



**ECONOMICS OF CHILLI PEPPER PRODUCTION IN JERE LOCAL GOVERNMENT  
AREA, BORNO STATE, NIGERIA**

**<sup>1</sup>Tahir, A. D., <sup>2</sup>Saleh, R. A. and <sup>3</sup>Muhammad, M. U.**

<sup>1</sup>Department of Agricultural Economics, Faculty of Agriculture, University of Maiduguri

<sup>2</sup>Desert Research Monitoring and Control Centre, Yobe State University, Damaturu, Nigeria

<sup>3</sup>Department of Agricultural Economics and Extension, National Open University of Nigeria

\*Corresponding Authors' Email: [tahirdori@gmail.com](mailto:tahirdori@gmail.com)

GSM: +2347039271418

**ABSTRACT**

The study analyzed the economics of chilli pepper production in Jere Local Government Area of Borno State. One hundred and fifty-four Chilli pepper farmers were selected randomly and interviewed for the study using a structured questionnaire. The data collected were analyzed using descriptive statistics, gross margin and multiple regression analysis. The results show that majority (70%) of the respondents were within the age bracket of between 26-40 years with majority (86%) being male and married. The result also show that 52% had primary education, 36 % had secondary education while only 2% had tertiary education with majority (68%) of the respondents having a household size of between 5-15 people per household. The result further revealed that majority (60%) of the respondents makes use of their personal savings, while 4% had access to credits. The result on profitability analysis revealed the total revenue per hectare, gross margin and the return on naira invested of the Chilli farmers in the study area as ₦404,000, ₦293,020.00 and ₦3.64 respectively. Furthermore, labour cost account about 30.2% of the total variable cost, followed by the cost of harvesting operation covering about 18.7% and cost of fertilizer 16.8%, the remaining variable cost account for the remaining 34.3% The result of the regression analysis revealed that quantity of seed, quantity of fertilizer use, labour in man-days and quantity of pesticide were the significant factors determining the production of chili pepper. The study concluded that Chilli production is profitable business in the study area going the level of return per Naira invested. Weeds, pests, high cost of transportation and inadequate storage facilities were the major problems encountered by the Chilli Pepper farmers. The study therefore recommend that government and NGOs should come up with policy that will address issues affecting the production by providing good storage facilities.

**Keywords:** Borno, Chilli-pepper, Economic, Farmers and Small-scale.

**INTRODUCTION**

Chilli pepper (*Capsicu frutescens*) is an important agricultural crop not only because of its economic importance, but also due to the nutritional and medicinal value of its fruit, as well as being an excellent source of natural colours and antioxidants compound (Lawal *et al.*, 2021). Chilli pepper, also known as *Attaruhu* in northern Nigeria, is one of the veggies farmers believe they are not losing anything on its production (Abubakar, 2023). Pepper is a common vegetable utilized across the world. Pepper cultivation is one of the most profitable industries in Nigeria and around the world. Pepper gardening, like tomato and cucumber farming, may be quite profitable. Habanero pepper, cayenne pepper, chilli pepper, and sweet pepper are the most popular types of pepper eaten in Nigeria. These peppers are known as *ataroho*, *shombo*, *ata ijosi*, and *tatase* in Nigeria (Veggiegrow, 2023). Farmers do not need to invest much money, and the method does not take much labor when compared to other vegetables that require money and attention. It also does not require a lot of inputs, which saves farmers a lot of money (Abubakar, 2023).



Nigeria is facing two key agricultural gaps: the inability to meet local food demand and the inability to export at the quality standards required for market success. The former issue is a production challenge caused by an inefficient input system and farming model. As a result, an aging farmer population lacks sufficient seeds, fertilizers, irrigation, crop protection, and other support to be successful. The latter challenges is driven by an equally inefficient system for establishing and enforcing food quality standards, as well as a lack of market awareness (Agriculture Promotion Policy, 2016).

