Available online at www.agrifarming.org

DOI: http://dx.doi.org/10.18782/2582-7146.186

ISSN: 2582 – 7146

Curr. Rese. Agri. Far. (2023) *4*(2), 25-33

Current Research in Agriculture and Farming

Research Article

Peer-Reviewed, Refereed, Open Access Journal

Determinants of Farmers' Participation Decision in Groundnut Commercialization: The Case of Babile District, Oromia National Regional State, Ethiopia

Oromia Megersa[1*], Chanyalew Seyoum[2]

[1]Fedis Agricultural Research Centre, Oromia Agricultural Research Institute
POB 904 Harar, Ethiopia

[2]Department of Rural Development and Agricultural Extension, Haramaya University

*Corresponding Author E-mail: oromiyamegersa2015@gmail.com

Received: 25.01.2023 | Revised: 12.03.2023 | Accepted: 24.03.2023

ABSTRACT

This study was conducted in the Babile district to examine the determinants of farmers' participation decisions in groundnut commercialization. A cross-sectional research design was used. Two-stage random sampling procedures were used for the selection of 160 representative sample households. The number of sample size was determined from each 4 representative kebele after the Yamane formula was used to determine the total sample size. Probability proportional to size was used to avoid under-representation of any one group. A semi-structured interview schedule was used for gathering primary data. Descriptive statistics and probit models were used for data analysis. The probit model result reveals that age, education level, distance to the nearest market, land size, access to market information, and non/off-farm income significantly influence households' participation decisions in groundnut commercialization. The findings have an implication for all the concerned bodies, and they should have to develop strategies to address the above-mentioned factors to improve smallholder farmers' groundnut commercialization decisions.

Keywords: *Farmers, Groundnut, Commercialization Decision, probit model, Babile district.*

INTRODUCTION

The agriculture sector is dominated by smallholder farming in Ethiopia. Smallholder agriculture represents about 95% of the total agricultural output. In addition to producing staple crops, smallholders produce a large share of export potential crops (FAOSTAT, 2014). Groundnut (*Arachis hypogaea* L.), is one of the world's principal oil seed crops, which originated from South America, and is now widely cultivated throughout the tropical, sub-tropical, and warm temperate climatic zones (Sogut et al., 2016). The lowland areas of Ethiopia have immense potential for groundnut production.

Cite this article: Megersa, O., & Seyoum, C. (2023). Determinants of Farmers' Participation Decision in Groundnut Commercialization: The Case of Babile District, Oromia National Regional State, Ethiopia, *Curr. Rese. Agri. Far. 4*(2), 25-33. doi: http://dx.doi.org/10.18782/2582-7146.186

The estimated production area and yield of groundnut in the country during the 2016/2017 cropping season were 74,861.4 ha and 129,636.4 tonnes, respectively, and the largest production areas are in Oromia (41,055.3 ha), Benshangul-Gumuz (19,729.0 ha) and Amhara (7,104.4 ha) (CSA, 2017). Its production is expanding and has a huge potential as a cash and food crop to improve the livelihoods of farmers and traders in Ethiopia (Daniel, 2009). Groundnut ranked third in Ethiopia after Sesame and Nuge. The total land coverage of groundnut in Ethiopia is 84,237.01 ha, and the production is estimated to be 144,091.26 tons with productivity of 1.71 tons per hectare (CSA, 2019). It is an important crop from the perspective of food and nutrition security of poor smallholder farmers in developing countries (Nedumaran, 2015). It also generates considerable cash income for small-scale producers and foreign exchange earnings through exports to Ethiopia (Geleta et al., 2007).

Eastern lowland areas of Ethiopia, particularly Babile, Fedis, and Gursum are the major producers of groundnut for household consumption and income generation (Chala et al., 2013). Commercializing smallholder agriculture is seen as a means to bring the welfare benefits of market-based exchange economies and is central to an inclusive development process (Arias et al., 2013). Commercialization of agriculture is the strategy that the Ethiopian government is following to bring a dynamic change by transforming the traditional agriculture of smallholder farmers (Afework & Endrias, 2016). Groundnut provides dietary nutrients, human income, and protein-rich fodder for livestock (Chinma et al., 2014). Groundnut seed is a rich food source providing quality vegetable oil (48%-50%), protein (26%-28%), dietary fiber, minerals, and vitamins that are essential for the health of the livelihood (Pasupuleti et al., 2013).

