COMPARATIVE ANALYSIS OF GENDER INVOLVEMENT IN PEANUT PRODUCTION AND PROCESSING IN NIGER STATE, NIGERIA

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ABSTRACT

Gender disparity is a common phenomenon in Nigeria. Multi-stage sampling technique was used to sample 132 farmers. The study analyzed the level of involvement and determinants of level of involvement of peanut producers and processors in the study area. Analytical techniques used were descriptive statistics, participation index and Logit regression model. The results reveal under-utilisation of modern processing equipment by the processors while peanut oil, *Kulikuli* and *Donkwa* were the major by-products. In peanut production, female farmers were actively involved in planting, fertilizer application, weeding, and harvesting while the males dominated in two major production activities which were land clearing and heap/ridging making. Conversely, female farmers' major processing activities were cleaning and sorting while the males dominated in grading and blenching activities. The result further reveals that the size of female gender household was a very important factor that determined the level of their involvement in both production and processing activities. For the male category, their level of education and access to extension services were two key factors which determined their level of involvement both in production and processing activities while for both genders, educational level of the respondents was a critical factor. Based on the findings, government should ensure the availability of modern production and processing equipment at affordable prices to increase gender involvement in peanut production and processing.

Keywords: By-products, equipment, gender, participation index, peanut,
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INTRODUCTION

Groundnut (*Arachis hypogea*) which originated from South America is also known as peanut and belongs to the legume family. According to [1], world groundnut production stood at 42.8 million tons in 2013, with Asia (67.1%) and Africa (24.6%) contributing the lion share. As at the close of the 2017/2018 season, the world production of peanut moved to 45.3 million metric tons, with Nigeria (7%) ranking third in the league of groundnut producing nations, just after China (41%) and India (14%). In 2017, peanut production in Nigeria stood at 2.42million metric tons [2]. It is mostly grown in the northern parts of the country and its seeds contain high quality edible oil (50%), easily digestible protein (25%) and carbohydrates (20%) for normal human growth and maintenance. It also produces high quality fodder for livestock, serves as cover crop and helps in nitrogen fixation into the soil through its root noodles [3]. It generates employment and income to its value -chain stakeholders and plays an important role in the diets of rural populations, particularly children. It is also a good dietary choice for people with diabetes because of its low carbohydrate content. Moreover, it is an excellent source of many vitamins and minerals which include biotin, copper, niacin, folate, manganese, vitamin E, thiamin, phosphorus, and magnesium [4]. The oil is also used to make margarine and mayonnaise while confectionery products such as snack nuts, sauce, flour, peanut butter and cookies are made from high quality nuts of the crop [2].

In many developing countries of the world, issues of gender inequality have posed major threats to increased productivity in relation to agricultural sector. It has also been reported that it can be potential sources of poverty and food insecurity in nation building [5]. Studies have shown that women productive capacities have been lower than their male counterparts despite the high proportion of women engaged in agriculture, with some of them even assuming the role of household heads [6]. This is due to the fact that women have had to contend with various socioeconomic, political, cultural and religion discrimination and obstacles such as limited access to land holdings, credit, technology access, education, production inputs and services than men. As a result of these, there has been increased global focus on gender issues in agriculture and economic development. In

Nigeria, the level of involvement in agricultural-based activities differ significantly between both genders for some activities while for others, both genders are involved. Men usually feature prominently in activities such as land clearing, ridge/heap making and harvesting while women are involved in menial activities such as weeding, winnowing and threshing. Even when women are household heads, they engaged the services of men in some farm operations. In some rural areas, women have practically taken over the production and processing of arable crops, being responsible for as much as 80% of staple foods produced in such areas [7]. The level of involvement in peanut production and processing activities is very critical in providing insight into how women could be empowered for increased competitiveness, relative to their male counterpart for improved self-esteem, output, productivity and food security. For instance, [8] reported that ensuring equal access to productive resources for women farmers could increase yields on their farms by 20-30 percent, which could have a 2.5-4.0 percent increase in total agricultural output. In a similar report, gender equality and women empowerment have implications on the stock of human capital, labour and product market competitiveness, investment in physical capital, and agricultural productivity [9]. Therefore, understanding the gender gap in production and processing of peanut and, the factors affecting the level of involvement of farmers in production and processing in the area will provide evidence-based information useful for planning developmental programs that could foster gender equality and ensure an inclusive economic growth in the area.

