improve the extent of cereal crops commercialization in Ethiopia.

Keywords: *cereal crops Commercialization, Tobit Regression Analysis, Ethiopia*

Cite This Article: Gemechu Mulatu, "The Extent of Smallholder Farmers Cereal Crops Commercialization in Ethiopia: The Case of Sinana District, Bale Zone, Ethiopia." *Journal of Applied Agricultural Economics and Policy Analysis*, vol. 3, no. 1 (2020): 15-19. doi: 10.12691/jaaepa-3-1-3.

1. Introduction

Agricultural commercialization and market participation occurs when the smallholders produce marketable surplus over what is needed for their own consumption. It usually takes a long transformation process from subsistence to semi-commercial and then to a fully commercialized agriculture [1,9]. Commercialization creates more markets for agro-inputs; improves supply bases of inputs for urban industries and consumers; increased economic investment in agriculture and other sectors; distribution of agricultural products through trade and environmental sustainability [2].

The Food and Agriculture Organization (FAO) has categorized farmers into three different groups based on the marketable surplus as a percentage of total production in the following manner [3]:

Subsistence farmers: - Marketable surplus under 25% of the total production.

Transition farmers: - Marketable surplus ranging between 25-50% of total production.

Commercial farmers: - Marketable surplus more than 50% of the total production

Generally, different literatures indicates that increased productions of crops and livestock for markets helps to transform the agricultural sector and accelerate the growth of the economy as a whole for countries which are dependent on the agricultural sector .

Even though cereal crops commercialization has got a great emphasis, smallholder farmers face challenges to participate in the cereal crops market. As a result, understanding the extent of smallholder farmers' cereal crops commercialization and identifying its contributing factors has significant policy implications to tackle the problem. Thus, this study provides some insights on the determinants of the extent cereal crops commercialization in Sinana District, Bale Zone, Ethiopia.

2. Methodology

The study was conducted in Sinana District, Bale zone, Oromia Region from December 2019 to January 2020. The district is located at a distance of 430 kilometers to southeast of Addis Ababa. It is bounded with Goro and Ginnir in East, Dinsho in West, Agarfa, and Gasera in North and Goba and Barbere district in the south. The lowest and highest altitude of the district is extended from 1650m to 2950m above sea level, respectively. The annual average rainfall is 1105 mm whereas the minimum and maximum rainfall is 1060 and 1150 mm, respectively.