In many parts of the country, market participation of smallholder family farms is limited and agricultural markets are fragmented and not well integrated into wider market systems, which increases transaction costs and reduces farmers' incentive to produce for the market (Mitku, 2014). With the ever-increasing population and the limited farmland, improving rural incomes will require a transformation of the subsistence, low-input, and productive farming systems to agricultural commercialization. Its ultimate purpose is poverty alleviation and economic development through income growth. However, it has not been possible to achieve the desired effect of commercialization in subsistence agriculture because farmers' market participation is not motivated by profit-maximizing behaviour (Barrett, 2008). They are still involved in local and regional markets and often do not have sufficient surplus production.

Various research was conducted on groundnut production flow and little attention was given to groundnut commercialization (Addisu & Erimias, 2017). The study area has a knowledge gap on the determinant factors influencing groundnut commercialization. This study aims to identify factors determining farmers' participation decisions in groundnut commercialization in the study area.

MATERIALS AND METHODS

2.1. Description of the Study Area

Babile is one of the districts of the Eastern Hararghe zone. It is located 557 km from Addis Ababa and 35 km from Harar town. The district is bordered by the Somali region in the South, Fedis in the East and Harari in the West, and Gursum in the North. The altitude of the district ranges from 989-1700 m.a.s. Agro-ecologically, 95% of the district is lowland while the remaining 5% is mid-altitude. The annual rainfall ranges from 410 to 800ml. The mean annual temperature of the area ranges between 24-28°C as information gathered from the district in 2019. Based on (CSA, 2008) the district has an estimated population of 99,379 of which 50,025 are male and 49,354 are female. Mixed farming is the major livelihood activity in the area. Sorghum, Groundnut, Maize, and Sesame are major crops produced in the area. Groundnut is one of the major oil crops grown in the district for income generation and consumption.

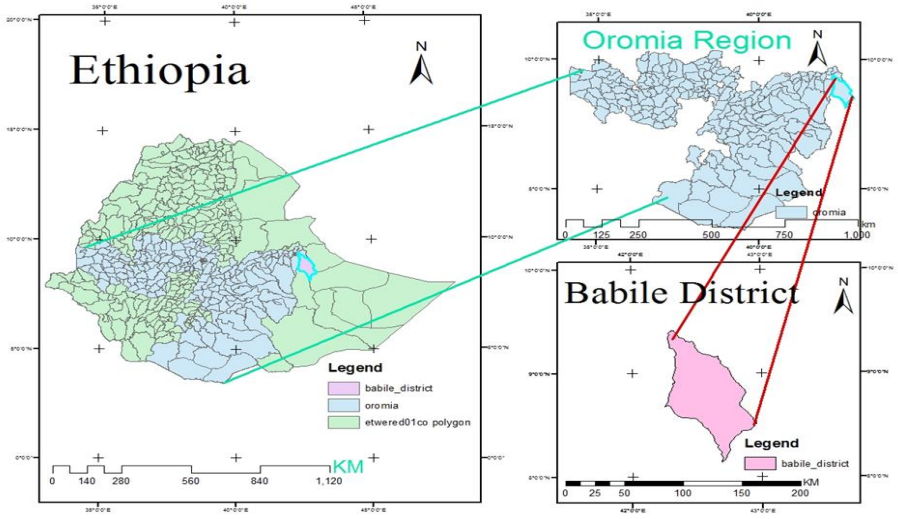

Figure1. Map of the study area

2.2. Research Design

This research work was based on a survey from randomly selected sample groundnut producers. Data were collected from sample respondents at one moment in time. A household survey was used to achieve the objective of the study.

2.3. Sampling Procedures and Sample Size Determination

Babile district was selected purposively based on groundnut production potential. Two-stage random sampling procedures were used for the selection of representative sample households. In the 1st stage, 4 groundnut producer kebeles were selected from all groundnut producer kebeles through random sampling. In the 2nd stage, 160 sample households were selected randomly from the sampling frame of 2,422 groundnut-producing households. This was determined by using the Yamane formula (Yamane, 1967).

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

Where: n = sample size of groundnut producer households, N = groundnut producer household heads, and e = level of precision (at 7.6%). The sampling error (0.076) is considering the research study's budget limitation and time utilization. Using probability proportional to size (PPS), the number of sample size was determined from each representative kebele to avoid underrepresentation of any one group.

$$n_i = \frac{nN_i}{\Sigma N} \qquad (2)$$

Where, n_i = number of sample size from each kebele, sample size determined (160), N_i= number of groundnut producer household head of each kebele, target population.

