Analysis of factors affecting banana market participation in the case of Assosa zone of Benishangul gumuz regional state, Ethiopia

Bezawit Yilma[1] and Alemayehu Keba[2]

Ethiopian Institute of Agricultural Research (EIAR), Addis Ababa, Ethiopia

Email address:

ybezawit@gmail.com , alemayehukeba@gmail.com

Abstract: Banana is an important commercial fruit crop for smallholder farmers in Assosa zone, western Ethiopia. However, its sector is experiencing many constraints and limited attention given to productivity and marketing. Therefore, this study was conducted to analyze the factor affecting market participation of small holders on banana. Data were collected through a survey, key informants' interviews, and focus group discussions. Different analytical and statistical tackles were used for data analysis. The study was based on the cross-sectional data collected from 193 sample households which were purposively selected from 7 rural kebeles. Both descriptive statistics and econometric analysis were used to identify and analyze factors that determine the market participation of smallholders. Accordingly, out of the included 10 variables, 3 were found to significantly influence the banana market participation of small holder farmers. The Probit regression model results showed that the market participation of smallholders includes land owned, road quality, and distance to main market are the significant determinants of banana market participation. Therefore, the government should also invest in rural infrastructure, especially on the road network to ease conveyance of the banana produced from the area of production to marketing point in order to lower transaction costs and to motivate market participation.

Keywords: Banana; Market; probit; Assosa; Ethiopia

Introduction

Banana (Musa spp.) is a crop of major economic importance in the world. It is the fourth most important crop of the food market next to rice, wheat, and maize [5].

Increasing market participation among smallholder farmers has a big potential to uplift living standards of poor through increasing production and consumption pattern. Although, smallholder farming made 95% of total crop production in Ethiopia, they are exposed to a marketing

bottleneck that hinders benefits from their produce [3] and also market participation in rural households is vital strategy in assuring better income and a key factor to lifting rural households from poverty [1].

According to [8] the improved banana varieties produced in Arba Minch were giant Cavendish, Medium Cavendish (Williams), Dwarf Cavendish and other local varieties. Farmers were asked whether they use a local or an improved variety of banana suckers. The largest proportion of the producers (84%) responded that they grew medium Cavendish and the remaining farmers grew giant Cavendish, Dwarf Cavendish, and other local varieties. The main reason they would like to grow medium Cavendish varieties was that its high productivity and better disease resistance than other verities in the district.

It is a great socioeconomic importance contributing much to the overall well-being of the rural communities including food security, income generation, and job creation [12] and it contributes around 48% for producers' own consumption, 49% for income generation, less than 1% for animal feed and less than 3% for other purposes in Ethiopia. It cover about 60% of the total fruit area, about 68% of the total fruits produced, and about 38% of the total fruit-producing farmers in Ethiopia [2].

The importance of market participation to economic growth and poverty reduction arises from the fact that market participation leads to market-oriented production where the household specializes in the production of those goods for which it holds comparative advantage [10] and Markets allow farmers to benefit from increased production [11].

 According to the study of [7] Smallholder farmers face many constraints that impede them from taking advantage of market opportunities and It is an important commercial fruit crop for smallholder farmers in Arba Minch, southern Ethiopia. However, its sector is experiencing many constraints and limited attention given to productivity and marketing [8]

It is, therefore, on this basis this research was conducted with the aim of identifying the factors affecting smallholder market participation so that the contribution of the Banana fruits to income and livelihood would be improved.

Methodology

The study was conducted in Homosha and Assosa woreda of Assosa zone in Benishangul Gumuz regional state of west Ethiopia. Assosa city is 683 km far from the capital Addis Ababa in west of the country. The study was conducted in the seven kebeles (Selga 24, Afasizim, Amba 01, Amba 10, Algela, Dareselam and Ashura) which found in Homosha and Assosa Woreda, Assosa zone, Western Ethiopia. Those kebeles have been selected purposively based on their potential Banana production. Primary data was collected from 193 households using structured questionnaire. Qualitative data also collected using Focus Group Discussion (FGD) and Key Informants (KII). Moreover, secondary data was also collected from different published and un-published documents. The sample keeping the proportion to each kebeles were selected by using [14] sample size formula.