MATERIAL AND METHODS

Study area

This study was conducted in Niger State. Niger State is located in the Northern Guinea Savannah ecological zone of Nigeria, between Latitudes 8°20´N and 11°30´Nand Longitudes 3°30´E and 7°20´E [10]. The Bureau of Statistics has maintained an approximate population growth rate of 2.5% geometrically. Based on that, the population of the State was 3,950,429 in 2006 with a total land mass of 58,676.2 square kilometers representing about 9.3 percent of the total land mass of the country [11]. The climate and ecological conditions of the State is characterized with mean annual rain fall of 782-1250 mm and mean temperature of about 82ºF or 27.7ºC [12]. The State has over the years remained a leading contributor to agricultural productivity in the country at the regional, and state levels [13]. The State is made up of 25 LGAs divided into three agricultural zones. with millet, rice, maize, guinea corn, cowpea, cassava, groundnuts and sweet potatoes as the major crops cultivated. Majority of the farmers keep livestock like poultry, cattle, goat and sheep while others are engaged in crafts such as sculptures, weaving and blacksmith [12]. About 85% of the population of the State are engaged in farming while 15% are involved in other vocations such as white collar jobs, businesses, crafts and arts [12].

Sampling techniques

Multi-stage sampling technique was adopted for the study. The first stage involved a random selection of two LGAs in the State. The second stage involved a random selection of two districts from each of the LGAs while in the third stage, two towns/villages were randomly selected from each of the districts. Proportionate sampling was used in the fourth stage where 10% of the registered groundnut producers and processors were selected from each of the selected towns/villages, respectively. Hence, the total number of respondents for the study was 132 farmers. The report from the field after the retrieval of the questionnaire showed that the respondents were made up of 92 males and 40 females for the study.

Table 1: Computation of sample size for groundnut production

LGAs	District	Villages	Sampling frame	Sample size (10%)
Shiroro	Kuta	Pina	351	35
		Gwada	410	41
Bida	Bida	Emigara	275	28
		Mungorota	280	28
	Total		1316	132

Source: Niger State Agricultural Mechanization and Development Agency (2018).

Method of data collection

Primary data were used for this study. These were collected with the aid of structured questionnaires supplemented with oral interview schedules to elicit relevant information on the socio-economic characteristics of the farmers, factors affecting level of involvement as well as constraints to peanut production and processing in the study area. Trained enumerators were used in administering the questionnaires.

Analytical techniques

In order to achieve the objectives of this study, descriptive statistics, participation index and logit regression analysis were used. The level of involvement of the respondents was achieved using participation index and a 4-point Likert-type rating scale. The production activities included land clearing (LC), ridge making (RM), herbicide application (HA), planting (PL), thinning (TN), weeding (WE), pesticide application (PA), application of organic manure (OM), irrigation (IR) and harvesting (HV) while the processing activities included cleaning (CL), sorting (SO), grading (GR), stripping (ST), blanching (BL) and extraction (EX). Four point Likert-type of scale was then used to score each activity *viz ;* always involved = 4, occasionally involved = 3, rarely involved = 2 and never involved =1. The participation index score was calculated by adding up all the scores of each respondent and dividing it by thetotal number of activities to derive the mean score. Any mean score greater than or equal to the cut-off mean score, that is, ≥ 3 was considered as high involvement and *vice versa* for low involvement. The formula for calculating the Participation Index (PI) for peanut production and processing is as presented in equations 1 and 2, respectively.

$$PI = \frac{LC + RM + HA + PL + TN + WE + PA + OM + IR + HV}{10}$$

……(1)

$$PI = \frac{CL + SO + GR + ST + BL + EX}{6}$$

…….(2)