Table1. Randomly selected kebeles and the number of sample size determined by PPS

No	selected kebeles	Groundnut producer	sample determined by PPS
1	Remeta Selama	707	47
2	Barkale	604	40
3	Ifadin	506	33
4	Tula	605	40
Total		2,422	160

Source**:** own computation based on secondary data source

2.4. Data Types, Sources, and Collection Methods

Quantitative data were gathered from primary and secondary sources. Quantitative primary data were mainly focused on socio-economic and demographic characteristics, institutional factors, and infrastructural facility-related issues. The primary data source was sample

farm household heads. Primary data were collected from randomly selected groundnut producers' using a cross-sectional survey method through a semi-structured interview schedule. In addition, primary data were collected from focus groups and key informants through focus group discussion and key informant interviews as methodology, respectively. Secondary data sources were collected from the Babile District Bureau of Agriculture and Natural resource, CSA, and Journals by reviewing.

2.5. Methods of Data Analysis

Descriptive statistics and probit models were used for data analysis. Descriptive statistics were used to summarize and categorize the information gathered. The chi-square test (χ^2-test) was used for categorical variables to compare group proportions. The t-test was employed to compare group mean differences for continuous variables.

Econometric model specification

A probit model was used. The decisions are modeled in the following manner:

The probit model is used to determine the farm households' commercialization decision and its specification is given: $y* = x_i\beta + \varepsilon_i N(0,1)$ (4)

$y_i = 1$ if $y* > 0$, 0 otherwise where $y*$ is a latent variable representing households' binary decision; x_i is a vector of independent variables hypothesized to affect households decision in the commercialization; β is a vector of parameters to be estimated by the model. ε_i is a normally distributed error term, and y_i is a discrete response variable.

RESULTS AND DISCUSSION

3.1. Descriptive Statistics Results

3.1.1. Demographic and socio-economic characteristics of sample households

Of the total sample respondents, 87.5% were from male-headed households, while the remaining 12.5% were from female-headed households (Table 3). Of the total sample of male-headed households, 74.4% participated in marketing their produce, while 11.25% of female-headed households participated in marketing their groundnut produce. The mean age of the sample household head was 37 years (Table 2). The mean age of household heads for participants in commercialization and non-participants was 36.09 and 42.35 years, respectively. There was a significant mean difference between participants and non-participants at a 1% significance level in terms of age in a year. The mean education level of household heads in formal schooling was 2.28 years (Table 2). The mean educational level of household heads for participants in commercialization and non-participants was 2.44 and 1.35 years in formal schooling, respectively. There was a significant mean difference between participants and non-participants at a 10% significance level in terms of formal education in the year.

The mean household size in adult equivalent was 5.11(Table 2). The mean household size for participants in commercialization and non-participants was 4.99 and 5.78 in adult equivalent, respectively. There was a statistically significant mean difference between participants and non-participants at a 10% significance level in terms of household size in adult equivalent. The mean livestock owned in the tropical livestock unit (TLU) was 3.23. The mean livestock owned in tropical livestock unit for participants in commercialization and non-participants was 3.34 and 2.62, respectively. The number of livestock held in TLU between participants and non-participants was almost similar. The mean land size of household heads in hectares was 1.16. The mean land-holding size of household heads for participants in commercialization and non-participants was 1.19 and 0.87 in ha, respectively. The mean income generated from non/off-farm activities in thousand birr was 3.44.

Household heads' mean income generated from non/off-farm activities for participants in commercialization and non-participants was 3.04 and 5.78 in thousand birr**,** respectively.

Table 2 Descriptive statistics result for Continuous explanatory variables

Variables	Participant n=137		Non- participant n=23		Total n=160		t-value
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	
Age of HH	36.09	10.07	42.35	8.99	37	10.14	-3.04***
Education HH	2.44	2.93	1.35	1.53	2.28	2.79	1.743*
Household SZ	4.99	1.84	5.78	1.73	5.11	1.84	-2.014*
Dntm	1.54	1.04	1.99	1.14	1.6	1.06	-1.776*
LVST	3.34	3.39	2.62	3.6	3.23	3.42	0.886
Land SZ	1.19	0.61	0.87	0.2	1.16	1.14	2.49**
Extn. con.	3.99	4.66	2.57	3.27	3.78	4.51	1.8*
NOFI	3.04	6.59	5.78	5.78	3.44	6.53	-2.06**
Credit	0.88	2.76	0.15	0.42	0.77	2.57	1.27

