



Profitability Analysis of Wheat (*Triticum aestivum*) Production in Kano State, Nigeria

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ABSTRACT

The study was conducted in Kano state, the overall aims of this study was to analyze the profitability of wheat production in Kano state. Multi-stage sampling procedure was employed for the study to select three out of seven Local Government Areas for this study. The L.G.As selected for this study were Kura, Bunkure and Bagwai. A total of 274 wheat farmers were interviewed. The data for this study were analyzed using descriptive statistic and farm budgeting techniques. The descriptive statistics results show the dominance of male farmers among wheat producers with a mean age of 46.01 years this shows that wheat producers are still agile and active in production, the Mean farming experience of the farmers was 15.17 years indicating that wheat production is an age-long venture in the study area and majority of the respondents obtain their production inputs directly from the market. However the Cost and returns associated with the use of different resources by the wheat farmers in the study area was determine through the use of Farm budgeting techniques, the total revenue for the production of wheat was ₦ 1,265,097.90 per hectare, while the total cost was ₦ 684,273.98 per hectare, given a Net Farm Income of ₦ 580,823.92 per hectare, indicating that wheat production is profitable in the study area. However, the result shows that 92% of the farmers agreed that High cost of production include inputs (labour, seed, fertilizers, and herbicides) was ranked first and most important constraint wheat farmers faced in the process of wheat production.

Keywords: Wheat, Profitability, Production, Kano State

1.0 INTRODUCTION

Agriculture is the mainstay of Nigeria's economy, contributing about 42% of the gross domestic product (GDP) (First Securities Discount House, 2017), providing employment to about 70% of the labour force, accounting for over 70% of the non-oil exports and perhaps most importantly, providing over 80% of the food needs of the country (World Bank, 2015). Since independence the Nigerian wheat imports had consistently exceeded local production as the consumption of wheat had also continued to rise. This was due to the low domestic production, low commercialization and high imports of wheat. There is still a wide gap between domestic demand and supply of wheat in the country. On average Nigeria produced only 2.06% of the total amount of wheat consumed between 2010 and 2020 (USDA, 2020). Wheat is one of the most important sources of nutrients, as it contributes to 19.6% and 18.3% of total human consumption of protein and calories, respectively (FAO, 2019). It provides other essential macro and micro nutrients, such as iron, magnesium, zinc, and folate. For a substantial part of the global population, it is a major source of these nutrients. It is also one of the world's most traded agricultural products in terms of quantity. In 2019, the global wheat trade amounted to 180 million metric tonnes (Mt) (FAO, 2019). International trade supplied almost one-quarter of all wheat-based nutrients at the aggregate level (FAO,

2019), hence playing a major role in global food security. In Nigeria, wheat is consumed in one form or the other in virtually every home, restaurants and hotels throughout the country. Besides, the crop is the main raw material in the Nigeria flour mills. Its flour is used for making bread, confectionaries, biscuits and other snacks. The offal (residue) is used in the feed mills in compounding livestock feeds (Ahmed, 2014). Broadly this study analysed financial profitability of wheat production in Kano state, Nigeria. The specific objectives include to:

- i. describe the socio-economic characteristics of wheat farmers in the study area.
- ii. determine the financial profitability of wheat producers in the study area.
- iii. identify constraints faced by wheat producers in the study area.

2.0. MATERIALS AND METHOD

2.1. Description of the study area

The study was conducted in Kano state. Historically, Kano state has been a commercial and agricultural state. It is one of the most extensively irrigated states in Nigeria with more than 20 dams providing about two million cubic metres of water to support agricultural and industrial activities (KNSG, 2018). The major crops cultivated along with wheat are; maize, rice, tomatoes, groundnut, sorghum, soya beans, millet, pepper, cabbage, onions and sweet potato. Other agricultural activities carried out in the state are animal husbandry, fishery, processing and marketing of agricultural products (NRPD, 2013). The state is located in the North Western part of the country and lies between latitude $9^{\circ} 30'$ to $10^{\circ} 33'$ to $12^{\circ} 37'N$ and longitudes $7^{\circ} 34'$ to $9^{\circ} 25'E$. The state has 44 local government areas with a total land area of about 42,582.8 km square out of which Agricultural land occupies 30,684.8km square, while forest and grazing land occupies 11,898 km square (KNSG, 2004). The population of the state stands at 13,076,900 people (NPC, 2016). The state has two distinct climate seasons (Dry and Raining season), The dry season spans the period between October/November to March/April, while the wet season spans the period between May/June to September/October, with an annual rainfall ranging between 787 and 960mm and a temperature ranging between $33^{\circ}C$ and minimum of $15^{\circ}C$ although it falls sometimes during Hamattan to as low as $10^{\circ}C$. The state has an altitude of 472.45m above sea level (Tankuro, 2017).

