

AJGA 2009149/6102

An Economic Analysis of Cowpea Production among Women Farmers in Askira/Uba Local Government Area Borno State Nigeria

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(Received December 30, 2009)

ABSTRACT: The study examined the economic analysis of cowpea production among women farmer in Askira/Uba Local Government Area, Borno State Nigeria. The specific objectives were to estimate; identify the socio - economic characteristic of the respondent, cost and returns associated with cowpea production estimate efficiency of resource use and estimate input - output relationship Random sampling technique was employed to select a total of (100) respondents. The data for the study were collected from primary sources by the use of structured questionnaires. Analytical tools such as descriptive statistics and regression analysis were used for the analysis of the data. The analysis revealed that majority of respondent were between the age group of 25 - 35 (26%), majority (48%) had formal education agric (43%) cultivated 2 hectares, also show that the coefficient of farm size was positively significant at (10%) hired labour was negatively significant at (10%), am the coefficient for mechanized labour was positively significant at (1%) leave respectively. Costs farm income and gross margin analysis per hectare for cowpea, production were ₦28,255.42, ₦75,032.26, ₦46,780.08 respectively. The resource use efficiency in cowpea production revealed that high cost of labor, lack capital and lack improved varieties of seed, were the problem affecting cowpea production in the study area. It was recommended that access to credit facilities for smooth running of the farming activities.

Keywords: Economic analysis; Cowpea; Women farmers; Borno State; Nigeria.

Introduction

Cowpea is gradually attaining economic importance in Nigeria, particularly the southern states of Nigeria, even though the bulk of the production is done in the semi arid zone of Nigeria (Petu-Ibikunle *et al* 2008). The appreciating economic importance made be due to it food value which made it a good supplement/complimentary, source of protein for animal source (meat, egg and fish). Cowpea contains 20 – 25% of protein and 64% carbohydrate. It therefore has a tremendous potential to contribute to the alleviation of malnutrition specifically amongst the poor.

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Protein shortage is a major feature in the diets of developing countries than shortage of calories (energy foods) this constitutes the problems of malnutrition and pronounced spread of human disease (Fleck, 1981). Nigeria being one of the developing countries of the sub Saharan Africa is producing protein food items to meet the nutritional need of the teeming population (Nworgu, 1997) according to the food and Agriculture organization (1983) 23% of the population of developing economic consumes 20% below the level of food intake required to sustain life among other activities. This is a problem which has which has persisted to date (FAO 2001, Okorie 2005).

From the 1970's Nigeria has witnessed a considerable decline in food production and a widening gap in the supply demand and brought about by a high population growth of about 3.5% per annum relative to food production growth of about 15% per annum. This problem is attributed to rapid urbanization, low per capital income, poor storage, inadequate transportation and marketing facilities as well as non- challent attitude to agriculture (FMA, (1984) GulatI 2000)

The estimated annual global cowpea grain production is estimated at 3 million (Singh et. al 1997). Approximately 64% of this grown in west and central Africa, which account for 80% of total production in Africa.

In Africa cowpea provides sources of income for women farmers who produce, make and sell snack foods from this nutritious legume.

In Nigeria the production trend of cowpea has experience d about a 44.1% increase in area planted and 41.% increase in yield from 1961 to 1995 (Ortiz 1998). According to Inaizume et.al (1999) several factors account for the impressive significant advances made by International Institution of Tropical Agriculture (IITA) over the last two decade in improving cowpea productivity in Sub - Saharan Africa. Singh et al 1994 also indicated that a number of varieties have been developed which combine diverse plant type, different maturity period, and resistance to several disease, insect pest and parasite as well as good agronomic traits .

Economically, cowpea has a great value in the internals trade in country because it promotes trade between the production area and non producing area. It also serves as a source of income for middlemen who embark on transportation from one place to another.

Statement of Problem

Cowpea becomes an important crop in the international market. It can be transformed into so many forms, in several dishes in many houses (Nayam Kpary J. 2001). It is also a significant source of vitamins. Despite its importance; there is still the insufficiency of the crop due to some problem, that hinder its productivity, such as abiotic, biotic, socio – economic, socio- cultural and political factors. The abiotic factors include erratic rainfall, high soil temperature, low soil fertility, the Biotic factors are insect pest, parasitic weed, disease induced by fungi, viruses and nematodes. The socio-economic factors: include farmers in capacity to produce, limited input and poor input delivery systems.