Source: own survey result, 2019

Note *** (p<0.01), ** (p<0.05) and *(p<0.1) significant at 1%, 5% and 10%, respectively

3.1.2. Institutional factors

About 62.5% of the sample household had access to market information, while 37.5% of the sample respondents had no access to market information in the study area (Table 3). The major market information sources for the study area's household heads are neighbouring farmers, development agents, and traders. However, there is variation in access to market information from the aforementioned sources between participants in commercialization and non-participants. There was a significant proportional difference between participants and non-participants at a 1% significance level in terms of access to market information. The mean frequency of extension contact in a year was 3.78 days (Table, 2). The mean frequency of extension contact provided for household heads for participants in commercialization and non-participants was 3.99 and 2.57 in days, respectively. There was a statistically significance mean difference between participants and non-participants at a 1% significance level in terms of frequency of contact in a year. The mean credit the sample households received was 0.77 in thousand birr. The mean credit received by participant households in commercialization and non-participants was 0.88 and 0.15 in thousand birr, respectively.

3.1.3. Infrastructural (road) facility

The mean distance to the nearest market in walking hours was 1.6 while the mean distance for participants and non-participants in commercialization was 1.54 and 1.99, respectively (table 2).

Table3. Descriptive statistics results for dummy explanatory variables

Variables	Participant in commercialization		Non-participant in commercialization		Total		χ^2_{value}
	N	%	N	%	N	%	
Sex of HH							
Male	119	74.4	21	13.1	140	87.5	0.355
female	18	11.25	2	1.25	20	12.5	
Acc.mrktinfn							
Yes	94	58.75	6	3.75	100	62.5	15.2***
No	43	26.88	17	10.625	60	37.5	

Source: own survey result, 2019

Note: ***, represents significance at 1%

3.3. Results of the Econometric Model

One of the rules of thumb to detect a high multicollinearity problem is using variance inflation factor (VIF) for continuous explanatory variables, while Tetrachoric correlations were used for dummy variables. The mean VIF was 1.2, indicating no serious problem of multicollinearity among the continuous variables in the model. Tetrachoric correlations for dummy variables less than 0.75 is appropriate. Breusch-Pagan/Cook-Weisberg test was employed to detect the heteroscedasticity problem. A box plot graph was used to test for the extreme values of continuous explanatory variables. There were no serious problems with extreme values in the data and no dropped-out data with extreme values.

3.3.1. Determinants of Farmers' participation decision in groundnut commercialization

The probit regression model results show that the function of participation decision in groundnut commercialization was highly significant at a 1% significance level (Prob > chi^2 = 0.0000), suggesting the model has a strong explanatory power of independent variables to explain factors determining the commercialization decision of households.

Out of the 11 explanatory variables used in the probit model, six variables: age of household heads, education level of household heads, distance to the nearest market, land size, access to market information, and income generated from non/off-farm activities, were found to significantly influences the farmers' participation decision in groundnut commercialization in the study area (Table, 4).

Age of household heads (Age of HH): The result shows that age has a negative effect on the farmers' participation decision in groundnut commercialization at a 1% significance level (Table 4). The marginal effect after probit indicated that as the age of household heads increases by 1 year, it decreases the farmers' participation decision in groundnut commercialization by 0.11%, keeping all other factors constant. This shows that involving an active labor force in agricultural activities increases the probability of participation decision in groundnut commercialization. Furthermore, older household takes the low profit with low risk rather than taking high profit with high risk. This result is consistent with the finding (Edosa, 2018) that age has a negative effect on market participation decisions.

Education level of household head (Education HH): It had negative and significant influences on the farmer's participation decision in the commercialization of groundnut at a 5% significance level (Table 4). This indicates that attending formal education may create other job opportunities to participate in non-agricultural activities as an employee. The marginal effect indicated that for each additional year in formal education, the farmer's participation decision in commercialization decreases by 0.18%, holding all other factors constant. This result is contrasted with the finding of (Christopher et al., 2014) that education level influences farmers' participation decisions positively.

Distance to the nearest market (Dntm): Was negatively and significantly influences the farmer's participation decision in commercialization at a 1% significance level (Table 4). The marginal effect of this variable revealed that a unit incremental in walking hour decreases the probability of farmer's participation decision in groundnut commercialization by 0.97% keeping all other factors constant. This implies that the long time taken to cover the distance to the nearest market required high transaction costs or costs of doing business, like transportation and personal expenses that decrease farmers' participation decisions. This finding is consistent with the finding of (Tufa et al., 2014).