Chilli pepper has been used by the majority of Nigerian households and industries (confectionaries, beverages, medicinal etc) as part of their dietary and raw material respectively. The demand for pepper is rapidly increasing and there is a great need for increase production. The efficiency with which farmers uses resources and technologies available to them are imperative in Nigeria agricultural production. Nom consideration of this has resulted in low farm income which has weakened the financial position of farmers who produce most of the crops in Nigeria. Causing a condition that has led to poor funding of their economic activities. The implication is that there is scope for further increase in output from existing hectares of crop if resources are accurately exploited. Similarly, the measurement of the productive efficiency in agricultural production is an important issue because it gives pertinent information for making sound management decision in resource allocation. It is very important to carry out an investigation to ascertain ways by which increased chilli pepper production can be achieved and thereby increasing its contribution to the farmer's livelihood (income).

Scarcity of resources has led production economists to think about the reallocation of existing resources to have more output with given level of input combinations or to produce prescribed level of output with the minimum cost without changing the production technology. Despite the economic importance of pepper in terms of income generation to farmers hence there should be a valid economic reason to boost its production and increase its level of contribution to the farmer's income. Farmers are interested in total profit made from the farm not putting into cognizance which of the crops gives the highest level of profit or at what percentage each crop is contributing to overall profit, this will encourage them to improve in efficiency for productivity enhancement in order to maximize profit. Considering the above facts, the major objectives of the study is to determine the economic analysis of chili pepper production in Jere Local Government Area of Borno State while the specific objectives were to:

- i. describe the socio-economic characteristics of chill pepper farmers in the study area;
- ii. examine the profitability of chilli pepper production in the study area;
- iii. determine the input and output relationship in chilli pepper production in the study area;
- iv. describe the constraints associated with the chilli pepper production in the study area?

## **MATERIALS AND METHOD**

### **The Study Area**

The study was conducted in Jere Local Government Area of Borno State. Jere Local Government Area has a population of about 211, 204 persons (NPC, 2006) and a projected population of 305,823 persons as of year 2021 at 2.8% growth rate. Jere L.G.A. lies between Latitude 11<sup>0</sup>40N and 12<sup>0</sup>05N and Longitude 13<sup>0</sup>50E and 12<sup>0</sup>20E and it occupies a total land mass of 160 square kilometers (MLS, 2013). The climate of the Area is characterized by dry and hot season with temperature ranging from 15°C - 45°C depending on the weather. Annual rainfall range from 500-700mm per annum (NMA, 2008). The rainy season is usually from May to October with low relative humidity and short wet season. Majority of the inhabitants are farmers, traders



and civil servants. Crops produced in the area include rice, millet, groundnut, cotton and vegetables.

### **Sampling Procedure**

Multi stage sampling technique was employed for the study. In the first stage, Alau and Jere LGA were purposively selected based on the high intensity of chilli pepper production in the area. At the second stage, a list of chilli pepper farmers (250) were collected to serve as the sampling frame for the study, the Yamani 1967 formula was adopted and 154 farmers from the list were randomly selected to serve as the sample size for the study. Data were collected with the aid of structured questionnaires.

### **Method of data Analysis**

Data were analyzed using descriptive, budgetary model and inferential statistics. Descriptive statistics such as frequency and percentages were used to achieve objective I and IV, while budgetary techniques i.e. gross margin analysis was used to achieve objective II and multiple regression analysis was used to achieve objective III.

