Journal of Agriculture and Environment Vol. 15 No. 1, 2019: 1-6
ISSN: 1595-465X (Print) 2695-236X (Online)

PROFITABILITY ANALYSIS OF COWPEA IN FUNAKAYE LOCAL GOVERNMENT AREA OF GOMBE STATE, NIGERIA

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ABSTRACT

The study examined profitability of cowpea production in Funakaye Local Government Area of Gombe State. The primary data for the study were obtained using structured questionnaire administered to 38 sampled farmers in the study area. Descriptive statistics such as frequencies, percentages and multiple regressions were used to analyse the data. The results showed that the estimated gross margin, and returns on naira invested were ₦ 42,602 and ₦ 1.58 respectively. The result of the Double -log functional form revealed that the value of coefficient of determinant (R^2) was 0.67. The significant explanatory variables include quantities of seed (X1), agrochemicals (X2) and organic fertilizer (X5). The major constraints faced by the cowpea farmers include inadequate credit, poor road network, unfavourable climate and pest and diseases. It is recommended the three tiers of Government (Federal, State and Local) should assist the farmers with subsidised agrochemicals, seeds and capital in the form of loans in the study area.

Keywords: Profitability; cowpea; agrochemicals

INTRODUCTION

Food demand in Nigeria has been growing at the rate of 3.5% per annum while the production and population are growing at a rate of 2.9 % per annum respectively in recent years, thereby, creating a serious food deficit (Shaib *et al*., 1999 and Baiyegunhi *et al*., 2010). The quest for self-sufficiency in food production therefore remains paramount. The country has potentials for production of different cereals and legumes, cowpea inclusive. Cowpea (*Vigna unguiculata* Walp) is a very important crop which is grown in many parts of Nigeria. Cowpea has a protein content of about 23 % making it good source of plant protein to rural as well as the urban dwellers; it serves as a substitute for the animal protein. However, cowpea production is generally low as a result of factors such as diseases and pest, drought, insect pest and weeds (Gungula and Garjila, 2005). Nigeria is the largest producer and consumer of cowpea accounting for 61% of production in Africa and 58% worldwide (NAERLS, 2017). The crop can be harvested in three stages: while the pods are young and green, mature and green, and dry. NAERLS (2017) reported an average yield of 0.77 kg/ha from the vast area of 5 million hectares cultivated to cowpea in Nigeria. The average land holding is less than two hectares for most farmers; family labour remains the essential input.

Capital is a major limitation in agriculture, only few farmers have access to rural credit. It is largely produced and consumed throughout the state. Thus, adequate knowledge of its production problems such as fertiliser and seed requirement, cost of production and other constraints becomes imperative. The broad objective of the study is to assess the economics of cowpea production in the study area.

MATERIALS AND METHODS

Study Area

Funakaye is one of the 11 Local Government Areas in Gombe state. It is located on longitude 10°51'N and Latitude 11°26'E. The LGA has an estimated land area of 1,415 km^2 and a population of 2,364,284 (NPC, 2006). The population was projected to be 3,472,222 in 2018 at 3.25% annual growth. The Local Government Area has an estimated population of 315,884 at January 2019 according to the 2.6% annual growth rate of Nigeria. The state has unimodal rainfall distribution with total average annual rainfall of 880mm and a mean of 12 days per month (Oladimeji and Sani, 2017).

Sampling Technique

The study adopted a multistage sampling approach. The first stage involves the purposive selection of Funakaye LGA because cowpea is among the major crops cultivated in the area. The second stage involves simple random sampling of 38 farmers across 9 villages in the LGA. Data for the study were sourced through the use of structured questionnaire administered in the study sites.

Data Analysis

Data were analyzed using descriptive statistics such as frequency, percentages, farm budgeting and production function. Descriptive Statistics involving use of percentages was adopted to come up with results for cowpea farmers' constraints through the use of frequencies and percentages.

Gross Margin Analysis

This method gives an insight on an enterprise profitability using only total variable cost. It is used in instances where farmers do not use fixed items or the fixed cost are too small and hence considered negligible. It can be explicitly shown as follows;
GM = TR – TVC (Olukosi *et al.*, 2005).
Where;
GM = Gross Margin
TR = Total Revenue (Total output of Cowpea (Kg) X Unit price (₦/Kg)
TVC = Total Variable Costs (Cost of all variable items used such as seeds, labour, fertilizer, agrochemicals)
Other indicators of profitability used includes:

i. Returns on Naira Invested (ROI): This shows the amount recovered on every naira invested, in other words, it shows the recovery power of every naira invested. It is given by:

Gross Income/Total Variable Costs

ii. Operating Ratio (OR): This shows the relationship between total variable cost and total revenue; it shows the amount of revenue that pays the operating cost. It is given by:

Total Variable Cost/Gross Revenue

Production Function Model:

Production function model was used to examine the input-output relationship in cowpea production and it was given as:

$$y = a + b_1x_1 + b_2x_2 + ...+ b_nx_n + \varepsilon \quad \text{..... (1)}$$

Where y =dependent variable

$x_1 - x_n$ =independent variables

$b_1 - b_n$ =coefficients

a =constant term

ε =error term

The linear regression form is expressed as

$$Y = bo + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \varepsilon \quad \text{.....(2)}$$

The double log is given as:

$$LogY = Logbo + b_1Logx_1 + b_2Logx_2 + b_3Logx_3 + b_4Logx_4 + b_5 \log x_5 + \varepsilon$$

……..(4)

Where

Y = Output of Cowpea (Kg/Ha)

X_1 = Seeds (Kg)

X_2 = Agrochemicals (litres)

X_3 = Labour (Man days)

X_4 = Inorganic Fertilizer (kg)

X_5 = Organic Fertilizer (kg)

ε = Error disturbance term.

