



SOCIO-ECONOMIC AND INSTITUTIONAL CHARACTERISTICS OF WHEAT FARMERS IN JIGAWA STATE, NIGERIA

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ABSTRACT

This study was carried out to analyze the socio-economic and institutional characteristics of wheat farmers in Jigawa State, Nigeria. Multi-stage sampling procedure was used to select 503 wheat farmers (352 men and 151 women) from the study area. Data were collected through the use of structured questionnaire and analyzed; using descriptive and inferential statistics (Tobit regression). The result revealed that majority (70%) of the respondents were male and 30% were female. About 56.0% male and 49.0% women respondents were within the age bracket of 30-39 years and 20-29 years respectively. It was revealed that 91.5% male and 95.4% female respondents were married. Furthermore, 58.3% of the female respondents had primary level of education. Meanwhile, 55.4% male and 56.3% female respondents had a household size between 6-10 persons and 1-5 persons respectively. Majority (64.2%) of the female respondents had a farm size between 0.5-1.0 hectares. About 54.8% male and 67.5% female respondents had 6-10 years and 1-5 years of farming experience. Furthermore, 68.5% of the male respondents had access to extension from Jigawa Agricultural and Rural Development Authority (JARDA) while, 51.7% women had no contact. On the other hand, 32.4% of male had extension contact twice a year while 32.5% female had contacted once a year. The result further revealed that 64.9% female respondents practice mixed cropping. 52.0% male practice bed drill method of sowing. The result further shows that majority (63.3% males and 67.5% female) respondents use the LCRIWHIT-4 (Atilla-Gan-Atilla) variety of wheat, 53.0% of female respondents applied organic manure to their farmland and 72.2% of the female respondents used machine in processing the wheat grains. Majority (68%) female respondents used wheat to prepare traditional dishes. The result further shows that 61.6% of the female respondents believed that high quality wheat variety is rewarded by substantial price premium. Tobit regression estimate of the extent of participation in wheat farming had a chi-square of 54.43 and significant at $P \leq 0.01$ level and Log likelihood of 364. Men and women participated in wheat farming, except that, on average male respondents had better access to land, inputs and extension services than the female wheat farmers. Policy makers should ensure that farmers receive the latest information on wheat agronomy through regular trainings.

Keywords: Socio-economic, Institutional, Characteristics, Wheat Farming.

INTRODUCTION

Wheat (*Triticum aestivum*) is a winter crop cultivated and grow best in the temperate region of the world. China is the largest producer of wheat in the world with 134.3 million metric tons (MMT), India 98.5MMT, Russia 85.9 MMT and United States of America 47.3 MMT. Africa produces 27 MT and Sub-Saharan Africa (SSA) produced a total of 7.5MT (Food and Agriculture Organization Corporate Statistical Data (FAOSTAT, 2019).



Nigeria's total local wheat production in 2020 was about 200,000 MT and yearly demand stands between 4.5 and 5.0 MMT (FAO, 2020), making Nigeria's local wheat production grossly insufficient to meet demand. Low productivity wheat in Nigeria is a threat to food security and wellbeing in both rural and urban populations. Wheat is a priority agricultural commodity, recognized as a vital dietary component due to its perceived health promoting and protecting attributes. It plays a vital role in the supply of raw material to the flour industry, and a great source of fiber, vitamins and minerals (Drucza and Peveri, 2018).

Nigeria has the potential to increase wheat production under both irrigation and rainfed conditions, because of its favourable agro-ecological zone. Moreover, it is produced mostly under irrigation, during the cool dry harmattan period, between October-to-February in the northern states. Over 1.5 million farmers cultivate wheat using irrigation in the wetland areas of the Jigawa State, with significant potential returns (Saleh, 2016). Rain fed wheat are also grown on the highlands of Mambilla Plateau in Taraba State, Jos Plateau in Plateau State and Obudu in Cross River State (Okpara, Stringer and Dougil, 2016; Olabanji, 2016).

Wheat farming is a livelihood strategy carried out according to gender roles. Technological breakthrough has resulted to increased productivity and farmers have adopted various cultivation practices, yet the crop yield realized on farmers field are considerably low. However, there is sufficient potential to increase wheat production, but only if gender access to productive resources such as access to land, credit and extension services, with regard to wheat farming is reoriented and critically looked at.

The broad objective of this study was to analyze socio-economic and institutional characteristics of wheat farmers in Jigawa State, Nigeria.