### **Budgetary techniques**

Gross margin was used to determine profitability of chill pepper production i.e. objective II which is expressed as:

$$GM = TR - TVC \quad \dots(1)$$

GM = Gross Margin (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

### **Multiple regression model**

Linear multiple regression model was used for the study. The model is specified as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e \quad \dots(2)$$

Where:

Y = Yield of chilli pepper (kg/h)

X<sub>1</sub> = Quantity of seed (kg/ha)

X<sub>2</sub> = Labour in man-days

X<sub>3</sub> = Quantity of fertilizer used (kg/ha)

X<sub>4</sub> = Quantity of pesticides (liters/ha)

b<sub>0</sub> = intercept (constant term)

b<sub>1</sub> – b<sub>4</sub> = estimated regression coefficients

e<sub>i</sub> = error term

## **RESULTS AND DISCUSSION**

### **Socio-economic Characteristics of Chilli Pepper Farmers**

The socio-economic characteristics of the respondents studied include age, sex, marital status, access to improved seed, farm size, farming experience, household size and sources of capital, this was presented in Table 1. The result showed that 70% of the respondents were within the ages of 26-40 years. This implies that most of the farmers in the study area were within their active age. The result is in line with findings of Olugbenga *et al.* (2022) and Alabi and Anekwe (2023) who found in their studies that small holder farmers were within their active age. Furthermore, the result showed that majority (86%) were male indicating male dominance in chilli pepper production in the study area. The result further revealed that majority (62%) were married. This was backed up by the findings of Tahir *et al.* (2021) who discovered that majority of the farmers in the same location were married, which resulted to increased farm output and reduced



cost on labour. The result also showed that more than half (52%) of the respondents had primary education, 36 % had secondary education while only 2% had tertiary education. This entails that most of the chilli pepper farmers were literate in one way or the other meaning that, education is significant in decision making and may yield better production strategies. It was showed that most of the farmers (80%) have no access to improved seed. This may be due to lack of knowledge of where to source the improved seed or lack of enough capital to purchase the seed, and, it may be due to the fact that the farmers did not trust how good the improved variety are, so they just make use of the local type they are used to. Furthermore, it has been shown that 68% of the respondents had household size of 5-15. Higher family size has been found to influence agricultural production especially the traditional system of agriculture where family labour is commonly used.

**Table 1: Socio-economic characteristics of Chilli Pepper farmers**

<b>Socio-economic characteristics</b>	<b>Frequency</b>	<b>Percentages</b>
<b>Age (Years)</b>		
18-25	13	26
26-32	23	46
33-40	12	24
>41	2	4
<b>Sex</b>		
Male	43	86
Female	7	14
<b>Marital Status</b>		
Single	14	28
Married	31	62
Widow	5	10
<b>Education level</b>		
Non-formal education	5	10
Primary	26	52
Secondary	18	36
Tertiary	1	2
<b>Access to improved seeds</b>		
Yes	10	20
No	40	80
<b>Household size</b>		
1-4	14	28
5-10	15	30
11-15	19	38
>16	2	4
<b>Farm size (ha)</b>		
0-1	50	100
<b>Farming experience (years)</b>		
1-5	20	40
6-10	11	22
10-15	12	24
>16	7	14
<b>Source of capital</b>		
Personal savings	30	60
Credit	2	4
Personal saving/credit	18	36

**Source: Field Survey, 2022**



The category of farmers used for study were small scale thus, their farm sizes ranges from 0.1ha - 1ha which has a direct effect on the quantity of output produced. The result also shows that all the farmers (100%) have 0-1ha of farm size for cultivation of Chilli. This result was in line with the findings of Tahir *et al.* (2021) that small scale farmers are those farmers that cultivated land ranging between 0-1ha. The Table 1 also showed that about 46% of the respondents had between 6-15 years of farming experience. The result, further revealed that majority (60%) of the respondents makes use of their personal savings, while 4% had access to credits. This shows that there is inadequate source of credit to the farmers in the study area, this made majority of the farmers to use their personal savings for investment in agricultural production rather than sourcing the credit from banks or lenders.