Econometric Model used for Analysis

To achieve the stated objective, before using the probit regression model, descriptive statistics (means, percentages, t-test, probabilities and chi-square test) was used to describe the socioeconomic features of banana market participants and non-market participants. Probit model was used to analysis the determinant affecting market participation decision of banana growers in the study area. According [4], the probit model to analyze the farmers' decision to participate in the output market can be computed from the standard normal cumulative distribution function as follows: $P(0, 1) = P(y = 1|x) = P(Z_i^* \leq Z) = P(Z_i^* \leq \beta_1 + \beta_2 x_i) = F(\beta_1 + \beta_2 x_i)$ (1)

Where, $P(0, 1)$ or $P(y = 1|x)$ is the probability that an individual household participate in the market given the explanatory variables X_i hypothesized to affect farmers 'decision to participate in banana market and Y is a dependent variable which takes on the value of 1 if the farmers participate in the banana market and 0 otherwise. Thus, the model specification on the decision of whether to participate in the market or not can be estimated as follows: $P(0, 1) = MarkPartic = \beta_0 + \beta_1 age + \beta_2 sex + \beta_3 educ + \beta_4 farmexperience + \beta_5 landsize + \beta_6 typeofroad + \beta_7 distancetocooperative + \beta_8 distmainmarket + \beta_9 distancetolocalmarket + \beta_{10} distancetoextension + \varepsilon_i$ (3)

Where, MarkPartic= is the market participation which can take the value of 1 if the household participated in the market or 0 if it does not.

Result and Discussion

Characterization of Banana Production in Homosha woreda

The major sources of income of the farmers in the study areas are Sorghum, maize, soya bean, haricot bean, cassava, ground nut, tropical fruits and livestock. However, sub-tropical fruits, particularly banana are dominant in terms of production and area coverage in the woreda next to mango. The result showed that on average a farmer have 2.77 ha of land from this land 0.58 ha of land is covered by banana tree. Numbers of banana seedlings are 0.02 quintal averagely. Averagely nonbearing and bearing banana trees are 23.47 and 22.97 respectively. Average banana per tree production was 0.24 quintal. Average selling price of banana was 24.70 Ethiopian Birr per kilogram (1\$=50 ETB). On average a household sold 11.45 quintal of the produced to buyers the other they use for consumption (Table 1).

Table 1: Banana trees owned by households

Variable	Mean	Std. Err.
Own land	2.77	0.21
Banana fruit trees (ha)	0.58	0.52
Banana fruit trees plot ownership	0.17	0.023
Banana fruit trees plot Irrigated	0.10	0.02
Banana Number of seedlings	0.02	0.02
Banana number of non-bearing trees	23.47	14.52
Banana number of Bearing trees	22.97	13.59
Banana Quantity harvested per tree (Quintal)	0.24	0.13
Banana Quantity sold Fruit (Quintal)	11.45	8.33
Banana Estimated average Price Fruit (Birr/Kg)	24.70	15.16

Descriptive Statistics for Continuous Variables

The descriptive and inferential results presented on Table 2 show that there was statistically significant difference between adopters and non-adopters in terms of distance to main market and own land. The descriptive and inferential result of each variable is interpreted as below:

The average land ownership of market participants of banana was 2.94 and for non-participants 1.77. The implication is that market participants have more access production by using their land for purposes of planting banana. This result suggests that, those farmers who owned more land have better chance to use banana. The t-test result showed that the land owning mean difference between the two groups is significant at 5% level.

Participation of households has significantly shorter distances to the main market 12.89 minutes than non-participant households 18.44 minutes. The findings suggest that farmers with access to

markets have a higher probability of market participation of banana than those that with limited access to markets. The t-test result showed that the main market distance mean difference between the two groups is significant at 1% level.