The specific objectives were to;

- i. describe the socio-economic and institutional characteristic of the respondents;
- ii. examine wheat farming technologies among the respondents.
- iii. discuss the extent of participation in wheat farming by the respondents

METHODOLOGY

The study area was Jigawa State, Nigeria located between Latitudes 11.00°N and 13.00°N of the Equator and Longitudes 8.00°E and 10.15°E of the Greenwich Meridian. The State has a land size of 23,287.0 square kilometers. The 2006 population of the study area was 4,361,002, projected to 6,323,452.9 people based on 3.2% growth rate (National Population Commission [NPC], 2021).

The State enjoys some water bodies such as the Hadejia, Kafin Hausa and Iggi Rivers with a number of tributaries feeding extensive marshlands in north-eastern part of the state.

A vast fertile arable land with appreciably cold Harmattan wind blowing from the north during the wheat-growing season (November to February). In addition, the area provides favourable conditions to almost all tropical crops, and livestock with over 80% of the population engaged in subsistence farming and animal husbandry (Jigawa State Ministry of Agriculture, 2020), thus constituting one of its highly prized natural resources.

Sampling Technique

The data for the study were obtained by the use of structured questionnaire. A multi-stage sampling technique was employed in the selection of respondents for this study. In the first stage twelve (12) Local Government Areas (LGAs) were purposively selected based on comparative advantage in wheat production in the area. In the second stage three (3) communities were selected from each of the LGAs to give a total of 36 communities using simple random sampling technique. The third stage involved proportionate and random



selection of 503 wheat farmers, obtained from the list of reconnaissance survey. Finally, using stratified sampling method, 70% and 30% were randomly selected to arrive at 352 men and 151 women wheat farmers.

Analytical Technique

Descriptive and Inferential statistics were used for the analysis of data. The descriptive statistics includes table of frequencies, mean and percentages for the presentation of the socio-economic and institutional characteristics of the respondents as well as the wheat farming technologies. Tobit regression analysis was the inferential statistical tool used to discuss the extent of participation in wheat farming by the respondents. The Tobit model for continuous dependent variable is specified by Agwu, (2014) as:

$$Y_i^* = \beta_0 + \beta X_i + \mu_i$$
$$Y_i = Y_i^* \text{ if } \beta_0 + \beta X_i + \mu_i > 0 \dots\dots\dots(1)$$
$$Y_i = 0, \text{ if } \beta_0 + \beta X_i + \mu_i \leq 0$$

where;

Y_i = Dependent variable (Observed)

Y_i^* = Latent variable (Unobserved)

X_i = Independent variables

β = Coefficient of the explanatory variables

μ_i = Error term

The proposed model is therefore specified as:

Y = the dependents variables: Extent of participation in wheat farming base on total land area under wheat cultivation by farmer

$$Ep = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_{11} X_{11} + U \dots\dots (2)$$

where;

$X_1 - X_{11}$ = Independent variables, defined as:

X_1 = age (in years)

X_2 = gender (male = 1, female = 2)

X_3 = marital status (married = 1, otherwise = 0)

X_4 = household size (number of people assisting)

X_5 = Labour

X_6 = educational level (years)

X_7 = Major occupation (1=farming, 2=otherwise)

X_8 = farming experience (years)

X_9 = access to inputs (access = 1 otherwise = 2)

X_{10} = extension contact (number of days)

X_{11} = membership of cooperative association (member = 1, otherwise = 2)

β_0 = Constant

$\beta_1 - \beta_{11}$ = regression coefficient

U = error term.

RESULTS AND DISCUSSION

Socio-economic and Institutional Characteristics of the Respondents

The result in Table 1 shows the distribution of respondents by socio-economic and institutional characteristics. It revealed that the majority (70%) of wheat farmers were male, while 30% were female. This means that, male respondents participate in wheat farming more than their female counterparts. This could be related to the dominant cultural views of labour in some part of the study areas which do not see farm work as a woman task, meanwhile some



women participated as proxy farmers. This corresponds with Famuyiwa *et al.* (2017), who found that more (74.17%) male were into cocoa farming than female 25.83%. The revealed mean ages of male and female wheat farmers as 33.8 and 31.6 years old, respectively. Implying that the respondents were young active adults in their productive ages who are supposed to have adequate knowledge, attitude and practices in wheat farming. About 33.5% male and 58.3% female respondents had attained secondary and primary level of education respectively. There is possibility that very young and moderately educated farmer may have the ability to learn and practiced new improved wheat farming technologies faster than the old aged farmer. As Clark *et al.*, (2015), found that 24.0% years' healthy young people demonstrate high performance in learning new skills than older (66.5%) adults who demonstrate lower performance in more complex task. Table 1 further revealed that 91.5% male and 95.4% female respondents were married, implying that wheat farming is dominated by married individuals who could be committed and be willing to acquire knowledge and practice wheat farming in the course of their extension trainings.

