International Journal of Agricultural Economics
2016; 1(2): 40-44
http://www.sciencepublishinggroup.com/j/ijae
doi: 10.11648/j.ijae.20160102.14

Determinants of Smallholder Farmers Participation Decision in Potato Market in Kofele District, Oromia Region, Ethiopia

Yassin Esmael Ahmed[1, *], Adam Bekele Girma[2], Mengistu Ketema Aredo[3]

[1]Department of Agricultural Economics, Adami Tulu Agricultural Research Centre, Adami Tulu, Ethiopia

[2]Department of Agricultural Economics, Ethiopian Institute of Agricultural Research, Adama, Ethiopia

[3]Department of Agricultural Economics, Haramaya University, Haramaya, Ethiopia

Email address:

yasoesmael@gmail.com (Y. E. Ahmed), adbk2012@gmail.com (A. B. Girma), Mengistuket@gmail.com (M. K. Aredo)

[*]Corresponding author

To cite this article:

Yassin Esmael Ahmed, Adam Bekele Girma, Mengistu Ketema Aredo. Determinants of Smallholder Farmers Participation Decision in Potato Market in Kofele District, Oromia Region, Ethiopia. *International Journal of Agricultural Economics.* Vol. 1, No. 2, 2016, pp. 40-44.
doi: 10.11648/j.ijae.20160102.14

Received: July 1, 2016; **Accepted**: July 11, 2016; **Published**: July 28, 2016

Abstract: Market participation plays a crucial role in generating better income and enhancing welfare of smallholder farmers and thus contributes to alleviate poverty. This study investigated the determinants of smallholder farmers' participation decision in potato market in Kofele district with the objective of identifying and analyzing factors affecting farmers' decision in supplying their potato products to market. A multi-stage sampling procedure was used to select sample households for data collection. A total of 120 potato producer households were randomly selected from the district and semi-structured questionnaires were used to collect data. The descriptive statistics and probit model were applied to analyze factors affecting smallholder farmers' market participation decision in potato market. The findings demonstrate that level of education, livestock owned, quantity of potato harvested, potato market price, and access to market information positively affect farmers participation decision whereas participation in off/non-farm activities were negatively affect farmers decision to participate in potato output market. This study suggested that a policy that improves determinants of market participation is recommended to enhance farmers' market participation in potato output market.

Keywords: Smallholder Farmers, Market Participation Decision, Potato, Probit Model, Kofele District

1. Introduction

Ethiopian economy is heavily dependent on agriculture which contributes about 44% of the Gross Domestic Product, 80% of employment and 90% of the export earnings [1].

Market participation has motivated the farmers to move from subsistence farming to commercial farming [2]. [3] Reported that farmers' market participation is very vital for sustaining economic growth, food security and poverty alleviation.

[4] Reported that smallholders with high degree of market participation have better potential of enjoying better standards of welfare. [5] Reported that effective market participation pulls rural people out of poverty by improving their income and food security.

Potato is a major root crop produced in Ethiopia and it is short duration crop which matured within 3-4 months [6]. It is an important crop which generates income for the farmers [7]. Potato is rapidly becoming a valuable source of cash income due to its high demand on the market [8].

West Arsi is a major potato producing zone in Oromia region that smallholder farming has diversified from staple food subsistence production into more market oriented and high value commodities [9]. Kofele is the second major potato producing and supplying district in West Arsi zone [9].

Despite the production potentials and importance of potato crop for the country as well as the study area, there has been limited performance of farmers in potato marketing. Thus, this study was initiated to identify factors affecting smallholder farmers' market participation and provide

location-specific and timely information for policy makers to solve problems.

2. Objectives of the Study

To describe the status of smallholder farmers participation in potato markets

To identify and analyze factors affecting market participation decision of potato producer farmers in Kofele district

3. Research Methodology

3.1. Description of Study Area

This study was conducted in Kofele district, West Arsi zone of Oromia National Regional State, Ethiopia. Kofele district is located at 305 km from Addis Ababa towards South direction. The district covers an area of 663 square kilometers and has 38 rural and two urban *Kebeles.* The total population of the district is 216159 (108156 males and 108003 females) having the rural population of 194531 (96652 males and 97879 females), and urban population of 21628 (11504 males and 10124 females) [10].

The major agro-ecologies of the district are high land (90%) and mid-land (10%) having loam soil type for highland and sandy loam for mid land soil types [11]. The district is found within 2400 to 2700 m. a. s. l. It receives an average rainfall of 1800 mm per annum with minimum 2300mm per annum and maximum 2700mm per annum. The district has bi-modal rainfall distribution. The small rainy season starts from March/April to May whereas the main rainy season starts from June to September/October [11]. The average temperature is 19.5°C per year with minimum of 17°C and maximum of 22°C [11].