2.2. Sampling Procedure

Multi-stage sampling procedure was employed for the study. First stage involved the random sampling via balloting to select three Local Government Areas out of seven major wheats producing LGAs proposed for the study. The L.G.As selected were Kura, Bunkure and Bagwai. Second stage involved the random selection of four farming communities from each L.G.A to give a total of 12 farming communities. Third stage involved the application of Yamane (1967) formula for sample size determination and proportionate sampling to select the appropriate number of wheat farmers per farming community.

The following expressions were used to determine the sample size as follows:

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

Where: n = sample size

N = Total number of J^{th} wheat farmers in all 12 farming communities

e^2 = Confidence level $(0.05)^2$.

While for the proportionate sampling the expressions were as follows;

$$n = \frac{X}{D} * N \quad (2)$$

Where: n = sample size of J^{th} wheat farmers selected per community

X = Number of J^{th} wheat farmers in a farming community

D = Total number of J^{th} wheat farmers in all 12 farming communities

N = Recommended sample size by Yamane's formula.

2.3. Method of Data Collection

Primary data was used for the study. The primary data was collected with the aid of a structured questionnaire administered to the sampled wheat farmers by trained enumerators. The Data collected include socio economic variables, inputs and output data on wheat production, domestic market price of output per kg, cost of various inputs used such as fertilizer, seed, land, labor, fuel, water, capital, and agro-chemical.

2.4. Analytical Techniques

The data for the study was analyzed using analytical tools such as descriptive statistics and Farm budgeting technique.

2.5. Descriptive Statistics

Descriptive statistics such as mean, frequency distribution and percentages were used to describe the socio-economic characteristics of wheat producers in the study areas.

2.6. Financial profitability analysis

Farm budgeting techniques is a farm planning and budgeting tool used to determine the profitability of a given enterprise. The explicit form of the model is as follows:

$$NFI = TR - (TVC + TFC) \quad (3)$$

where:

NFI = Net Farm Income of J^{th} wheat producer in naira (₦)

TR = Total Revenue

TVC = Total Variable Cost (Cost of seed, fertilizer, glyphosate, labor, water charges, transportation, manure, bagging and storage)

TFC = Total Fixed Cost (Depreciation on fixed asset, Cost of capital, Rent paid on lease of land and tax on output).

The following expression was used to determine depreciation of fixed assets:

$$D = \frac{P-S}{T} \quad (4)$$

where: P = Initial cost of the asset,

S = Salvage value is the estimated value of asset at the end of its useful life and

T = Useful life of the asset is the number of years the asset is expected to be used.

3.0. RESULTS AND DISCUSSION

3.1. Socio-economics characteristics of the wheat producers

Table 1, shows the distribution of wheat farming households by their socio-economic characteristics. The result revealed that majority of wheat farmers (44.2%) are within the age range of (45 to 54) years with mean age of 46 years. This means that wheat producers in the study area are still agile and active in wheat production. Age had been found to affect the ability of farmers to cultivate more hectares which in turns leads to an increase in productivity and level of commercialization, this might be because farmers at their prime age can produce a high quantity compared with their counter older age farmers, this is in agreement with that of Anyiam et al. (2019) who revealed that majority of the farmers in South Eastern Nigeria were between the productive age of 42-54, years.