Table 2: Descriptive statistics of continuous independent variables

Characteristics	Market participant	Non-market participant	
	mean	mean	ttest
Age of house hold(year)	47.91	42.78	-1.45
Own land(ha)	2.94	1.77	-1.96**
Walking distance to local market(km)	5.66	4.32	-0.32
Distance to Main Market(minutes)	12.89	18.44	2.65***
Farm experience(year)	23.02	18.50	-1.85
Distance to cooperative(km)	1.78	1.00	-0.50
Distance to extension(km)	3.16	0.92	-0.48

Descriptive Statistics for Dummy Variables

The descriptive and inferential statistics results presented in Table 3 show that 45.88 percentage of banana market participant households used quality road to main market and also 6.19 percentage of non-market participant households used quality road to main market. Compared to non-market participant, market participant households have got satisfied with their joining of quality road to sale their banana production or fruits to main market. Two of the dummy variables described in table below are statistically insignificant (p>0.1) between market participant and non-market participant households.

Table 3: Descriptive statistics of Dummy/ discrete Independent Variables

Characteristics		Market participant	Non-market participant	
		percentage	percentage	Chi2
Sex of house hold	Male	65.46	10.30	0.33
	Female	20.10	4,12	
Education of house hold	Educated	44.32	8.76	0.76
	Illiterate	41.24	5.67	
Type of road to main market	Paved road	45.88	6.19	1.11*
	Non-Paved road	39.69	8.24	

Determinants of Banana Market Participation among Smallholder Farmers

The probit regression model results (Table 1) showed that the market participation is influenced by the road type to market, land allocated for banana and distance to main market.

Households with best road quality to market for banana had higher banana market participation at 1% significant level. The marginal effects showed that a 1 unit increase in road quality to market has led to a 10.1% probability increase of market participation of small holder farmers.

Households with large land size allocated for banana had higher banana market participation at 10% significant level. The marginal effects showed that a 1 ha increase in land allocation for banana plantation has led to a 4.6% probability increase of market participation of small holder farmers. This is in line with the findings of [3], who reported that the farm size was the significant factor that affected the farmers' degree of market participation.

However, the probit results revealed that distance to main market was found to have negative significant influence on the probability of smallholder farmers to participate in the output market. The sign negative means that as distance to nearest market increases, the probability of farm household's orientation towards commercialization of their farming system reduces in the study area. This is because as the distance to market increases, the transportation cost increases as well, this is a disincentive to market participation. The marginal effect revealed that as the distance to nearest market increase by one kilometer, the probability of household to participate in the output market decreases by 0.7 percent. This is in line with the findings of [6, 9 and 13] those whom reported that the distance to nearest market was the significant factor that affected the farmers' degree of commercialization.

Table 4: Determinants of banana market participation (probit model output).

Explanatory variable	Coef.	Std. Err.	Marginal effect (dy/dx)	z	P>z
Sex House Hold	0.119	0.321	0.019	0.37	0.711
Age of House Hold	-0.011	0.010	-0.002	-1.07	0.285
Education of House Hold	-0.086	0.301	-0.014	-0.29	0.775
Type of road to main market	0.608**	0.282	0.101	2.16	0.031
Own land	0.286***	0.108	0.046	2.65	0.008
Distance to extension	0.003	0.016	0.001	0.15	0.878
Distance to cooperative	0.023	0.071	0.004	0.32	0.748
Farm experience	0.022	0.014	0.004	1.58	0.115
Distance to Main Market	-0.044***	0.013	-0.007	-3.27	0.001
Walking distance to local market	0.007	0.015	0.001	0.46	0.645
cons	0.721	0.482		1.50	0.135

LR chi2 (10) =24.98

Pseudo R2 =0.1560

Prob > chi2 =0.0000

Log likelihood = -67.582216

*** and ** are significant at 1% and 5% significant levels, respectively.

Conclusions and Policy Implications

Market participation of smallholder farmers on agriculture entails production decisions based on market signals and output markets. Hence, analysis of the market participation requires analysis factors that determine the market participation of households. Thus, this study has made an attempt to contribute to the improved understanding of smallholders' market position of banana by identifying the demographic, socioeconomic, and institutional factors that determine market participation. Given the current high market demand for Assosa banana, there is a room to enhance the level of banana commercialization. According to the empirical results, to improve and enhance banana market participation policies and development, endeavors must be targeted at improving household resource endowments, market linkage, and strengthened banana nursery sites, and increase production and productivity of banana in the study area.