Logit regression analysis was used to determine the factors affecting the level of involvement in peanut production and processing. In this study, all the respondents with participation index greater or equal to the cut-off mean was categorized as 1 (That is, high level of involvement) and those below the mean were regarded as zero (Low level of involvement). The logistic regression model was used to explain the effects of the explanatory variables on the binary response, Y. The implicit form of Logit regression model to determine the factors affecting the level of involvement in peanut production and processing is as stated thus:

$$P_i = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{i1} + \ldots\ldots + \beta_k X_{ik}}}$$

…….(3)

Where,

P_i = probability of high involvement, β_0 = Constant, $\beta_{1.....k}$ = Coefficients to be estimated, $X_{i1.....ik}$ = Predictors, i= ith observation

Let $Z = \beta_0 + \beta_1 X_{i1} \ldots\ldots \beta_k X_{ik}$

……(4)

Therefore, the probability of high involvement is:

$$P_i = \frac{1}{1 + e^{-zi}}$$ ……(5)

While the probability of low involvement is:

$$1 - P_i = \frac{1}{1 + e^{-zi}}$$

……,(6)

Hence,

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{zi}}{1 + e^{-zi}} = e^{zi} = OR$$

…….(7)

Where OR is the Odd Ratio

As Z_i ranges from $-\alpha$ to $+\alpha$, p_i ranges from 0 to 1 and p_i is non-linearly to Z_i. The logit of the unknown binomial probabilities, i.e, the log of the odds, are modelled as a linear function of the X_i. . Therefore, the model in its log form is expressed as:

$$Logit(P_i) = \ln \frac{p_i}{1 - p_i} = Z_i = \beta_0 + \beta_1 X_{i1} \ldots\ldots \beta_k X_{ik} + U_i$$

…….(8)

Thus, the model is explicitly expressed as:

$$Y = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \beta_8 X_{i8} + \beta_9 X_{i9} + U_i$$

….(9)

Where,

Y = Level of involvement (Y = 1 for high involvement and 0 otherwise)

X_1=Farm size (Ha)

X_2 = Labour (Mandays)

X_3= Age (Years)

X_4 = Household size (Number.of persons)

X_5 = Marital Status (dummy: married 1; 0 otherwise)

X_6 = Access to credit (₦)

X_7 = Education level (Years)

X_8= Extension contact (No. of visits)

X_9 = Years of experience (Years)

RESULTS AND DISCUSSION

Types of peanut processing equipment and by-products in the study area

A comprehensive list of equipment was identified and farmers were asked to indicate the types of equipment they used and the by-products obtained from peanut processing. The result in Table 2 reveals that all the respondents stated that tray, grinding machine, frying pan, mortar and pestle, knife, grinding stone, calabash, bottle, metal pot, coal pot and steering stick were the most prominent type of technologies available in the study area.

These were followed by firewood (96.7%) and earthen pot (93.8%). Only about 15.0% of the farmers were exposed to improved peanut roaster while 11.7%, 10.0%, 5.0%, 3.3% and 3.3% asserted that oil extractor, peanut butter machine, groundnut Sheller, motorized mixer and frying machine technologies were available for their processing activities. It therefore implies that, majority of the farmers depended on manual or traditional technology to execute processing activities. This result agrees with that of [1] who carried out a research on the use of improved groundnut processing technologies among women processors in Jigawa State, Nigeria. It was reported that the respondents were only exposed to few groundnut processing technologies while others were fairly available for use.