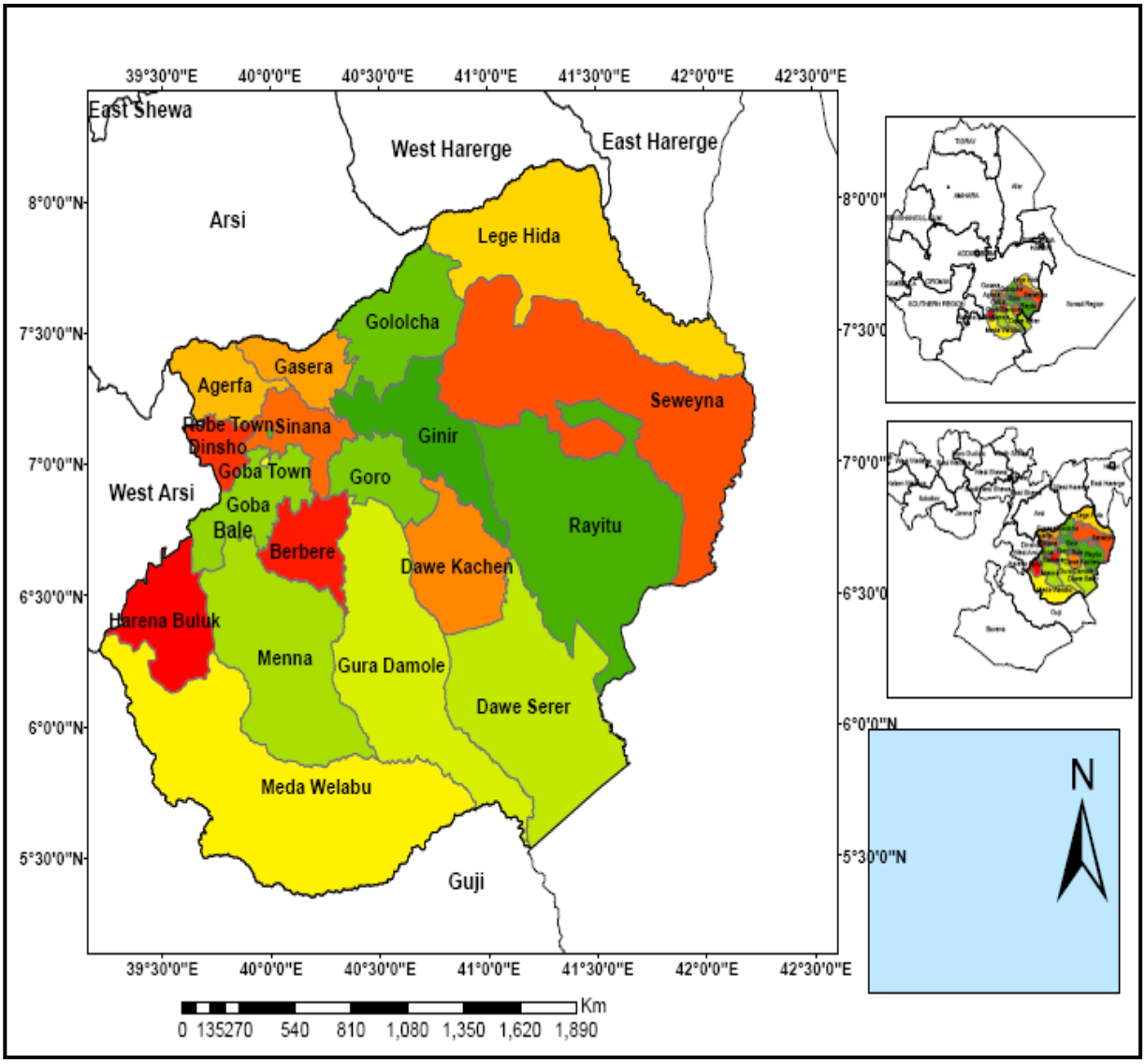

Figure 1. Map of the study area

In this study, both primary and secondary data were gathered. The primary data were collected through an in-depth interview, focus group discussions, and semi-structured questionnaire using face-to-face interview of the sample household heads. Secondary data were also gathered from published and unpublished documents.

Representative sample household heads were selected using multistage sampling techniques. In the first stage, four *kebeles* (Alage, Horo Boka, Asanbarera and Nano robe kebeles) were randomly selected from the district. In the second stage-sampling units, households were selected from a fresh list of households that were prepared by each *Kebele* administrative at the beginning of the survey. Finally, the sample size was determined per each kebele proportionally to the total number of farm households.

The desired sample size was determined as follows [4]:

$$n = \frac{Z^2 \times P(1-P)}{e^2} = \frac{1.96^2 (0.5)(0.5)}{0.05^2} = 384$$

Where, n - desired sample size

Z - Values of standard variate at 95% confidence interval (Z = 1.96).

P - Estimated proportion of households using formal financial institutions

e - Margin error.

The empirical data was analyzed using both descriptive and econometric models. Cereal crops commercialization was measured by the proportion of the value of cereal crops sold to total value of all cereal output produced.

Estimated quantity of total cereal crops harvested = Quantity consumed at home + Quantity sold + Quantity stored + Quantity Retained for seed + Quantity used for animal feed + Quantity given out as gifts or as payments in-kind

By adopting the measurement of agricultural commercialization as in [1,8,10,11], using the proportion of crop sold as:

$$\textit{cereal crop commercialization level} = \frac{\left(\begin{array}{l}\textit{the value of cereal crops sold}\\ \textit{in } 2019/2020 \textit{ cropping season}\end{array}\right)}{\left(\begin{array}{l}\textit{the value of total cereal crops produced}\\ \textit{in } 2019/2020 \textit{ cropping season}\end{array}\right)}.$$

A value of zero indicated that the household is at subsistence level, and the index increases with increase in market -oriented production.