The result on farm size revealed that majority (64.0%) female had farm size between 0.5-1.0 hectares while, 48.9% male had farm size between 1.5-2.0 hectares. The mean farm size for male and female respondents were 1.4 and 1.1 hectares respectively. This indicate that the respondents were small scale farmers. Nevertheless, they may still utilize their knowledge and practices positively to increase yield with good management practices. Nwaobiala and Uchechi (2016) in a study also found mean farm size of 1.3 hectares.

The result on farming experience reveals that majority (54.8%) of the male respondents had 6-10 years of wheat farming experience while, 67.5% of the female respondents had 1-5 years of wheat farming experience. The mean years of farming experience for the male and female were 5.7 and 5.3years, respectively. This implies that, five years of wheat farming experience could give enough experience, if farmers are properly supported with the required extension services, and can facilitate increased knowledge, attitude and participation in wheat farming practices. This is in tandem with Salau, *et al.* (2017), that 65.4% of the respondents had between 6-10 years' experience in farming. About 68.5% male and 43.7% female respondents had access to extension services from JARDA. 32.4% male respondents had extension contact twice a year while 32.5% female had contact annually. This corroborates with the findings of Ragasa *et al.*, (2012) finds, women farmers compare to male counterpart lag behind in exploiting the benefits from extension services.



Table 1: Socio-economic and Institutional Characteristics of the Respondents

Socio-economic variable	Men (n=352)		Women (n=151)		Mean	
	Freq	%	Freq.	%	Men	Women
Gender	352	70	151	30		
Age (years)						
20-29	93	26.4	74	49.0		
30-39	197	56.0	53	35.1		
40-49	57	16.2	17	11.3	33.8	31.6
50 and above years	5	1.4	7	4.6		
Marital status						
Single	20	5.7	2	1.3		
Married	322	91.5	144	95.4		
Widowed	6	1.7	3	2.0		
Divorced	4	1.1	2	1.3		
Educational level						
Primary education	106	30.1	88	58.3		
Secondary education	118	33.5	24	15.9		
No formal education	19	5.4	15	9.9		
Tertiary education	76	21.6	10	6.6		
Others	33	9.4	14	9.3		
Size of land (ha)						
0.5-1.0	153	43.5	97	64.2		
1.5-2.0	172	48.9	50	33.1	1.4	1.1
2.5-3.0	24	6.8	4	3		
3.5-4.0	3	0.9	0	0		
Farming experience						
1-5	126	35.8	102	67.5		
6-10	193	54.8	35	23.2	5.7	5.3
11-15	29	8.2	9	6.0		
16 and above years	4	1.2	5	3.3		
Source of extension services						
Ministry of Agriculture	65	18.5	30	19.9		
JARDA	241	68.5	66	43.7		
Research institutes	23	6.5	28	18.5		
University	13	3.7	7	4.6		
NGO's	10	2.8	20	13.2		
Frequency of extension contact						
None	16	4.5	78	51.7		
Twice in a year	114	32.4	10	6.6		
Forth nightly	58	16.5	5	3.3		
Monthly	53	15.1	1	0.7		
Weekly	26	7.4	7	4.6		
Quarterly	11	3.1	1	0.7		
Annually	74	21.0	49	32.5		



Wheat Farming Technologies

The distribution of respondents based on wheat farming technologies is presented in Table 2. The result shows that 51.1% male and 35.1% female practice mono-cropping, while 48.9% male and 64.9% female respondents practice mixed cropping. This implies that mono-cropping seems to be the widespread cropping pattern in wheat cultivation in the study area. The result in Table 2 further revealed that majority (52.0% male and 50.3% female) respondents practice bed drill method of sowing wheat. This implies that wheat farmers in Jigawa State followed the recommended practice for sowing wheat which is drilling method technology. This could be to ensure seed get covered by the soil to prevent the seed eaten by birds.