### **Profitability of Chilli Pepper Production**

Table 2 shows the computed gross margin for Chilli pepper enterprise per hectare. The result shows that total variable cost was found to be ₦110,980. The total revenue per hectare was computed to be ₦404,000 this was obtained from the response of the respondents as the average cost of total output from production of Chilli pepper per hectare in the study area. The gross margin was found to be ₦293,020.00. Furthermore, labour cost account about 30.2% of the total variable cost, followed by the cost of harvesting operation covering about 18.7% and cost of fertilizer 16.8%, the remaining variable cost account for the remaining 34.3% and the return on capital investment of ₦3.64 shows that the investment is profitable and worthwhile this is in line with findings of Mohammed *et al.* (2015) who in his studies found ROI of ₦2.28 among Chilli Pepper farmers in Kaduna State. According Muhammad and Danwawu (2022) if the farmers continued with good agronomic practices as recommended by the experts, their revenue will increase.

**Table 2: Estimate of gross margin of Chilli Pepper**

<b>Items</b>	<b>Cost/ha (₦)</b>	<b>Percentage</b>
<b>Total Revenue</b>	<b>404,000</b>	
<b>Variable Cost</b>		
Labour	33,600	30.2
Harvesting	20,800	18.7
Fertilizer	18,750	16.8
Seed	12,150	10.9
Transportation	8,550	7.7
Storage facilities	7,500	6.7
Herbicide	3,780	3.4
Pesticide	2,700	2.5
Hoe	1,900	1.7
Rake	1,250	1.1
<b>Total Variable Cost</b>	<b>110,980</b>	
<b>Gross Margin</b>	<b>293,020</b>	
<b>Return on capital Investment</b>	<b>3.64</b>	

**Source: Field Survey, 2022**

### **Determinants of Chilli Pepper production**

The result in Table 3 present analysis of the determinants influencing the input-output relationship of Chilli Pepper production using linear multiple regression model. The shows that 95% variation in Chilli pepper production was explain by the independent variables included in the model. However, the result revealed that quantity of seed, quantity of fertilizer use in the production of Chilli pepper were positive ad significant at 1% indicating that the more the quantity



of seeds and fertilizer the more the Chilli pepper produced in the study area. Furthermore, the coefficient associated with labour in man-days and that of quantity of pesticide were both positive and significant at 5%, this implies that labour in man-days and quantity of pesticide use significantly influence Chilli Pepper production in the study area.

**Table 3: Determinants of input-output relationship of Chilli Pepper**

Variables	coef.	Std. Err.	t-value
Constant	7.155198	.0864884	82.73***
Quantity of seed	.0006063	.0001216	4.99***
Labour in man-days	.0006063	.0003206	2.06**
Quantity of fertilizer	.000257	.0000228	11.26***
Quantity of pesticide	.0000831	.0000422	1.97**
R <sup>2</sup> value	95.0%		
F value	34.7		0.000***

Source: Field Survey, 2022

\*\*\* significant at 1%, \*\* Significant at 5%

### Constraints to Chilli Pepper Production

The problems faced by Chilli Pepper farmers based on the level of how it affects them in the study area is presented in Table 4. The problems were ranked in order of importance. The major problem faced by the farmers was weed infestation as shown by all the respondents, the weeds tend to compete with the Chilli pepper for space, sunlight, air, water, mineral nutrients thereby reducing the quality and quantity of Chilli Pepper produced. Storage facilities was ranked second (98%), followed by transportation (86%), diseases (82%), followed by inputs (70%), marketing (46%), pests (36%) and lack of capital (26%).