Table 2: Types of peanut processing equipment available in the study area

Processing equipment	*Frequency	Percentage (%)	Rank
Traditional practices			
Tray	60	100.0	1st
Grinding machine	60	100.0	1st
Frying pan	60	100.0	1st
Mortar and pestle	60	100.0	1st
Knife	60	100.0	1st
Grinding stone	60	100.0	1st
Steering stick	60	100.0	1st
Coal pot	60	100.0	1st
Bottle	60	100.0	1st
Calabash	60	100.0	1st
Metal pot	60	100.0	1st
Earthen pot	59	98.3	12th
Fire wood	58	96.7	13th
Modern technologies			
Groundnut roaster	9	15.0	14th
Peanut butter machine	6	10.0	15th
Oil extractor	7	11.7	15th
Groundnut Sheller	3	5.0	17th
Motorized mixer	2	3.3	18th
Frying machine	2	3.3	19th

Source: Survey Data, 2018 *Multiple responses allowed

Table 3: Types of peanut products produced in the study area

By products	*Frequency	Percentage (%)	Rank
Peanut oil	57	95.0	1st
Kuli kuli	48	84.0	2nd
Yaji	23	38.3	3rd
Donkwa	27	42.2	4th
Kunun geda	25	41.7	5th
Gudi-gudi	25	41.7	5th
Peanut butter	13	21.7	8th
Sharuwa	10	16.7	7th
Domku	1	1.7	9th

Source: Survey Data, 2018 *Multiple responses

Types of by- products from groundnut processing in the study area

Table 3 shows the frequency distribution of the types of products obtained from peanuts by the women farmers in the study area. The findings reveal that 95.0% of the respondents used their peanuts mainly for the production of peanut oil and *Kuli-kuli* (Peanut cake) which is a Northern Nigerian snack that is made from dry roast peanuts. In addition, *yaji* a Nigerian *suya* spice was acknowledged by 84.0% of the respondents as their major peanut products while 42.2%, 41.7%, and 41.7% of the respondents also stated that *donkwa*, *kunugeda* a popular refreshment drink among Nigerians and *gudi-gudi* were the by-products ofpeanuts in the area. However, only 21.7%, 16.7% and 1.7% of respondents produced peanut butter, *sharuwa* (peanut snacks) and *Domku*, respectively. This showed that they mainly processed peanut into locally recognized products than peanut butter which is recognized globally. This is probably because they reliedmainly ontraditional technologies for their processing activities.

Level of involvement in pea**nut production operations along** g**ender lines**

Table 4 shows that the major groundnut production activities performed by women were harvesting (WM = 3.60), fertilizer application (WM = 3.43), planting and weeding (WM = 3.18), which ranked 1st, 2nd and 3rd, respectively. However, the most dreaded and dreary operation included land clearing (WM = 2.28) and irrigation (WM = 1.13) hence were rarely involved. On the contrary (Table 5), the males gender dominated two major production activities which included land clearing (WM = 3.89) and ridging (WM = 3.88). However, both gender participated equally in thinning operation. This result was an indication that female gender was involved in less tedious farm activities than their male counterpart. Based on the report from the field, the women who were the breadwinners or whose spouses were dead, sick or incapacitated had to depend on hired labour (male) to do the tedious work for them. This result is in line with the findings of [14] who reported that men were more involved in tedious farm activities than women. The results also agrees with the findings of [15] who stated that because of the physical demands, men more often than women prepare land for planting, provided 85% of the labour in clearing the land, though their share of labour dropped during tilling and planting to 65% and 40%, respectively

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Table 4: Level of involvement of female farmers in peanut production

Production practices	AI	OI	RI	NI	WS	WM	Rank
Harvesting	24(60.0)	16(40.0)	0(0)	0(0)	144	3.60	1st
Fertilizer application	17(42.5)	23(57.5)	0(0)	0(0)	137	3.43	2nd
Planting	23(57.5)	1(2.5)	16(40.0)	0(0)	127	3.18	3rd
Weeding	22(55.0)	3(7.5)	15(37.5)	0(0)	127	3.18	3rd
Herbicide application	15(37.5)	18(45.0)	3(7.5)	4(10.0)	124	3.10	4th
Thinning	21(52.5)	2(5.0)	15(37.5)	2(5.0)	122	3.05	5th
Ridge making	11(27.5)	20(50.0)	1(2.5)	8(20.0)	114	2.85	6th
Pesticide application	6(15.0)	14(35.0)	15(37.5)	5(12.5)	101	2.53	7th
Land clearing	2(5.0)	17(42.5)	11(27.5)	10(25.0)	91	2.28	8th
Irrigation	0(0)	1(2.5)	3(7.5)	36(90.0)	45	1.13	9th