The result in Table 2 also shows that majority (63.3% males and 67.5% female) respondents use the LCRIWHIT-4 (Atilla-Gan-Atilla) variety of wheat, as 22.7% male attest that, the preferred variety matures in less than 90 days, while 25.8% female respondents believed that the variety gives higher yield per hectare. This implied the wheat farmers had knowledge on varieties of wheat used in the area. Namfumba *et al.* (2013) study reveals that 12% male and 7% female respondents prefer hybrid varieties that matures early and susceptible to flooding at maturity stage. The result in Table 2 further reveals that about 46.9% male respondents apply fertilizer for soil amendments, while 53.0% of female respondents applied organic manure to their farmland. It could be that; the women are constrained with cash to buy fertilizer, that is why they go for organic manure which can be obtained from their homes.

The result in Table 2 also shows that 42% male respondents engaged in primary processing while, 51% female respondents were into secondary processing. This implies that female respondents were more into secondary processing and value addition. This might be as a result of the females having knowledge on processing skills. This study conforms with Gbolagade *et al.* (2015) who reported that majority of women are into processing in Nigeria as a result of their responsibility in diversifying livelihood in the rural household. It also shows that majority (52.3% male and 72.2% female) respondents used machine in grinding and milling the wheat grains. This implies the respondents had knowledge and practice the use of the equipment, which can ease and facilitate their work. This is contrary with Ugboaja and Ezebuiro (2017), who indicated that farmers and processors use crude and rudimentary technologies for both production and processing. The result from Table 2 also revealed that, majority (53.4% male and 52.3% female) affirm that wheat harvesting was a difficult task.

Furthermore, the results from the Table 2 shows that majority (66.2% male and 68% female) respondents attest that wheat as household food item was used to prepare traditional dishes among which include; *Alkaki*, *Punkaso* and *Alkhubus*. This implies that wheat is an important cereal crop used for making human food. This concurs with Drucza and Peveri, (2018) who stated that wheat is an important staple food crop with great source of fibre, vitamin B and minerals. Furthermore, 52% male and 47.7% female respondents believed that grading and standardization of the wheat grain is the value addition for better pricing.



Table 2: Wheat Production and Processing Technologies

Production and processing Technologies	Male (n = 352)		Female (n = 151)	
	Freq.	%	Freq.	%
Cropping pattern				
Mono (Sole)	180	51.1	53	34.5
Mixed	172	48.9	98	65.6
Planting methods				
Drill sowing	183	52.0	76	50.0
Transplanting	136	38.7	50	32.8
Broadcasting	33	9.3	25	17.2
Wheat variety used				
LACRIWHIT-4(Atilla-Gan-Atilla)	223	63.4	102	67.5
LCRIWHIT-5 (Norman)	19	5.4	22	14.6
LCRIWHIT-6(Reyna 28)	26	7.4	7	4.6
LACRIWHIT-9 (PASTOR)	1	0.3	1	0.7
Others	83	23.6	19	12.6
Reason for preferred variety				
Variety matures in less than 90 days	80	22.7	53	35.1
current best irrigated varieties	80	22.7	24	15.9
Gives higher yield/ha	75	21.3	39	25.8
Easy to harvest	77	21.9	27	17.9
Resistance to pest/disease	33	9.3	8	5.4
Soil fertility management				
Use of fertilizer	165	46.9	33	21.9
Organic manure	84	23.9	80	52.3
Crop rotation with legumes	41	11.6	19	12.6
2 or 3 of the above	62	17.6	19	13.2
Processing method:				
Primary processing	148	42.0	59	39.1
Secondary processing	160	45.5	77	51.0
None	44	12.5	15	9.9
Equipment use in processing				
Traditional Equipment	119	33.8	28	18.5
Use of machines	184	52.3	109	72.2
None	49	13.9	14	9.3

Source: Field survey, 2021

Table 2: Wheat Production and Processing Technologies Cont'd.