Table 1: Socio-economic characteristics of the wheat producer

Variables	Frequencies	Percentages (%)	Mean
Age (year)			
25-34	42	15.30	
35-44	62	22.60	
45-54	121	44.20	46.01
55-64	32	11.70	
65-74	17	6.20	

Gender			
Male	259	94.50	
Female	15	5.50	
Marital Status			
Single	31	11.30	
Married	231	84.30	
Widow	8	2.90	
Divorce	4	1.60	
Level of education			
Primary	67	24.50	
Secondary	52	18.90	
Tertiary	35	12.80	
Adult education	42	15.30	
No formal education	78	28.50	
Number of dependent			
0-5	106	38.69	
6-10	125	45.62	6.75
11-15	27	9.85	
16-20	16	5.84	
Farm size (ha)			
0.1 – 1.0	129	47.08	0.97
1.1 - 2.0	98	35.77	
2.1 – 3.0	27	9.85	
3.1- 4.0	13	4.74	
4.1 –5.0	7	2.55	
Farming Experience (Year)			
1 – 5	41	15.00	
6- 10	71	25.90	
11- 15	93	33.90	13.44
16- 20	38	13.90	
21- 25	31	11.30	
Access to credit			
Yes	57	20.80	
No	217	79.20	
Major occupation			
Farming	217	79.20	
Trading	39	14.20	
Civil servants	18	6.60	
Extension contacts			
Yes	122	44.50	
Nos	152	55.50	
TOTAL	274	100.00	

Source: Field survey, 2023.

The result also revealed that majority (94.5%) of the wheat producers were male this implies that male participate in wheat production more than their female counterparts. This could be related to dominant cultural views of labour in the study area, which do not see farm work as a woman task, this implies that most farming activities were carried out by male and most male household head have sole responsibility to carter for the family, meanwhile some women's participated as proxy farmers. This finding is in consonance with that of (Amurtiya, 2015; Aboaba et al., 2019), who revealed that there are more male-headed household in rural Nigeria than female-headed household.

The result further revealed that 84.3% were married. This implies that wheat farming is dominated by married individuals due to tradition and social orientation. This scenario may encourage farmers' level of commercialization to meet up with family responsibilities. This aligns with the findings of Kirwah and Maye (2013), who found that most rural farmers prefer to marry in order to have cheap labour for agricultural activities to enable their household to be food secured.

Education is an important factor in agricultural production and farmer's income (Mohammed et al., 2020). The result revealed that 43.8% of farmers had no formal education, followed by primary, secondary and tertiary with 24.5%, 18.9%, and 12.8% respectively. This indicates that there is low level of tertiary education in the study area and hence new innovations may not likely be accepted easily because a high level of western education has always recognized as the important key factor that determines how easily new innovations can be introduced and embraced by certain group of agricultural society. This is in line with the finding of Mukaila et al. (2020), who found that low level of education could influence farmers decision making process negatively.

Number of dependents of the wheat farmers ranged between 0 to 18 members and the model group were 6 person accounts for 17.5% of the producers, further result revealed that the mean number of dependents were 6.75. This may be due to the household with large family size can cultivate more land by substituting hire labour and participating in commercialization. This result is in agreement with Changalima and Isma,il(2022), who found increasing trends in market participation and increase in family size. This is mainly because a large family size has contributed to an increase in the volume of output produced and volume supply to market. This result is not in agreement with Hailua et al., (2022), that confirmed that dependency ratio has a negative effect on the amount of output supply to the market, that households with large number of dependents allocated more products for home consumption purpose and supplied less quantity to the market.

The result on farm size revealed that (47.08%) of the farmers had a farm size of between 0.1 – 1.0 hectares while 35.77% had farm size of 1.1 - 2.0 hectare and only 17.15% had a farm size greater than 2.0 hectares with the mean farm size of 0.97 hectares. The finding further revealed that wheat farmers in the study area were mainly small-scale farmers. Nevertheless, they may still utilize their knowledge and practices positively to increase yield with good management practices. This finding is in agreement with the finding of Amurtiya, (2015) that majority of Nigerian farmers were small scale farmers who cultivate less than 5 hectares.