Source: Field survey, 2018 **Note:** AI-Always involved; OI-Occasionally involved; RI-Rarely involved; NI-Never involved; WS=Weighted sum; WM=Weighted Mean

Table 5: Level of involvement of male farmers in peanut production

Production practices	AI	OI	RI	NI	WS	WM	Rank
Land clearing	87(94.6)	1(1.1)	3(3.3)	1(1.1)	358	3.89	1st
Ridge making	88(95.1)	1(1.1)	2(2.2)	1(1.1)	357	3.88	2nd
Planting	84(91.3)	3(3.3)	4(4.3)	1(1.1)	354	3.85	3rd
Harvesting	76(82.6)	5(5.4)	6(6.5)	5(5.4)	336	3.65	4th
Thinning	46(50.0)	34(37.0)	7(7.6)	5(5.4)	305	3.32	5th
Weeding	45(48.9)	32(34.8)	13(14.1)	2(2.2)	304	3.30	6th
Herbicide application	41(44.6)	24(26.1)	15(16.3)	12(13.0)	278	3.02	7th
Pesticide application	28(30.4)	22(23.9)	29(31.5)	13(14.1)	249	2.71	8th
Fertilizer application	24(26.1)	30(32.6)	23(25.0)	15(16.3)	247	2.68	9th
Irrigation	0(0)	3(3.3)	13(14.1)	76(82.60	111	1.21	10th

Source: Field survey, 2018 **Note:** AI-Always involved; OI-Occasionally involved; RI-Rarely involved; NI-Never involved; WS=Weighted sum; WM=Weighted Mean

Table 6: Level of involvement of females in peanut processing

Processing practices	AI	OI	RI	NI	WS	WM	Rank
Cleaning	37(92.5)	2(5.0)	0(0)	1(2.5)	155	3.88	1st
Extraction	30(75.0)	8(20.0)	1(2.5)	1(2.5)	147	3.68	2nd
Stripping	27(67.5)	9(22.5)	4(10.0)	0(0)	143	3.58	3rd
Blanching	28(70.0)	8(20.0)	1(2.5)	4(10.0)	141	3.53	4th
Sorting	20(50.0)	(17(42.5)	3(7.5)	0(0)	137	3.43	5th
Grading	11(27.5)	15(37.5)	12(30.0)	2(5.0)	115	2.88	6th

Source: Field survey, 2018

Note: AI-Always involved; OI-Occasionally involved; RI-Rarely involved; NI-Never involved; WS=Weighted sum; WM=Weighted Mean

Table 7: Level of involvement of males in peanut processing

Processing practices	AI	OI	RI	NI	WS	WM	Rank
Grading	18(90.0)	1(5.0)	1(5.0)	0(0)	77	3.85	1st
Blanching	17(85.0)	1(5.0)	2(10.0)	0(0)	75	3.75	2nd
Cleaning	16(80.0)	0(0)	4(20.0)	0(0)	72	3.60	3rd
Extraction	6(30.0)	6(30.0)	8(40.0)	0(0)	58	2.90	4th
Sorting	1(5.0)	5(25.0)	8(40.0)	6(30.0)	41	2.50	5th
Stripping	0(0)	0(0)	11(55.0)	9(45.0)	31	1.55	6th

Source: Field survey, 2018**Note:** AI-Always involved; OI-Occasionally involved; RI-Rarely involved; NI-Never involved; WS=Weighted sum; WM=Weighted Mean

Level of involvement in peanut processing along gender lines

As revealed in Tables 6 and 7, both gender engaged in same processing activities. These activities were cleaning, stripping, blanching, extraction, sorting and grading The result shows that the major processing activities performed by women were cleaning (WM = 3.88), extraction (WM = 3.68) and striping (WM = 3.58). The male gender was mainly involved in two major processing activities, which included grading (WM = 3.85) and blenching (WM = 3.75). These show that females dominated processing activities. This result corroborates the findings of [16] in a research conducted on the roles of women in groundnut value chain in Kano State, Nigeria. The findings revealed that 69% of the female respondents after harvesting go through a process of shelling and oil pressing in form of value addition although the value-added is minimal.