The result revealed that road quality and own land positively and significantly affects the amount of banana market participation but Distance to the main market negatively and significantly affects the amount of banana market participation. Therefore, the government should also invest in rural infrastructure, especially on the road network to ease conveyance of the banana produced from the area of production to marketing point in order to lower transaction costs and to motivate market participation.

Reference

1. Agete Jerena Kabeto (2014).An Analysis of Factors Influencing Participation of Smallholder Farmers in Red Bean Market in Halaba Special District, Ethiopia

2. Central Statistical Agency of the Ethiopia (CSA). (2015). Agricultural sample survey 2014/2015 (2007 E.C.). Volume I. report on area and production of major

3. Dalango, Deresse, Wondaferhu Mulugeta, and Tesfaye Melaku. "Determinants of Smallholder Teff Farmers' Market Participation; A Case Study In Gena-Bossa District, Dawro Zone, Ethiopia." (2018).

4. Egbetokun, A., & Omonona, B. T. (2012). Determinants of Farmers' Participation in Food Market in Ogun State. Global Journal of Science Frontier Research Agriculture and Veterinary Sciences, 12(9), Version 1.

5. Food and Agriculture Organization Statistical Division (FAOSTAT). (2O12). Overview of world banana production and trade. The world banana economy, 1985-2012. FAO

Corporate Document Repository. Produced by Economic and Social Development Department. Retrieved June 1, 2016, from http://fao stat3.fao.org/home/index.html

6. Geremewe, Y. T. (2019). Factors influencing the intensity of market participation among smallholder wheat (Triticum aestivum.) farmers: A case study of Jabi Tehnan District, West Gojjam zone, Ethiopia. International Journal of Horticulture, Agriculture and Food Science (IJHAF), 3, 2456–8635.

7. Getahun Kassa,, Eskinder Yigezu, and Desalegn Alemayehu (2017). Determinants of smallholder market participation among banana growers in bench Maji Zone, Southwest Ethiopia

8. Girma Gezimu Gebre, Eweg Rik & Albertien Kijne | (2020) Analysis of banana value chain in Ethiopia: Approaches to sustainable value chain development, Cogent Food & Agriculture, 6:1, 1742516, DOI: 10.1080/23311932.2020.1742516

9. Mbitsemunda, Jean Pierre Kamanzi, and Antoine Karangwa. "Analysis of factors influencing market participation of smallholder bean farmers in Nyanza district of Southern Province, Rwanda." *Journal of Agricultural Science* 9, no. 11 (2017): 99-111.

10. Njeri and Kim (2016). Review of Smallholder Market Participation in Kenya: Barriers and Determinants. Afri. J. Sci. and Res., (5)3:50-56

11. Wiggins, S. and Keats, S., 2013. Leaping and Learning: Linking smallholders to markets in Africa.

12. Woldu, Z., Mohammed, A., Belew, D., Shumeta, Z., & Bekele, A. (2015a). Assessment of banana production and marketing in Ethiopia. International Journal of Sciences: Basic and Applied Research, 24, 283–307.

13. Worku, Chernet, Marlign Adugna, and Essa Chanie Mussa. "Determinants of market participation and intensity of marketed surplus of smallholder chickpea producers in Este woreda." *Legume Science* (2021): e132.

14. Yamane, Taro. (1967): Statistics: An Introductory Analysis, 2nd Ed., New York: Harper and Row. Zodpey, S P (2004): Sample size and power analysis in medical research, Indian J. Dermatol. Venereol.Leprol, 70 (2), 123-128.