Determinants of Groundnut Market Supply: The Case of Fogera Woreda, South Gondar Zone of Amhara Regional State

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Abstract: This research tried to analyze the determinants of groundnut market supply in Fogera Woreda, South Gondar Zone of Amhara Regional State. Groundnut (Arachis hypogea L.) is an important cash crop and contributing as both food security as well as sources of income generation for many smallholder producers which improves their living standards. However, improving groundnut producers to arrive at market is a key concern desired in the study area. Hence, this study aimed to identify factors determined household's groundnut supply to the markets using survey data collected from randomly selected 175 groundnut producing producers. Descriptive statistics was used for socio-economic characteristics of groundnut producers and econometric analysis was used for determinants of groundnut supply to the markets. Ordinary least square estimation result indicated that education level, numbers of oxen owned, number of family size, land size, quantity produced, farming experience, extension service and credit service were significant predictors of groundnut marketed supply. This study was recommended that improving the extension and credit service system is an imperative to accelerate groundnut market development particularly in the study area and generally in the country at large.

Keywords: Groundnut, Market Supply, Multiple Linear Regression Model

1. Introduction

Ethiopia plays a great role in generating income for economic development from the export of agricultural commodities such as oilseeds. National Bank of Ethiopia report indicated that Oilseeds are one of the major export commodities to generate revenue in Ethiopia [19]. In 2012/13 production season, oilseeds were the third largest export earner after coffee and gold accounted for 14% of total exports. However, export of oilseeds is significantly dominated by one commodity – Sesame which constitutes about 79%, 11% of Niger seed, 5% of groundnut and 3% castor bean. Export earnings from oilseeds reached USD 510.1 million, depicted a 21.8% fall over the preceding year on account of 23.2% drop in international price albeit 1.9% increases in volume. Oilseeds export accounted for 16.9% of the total merchandise export proceeds as compared with

19.8% last year [20]. It was noted that even if the volume of the products increased, the income generating from the export of the product was decreased that indicates there was a gap regarding the marketing aspects of the product. Furthermore, the Central Statistical Agency of Ethiopia stated that oil crops used to cover about 0.86 million hectares, involving close to four million small holder producers in Oromia, Amhara, Tigray, and Benishangul-Gumuz Regional States and the report shown that groundnut production was 1.24 million quintals which leads to improve the living standard of smallholder producers by generating income in the form of cash as well as for households' consumption [8].

Notably, Groundnut (Arachis hypogaea L.) is an important source of edible oil and protein oil crop used in terms of domestic market and minimal export market as compared to sesame. This crop is mainly growing in the country where drained loose soil,