Due to the presence of zeroes in the dependent variables, a Tobit model is a more accurate and fitting model to identify factors which influence the extent or the degree of household cereal crops commercialization level. The Tobit model helps to identify the effects of the factors influencing the level or magnitude of cereal crops commercialization of smallholder farmers. Tobit model is formulated as [5]

$$Y_i = \begin{cases} Y_i^* = X'\beta_i + U_i & Y_i^* > 0 \\ 0 & Y_i^* = 0 \end{cases}$$

Where U_i is assumed to be independently normally distributed: $-U_i \sim N\left(o, \delta^2\right)$

Yi is the level of household level cereal crops commercialization index

βi is the vector of parameters

X' is matrix of explanatory variables consists of household head characteristics, household level characteristics, and access to resources and different institutions.

The conditional expectation of Y given X is

$$E\left(Y_i \mid X\right) = \left(1 - \Phi\left(-X_i\beta/\sigma\right) X_i\beta + \sigma\phi\left(-X_i\beta/\sigma\right)\right)$$

Tobit model parameters do not directly correspond to changes in the dependent variable brought about by changes in independent variables. The marginal effect of the intensity of market participation due to changes in the explanatory variable is given as follows [5]:

$$\frac{\partial E\left[y_i \mid X_i\right]}{\partial x_{k,i}} = \left(1 - \Phi\left(-X_i\beta/\sigma\right)\right)\beta_k$$

Since the marginal effect and the coefficients of the variables were equal, we used the coefficients for interpretation of the results.

3. Results and Discussion

3.1. Descriptive Analysis

There are ample socio-economic and demographic variables associated with cereal crops commercialization. Among the different variables, some of them are discussed as follows.

In order to standardize the livestock holdings of the sample households, TLU was calculated based on conversion factors. Based on TLU measure, the average livestock holding per household is 27.56 for sample households. In a labor based household economy where the income of the household depends on the labor availability, the number of family labor determines the level of household's level of cereal crops commercialization. Accordingly, the mean family size for study area was 6.15. The mean distance from the road was 5.44 km with standard deviation of 3.93 km. The mean landholding size for the study area was also 2.34 ha hectares with standard deviation of 1.89 size in hectares. Non-farm income is the important determinant of household extent of participation in cereal crops commercialization. The mean non-farm income earned for the study area was 740 ETB.

Market information is necessary to decide on what to produce, when to produce and where to sale. From total household heads, 87.5% have access to different media to access market information. Credit is usually believed to fill cash requirement gaps of farmers for purchasing agricultural inputs and 37.76 % of respondents replied that they received credit in the last cropping season.

Table 1. Descriptive statistics of continuous variables

Variables	Mean	Standard deviation	Minimum	Maximum
Educational attainment in years of schooling	2.8	3.59	0	18
Family size in numbers	6.15	2.68	1	18
Livestock ownership in TLU	27.56	28.53	0	248.77
Distance to nearby all-weather roads in km	5.44	3.93	1	14
Landholding size in hectares	2.34	1.89	0	18.95
Non-farm income (in thousand birr)	0.74	1.39	0	11

Source: Survey Data (2020).

Table 2. Summary statistics of dummy variables

name of the variable	category	frequency	percent
Sex of the household head	Female	46	11.98
	Male	338	88.02
Extension visits	No	216	56.25
	Yes	168	43.75
infestations of crops by diseases	No	230	59.9
	Yes	154	40.1
Access to training	No	327	85.16
	Yes	57	14.84
Access to market information	No	48	12.5
	Yes	336	87.5
Access to credit	No	239	62.24
	Yes	145	37.76

Source: Survey Data (2020).

Sex of the respondent is important variables that are the primary basis for demographic classification in vital surveys. As shown in Table 2, 88.02% of sample respondents were male headed while the remaining were female headed. Respondents were also requested to indicate whether they received training at FTC level and only 14.84% household heads received training related crops production in the last cropping season. This shows that there is low access to training in the study area. Similarly, the agricultural extension services of development agents play a critical role to provide skill and knowledge for farmers to adopt new and improved technologies that increases agricultural production. This in turn increases the proportion of marketable output However, less than half of household half (43.75%) visited by agricultural extension agents to receive advisory services. Crop infestations usually reduce quality and quantity of cereal crops to be produced. Around 40.1% of sample respondents reported that their crops were susceptible to disease infestations.

3.2. Econometric Estimation Results

In estimating the extent of cereal crops commercialization, the Tobit Model result for 12 independent variables used is shown on Table 3.