Production and processing Technologies	Male (n = 352)		Female (n = 151)	
	Freq.	%	Freq.	%
Ease of harvesting wheat				
Easy	52	14.8	17	11.3
Difficult	188	53.4	79	52.3
Normal	56	15.9	39	25.8
None	56	15.9	16	10.6
Uses to which wheat is applied to as household food items				
Traditional dishes (<i>Alkaki, Punkaso, Alkubus</i>)	233	66.2	103	68.0
Bread making	17	4.8	22	15.0
Livestock feed	8	2.3	3	2.6
2 or 3 of the above	29	8.2	7	4.6
None	65	18.5	16	10.3
Value addition for better pricing				
Cleaning	94	26.7	51	33.8
Grading and standardization	183	52.0	72	47.7
Packaging	1	0.3	0	0
None	74	21.0	28	18.5

Source: Field survey, 2021

Tobit Regression on Extent of Participation in Wheat Farming

Tobit regression was used to estimate the extent of participation in wheat farming practices. The model recorded (Table 3) a chi-square of 54.43 which is significant at 1% level and Log likelihood of 364.80. These results show that the model fit very well, this was also supported by the value of sigma which is highly significant at 1%. The results (Table 3) on extent of participation in wheat farming revealed that the coefficient of age, gender, household size, educational level, wheat farming experience, farm size, and access to farming inputs and extension services were all positive and significant at 1% level of probability. While, marital status, labour and membership of association were positive and significant at 5% level of probability except main occupation which is not significant. This implies that the variables are strongly associated with extent of participation in wheat farming activities.

The result (Table 3) reveals that coefficient of age was positive and significant at 1% level of probability, implies that a year increase in farmer's age will result to increase in participation in wheat farming practices by 8.9%. High participation in wheat farming activities by farmers in the study area, is significantly influenced by an increase in age of farmer. Coefficient of gender (Table 3) was positive and significant at 1% level of probability implies that male respondents were more extensively participating in wheat farming activities than the females because they had larger farm than the female. This could be explained by the fact that. Socio-cultural norms do not allow women to participate in wheat farming activities in the study area. The women who are participating in threshing or winnowing activities were either widows or the elderly. The result is in consistent with the findings of Okwoche *et al.* (2012) who noted that females are often married to the males and so might not own land. Household size indicated a positive coefficient and significant at 1% level of probability This positive coefficient illustrates that, as household size increased, participation in wheat farming activities would increase.

The coefficient of educational level was positive and significant at 1% level of probability (Table 3). This implies that education had a significant effect on extensive



participation. Positive relationship reveals that increase in education will enhance farmers' willingness to participate extensively in wheat farming activities, as such increased education level increases participation in wheat farming activities. Coefficient of wheat farming experience (Table 3) was positive and significant at 1% level of probability. This implies that with more years of experience in wheat farming activities, the more likelihood of extensive participation in wheat farming activities. Elzo *et al.* (2010) was of the view that more experienced farmer manages and expand their production better, receive high revenue than the non- experienced farmer.

As presented in Table 3, coefficient of extension services was positive and significant at 1% level of probability. This implies positive effect on extent of participation on wheat farming activities. The positive relationship of extension services means it provide information on improved wheat farming. This corresponds to Injamu and Makokha (2014) who discovered that socio-economic, socio-cultural, training and extension services significantly affect participation in agricultural production in Kenya.

Table 3: Tobit Regression on Extent of participation in wheat farming

Variables	Coefficient	Std. Error	t-value
Age	0.0888	0.0240	3.7***
Gender	0.2765	0.09816	2.8***
Marital status	0.0918	0.0380	2.4**
Household size	0.0765	0.0139	5.5***
Labour	0.0677	0.0210	3.2**
Educational level	0.0357	0.0149	2.4***
Main occupation	0.0131	0.0163	0.8NS
Wheat farming experience	0.2761	0.0849	3.3***
Farm size	0.1897	0.0449	4.2***
Access to farming inputs	0.0763	0.0280	2.7***
Access to extension services	0.1090	0.0267	4.1***
Membership of association	0.0524	0.0232	2.3**
Constant	0.3534	0.0977	3.6***
Sigma	0.1148	0.0036	
Log likelihood	364.80102		
LR chi2(12)	54.43		

Note: **, *** and NS are significant at 5%, 1% and not significant, respectively.

Source: Field survey, 2021

CONCLUSION AND RECOMMENDATIONS

Men and women participated in wheat farming, except that on average the men had better access to land, fertilizer and extension services than their female counterpart because of their social network. Seed companies should partner with research institutes and extension organization for testing and release of high-quality wheat seed variety in sufficient quantities and to provide offtake to farmers to increase productivity. Policy to ensure that farmers receive the latest information on wheat agronomy through regular trainings.

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