sandy loam soil and warm climate suit for agro-ecological zone. Groundnut is one of the five widely cultivated oilseed crops in Ethiopia [23]. It generates considerable cash income for several small-scale producers and foreign exchange earnings through export for the country [9]. And it has nitrogen fixing ability to improve soil fertility and making them ideal for crop rotation with cereal crops like maize [15].
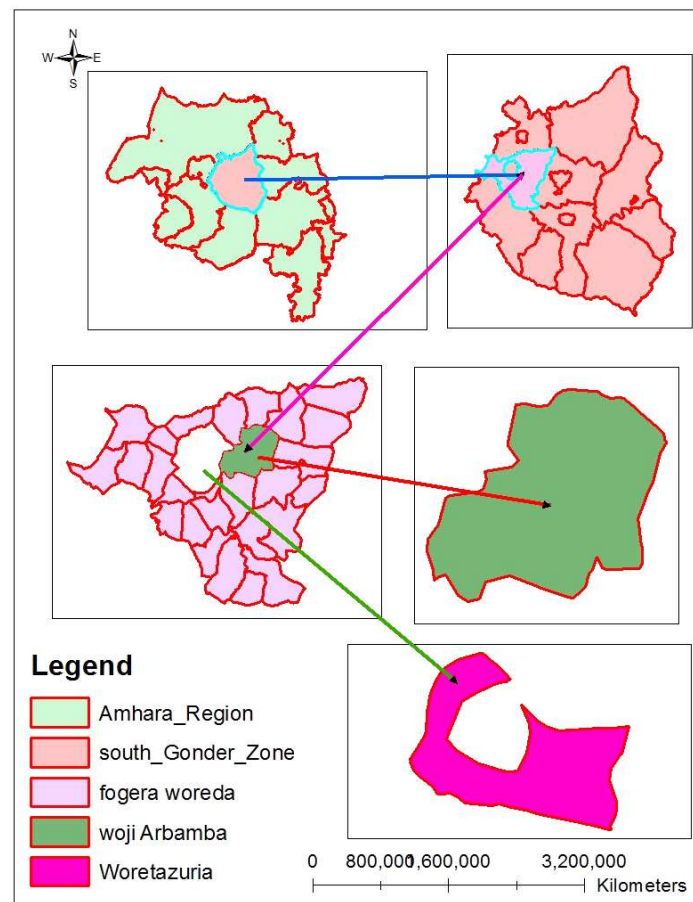
In Ethiopia groundnut largely cultivated by small holder producers with area coverage of more than 75 thousands of hectares and total volume of production was more than 1 million quintals which accounted the national average yield of 15.31 qt ha-1; it was noted that from a total share of volume of production and productivity which accounted about 0.49 and 12.96% respectively [8].

Moreover, a lot of efforts have been invested by the government to produce surplus oil crops for export purpose. However, the significance of groundnut in the livelihoods of producers as an income generating crop, it has not been given due attention most especially in the area of marketing as sesame [19]. Even though research done on groundnut includes response of groundnut to different rate of phosphorus fertilizers, performance of groundnut varieties, design and development of groundnut Sheller by respectively in different area of the country [5, 9, 11]. However, the determinant of groundnut market supply, which is one of the major cash crops in the area, was not investigated. Hence, this study was initiated and investigated the factors that determined the households' groundnut market supply and designed to address the existing information gap on the subject and contributed for the proper understanding of the challenges and designed the groundnut market development strategies for benefiting all actors.

2. Research Methodology

Fogera Woreda is one of the 106 Woredas in Amhara National Regional State (ANRS) which is found in South Gondar Zone. It is situated in 11°58′ N latitude and 37°58′E longitude. Woreta is the town of the Woreda and found in 625 Km from Addis Ababa and 55Km from the Regional capital, Bahirdar. It is also located 42Km from Debre-Tabour which is the capital city of South Gondar Zone [14]. Its annual rainfall ranges from 1103mm to 2400mm with a mean annual rainfall of 1751mm and it has 100% wona dega weather condition. The temperature ranges from 11.48 degree celcious to 27.3 degree celcious and its altitude ranges from 1774 to 2410 masl which allowing a favorable weather condition for wider crop production i.e. teff, rice, finger millet, maize, red pepper, groundnut and livestock rearing average land holding was about 1.4 ha with minimum and maximum of 0.5 and 3.0ha, respectively [14].

Source: Bureau of Agriculture and Rural Development, 2016

Figure 1. Depicted that map of the study areas.

2.1. Sources and Methods of Data Collection

For this study both primary and secondary sources of data were used. Primary data were collected by means of formal survey and informal surveys i.e. focus group discussion of selected groundnut producing producers using pre-testing structured and semi-structured questionnaires. The secondary sources of data were collected from published and unpublished documents and internets.