$B_0 - B_5$ = Parameters to be estimated and they show the existing relationship between the dependent variable (Y) and independent variables (X_1-X_5)

Log = Natural logarithm

RESULTS AND DISCUSSION

Costs and Returns Analysis of Cowpea Production

Table 1 indicated that 52% of the total cost of producing a hectare of cowpea was from labour while 22.9% of the total cost was incurred from purchase of inorganic fertilizer

and 2.4% of the total cost was spent on purchase of bags. The total variable costs incurred for producing a hectare of cowpea was ₦73, 022. The profit margin realized for producing a hectare of cowpea is ₦42, 602. Returns on investment for cowpea production are ₦1.58 indicating that each naira spent recovered that same amount.

Table 1: Summary of cost and returns of cowpea farmers

Inputs (₦/Ha)	Costs (₦/Ha)	Percent (%)
Seeds	3557	4.87
Inorganic Fertilizer	16686	22.85
Organic Fertilizer	6398	8.76
Labour	37978	52.01
Agrochemicals	6655	9.11
Costs of Bags	1747	2.39
Total Variable Cost (TVC)	73022	100.00
Total Output (Kg/Ha)	596	
Unit Price (₦/Kg)	194	
Gross Income	115624	
Gross Margin	42602	
Returns on Investment (ROI)	1.58	
Operating Ratio (OR)	0.63	

Source: Field survey data 2018

Result of Production Function Analysis of Cowpea

Results of the regression analysis of the factors that influence the quantity of cowpea produced by the farmers in the study area were presented in Table 2. The result shows that the estimated coefficient of determinations (R^2) indicates that the postulated regressors (i.e included variables in the model) explained 68 % in the variation of the regress and (i.e quantity of cowpea produced).

Table 2: Influence of inputs on quantity of cowpea produced in the study area

Variables	Coefficients	Standard Error	T-ratio	P
Constant	4.996	0.556	8.990	0.000^{***}
Seeds X_1	0.385	0.132	2.910	0.007^{***}
Agrochemicals X_2	0.752	0.148	5.070	0.000^{***}
Man days X_3	-0.207	0.194	-1.060	0.295^{NS}
Inorganic Fertilizer X_4	0.073	0.059	1.240	0.226^{NS}
Organic Fertilizer X_5	-0.090	0.041	-2.200	0.035^{**}

$R^2 = 0.6764$ R^2 (Adj) = 0.6259; Source: Field survey data, 2018

The Table further indicated that coefficients on seeds, agrochemicals and inorganic fertilizer were positive and hence increase the output by the prevailing values of their

coefficients. Coefficients of seeds were positive while Man days were found to be positive. This is in disagreement with Sani (2013). Agrochemicals were found to be significant while inorganic fertilizer showed negative indicating underutilization by the farmers. Coefficient for organic fertilizer was negative and implies a unit increase in the quantity of the input results to a decrease by the prevailing units of the coefficient. The value of organic fertilizer is both negative for the coefficient and the t-ratio and it implies that the variable is at its third stage of production process. Therefore, the quantity utilized for the input ought to decrease to target the optimal level.

Constraints of Cowpea Production

Constraints of cowpea production are presented in Table 3. The Table shows that inadequate capital ranked first as a constraint. This is closely followed by poor road network (2^{nd}) and unfavourable climate (3^{rd}), infestation of pests and diseases ranked fourth and inadequate cultivable farmlands ranked fifth as constraints limiting cowpea production in the study area. Other constraints include Distance to markets, high transport costs, no market for produce lack of certified seeds and rare extension visit.

Table 3: Distribution of respondents according to constraints

Constraints	Frequency	Percent	Ranking
Inadequate cultivable farmlands	23	60.53	5^{th}
Inadequate Capital	38	100.00	1^{st}
Rare Extension visits	3	7.89	10^{th}
Un-favourable Climate	26	68.42	3^{rd}
Lack of Certified seeds	5	13.16	9^{th}
Infestation of Pests and Diseases	24	63.16	4^{th}
High transport costs	19	50.00	7^{th}
Distance to markets	20	52.63	6^{th}
No market for produce	15	39.47	8^{th}
Poor road network	33	86.84	2^{nd}

Multiple Response; Source: Field Survey data, 2018

CONCLUSION

This study shows that cowpea production in the study area requires investment in capital, labour and agrochemicals. The study also indicated that optimum usage of labour and capital to purchase agrochemicals leads to profitable production of cowpea in the study area.

It is recommended that the three tiers of Government (Federal, State and Local) should assist the farmers with subsidized agrochemicals, quality seeds and capital in the form of loans in the study area.

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