Table below reveals a F(12, 372) = 9.76 and significant at 1 percent significance level implying that the model has a good fit to the data. Nine out of the twelve regressors were significant at various levels of significance. To avoid heteroskedasticity problem robust standard errors were reported. Sex, education, family size, extension visit. livestock ownership, disease infestation of crops, access to market information, access training, access to credit, non-farm income were found to be significant up to 10 percent significance level.

The discussion of each variable is given below.

Household head is the most responsible person for the welfare of the household members. The positive coefficient of the variable sex indicated that being male headed increase the level of cereal crops commercialization by 5.9%. This confirms the findings of [6] that Households headed by women earned little from crop sales compared to their counterpart men-headed households

Education level of household head is positive relationship with cereal crop commercialization and significant at 5% probability level. Marginal effect is 0.006 (Table 3), that implies the being other things constant, as year of schooling of household head increased by one, the probability of household being cereal crops commercialization increase by 0.6%. This finding is consistent with previous similar studies [8,10,12].

The family size variable has negative coefficient and significant relationship with the cereal crops commercialization level. The reason for this is that having more family size in a limited and marginalized land resulted in lesser and lesser per capita agricultural production and sales. More specifically, the coefficient reveals that an increase in household size by one reduces cereal crops commercialization index by 0.79 percent. Increasing household size also results in increased in household consumption. This reduces the amounts of agricultural output offered to the market for sale. This finding confirms the findings of [1,7,8] who supported of the argument that household size in the absence of sufficient complementary inputs like land tend to decrease the welfare of the household.

Training at FTC involves advising them on demand situations, post-harvest handling techniques, informing them with the desired quality of the crop, expected prices, time of delivery and quantities and storage mechanisms, enhancing dissemination of timely price information and giving of training for the farmers encourages them to acquire new skills. Lack of reliable information discourages smallholder farmers and dissemination of price information improves bargaining skills of farmers for their sales. If the market is imperfect, traders may exploit farmers. This variable was statistical significant and having training increases the level of cereal crop commercialization by 8.8%. The study is congruent with the findings in Kenya that market information plays a significant role in farmers' decision on how much output to make available to the market depending on the prevailing price and nearness of the specific market outlet [6].

Table 3. Tobit regression model result

independent variables	Coefficient	Standard error	Marginal effects
Sex of the household head	0.059***	0.021	0.059
Educational attainment of household head	0.006**	0.003	0.006
Family size	-0.008**	0.003	-0.0079
Extension visit	0.073***	0.017	0.073
livestock ownership in TLU	0.001*	0.000	0.00057
Distance to nearby road	-0.003	0.002	-0.0035
disease infestation of crops	-0.006	0.017	-0.0064
Access to market information	0.152***	0.034	0.151
Landholding size	-0.005	0.004	-0.0055
Access training	0.088***	0.020	0.088
Access to credit	0.105***	0.028	0.105
non- farm income	-0.022**	0.010	-0.022
constant	-0.110	0.037	
/sigma	0.153	0.008	
95 of them are left-censored observations at HCL <= 0			
289 of them are uncensored observations			
0 right-censored observations			
Number of observation = 384			
F(12, 372) = 9.76***			
Log pseudolikelihood = 64.484			

Source: Survey Data (2020).

The positive sign of the variable access to credit was found to be positive and significant at 1 percent significance level. The main reason is that credit fills cash shortages during cropping season. This in turn increases farmers' cereal crops commercialization level. This keeps the findings of [13].

The variable extension visit had a positive and a statistically significant relationship with cereal crops commercialization. The probable justification is that frequent extension visits helps farmers to adopt improved agricultural technologies and improves crop productivity. This resulted in more participation of households in cereal crops markets. This finding is in line with previous studies [10].

Due to asymmetric information, farmers may not get right price for their output. Thus, the variable access to market information has a positive and statistically significant effect on the level of cereal crops commercialization. The probable justification is that with asymmetric information traders might exploit farmers by lowering prices. This discourages them from producing more for the markets.

Most income generating activities in Ethiopia are directly linked to crop production, while only a small share comes from non-farm activities. The variable from income from non-farm activities has a negative and statistically significant effect on the level of cereal crop commercialization. This contradicts the findings of [10,12] that income positively influences the level of agricultural commercialization.