2.2. Focus Group Selection

Is one of the informal surveys that helps to collect primary data. Respondents involved with better groundnut farming experience, adult producers as well as female producers were incorporated to select for discuss issues related to the objective of the study by forming a small group with a group size of eight. The reason of selecting the participants were to assess thoroughly the groundnut producing ability i.e. searching and getting detailed market as well as production information. Two focus group discussions were conducted for each kebele before the questionnaire actually administered followed the data collected. However, at the end of the survey additional focus group discussion was not conducted since in the two cases the data collected were similar as well as enumerators were familiar in the study areas. The discussion was facilitated by preparing a check list of the researcher together with trained enumerators and group participants were encouraged to deal freely about the specific objectives of the study. In addition, Key Informants discussion were made with those experts who had better experience, active involvement and knowledgeable in the

area of groundnut production and marketing information. Among those, development agents, office of agricultural experts as well as researchers was interviewed and data were incorporated.

2.3. Sampling Techniques and Sample Size Determination

A multistage sampling technique was employed to select groundnut producing households in Fogera Woreda. In the first stage, Fogera woreda was selected purposively based on its groundnut production potential. In the second stage, two groundnuts producing kebeles from Woreda out of seven kebeles were purposively selected based on production potential with recommendation of woreda agricultural office leaders and development Agents. Then by using the probability proportional to size of households 116 households (66%) from Woji Arbamba kebele and 59 (34%) from Woreta Zuria kebele were determined. A piece of paper 180 prepared and properly folded and reserve five used for the sake of unvolunteered respondents. Finally, from the sample frame 175 households were selected using random sampling technique and interviewed. Sample size was determined according to a simplified formula to calculate sample size determination with 95% confidence level and 7% precision level [25] as follows:

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

Where n is sample size, N is the population size and e is the level of precision. Hence, 175 data were collected from 1229 households. The reason for the value of the level of precision 7% was due to the resource limitation such as finance and time.

Table 1. Distribution of sample household respondents in the study area.

Kebeles	Number of producers	Sample size of producers	Proportion in percentage
Woji Arbamba	841	116	66
Woreta Zuria	388	59	34
Total	1229	175	100%

Source: Own computation, 2017

2.4. Methods of Data Analysis

Descriptive statistics and econometric model were used to analyze the collected data from groundnut producing producers. Descriptive statistics employed like mean and percentage to describe the groundnut producers' socio-economic characteristics. Econometric analysis, Multiple linear regression model had been specified to analyze determinants of groundnut market supply. Notably, the Ordinary Least Squares (OLS) estimator method was used because the least-squares estimates possess some ideal or optimal statistical properties of being the best linear, unbiased and with the minimum variance (Gujarat, 2004) with the following model specification.

$$Y = \beta_0 + \beta_i X_i + U_i \qquad (2)$$

Where: Y = quantity of groundnut supplied to the markets, β_0 =Intercept, β_i= coefficient of ith independent variable to be

estimated X_i = vector of explanatory variables and i = 1, 2,…….n, U_i = unobserved disturbance term. The parameter estimates of the above model may not be Best Linear Unbiased Estimator (BLUE) when some of the assumptions of the Classical Linear Regression (CLRM) models are violated. Hence, to detect multicollinearity problem for continuous variables, variance inflation factor (VIF) defined as:

$$VIF = \frac{1}{1-R_j} \qquad (3)$$

As a rule of thumb, states that if the VIF value of a variable exceeds 10, which was happened if R_j (explained variation) exceeds 0.90, then, that variable is said to be highly collinear [12]. On the other hand, contingency coefficient was used to check multicollinearity of discrete (dummy) variables. It measures the relationship between the raw and column variables of a cross tabulation. The value

ranges between 0 - 1, with 0 indicating no association between the row and column variables and value close to 1 indicating a high degree of association between variables. Contingency coefficient is computed as follows:

$$CC = \sqrt{\frac{\chi^2}{N+\chi^2}} \qquad (4)$$

Where, CC is contingency coefficient, $\chi 2$ is chi-square value and N is total sample size. The decision criterion with the contingency coefficient is that if the value of CC is

greater than 0.75, the variables are said to be collinear (CC > 0.75).