The land use pattern of the district shows that 40260 ha is cultivable, 21629 ha is grazing land, 3852 ha is covered by forest, bushes and shrubs, and 4486 ha is being used for other purposes such as encampments, and infrastructure facilities. The average land holding of the district is 3.6 hectare [11].

The district features a crop-livestock mixed farming system. Barley, Potato, Wheat, Maize, Enset, Cabbage and Head Cabbage are widely grown in the district. The district is known for its predominance of potato production in west Arsi zone. Potato is the major cash crop in the Kofele district [11].

3.2. Sampling Procedure

A multi-stage sampling procedure was used to identify sample households for data collection. In the first stage, potato producer *kebeles* were purposively identified in collaboration with concerned experts from district office of agriculture and development agents based on the intensity of potato production. The second stage involved random selection of four potato producing *kebeles* from a list of the potato producer *kebeles* in the district. In the third stage, 120 potato producer households were randomly selected from the total potato producer households after determined by using sample size determination formula [12].

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

Where: n = is the sample size of potato producer households, N = is the total potato producer households in the district (N = 6612) and e = 0.09 is the level of precision defined to determine the required sample size at 90% level of precision. Probability proportional to size was used to determine sample sizes from each *kebele*.

Table 1. *Sampling frame and sample size determination.*

Name of selected Kebeles	Potato producer households (no.)	Proportion of sampled household (%)	Numbers of sampled households
Koma Bitachaa	591	15	18
Afamo	1257	31	37
Garmema	647	16	19
Gurmicho	1515	38	46
Total	4010	100	120

3.3. Data collection and Analysis Methods

Both primary and secondary data were used in this study. Primary data on factors affecting potato market participation decision was collected from sample households using semi-structured questionnaires. Secondary data that relevant for this study was gathered from district office of agriculture, Central Statistically Agency (CSA) and from published and unpublished sources.

Both descriptive statistics and econometric model were used for data analysis.

3.4. Econometric Model

A probit model was used to identify factors affecting farmers' participation decision in potato marketing.

$PD_i^* = \beta X_i + \varepsilon_i$

PDi = 1, if PDi* > 0, otherwise PDi = 0

Where, PD_i^* is a latent (unobservable) variable, which is the utility the farmer gets from participating in the market, X_i is a vector of independent variables hypothesized to affect households decision to participate in potato market; βi is a vector of parameters to be estimated; ε_i is the error term. PD_i is a discrete response variable for household market participation decision which takes a value 1 if the household sales potato and 0 if household do not sale potato. Probit model was estimated using maximum likelihood estimation using STATA Version 11.

Where, *Yi and Yi* sales/marketing/, that the error terms (εi *and Ui*) distributed as: εi ~ (*N0, 1*) *and Ui* ~N (0, σ).

Table 2. *Description of the variables used in the model.*

Variables	Description	Measurements	sign
MPDHH	Dependent variable: if household sell potatoes its represented by one; zero otherwise	D= 1 if yes; 0 otherwise	
REDU	Respondent's education level	Schooling year	+
FExperience	Potato farm experience	Years	+
FSize	Family size	Number	-
TLU	Livestock owned	TLU	+
Land CULT	Land cultivated under potato	Hectare	+
DSMKT	Distance to the nearest market	Hours	-
PROD	Potato production	Quintals**	+
MRKTPRICE	Potato market price	ETB*	+
FERTApp	Fertilizer application	Quintals**	+
MKTINFO	Access to market information	Dummy (1=yes, 0=no)	+
EXTENSION	Extension services	Dummy (1=yes, 0=no)	+
PNOFARM	participation in non/off-farm activities	Dummy (1=yes, 0=no)	+

*: ETB=Ethiopian birr, **: 1 quintal=100 kilogram

4. Results

4.1. Descriptive Analysis

Analysis of market participation of farmers showed that from the total 120 potato producer sampled households, 68% are engaged in potato sales while the remaining 32% were used potato outputs for home consumption. The average family size, potato farm experience, education level and livestock owned of the respondent were 8, 22, 5 and 8 respectively. The average cultivated land under potato and quantity of potato production were 1.38 hectare and 29 quintals respectively. The respondents received the mean price of ETB 200 from sells potato product per year (Table 3). The farmers travelled the average distance of 1.54 hours to reach the nearest market. Crop and livestock productions are the major source of income in the study area. In addition to this, 48% of the respondents earned income by participating in non/off-farm activities. From the total sampled households, 61% of them have access to extension service (Table 3).