The result on farming experience revealed that (33.9%) of the producers had 11-15 years of wheat farming experience and the mean years of farming experience were 13.44 years. This means that wheat production is an age-long venture in the study area. The years of wheat farming experience could give enough experience if farmers are properly supported with the required extension services and can facilitate increased knowledge and participation in wheat farming practices. This is in tandem with Salau, et al., (2017), that majority of the farmers had over 10 years' experience in wheat production.

The result also revealed that majority of the farmers had no access to credit facilities which implies that the finance needed to expand their farming activities was not available due to inability to get the loan and meet the loan conditions in terms of collateral, interest rate and repayment period. This aligns with the findings of Abdulrahman and Donkah, (2015) who stated that low-income farming household had no access to credit probably due to lack of collaterals.

The occupational distribution of the farmers presented in Table 6, indicates that 79.2% of the farmers had farming as their primary occupation, 14.23% were trading and 6.57 were civil servants. It is clear that agricultural sector is the highest employer of labour in the study area. The result is in agreement with the study carried out by Shehu (2018), who found out that farming constituted the major occupation of people in rural areas in Nigeria.

The result shows that 55.5% of the wheat producers had no contact with extension services, this lack of contact with extension agent could be due to the inadequate funding of extension agents in Nigeria by the Government, (Ozor et al., 2007). This may decrease the likelihood of farmers having access to improved technologies, production inputs as well as other production incentives provided by extension agents this would leads to low level of wheat production and commercialization.

3.2. Financial profitability analysis

This section focuses on the determination of cost and returns associated with the use of different resources by the wheat farmers in the study area. This was determined using Farm budgeting techniques. The discussion on cost and return was based on the prevailing market price of inputs and output at the time the study was conducted. The analysis showed in the Table 2 below, based on the data obtained from the field, cost of seed, fertilizer, water charges, labor, fertilizer, herbicide, manure, storage and transport were considered as variable cost, while depreciation on fixed asset, tax on output, cost of capital and rent paid on leased of land were considered as fixed cost. In any production process, costs are incurred in producing output and returns are earned from sales of such outputs produced. The total revenue was derived by multiplying the average yield (quantity) of wheat per hectare by the prevailing market price at the period of the survey.

Table 2: Cost and return analysis of wheat production per hectare

Production Variable	Quantity	Unit Price (₦)	Amount(₦)	Percentage Contribution (%)
A. Variable cost				
Seed	110 kg	513.94	56,533.40	8.26
Urea	227.5 kg	379.01	86,224.78	12.60
N P K	272.5 kg	464.11	126,469.98	18.50
Manure	3 trucks	5,112.26	15,336.78	2.24
Glyphosate (Roundup)	5.66 liters	3,257.91	18,439.77	2.69
Labour	130 man-days	1,583.59	205,866.70	30.08
Transport	194.71km	200.00	38,942.00	5.69
Water charges	10 days	1,051.55	10,515.50	1.54
Bagging	31.4 bags	499.20	15,674.88	2.29
Storage	31.4 bags	173.18	5,437.85	0.79
B. Total variable cost			579,441.64	84.68
C. Fixed cost				
Depreciation on fixed asset	1ha	7,038.32	7,038.32	1.03
Rent paid on leased of land	1ha	36,635.22	36,635.22	5.35
Tax on output	1ha	6,270.80	6,270.80	0.92
Interest (Cost of capital)	1ha	54,888	54,888	8.02
D. Total fixed cost			104,832.34	15.32
E. Total cost(TC)=TVC+TFC			684,273.98	100
F. Total revenue (TR)			1,265,097.90	
G. NFI = TR - TC			580,823.92	85
IRR= NFI/TC			0.85	

Source: Field survey, 2023.