2.5. Groundnut Quantity Supplied to the Market

Is a continuous dependent variable measured in quintal and used in the multiple linear regression model. It is the actual supplied to the markets in the year 2015/16. Whereas the summary of the independent variable used in this model are presented below in Table 3.

Table 2. Summary of the independent variables used in the Multiple Linear Regression model.

Variable Name	Description of variables	Type	Expected sign
EDU-HH	Education level of household head grade attended	Continuous	+
FAM _SIZE	Family Size in number	Continuous	±
INCOM_NONFAM	Income from non-farming in Birr	Continuous	_
OX_OWN	Ox owned in number	Continuous	+
GNT_PROD	Quantity produced in quintal	Continuous	+
LAND_GNTSIZE	Size of Land for groundnut production in hectare	Continuous	+
DIS_ MKT	Distance to the nearest market in hour	Continuous	_
GNT_FARMEXP	Experiences in groundnut production in years	Continuous	+
LGD_MKTPRICHIGGNT	Price of groundnut in 2015/16 in birr	Continuous	+
SEX_HH	Sex of household head, 1=male, 0=female	Dummy	+
EXTENSION_SERV	Access to extension service 1=access, 0= not	Dummy	+
CREDIT_SERV	Access to Credit Service, 1= access, 0=not	Dummy	+
ACCESS_MKTINFO	Access to market information, 1=access, 0=not	Dummy	+

Source: Own computation, 2017

3. Result and Discussion

3.1. Socio-economic Characteristics of Sample Producers

It is believed that when the educational background of the sampled household head increased, there is a probability for acquiring new methods of production and access to market information. With regard to the educational background of the sampled producers, about 62% did not attend formal school and 17% were attended primary school (1 to 4 grade)

followed by 14% and 7% who attended graders 5 to 8 and 9 to 12 respectively. It is believed that these groups of the producers found better production and marketing information than those who were less or no educated one. Education helps producers to acquire and process information which enable them to evaluate their decisions, plan and conduct their businesses with confidence which improves their business performance as well [26]. This study results also in lined with the scholars finding.

Table 3. Socio-economic characteristics of sample producers (in percentage).

Variables		N= 116 Woji Arbamba	N=59 Woreta Zuria	N=175 Total	χ^2 value
Sex	Male	94.8	96.6	95	0.285
	Female	5.2	3.4	5	
Religion	Orthodox	17.2	61	32	34.441
	Muslim	82.8	39	68	
Marital status	Single	0.9	-	0.6	6.066
	Married	93.1	94.9	93.7	
	Divorced	6	1.7	4.6	
	Windows	-	3.4	1.1	
Education level	No formal school attended	63	60	62	3.654
	Attended 1 to 4	15	20	17	
	Attended 5 to 8	13	17	14	
	Attended 9 to 12	9	3	7	

N= Sample size
Source: Survey result, 2017

The result in Table 4 indicated that oxen provided draft power and were the most importance inputs for groundnut production process. While this was the case Table 4 indicated that from the

total sampled groundnut producing household heads, there had an average ownership of household, two oxen. This means that the more the number of the household have oxen, the better

prepare the land to produce groundnut and supply to the market   than those who have the-less number of oxen.

Table 4. Household characteristics, farming and non-farming income & resource ownership of sample producers in 2015/16.

Characteristics	N	Minimum	maximum	Mean	St. dev
Age of household	175	25	78	45	11.32
No of family size (active labor force)	175	1	7	4.39	1.221
Annual farming income (Birr)	175	2,500	55,000	18,830.86	11,826.39
Annual non farming income (Birr)	175	0	3,000	929.14	2,583.88
TLU	175	0	14.69	5.598	3.221
Ox owned	175	0	5	2.33	1.089

N= Sample size
Source: Own computation, 2017

The average number of active labor force in the family was 4.39 which range from 1 to 7. As table 4 indicated that the minimum and maximum number of family size of the producers was 1 and 7 respectively. This shows that those households who have better number of active labor force have better produce and supply groundnut to the market since the crop is labor intensive by its nature.