Table 3. *Descriptive statistics of selected variables used in the empirical analyses.*

Variables	Mean+SD	Min	Max
MPDHH	0.68±0.47	0	1
FExperience	22.10±9.69	7	47
REDU	4.80±3.62	0	12
FSize	8.52±2.16	5	13
TLU	7.94±4.73	0	25
Land CULT	1.38±0.69	0.13	3
PROD	29.21±23.79	3	110
MRKTPRICE	200.25±75.10	65	360
FERTApp	1.33±1.10	0.1	5.75
DSMKT	1.54±0.25	1	2
MKTINFO	0.58±0.49	0	1
EXTENSION	0.61±0.49	0	1
PNOFARM	0.48±0.50	0	1

4.2. Results of Econometric Model Analysis

Education level had a positive impact on the farmers' participation decision in potato output market at 10% level of statistical significance that satisfies the *priori* expectation.

Owning more number of livestock had a positive and significant influence on the farmers' participation decision in potato output markets at 1% level of statistical significance which Consistent with *priori* expectation.

The respondents who had more potato production, offered high price from sell potato products and access to market information were more likely to participate in potato output markets which confirm the *priori* expectation.

Participation in non/off-farm activities had a negative and significant impact on the farmers' market participation decision at 5% level statistical significance. This result implied that as the respondents' participation in off-farm activities increases the likelihood of participation in potato market would decreases by 19.7%.

5. Discussion

For each additional year in education, the respondents were 2% more likely to participate in potato markets, keeping other factors constant (Table 4). This result implies that the level of education motivated the respondents' participation in potato market by empowering their marketing skills and knowledge. This is in line with the findings of [13].

Table 4. *Marginal effects of probit regression for market participation decision.*

Variables	Coefficients	Robust Std. Err.	P>z	Marginal effect
FExperience	-0.031	0.020	0.119	-0.006
REDU	0.093*	0.058	0.100	0.019
FSize	-0.101	0.072	0.163	-0.020
TLU[a]	0.862***	0.321	0.007	0.173
LandCULT	-0.277	0.300	0.356	-0.056
PROD[a]	1.559***	0.407	0.000	0.312
MRKTPRICE	0.010***	0.003	0.000	0.002
FERTApp	0.098	0.112	0.382	0.020
DSMRKT	0.848	0.827	0.305	0.170
MKTINFO	0.885**	0.355	0.013	0.194
EXTENSION	0.167	0.369	0.650	0.034
PNOFARM	-0.934**	0.404	0.021	-0.193
_cons	-7.692***	2.085	0.000	

***, **,*: implies statistical significance at 1%, 5%, and 10% levels, [a] = Natural logarithm, Log pseudo likelihood = -33.619, Pseudo R^2 = 0.5513, Wald chi^2 (12) = 50.58, Prob> chi^2 = 0.0000, N = 120. Source: Model result, 2015.

Table 4 above indicates, an additional in livestock would increase the likelihood of participation in potato markets by 17%, keeping other factors constant. The probable reason could be that owning more number of livestock would increases potato production through providing manures, traction power and transporting commodities to markets. This is in line with the findings of [14].

This result indicated (Table 4), the respondents' likelihood of participation in potato markets would increase by 31.2% as a result of one unit increase in potato production, other factors held constant. The reason could be that more potato production result in more marketable surpluses which motivate farmers' participation in potato market. The findings of [5] support the finding of this study.

Potato market price has a positive influence on the respondents' participation decision in potato output markets (Table 4). One ETB increase in potato price would increase the respondents' likelihood of market participation by 0.2%, keeping other factors constant. This means as potato price raised by ETB 100 the respondents' likelihood of market participation would increase by double. This suggested that farmers are more responsive to higher prices because they got higher incomes from their produces. This result is consistent with the findings of [15].

As table 4 above indicates, the more the respondents participated in non/off-farm activities, they were 19% less likely to participate in potato output markets, keeping other factors constant. The reason was that participation in off-farm activities is competed with farm activities (that is potato production) for the time resource which possibly results into smaller quantities of potato produced and hence decreases market participation. This finding is in line with the finding of [16].

6. Conclusion

Transforming agriculture through improving farmers' market participation is one of the pillar strategies in the policy of Ethiopia. This study has identified household level determinants of potato market participation decision in Kofele district, West Arsi zone, Oromia region, Ethiopia.

The model output shows that education level, livestock owned, quantity of potato harvested, potato market price and access to market information have positive influence whereas participation in off/non-farm activities has a negative influence on farmers market participation.

Recommendation

Education level plays an important role in potato market participation decision of households. Therefore, any interventions that upgrade the knowledge of the households through education and trainings (market related) have better enhances farmers' market participation in the study area.

Livestock ownership has a positive impact on households' market participation decision. Therefore, an intervention that improves the livestock assets of households are better recommended as livestock provides manures for the farm, means of transportation of their products to the market, and provide financial liquidity for the farmers in the area.