Determinants of level of involvement in peanut production along gender lines

Logistic regression analysis was used to analyze the determinants of level of involvement in groundnut production along gender lines in the study area. The prob > chi value shows that the whole model was significant at $P < 0.001$. Since this is a logistic regression, the interpretation of the result is better presented using the odd ratio. A greater than one odd ratio shows a positive relationship while a less than one ratio depicts a negative relationship. For the female producers, educational level (0.80) had an inverse relationship with level of involvement in peanut production while labour (1.02) and household size (1.55) had direct relationship which show that a unit increase in any of these variables increased the odds of being involved in peanut production in the area, that is, an increase in household size by an individual and an increase in labour by one manday led to 2% and 55% increase in the level of involvement in peanut production practices among female farmers. By implication, increase in female's farmers' household size and labour may tend to increase yield since the household is the major source of labour. Therefore, the larger the household size, the greater the labour force, and, in turn, the larger the area of land that would be cultivated, all things being equal. With a larger area of land under cultivation, one would expect higher involvement in production activities of the farmers. This result corroborates with the findings of [17] who reported that as the number of people in female household increases, a pool of family labour becomes available for production processes and also the total area cultivated to different crop enterprises.

On the contrary for the male category, age (0.94) and educational level (0.32) of farmers showed that a one-unit increase in any of these variables reduced the odds of being involved in peanut production by 94% and 31%, respectively. Therefore, as the farmers increase in age, their level of involvement decreased because aged farmers tend to be more risk averse than young enterprising farmers. This finding is in agreement with the finding of [18] that younger farmers are more risk preferring and tends to be involved in farm innovations than the older farmer. Also, the higher the educational level of the farmer, the higher the chances of opting-out from farming in search of white collar jobs or political positions. In addition, when farm size increases, the tendency of diversifying into other aspects of agriculture increases. Conversely, the odd ratio of access to extension services (1.42) implied that a unit increase in these variables led to 42% increase in the probability of male farmers involvement in groundnut production. This implied that male farmers that received agricultural extension services may likely increase farm productivity than the females without any agricultural extension services. This is probably due to better information on new techniques for groundnut production. This result further corroborates the findings of [17] who also reported that availability of extension services to farmers could play an important role on information dissemination to farmers.

Table 7: Determinants of level of involvement in peanut production along gender lines

Variables	**Male**			**Female**		
	Coefficient	Z-values	Odd ratio	Coefficient	Z-values	Odd ratio
Farm size	-0.7659	-1.04	0.465	1.6562	1.63	5.240
Labour	-0.0000	-0.01	1.000	0.0157	2.10**	1.016
Age	-0.0596	-2.02**	0.942	0.0374	0.70	1.038
Household size	0.0211	0.19	1.021	0.4382	1.86*	1.550
Marital status	0.4322	0.49	1.541	0.8609	0.91	2.365
Access to credit	-0.0000	- 0.57	1.000	0.0000	0.87	1.000
Educational level	-1.1582	-1.84*	0.314	-0.2258	-2.2**	0.798

Extension contact	0.3492	1.91*	1.418	0.8292	1.24	2.292
Constant	4.8951	2.74***	133.629	-11.2584	-2.32**	0.000
Number			92.000			40.000
LR chi^2			20.940			16.200
Prob > chi^2			0.000			0.000
Pseudo R^2			0.212			0.306