Landholding size (Land SZ): It was found to have positive and significant influences on the participation decision in the commercialization of groundnut at a 1% significance level (Table, 4). Marginal effect indicated that as the land size increases by 1 hectare the probability of farmer's participation decision in commercialization increases by 3.91%,

holding all other factors constant. This implies that land is one of the production factors that helps farmers allocate their land for different crops. This result is in line with the finding of (Ataul & Elias, 2015) that as the land size increases, the probability of decision for commercialization increases.

Access to market information (Acc. mrktinfn): Found to have positive and significant influences on the farmer's participation decision in groundnut commercialization at a 1% significance level (Table 4). After probit regression, the marginal effect of this variable disclosed that as farmers have access to market information, the probability of participation decision in commercialization increases by 2.16%, keeping all other factors constant. This indicates that access to market information helps farmers to be market-oriented for their production (when and where to sell). This study is in line with the finding of (Yassin et al., 2016) that access to market information has a positive and significant impact on the households' market participation decision.

Non/off-farm income (NOFI): It had negative and significant influences on the farmers' participation decision in groundnut commercialization at a 10% significance level (Table 4). The marginal effect of the variable indicated that as the income generated from non/off-farm activities increases by a thousand birr the probability of participation decision in commercialization decreases by 0.07%, keeping all other factors constant. The possible reason is that groundnut commercialization is a risk-bearing agricultural activity as compared to non/off-farm income-generating activities. Furthermore, engagement in non/off-farm activities easily generates income in a short period of time. This finding is in line with the finding (Gabriel, 2017) that getting more non/off-farm income represents additional wealth, which constrains households not to participate in cash crops.

Table4. Determinants of Farmers' participation decision in groundnut commercialization

Variables	Coefficient	Robust Std. Err	P>|z|	Marginal effect
Constant	4.1504***	1.0943	0.000	
Sex of HH	.0004	.5122	0.999	5.08e-06
Age of HH	-.0795***	.0210	0.000	-.0011
Education HH	-.1299**	.0533	0.015	-.0018
Household SZ	-.1153	.0950	0.225	-.0016
LVST	-.0071	.0585	0.903	-.0001
Land SZ	2.7621***	.6245	0.000	.0391
NOFI	-.0473*	.0265	0.075	-.0007
Acc.mrktinfn	.9485 ***	.3385	0.005	.0216
extn.con.	.0205	.0383	0.593	.0003
Credit	. 0955	.1602	0.551	.0014
Dntm	-.6853***	.2142	0.001	-.0097
Number of obs = 160			Log likelihood = -32.229575	
Wald chi2 (11) = 48.26			Prob > chi2 = 0.0000	
Pseudo R^2 = 0.5107				

Source: own survey result, 2019

Note: ***, **,* represents significance at 1%, 5%, and 10% level respectively.

CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

Farm households' groundnut commercialization decision has an association with different factors. Factors such as household heads' age, education level, land holding size, access to market information, non/off-farm income, and distance to the nearest market have significant relationships

with farm households' groundnut commercialization decisions. This suggests that different factors influence households' commercialization decisions. Generally, different factors in the study area influence smallholder farmers' groundnut commercialization decisions.

4.2. Recommendations

The following recommendations are given based on the results of the probit model.

The age of the sample respondent has a negative relationship with participation decisions in groundnut commercialization. Therefore, both government and non-government organizations should introduce capital-intensive technologies to increase the participation of older farmers in groundnut production and commercialization. Likewise, distance to the nearest market negatively and significantly influences households' participation decisions in groundnut commercialization. The government should strengthen and promote better access to quality road and transportation facilities to help farmers participate in commercialization decisions with low transaction costs.

Land size positively and significantly influences farmers' commercialization decisions. Since the expansion of cultivation land is impossible in the study area. The agriculture and natural resource sector should encourage farmers to use intensive farming systems by using full packages of technologies on scarce land resources to increase participation decisions in groundnut commercialization. Access to market information also positively influences households' commercialization decisions. Therefore, extension organizations and farmers' cooperatives should deliver reliable market information on time to help farmers benefit from groundnut commercialization.

Acknowledgement:

The authors thank all the concerned body contributed to the paper for publication.

Funding: NIL.

Conflict of Interest: There is no conflict of interest between authors.

Author's Contribution: Authors contributed almost equally according to their order and equal response is observed from all authors.