Table 5. Groundnut farming experience of producers (average & percentage).

Variables Years		N=116 Woji Arbamba	N= 59 Woreta Zuria	N=175 Total	χ^2-value
	1-5	32.2	37.9	36	
Farming experience	5-10	27.6	27.1	27.4	0.756
	>=10	40.7	34.5	36.6	

N= Sample size
Source: Survey result, 2017

Table 5 depicted that 36.6% of the respondent found to be more than 10 years of groundnut farming experience. 36% and 27.4% of the rest from total sampled respondents included between 1-5 and 5-10 year of groundnut farming experience respectively. Woji Arbamba had 40.7% more than 10 years of farming experience than Woreta Zuria 34.5% of farming experience. It is believed that, the more groundnut farming experience would be the better to produce which in turn supply to the markets. In addition, those producers who had better groundnut farming experience which leads to seek and obtain important production technologies as well as marketing information than those less experienced producers.

The respondents were asked whether they were interested to receive credit or not, and about almost 71% of the respondents confirmed that they were need credit and almost 27% of the respondents had received credit and used for weeding, harvesting and or sorting purpose as well as used for buying of fertilizer for other crops. The result in Table 6 indicated that Woreta Zuria (86.8%) of producers need credit which was more than that of Woji Arbamba producers (60.9%). However, more credit beneficiaries were Woji Arbamba producers (28.7%) than that of Woreta Zuria (22.4%) producers. This was happened due to the fact that is associated with the risk of repayment power since the credit provided in group and if one of the group member unable to repaid the amount borrowed, the rest members were obliged to pay, high interest rate from the finance institutions, misperception by the community that assumes credit as a poor household's identity than a mechanism to create wealth.

The chi-square statistics result revealed that there was statistically significant at less than 1% level of significance regarding credit need in the study areas. Regarding the amount of credit took from the total sampled respondents, about an average Ethiopian Birr (ETB) 862 were received per household head and as the t-test result shown that there was statistically significant difference at less than 1% level of significance about the amount of credit took.

Table 6. Credit and extension support in 2015/16 (in percentage & average).

Variables	N=116 Woji Arbamba	N=59 Woreta Zuria	N=175 Total	χ^2 / t-value
Need credit (yes, %)	60.9	86.8	70.7	10.646***
Credit take (yes, %)	28.7	22.4	26.5	0.636
Amount credit (Birr)	844 (334.577)	904.55 (324.388)	862 (328.062)	15.774***
Extension service (yes, %)	32.2	33.6	33.1	0.35

N= Sample size *** value shows statistically significant at less than 1% significant level and figures in parenthesis indicate standard deviation
Source: Survey result, 2017

Table 6 revealed that from the total sampled household heads 33.1% had extension service regarding with groundnut production. Comparing the extension advice or service between the two kebeles, it is clear that relatively more producers in Woreta Zuria almost 34% obtained extension service than that of Woji Arbamba (32%). This could be due

to the distance from the woreda town and as producers in Woreta Zuria are closer than the other Kebele producers and

they had the probability of accessing information more than the other kebele.

Table 7. Seed rate, area planted, production and productivity of groundnut (average) in 2015/16.

Variables	N=116 Woji Arbamba	N=59 Woreta Zuria	N= 175 Total	t-value
unknown seed rate in Kg/ha	100 (23)	95.25 (15.9)	98.47 (20.94)	62.134***
Groundnut area cultivated (ha)	0.418 (0.172)	0.392 (0.122)	0.409 (0.157)	34.465***
Quantity produced (qt)	8.56 (4.118)	8.66 (3.51)	8.59 (3.914)	1.469
Productivity (qt/ha)	20.06 (4.512)	21.7 (4.414)	20.62 (4.533)	60.16***
Land holding (ha)	1.530 (0.890)	1.68 (0.969)	1.581 (0.917)	2.500