**Table 4: Constraints in Chilli Pepper Production**

Constraints	Frequency	Percentages (%)	Rank
Weeds	50	100	1 <sup>st</sup>
Storage facilities	49	98	2 <sup>nd</sup>
Transportation	43	86	3 <sup>rd</sup>
Diseases	42	84	4 <sup>th</sup>
Inputs	35	70	5 <sup>th</sup>
Marketing	23	46	6 <sup>th</sup>
Pest	18	36	7 <sup>th</sup>
Lack of capital	13	26	8 <sup>th</sup>

Source: Field Survey, 2022

### CONCLUSIONS AND RECOMMENDATIONS

It was concluded that majority of the Chilli Pepper farmers were young and still in their active age. Majority had no access to improved seed. The production revealed that a unit increase in seed, labour, fertilizer and pesticide on Chilli Pepper farm will also lead to a relative increase in the quantity of Chilli Pepper produced. Despite the problems of weeds, pests, high cost of transportation and lack of storage facilities faced by the Chilli Pepper farmers, profitability analysis revealed that Chilli Pepper production was yet a profitable business. The following recommendations were made based on the findings of the study;

- i. Policy on disbursement should be designed by the Governments and to favour farmers so as to boost their morale to produce on large scale.



- ii. Extension agents should render adequate extension services to farmers especially in the method of weed/disease control.
- iii. Farmers should form cooperative unit for the purpose of self-help in terms of input acquisition and output
- iv. Farmers need to be taught new storage technology by extension agents so as to be able to reduce losses.
- v. Government should construct a good road to aid transportation of Chilli Pepper within and outside the state

### **REFERENCE**

- Abubakar, A. M. (2023). Chilli Pepper Farming Is Profiting. *Dailytrust newspaper*. Retrieved from <https://dailytrust.com/chilli-pepper-farming-is-profiting-farmers/#:~:text=The%20greater%20part%20of%20pepper,other%20countries%20of%20the%20world.>
- Agriculture Promotion Policy, (2016). *The Agriculture Promotion Policy (2016 – 2020) Building on the Successes of the ATA, Closing Key Gaps*. Retrieved from [https://nssp.ifpri.info/files/Nigeria-Agric-Sector-Policy-Roadmap\\_June-2020\\_Final.pdf](https://nssp.ifpri.info/files/Nigeria-Agric-Sector-Policy-Roadmap_June-2020_Final.pdf)
- Alabi, O. O. and Anekwe, C. E. (2023). Gender Differentials and Profitability Analysis of Pepper (Capsicum Species) Production, Kaduna State, Nigeria. *American International Journal of Agricultural Studies*, **7**(1): 1–9.
- Lawal, A. T., Gaya, A. Y., Alhassan, A., Sulei, I., Abdulwahab, F. S. and Umar, H. (2021). Marketing Analysis of Chilli Pepper in Kano State Markets, Nigeria. *Fudma Journal of Science*. **5**(4):38-43.
- MLS (2013). Ministry of Land and Survey. Office Memo File Vol 4 pp 55-58.
- NPC (2006). National Population Census for Nigeria. National Population Commission. Provisional Census Figures; Abuja, pp 20-21.
- Mohammed, B., Abdulsalam, Z. and Ahmed, B. (2015). Profitability in Chilli Pepper Production in Kaduna State, Nigeria. *British Journal of Applied Science & Technology*, **12**(3):1-9.
- Muhammad, M. U. and Danwawu, S. S. (2022). Cost and Returns Analysis of Small-Scale Date Palm Production in Jigawa State, Nigeria. Proceedings of the 56<sup>th</sup> Annual Conference of the Agricultural Society of Nigeria. Pp 19-25.
- Olugbenga, O. A., Ayoola, O. O. and Ibrahim, M. (2022). Economics of Scale and Technical Efficiency of Smallholder Pepper (Capsicum species) Production in Abuja, Nigeria. *Journal of Agricultural Sciences*, **67**(1):63-82.
- Tahir, A. D., Ghide, A. A., Ibrahim, U. S., Mohammed, A. G. and Abba, I. Y. (2021). Economic Analysis of Small-Scale Tomato Production in Jere Local Government Area of Borno State, Nigerai. *FOUYE Journal of Agriculture and Ecology*, **5**(2):21-28.
- VeggiEGrow (2023). Pepper farming: A complete guide on how to grow pepper. Retrieved from <https://veggiegrow.ng/pepper-farming-in-nigeria/>