Quantity of potato harvested has positive influence on the households' market participation decision. Therefore, interventions targeting on promoting and delivering technology packages to smallholder farmers that increases potato production and also link them with output market are good options to enhance smallholder farmers' market participation.

Potato market price influences the households' market participation decision positively. Therefore, interventions in the form of establishing new farmers cooperatives/groups and improves the existing farmers cooperatives/groups to collect potato products and link farmers cooperatives/groups with output markets are required to reduce broker interferences and transportation costs and also sustain farmers' benefits from their products.

Access to market information has a positive and significant impact on the households' market participation decision. Therefore, effort should be made to deliver proper and adequate market information through strengthening market information delivery network and also link farmers' cooperatives/groups with proper sources of market information to enhance potato farmers' regular access to information on market dynamics.

Acknowledgements

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

I also would like to thank Oromia Agricultural Research Institute (OARI) for funding this research and also Adami Tulu Agricultural Research Centre for providing office and facilitating vehicle for the accomplishment of this study.

References

[1] MoFED (Ministry of Finance and Economic Development), Growth and Transformation Plan. Annual Progress Report for Fiscal Year 2011/12. Addis Ababa, Ethiopia, September, 2013.

[2] M. Makhura, J. Kirsten, C. Delgado, Transaction Costs and Smallholder Participation in the Maize Market in the Northern Province of South Africa. Seventh Eastern and Southern Africa Regional Maize Conference, Pretoria, South Africa, 2001.

[3] B. Jari, C. G. Fraser, An Analysis of Institutional and Technical Factors Influencing Agricultural Marketing amongst Smallholder Farmers in the Kat River Valley, Eastern Cape, South Africa. Afric. J. Agri. Res., Vol. 4, pp. 1129-1137, 2009.

[4] K. Sharp, S Gebreselassie, Commercialisation of farming in Ethiopia: Which pathways? Ethio. J. Econ., Vol. 16, pp. 43-56, 2007.

[5] S. B. Gani, I. A. Adeoti, Analysis of Market Participation and Rural Poverty among Farmers in Northern Part of Taraba State, Nigeria. Department of Agricultural Economics, University of Ibadan, Ibadan. Oyo State, Nigeria, J. Econ., Vol. 2, pp. 23-36, 2011.

[6] G. Endale, W. Gebremedhin, L. Berga, Potato Seed Management. In Root and tuber crops: Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia. The untapped resources, ed. W. Gebremedhin, G. Endale, and B. Lemaga, pp. 53–78, 2008.

[7] T. Agajie, L. Berga, J. A. Mwakasendo, Z. Nzohabonayoz, J. Mutware, K. Y. Wanda, P. M. Kinyae, O. Ortiz, C. Crissman, G. Thiele, Markets for Fresh and Frozen Potato Chips in the ASARECA Region and the Potential for Regional Trade: International Potato Center (CIP), Lima, Peru, pp. 44, 2010.

[8] FAO (Food and Agriculture Organization), Strengthening potato value chains. Technical and policy options for developing countries. The Food and Agriculture Organization of the United Nations and the Common Fund for Commodities, 2010.

[9] E. Bezabih, N. Mengistu, Potato Value Chain Analysis and Development in Ethiopia; Case of Tigray and SNNP Regions. Addis Ababa, Ethiopia, pp. 25-26, October, 2011.

[10] CSA (Central Statistical Agency), Population Projection of Ethiopia for all Regions at Wereda level from 2014 – 2017. Addis Ababa, Ethiopia, 2014.

[11] DOA (District Office of Agriculture), Reports of Kofale District Office of Agriculture, Kofele, Ethiopia, 2013, unpublished.

[12] T. Yamane, Statistics: An Introductory Analysis, 2nd Ed., Harper and Row, New York, 1967, pp. 919.

[13] T. Aman, B. Adam, Z. Lemma, Determinants of smallholder commercialization of horticultural crops in Gemechis District, West Hararghe Zone, Ethiopia. Afric J Agri Res., Vol. 9, pp. 310-319, January, 2014.

[14] A. Solomon, S. Bekele, S. Fantahun, G. Muricho, A. Tsedeke, F. Setotaw, Socio-economic Assessment of Legume Production, Farmer Technology Choice, Market Linkages, Institutions and Poverty in Rural Ethiopia. Nairobi, Kenya, 2010.

[15] R. G. Sigei, H. Bett, L. Kibet, Determinants of Market Participation among Small-scale Pineapple Farmers in Kericho County, Kenya. Egerton University, Kenya, May, 2014.

[16] C. Sebatta, J. Mugisha, E. Katungi, A. Kashaaru, H. Kyomugisha, Smallholder Farmers' Decision and Level of Participation in the Potato Market in Uganda, Mod. Econ., 2014.