Source: Field survey, 2018

Note: ***= Significant at 1%, **= Significant at 5%, *= Significant at 10%

Determinants of level of involvement in peanut processing along gender lines

Logistic regression analysis was also used to determine the factors affecting level of involvement in peanut processing along gender lines in the study area. For the female category, the regression result presented in Table 9 reveals that the odd ratio of household size (1.19) and years of experience (1.20) implied that an increase in household size by one individual and a year increase in level of experience led to 19% and 20% increase in level of involvement in peanut processing practices by the female farmers. By implication, household size may have influenced women accessibility to labour resource in peanut processing since the significance of household size in agriculture is hinged on the availability of labour for farm production. This outcome is in agreement with the finding of [19] that peanut processing is a highly labour intensive venture and a large household has the opportunity of providing free family labour thereby reducing cost incurred in the business. Equally, years of experience with positive and significant to the level of involvement. This reveals that the higher the women's years of experience the better their productive capacities because of the knowledge accumulated over the years. This result corroborates with the findings of [20] who reported that the women farmers were widely experienced, matured and could achieve a better understanding of processing strategies. Conversely, the odd ratios of farm size (0.03) and age (0.54) revealed that these variables had inverse relationship with level of involvement in groundnut processing.

For the male category, educational level (0.53) had inverse relationship with level of involvement while extension contact had direct relationship with the level of involvement in peanut processing by the male gender. This finding is in consonance with the reports of [20] who reported that extension services to farmers in the study area is effective which in turn will increase the adoption of innovation and improve farming practices.

Summarily, the main determinants of level of involvement in peanut production by female category were labour, household size and educational level while those of processing activities included farm size, age, household size and years of experience. Therefore, household was a very important factor that determined the level of respondents' involvement in both production and processing activities. For male category, the main determinants of their level of involvement in peanut production are age, educational level and extension contact while those of processing activities included educational level and extension contact. Therefore, their level of education and access to extension services were two key factors in determining their level of involvement both in production and processing activities.

Table 9: Factors affecting level of involvement in peanut processing along genderline

Variables	**Male**			**Female**		
	Coefficient	**Z-value**	**Odd ratio**	**Coefficient**	**Z-value**	**Odd ratio**
Farm size	-1.66606	-0.58	0.18899	-3.54769	-2.24**	0.028791
Labour	0.02513	1.07	1.025448	0.005566	0.54	1.005582
Age	1.13631	1.19	3.115253	-0.60853	-2.31**	0.544148
Household size	-2.3227	-1.20	0.098009	0.171788	1.95*	1.187426
Marital status	-6.45577	-1.37	0.001571	-0.59533	-0.57	0.551379
Access to credit	-4.3E-05	-1.40	0.999957	-7.20E-06	-0.82	0.999993
Educational level	-0.63626	-1.70*	0.529268	0.014054	0.13	1.014153

Extension contact	1.867535	1.76*	6.472321	-0.19116	-0.50	0.826000
Years of experience	0.296947	0.45	1.345744	0.178261	2.34**	1.195138
LR chi^2			13.47			22.83
Prob > chi^2			0.1423			0.0066
Pseudo R^2			0.4895			0.4146

Source: Field survey, 2018

Note: ***= Significant at 1%, **= Significant at 5%, *= Significant at 10%

CONCLUSION

The study revealed a very low level of modern processing equipment usage by the processors while peanut oil, *Kuli kuli* and *donkwa* were the major by products in the study area. In peanut production, female farmers were mainly involved in harvesting, fertilizer application, planting and weeding while the males dominated land clearing and heap/ridging making. Conversely, female farmers' major processing activities were cleaning and sorting while the males dominated in grading and blanching activities. The main determinants of level of involvement in peanut production by female category were labour, household size and educational level while for processing activities included farm size, age, household size and years of experience. For the males, the main determinants of their level of involvement in peanut production included age, educational level and extension contact while those of processing activities included educational level and extension contact. Therefore, their level of education and access to extension services were two key factors in determining their level of involvement both in production and processing activities.

Based on the findings of this research, the following recommendations are made.

1. Government should ensure the availability of modern production and processing equipment at affordable prices to increase farmers' involvement in peanut production and processing.

2. There is need for increased visit of extension agents and enrolment of both gender in adult education programmes to improve their capacities in peanut production and processing

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