N= Sample size *** value show statistically significant at less than 1% significant level and figures in parenthesis indicate standard deviation
Source: Survey result, 2017

From Table 7 the total sampled respondents' individual producers had used an average 98.47 Kilogram (Kg) of seed rate per hectare. From the sampled respondents of Woji Arbamba producers had used more seed rate an average 100Kg per hectare than that of Woreta Zuria 95 Kg per hectare as compared to each research areas regarding amount of seed rate used per hectare. Hence, as the t- test value result indicated on Table 7 that, there is statistically significant difference in the study areas of amount of seed rate used per hectare at less than 1% level of significance. During interviewed, those respondents suggested that they did not get the recommended seed rate per hectare from experts' side. The researcher also conducted the key informants interviewed with expert from Amhara Regional Agricultural Research Institute (ARARI) and Adet research center regarding groundnut production in the area of their contribution and confirmed that they didn't know even the crop by itself producing in that areas. Hence, this study provided an input to conduct further research. Average quantity of groundnut produced from the total sample households was 8.59qt per household head. Land was one of the major limiting factors of groundnut production of the household heads in the study areas. Since the newly formed households have been no option for getting lands rather, they were shared from their parent's land. The result in Table 7 depicted that the total sampled households had an average farm size was 1.16 hectare (ha) per household head in the

study area. However, Woreta Zuria kebele producers have higher land size (1.68ha) than that of Woji Arbamba kebele producers that was 1.530ha.

3.2. Determinants of Groundnut Market Supply

In the study area, production of groundnut is mainly for market and it is the primary cash commodity as compared to other crops produced in the study area. In this regard, all the respondent households (100%) indicated that groundnut is the primary cash crop relative to level of cash income. The hypothesized determinants of groundnut supply to the market were summarized in Tables 2 and 9 of them were continuous and the rest 4 were dummy variables. However, prior to running the OLS estimator, the hypothesized explanatory variables had checked for the problem of multicollinearity using variance inflation factor (VIF) for continuous independent variables and contingency coefficient (CC) used for discrete or dummy variables. As a rule of thumb, if the VIF value of a variable less than10 and CC is less than 0.75 which means no longer multicollinearity problem existed among the independent variables. Hence, based on this rule, the VIF and CC values were less than 10 and 0.75 respectively, and this indicates that there was a not problem of multicollinearity among the continuous as well as the dummy variables for this particular study [12].

Table 8. OLS estimation results of determinants of groundnut market supply.

Variables	Coefficients	Standard error	t-ratio	P-value
Constant	0.845	1.272	0.664	0.507
DIS_MKT	-0.035	0.111	-0.315	0.754
SEX_HH	0.647	0.538	1.203	0.231
EDU_HH	0.256	0.127	2.016	0.045**
FAMLY_SIZ	0.364	0.137	2.657	0.009***
INCOM_NONFAM	-0.015	0.035	-0.429	0.674
OX_OWN	0.964	0.171	5.637	0.000***
GNT_PRDUCED	0.007	0.004	1.75	0.076*
LAND_GNTSIZE	5.470	0.996	5.492	0.000***
EXTENSION_SERV	0.021	0.004	5.25	0.000***
CREDIT_SERV	0.006	0.003	2.000	0.036**
GNT_FARMEXP	0.727	0.194	3.747	0.000***
ACCESS_MKTINFO	0.222	0.214	1.037	0.300
LGD_MKTPRICHIGGNT	-0.283	0.453	-0.625	0.533

R^2= 87.59% Adj. R^2= 86. 59% F-value= 87.44*** Number of observations =175
***, ** and * Show the value statistically significant at less than 1%, 5% and 10% respectively
Source: Own computation, 2017

3.2.1. Education Level of Household Head (EDU-HH)

This variable was found to affect the volume of market supply of groundnut as hypothesized positively and significantly. That is education level of a household head affect the market supply of groundnut positively and significantly at less than 5% significance level. As the groundnut producers' education level increased by one grade, the quantity of groundnut supplied to the market increased by 0.256 quintals holding other variables constant. It is believed that education provides for individuals with the necessary knowledge that can be used to collect production and market information, interpret the received information and help to make better production and marketing decisions. This result is in agreement with the result of the previous studies conducted by, which argued that education had positive and significant effect on quantity of milk marketed in Ethiopian highlands [13]. Similarly, noted that education helps producers to acquire and process information and which enable them to evaluate their decisions, plan and conduct their businesses with confidence which improves their business performance [26].