4. Conclusions and Recommendations

The objective of this study was to examine the extent of cereal crops commercialization by smallholders in Ethiopia. The study used 384 sample households from Sinana Ditrict. Tobit regression model was used for data analysis. Out of the 12 variables incorporated in the model 9 of them were significant at different significance levels. Sex, education, family size, extension visit, livestock ownership in tlu, disease infestation of crops, access to market information, access training, access to credit and non-farm income were found to be significant up to 10 percent significance level. Based on the study findings some policy implications were made for the significant variables.

Despite the government effort for improving access to market information, the variable access to training on market information is another significant variable. Dissemination of market pricing information is vital for rural cereal crop commercialization. Asymmetric price information distorts distribution of crops. Trades may exploit farmers by creating information gap. This discourages market oriented production. This calls for expansion of information and communication technologies (ICTs) for dissemination information to remote areas.

Owing to the negative effect of the variable family size on the extent of cereal crops commercialization, the government must strengthen the present means of fertility control, and developing societal awareness about the burden of population growth.

Access to credit has a positive impact on the extent to which smallholder farmer's cereal crops commercialize their agriculture .This calls for strengthening the existing credit services provided by different institutions.

The study established that extension visit influenced the level of smallholder farmer's cereal crops commercialization. This calls for strengthening of the capacity of extension agents to encourage them to frequently visit farmers at the farm field. Finally, it is recommended that further research must be done on dynamics of agricultural commercialization in Ethiopia.

Acknowledgments

This data collection for this study was supported by Madda Walabu University.

References

[1] Berhanu G., and Moti J., 2010, Commercialization of Smallholders: Does Market Orientation Translate Into Market Participation? International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia.

[2] World Bank, 2008, World Development Report 2008: Agriculture for Development, 1818 H Street, NW, Washington, Dc 20433, USA.

[3] Food and Agricultural Organization, 1989, Horticultural Marketing: A Resource and Training Manual for Extension Officers', Rome.

[4] Kothari, C. 2004. Research Methodology: Methods and Techniques, 2nd Edition, Wisha, Prakasha, New Delhi.

[5] Greene, W. H. 2012. Econometric Analysis. 7th edition, Boston: Pearson Education.

[6] Omiti J. M. and Otieno D. J., Nyanamba T., and Mc Cullough E., 2009, Factors Influencing the Intensity of Market Participation by Smallholder Farmers: A Case Study of Rural and Peri-Urban Areas of Kenya, AFJARE Vol 3 No 1 March 20097.

[7] Agwu N.M., C.I. Anyanwu and E.I. Mendie, 2012, Socio-Economic Determinants of Commercialization among Small Holder Farmers in Abia State, Greener Journal of Agricultural Sciences ISSN: 2276-7770 Vol. 2 (8), pp. 392-397, Nigeria.

[8] Bedaso, T., Wondwosen, T. & Mesfin, K., 2012, Commercialization of Ethiopian Smallholder Agriculture: Factors and Challenges Behind, A Paper Presented on Tenth International Conference on Ethiopian Economy, Addis Ababa, Ethiopia.

[9] Berhanu G., and Moti J., 2012, Market Orientation and Market Participation of Smallholders in Ethiopia: Implications for Commercial Transformation, International Livestock Research Institute (ILRI), elected Paper prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, , Brazil, 18-24 August, 2012.

[10] Birara Endalew, Mezgebu Aynalem, Fenta Assefa, and Zemen Ayalew. (2020). Determinants of Wheat Commercialization among Smallholder Farmers in Debre Elias Woreda, Ethiopia. Volume 2020 |Article ID 2195823. |Journal of advances in agriculture. Volume 2020 |Article ID 2195823 |.

[11] Agwu N.M., C.I. Anyanwu and E.I. Mendie, 2012, Socio-Economic Determinants of Commercialization among Small Holder Farmers in Abia State, Greener Journal of Agricultural Sciences ISSN: 2276-7770 Vol. 2 (8), pp. 392-397, Nigeria.

[12] Taye Melese, Abebe Birara Dessie, Tadie Mirie Abate (2018). Determinants of commercialization by smallholder onion farmers in Fogera district, South Gondar Zone, Amhara national regional State, Ethiopia. Journal of Development and Agricultural Economics. Vol.1(10), pp. 339-351.

[13] Romanus Osabohien Anita Mordi Adeyemi Ogundipe. (2020). Household access to agricultural credit and agricultural production in Nigeria: A propensity score-matching model. South African Journal of Economic and Management Sciences (SAJEMS) 23(1).