REFERENCES

Aman, T., Adam, B., & Lemma, Z. (2014). Determinants of smallholder commercialization of horticultural crops in Gemechis District, West Hararghe Zone, Ethiopia. *African Journal of Agricultural Research, 9*(3), 310-319.

Arias, P., Hallam, D., Krivonos, E., & Morrison, J. (2013). Smallholder integration in changing food markets. Food and Agriculture Organization of the United Nations, Rome.

Ahmed, Y. E., Girma, A. B., & Aredo, M. K. (2016). Determinants of Smallholder Farmers Participation Decision in Potato Market in Kofele District, Oromia Region, Ethiopia. *International Journal of Agricultural Economics, 1*(2), 40–44.

Barrett, C. B. (2008). Smallholder market participation: concepts and evidence from eastern and southern Africa. *Food Policy*, *33*(4), 299–317.

Central Statistical Agency (CSA) (2008). Population survey, Addis Ababa.

Chinma, C. E., Ariahu, C. C., & Abu, J. O. (2014). Shelf Life Extension of Toasted Groundnuts through applying Cassava Starch and Soy Protein-Based Edible Coating. *Niger. Food J. 32*(1), 133-138.

Chala, A., Mohammed, A., Ayalew, A., & Skinnes, H. (2013). Natural occurrence of aflatoxins in groundnut (Arachis hypogaea L.) from eastern Ethiopia. *Food Control, 30*, 602–605. http://dx.doi.org/10.1016/j.foodcont.2012.08.023

CSA (Central Statistical Agency) (2017). Report on area and production of major crops (Private peasant holdings, meher season). *Ethiopian Agricultural Sample Survey* (2016/2017).

Daniel, E. (2009). Groundnut research. In Presentation for Workshop (pp. 1–3). Ethiopia: *Werer Agricultural Research Center*.

FAOSTAT (2014). Retrievedfromhttp://www.faostat.fao.org.http://dx.doi.org/10.1016/j.foodpol.2005.12.003

Getahun, A., & Tefera, E. (2017). Value Chain Assessment Study of Groundnut in Northwestern Ethiopia. *British Journal of Economics, Management, and Trade 16*(2), 1-15.

Hagos, A., & Geta, E. (2016). Review on smallholders' agriculture commercialization in Ethiopia: What are the driving factors to focused on? *Journal of Development and Agricultural Economics, 8*(4), 65-76.

Leta, E. T. (2018). Determinants of commercialization of teff crop in Abay Chomen District, Horo Guduru wallaga zone, Oromia Regional State, Ethiopia. *Journal of Agricultural Extension and Rural Development, 10*(12), 251–259.

Mitku, A. (2014). Impact of smallholder farmers' agricultural commercialization on rural households' poverty. *Int. J. Appl. Econ. Finance, pp. 8*, 51-61.

Nedumaran, S., Abinaya, P., Jyosthnaa, P., Shraavya, B., Parthasarathy, R., & Cynthia, B. (2015). Grain Legumes Production, Consumption and Trade Trends in Developing Countries. ICRISAT, No. 60.

Osmani, A. G., & Hossain, E. **(**2015). Market Participation Decision of Smallholder Farmers and Its Determinants in Bangladesh. *Journal of Economics of Agriculture, 62*(1),163-179.

Paupuleti, J., Venuprasad, R., Rathore, A., & Rupakula, A. (2013). Genetic Analysis of Resistance to Late Leaf Spot in Interspecific Groundnut. *Euphytica*, 1-13.

Sebatta, C., Mugisha, J., Katungi, E., Kashaaru, A., & Kyomugisha, H. (2014). Smallholder Farmers' *Decision and Level of Participation in the Potato Market in Uganda, 5*, 895-906.

Sogut, T., Ozturk, F., & Kizil, S. (2016). Effect of sowing time on peanut (Arachis Hypogaea L.) cultivars: II. Fatty acid composition. *Agriculture and Agricultural Science Procedia, 10*(1), 76-82.

Tarekegn, G., Purshotum, K. S., Wijnand, J. S., & Tamado, T. (2007). Integrated management of Groundnut Root Rot Using Seed Quality and Treatment. *International Journal of Pest Management, 53*(1), 53 - 57.

Temesgen, G. (2017). Small Scale Irrigation and Agricultural Commercialization in Tigray. *G. J. C. M. P. (2)*, 87-94.

Yamane, T. (1967). Statistics: An Introductory Analysis, 2nd Edition. Harper and Row, Publisher, New York.