3.2.2. Number of Family Size (FAM _SIZE)

This variable was hypothesized to have effect on the quantity supplied of groundnut either negatively or positively. But the result shows that family size had positively and significantly effects on the quantity supplied of groundnut at less than 1% significance level. This implied that as the members of active family labor force increased by one member, the quantity of groundnut supplied to the market increased by 0.364 quintals holding other variables constant. This could be because groundnut farming activity is labor intensive and the more the family has active labor force, the better to produce and supply to the market. However, this result is contradicted with the result of the previous studies by who respectively investigated the marketed surplus of buffalo milk, vegetable market chain analysis and analysis of rice profitability and marketing chain [22, 1, 4]. These studies found that the number of family size affected the market supply of each commodity negatively and significantly. Nevertheless, in line with this result, similar studies conducted found that family size had significantly and positively effect on quantity of teff marketed [24].

3.2.3. Number of Oxen Owned (OX_OWN)

As it was hypothesized, this variable significantly and positively affected the quantity of groundnut supplied to the market at less than 1% significance level. This means that as the number of oxen owned by the household is increased by one, the quantity of groundnut supplied to the market is increased by 0.964 quintals holding other variables constant. This was due to the fact that those producers who owned oxen are better to plough plow the land timely, sowing timely which increased production and productivity and which in turn reflected the market supply of groundnut positively. This result is in agreement with the result of the previous studies conducted by analyzed grain and vegetable market chain analysis respectively and confirmed that the number of oxen owned by the households have significantly and positively affected the market supply of the commodities [1, 3].

3.2.4. Quantity Produced (GNT_PRDUCED)

This variable was hypothesized to influence the volume of groundnut supplied to the market positively and significantly. As it was hypothesized, this variable affected the quantity of groundnut supplied to the market positively and significantly at less than 10% significance level. The result in Table 9 presents that a one quintal increases in groundnut production, leads to 0.007 quintal increase in the volume of market supply of groundnut holding other variables constant. This result was in line with the agreement of the earlier studies conducted by, which found that on wheat and teff, grain marketing and red pepper marketing analysis respectively, produced by household affected the market supply of each commodity positively and significantly [2, 3, 18, 21].

3.2.5. Land Size (LAND_GNTSIZE)

This variable was hypothesized to influence the quantity of groundnut supplied to the market positively and significantly. It was found that land allocated for groundnut production affect the volume of groundnut supply to the market positively and significantly at less than 1% significance level. As the econometric model indicates that a one hectare increased in land for groundnut production, the amount of groundnut supplied to the market increased by 5.470 quintals holding other variables constant. So, the more land allocated for groundnut production, the better will be the volume of groundnut supplied to the market. Similar studies conducted on market chain analysis of red pepper and sesame found that the more land allocated for red pepper and sesame production affected the volume of groundnut supply to the market positively and significantly respectively [2, 16].

3.2.6. Access to Extension Service (EXTENSION_SERV)

The result in Table 8 indicated that those producers who obtained extension service more volume of groundnut supplied to the market than those who had no obtained extension service. This variable was found as hypothesized to influence the market supply of groundnut significantly and positively at less than 1% significance level. This means that those producers who had accessed to extension service supply 0.021 quintals of groundnut than those who had no extension service, holding other variables constant. This finding suggested that access to extension service provided important information like improved technology, production and market information to producers etc that improves production and productivity, hence leads to increase the market supply of groundnut. Similarly, found that access to extension service improved the production of wheat and teff and red pepper which affected the market supply of each commodity significantly and positively respectively [18, 21].