The socio-cultural factors are low acceptability of cowpea, low acceptance of new formulation of chemicals and improve post-harvest technologies. The political factors include negative or neglected position of the developing countries government to restore the problems associated with development of post-harvest systems.

This research was therefore carried out to determine the profitability as well as the problems affecting cowpea processing in Askira/Uba L.G.A of Borno State. This research is therefore designed to provide answers to the following questions:

- (i) What are the socio-economic characteristics that affect cowpea production?
- (ii) Are resource uses in cowpea production efficiently utilized?
- (iii) What is the relationship between input used and output obtained?

(iv) What are the constraints in cowpea production?

Objectives of the study

The main objective of this study is to examine the economic analysis of cowpea production among women farmers in Askira/Uba local government area of Borno State. The specific objectives are to,

- (i) Examine the socio-economic characteristics of cowpea producers
- (ii) Estimate the cost and return of the cowpea producers in the study area
- (iii) Estimate efficiency of resource-use in cowpea production
- (iv) To estimate the production relationship of output and for cowpea production in the study area.
- (v) Identify the problem of cowpea producers in the study area.

Methodology

The study is Askira/Uba Local Government Area of Borno State, local government is one of the twenty seven (27) local governments of Borno State of Nigeria. The local government was created in October, 1976 and is located in the northern part of Borno State in northern Nigeria, it lays between latitude 11° 15N and [longitude 11 30E with Askira town being the headquarters of the local government with 13 wards. It shares boundaries with Biu Local government in the west, Damboa Local Government Area in the north, Gombi Local Government (Adamawa State) in the south and Michika Local Government Area (Adamawa State) in the East

Askira/ Uba are situated in southern part of Borno state covering a land area of about three hundred and twenty-five thousand square kilometers (325,000 sq km). The area has an estimated population of 165,207 people (NPC, 2006) based on population growth rate (2008), The population has increased by 2.5% each year making a population of 177,598 people. About 80% of the people are farmers, thus farming is the major occupation of the population The area is cool and dry for most part of the year; the annual rainfall is between 550cm to about 680cm, the temperature are the major tribes in the area are Margi, Fulani, Bura, Chibok, and Higgi. The main occupation of the people in the area is farming. The major crops grown in the area [are sorghum, maize, rice groundnut, cowpea, tomato, cocoyam, sweet potatoes and bambaranut. The annual rainfall in this area ranges from 550cm to about 680cm.

Sampling Technique

Multi - stage technique was used to select twenty (20) respondent from each of the (5) wards selected out the 15 ward of the local government area making the total of one hundred 100 respondents. The wards are Wamdeo, Uvu, Tampul, Hussara, and Uba.

Data Collection

The data was obtained from both primary secondary sources. The primary data was collected with the aid of structured questionnaires administered to the respondent. The secondary information was obtained from textbook, internet, past project, Journal, etc.

Data were collected based on the socio-economic variables such as gender farming experiences educational status, household size, farming experience, farm size and income level of respondent, as well as cost and returns and problem encountered by the respondents.

Analytical Technique

The analytical tools that were used for this study include descriptive statistics, gross margin, and production function analysis. .

Descriptive Statistics

The descriptive statistics that used include percentage and frequencies. This was used to analyze the socio - economic characteristic of respondent as well as the problem association with cowpea production to achieve specific objectives (i) and (v).

Gross margin Analysis

Gross margin analysis was estimated from cost and returns in cowpea production. To achieve objective (ii) these determine the total variable costs of cowpea production. It is expressed as follows::

$$GM-TR-TVC$$

Where

GM = Gross margin N/ha
TR = Total Revenue N/ha ,
TVC = Total variable Cost N/Ha.

Production Function Analysis

Production function was used to determine the physical relationship between input and cowpea production to achieve objective (iii).

$$Y=F (X_1, X_2, X_3, X_4, X_5, \dots, u)$$

Y= Cowpea output (kg)
X₁= Quantity of seed (kg)
X₂ = Farm size (ha)
X₃ = Family Labour (Man-days)
X₄ = Hire Labour (Man- days)
X₅ = Fertilizer (kg)
X₆=Chemical (litres)
X₇ = Mechanized Labour (N)
U = error term

It was expected a priori that the coefficient of X₁, X₄, X₅, and X₆ Would be positive while the coefficients of X₂, X₃, and X₇ would be negative. The farmer's income in cowpea production will be high and their resource in cowpea production will be efficiently utilized.