Table 2, revealed that the average market price was ₦403.54/kg while the average yield per hectare was 3,135 kg/ha and the total revenue was ₦ 1,265,097.90, per hectare. The total cost of wheat production was ₦ 684,273.98 per hectare where variable cost accounted for 84.68% (₦ 579,441.64) of the total cost of production while the fixed cost accounted for 15.32% (₦ 104,832.34%). Labour constitutes 30.08% of the total cost of production which is equivalent to ₦ 205,866.70 per hectare and was the highest production cost incurred,

followed by cost of NPK, Urea, Seed and Interest rate with 18.50%, 12.60%, 8.26% and 8.02% respectively. The Net Farm Income was ₦ 580,823.92 per hectare of cultivable land, indicating that wheat production is highly profitable and has the potential for increasing farmers income, this can also be confirmed from the IRR value of 0.85 which implies that for every one naira invested on wheat production it will generate 85k profit. This confirms the claim that labor constitutes the highest production cost in subsistence agriculture (USDA, 2021).

3.3. Constraints faced by wheat farmers

Table 3: Constraints faced by wheat farmers

Constraint	Frequency	Percentages (%)	Rank
High cost of production inputs	252	92.00	1 st
Inadequate credit facilities	248	90.50	2 nd
Instabilities of Government policy	246	89.80	3 rd
Distance to market	220	80.30	4 th
Lack of modern technologies	216	78.80	5 th
Low price of output	195	71.20	6 th
Shortage of water	186	66.20	7 th
Lack of improve seed	175	63.90	8 th
Lack of extension agent	165	60.20	9 th
Poor market system	134	48.90	10 th
Theft	109	39.80	11 th
Pest and disease	85	31.00	12 th

Source: Field survey, 2023. *Multiple responses were allowed

Table 3, shows constraints of wheat production as perceived by the farmers. The table shows that 92% of the farmers agreed that High cost of production inputs (labour, seed, fertilizers, and herbicides) was ranked first and most important constraint wheat farmers faced in the process of wheat production, the key assets for rural farmers include accesses to physical inputs like fertilizers, herbicides, labor and seed among others. Therefore, the high prices accruing to these inputs, whereas capital used for the production process by farmers is quite meager constitute a great barrier to the farmers' decision and ability to produce more. Furthermore, the result revealed that inadequate access to loan/credit facilities was ranked as second most important constraints faced in their production endeavor.

Falola et al. (2022), agreed with the importance of capital in farming when they reported that capital accumulation is an important stimulus and a key asset to investment. Instabilities in government policies, Distance to the market and Lack of modern technologies were also found as significant barriers to wheat production. Instabilities of the government policies is crucial to the production process, therefore, lack of stable government's policies and the long distance to the market are considered external factors which impact the farmer's decision to produce, thereby reducing the level of production and overall market participation. Incidence of pest and disease was the least important constraints farmers face in the process of wheat production. This supports the reports of Ibrahim et al.(2018), that wheat production was faced with the challenges of incidence of pest and disease.

4.0. CONCLUSION AND RECOMMENDATIONS

The Cost and returns associated with the use of different resources by the wheat farmers in the study area was determine through the use of farm budgeting techniques, the total revenue for the production of wheat was ₦ 1,265,097.90. per hectare while the total cost was ₦ 684,273.98 per hectare therefore given a Net Farm Income of ₦ 580,823.92 per hectare of cultivable land, indicating that wheat production is profitable in the study area, this can also be confirmed from the IRR value of 0.85. It was concluded that wheat production was

financially profitable in the area at private prices given current technology, inputs, output price and policy transfers.

The study recommended that, there is need for concerted effort by the government and non-governmental organizations (NGOs) and other relevant agencies to expand wheat production in the area because most of the farmers were still under subsistence wheat production with a mean farm size of 0.97 ha and thus relevant policies should be put in place and making wheat production a worthwhile venture for farmers, this could be achieved through expansion of irrigation scheme, provision of dams, improved seeds, rain feed seed, fertilizers, pesticides to farmers at zero interest or subsidized rate to boost wheat production in the area.

There is low credit access in the study area due to lack of information about available and suitable credit options, high cost of borrowing and lack of trust between farmers and lenders, due to history of fraud in agricultural sector. Therefore, efforts should be made towards proving reliable and easy access to low-interest rate loans to wheat farmers by the Government and other relevant agencies.

There is need for Wheat farmers to focus more attention on strengthening and expanding farmer's cooperatives groups and better linking social capital with extension agencies, markets and agricultural value chain actors.

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