3.2.7. Access to Credit Service (CREDIT_SERV)

This variable was also as hypothesized, to influence the market supply of groundnut significantly and positively at

less than 5% significance level. This result stated that those producers, who had accessed to formal credit service, were probably better to supply groundnut to the market than those with no access to credit service. Credit service in this case determined by the availability of cash at hand. To get credit producers should organized themselves into seven members within a group and if one of the member/s was/were unable to pay the amount borrowed the rest members should pay. The result in Table 9 shows that producers who had accessed to credit service would supply 0.006 quintals more groundnuts than those with no credit access, holding other variables constant. This was due to the fact that those producers who had accessed to credit service, can used the credit for timely weeding, harvesting, transporting and sorting of groundnut which ultimately increased production and supply of the commodity to market since the crop by itself is labor intensive. Similar result by also showed that access to credit improved red pepper and wheat and teff production which finally affects the market supply of each commodity significantly and positively respectively [2, 18].

3.2.8. Farming Experiences (GNT_FARMEXP)

It was a continuous variable measured by number of years stayed in groundnut production and this variable found as hypothesized affected the quantity of groundnut supplied to the market positively and significantly at less than 1% significance level. The result in Table 8 shows that as the groundnut farming experience is increased by one year, the amount of groundnut supplied to the market increased by 0.727 quintals holding other variables constant. This means that as producers have more groundnut production experience, the quantity supplied to the market is increased throughout its effect on groundnut production. This was due to the fact that experienced producers in groundnut production have better knowledge of adopting technologies, accessing information, timely sowing, cultivating, harvesting than those who are less experienced producers. Similar studies conducted on market chain analysis of vegetable, red pepper and determinants of productivity among smallholder cassava indicated that the farming experience of vegetable, red pepper and cassava production affected the volume of supply to the market positively and significantly respectively by [1, 2, 17].

4. Conclusion and Recommendation

This study was conducted at Fogera Woreda, South Gondar Zone of Amhara Regional State which aimed at investigated the factors that determined the households' groundnut market supply. The data were collected from both primary and secondary sources. The primary data were collected from individuals' face to face interview using semi-structured questionnaires from 175 randomly selected groundnut producer households. The secondary data were obtained from different sources like published & unpublished sources i.e. CSA and websites. The collected data analysis was made using descriptive statistics and econometric analysis. The descriptive statistics measures like average, percentages and multiple regression model was used to investigate the factors that determined the households' groundnut market supply. The result of the multiple linear regression models indicates that determinants of groundnut market supply were groundnut farming experiences, access to credit service, access to extension service, land size, quantity produced, number of ox owned, number of family size and education level of household head. All of these variables were affected groundnut market supply positively and significantly.

Based on the finding, this study recommend that the research institutes should conduct adaptive research and demonstration trials around Fogera woreda in order to boost production and productivity of groundnut thereby increased market supply is pertinent.

The contribution of extension service was 33.2% which was minimal. Hence, by using different techniques including ICT for scaling up the best practices which used to be limited to few farmers.

In addition to this, it is recommended to assign efficient extension system, updating the extension agent's attitude, knowledge and skills in order to improve production and marketing system of groundnut producers.

Adding up, improving credit service for producers would be a priority which leads to improve groundnut production and productivity and market supply in turn improves groundnut market performance and there is a need to promote the availability of improved species of oxen in the woreda as well.

Moreover, enhancing education has a positive effect on the quantity of groundnut supplied. This implies that promoting producers' education level through training is a crucial factor for improving the production and market performance of groundnut. So, stakeholder's, agricultural and rural development office experts have to create awareness of groundnut production methods and market development in order to distribute fair beneficiaries of groundnut producers.

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