Determining Economic Efficiency of Resource Use

The following ratio was used to estimate the relative efficiency of resource use
= $\frac{MVP}{\dots}$

MFC

where

MFC= Cost of unit of a particular resource

MVP= Value added to cowpea output due to the use of an addition unit of input i.e.

Decision Rule:

If $r = 1$ resource is efficiently utilized

$r > 1$ resource is under – utilized

$r < 1$ resource is over-utilized.

Where $MVP = MFC$ or r is not equal to (1), it suggest that resources are not efficiently utilized. Adjustment could, therefore be made in the quality of input used and costs in the production process to restore $r = 1$.

Determining Technical Efficiency of Resource use

The elasticity of production which is the percentage change in output as a ratio of a percentage change in input is used to calculate the rate of return to scale which is a measure of a firm's success in producing maximum.

Output from a set of input (Coeilli and Batesse, 1996).

$$EP = \frac{MPP}{APP}$$

Where

E_p = Elasticity of production

MPP= Marginal Physical Product

APP = Average physical product

IF $\sum EP = 1$: Constant return to scale

$\sum EP < 1$: decreasing return to scale

$\sum EP > 1$: Increasing return to scale

Results and Discussion

Socio-economic Characteristic of Respondent

The result in Table 1 shows that all the respondents engaged in cowpea production all females (as stated in the main objectives) the result also revealed that majority (26%) of the farmers are in the age range of 25-35 while only 6% were in the age group 17-24. which are in the age range of 25-23 while only 6% were in the age group of 17 -24. These within the age of 25- 35 year are still very strong for farming activities.

Table 1: Socio-economic Characteristic of Farmers

ECONOMIC VARIABLE	FREQUENCY	PERCENTAGE
Gender	100	100%
Female		
Age		
17-25	9	9%
26-35	26	26%
36-45	23	23%
46-65	18	18%
Total	100	100%
Marital Status		
Single	6	6%
Married	74	74%
Widow	20	20%
Total	100	100%
Educational Level		
Primary Education	16	16%
Secondary Education	48	48%
Tertiary Education	18	18%
Non-formal Education	18	18%
Total	100	100%
Years of farming Experience		
1-5	20	20%
6-10	23	23%
11-15	40	40%
16-20	17	17%
Total	100	100%
Source of finance		
Personal savings	55	55%
Credit	8	8%
Both	37	37%
Total	100	100
Farm Size		
1 (ha)	23	23%
2(ha)	43	43%
3 (ha)	16	16%
4 (ha)	10	10%
5 (ha)	8	8%
Total	100	100%
Type of Labour		
Family labour	34	34%
Hired	21	21%
Both	45	45%
Total	100	100%
House hold size		
1-5	25	2%
6-10	53	53%
16-20	6	6%
Total	100	100%

Source: Field Survey, 2009

The result revealed that majority of the respondent are married gave (74%) they are responsible for their family while the single engaged in other activities e.g. schooling and trading, this will stop them from paying much attention to their farming activities.

Education is major determinate in the in the nation. The level of formal education attained by an individual goes along way in shaping his personality, attitude to life and adoption of improved practice (Sullumbe 2004). The highest percentage (48%) of formal education (Secondary Education) indicate that the respondents have not acquired the required level of education to enable them acquire adequate knowledge about new innovations.

For farming experiences the result shows that majority (40%) of the farmer or respondent had farming experience of 11 - 15 while (17%) had farming experience of 16 -20. The result revealed that majority of the respondents (55%) use their personal savings to farm while only (8%) acquired credit from financial institute which means respondent in the study area have not enjoyed credit benefit from banks.

The result revealed that majority of the respondent (43%) cultivated 2 hectares, while only (8%) cultivated 5 hectares of land, this shows that majority of the cowpea producers in the study area are small scale farmers.

The result revealed that majority (45%) of the cowpea producer uses both family labour and hired labour for their production. This result shows that the respondent hired labour supplement farming labour.

The result revealed the majority (53%) have household of 6 - 10 persons. In traditional agriculture fanning is highly labour intensive therefore they must hired labour to supplement family labour .

Cost and Return Analysis

The cost incurred in cowpea production and the financial benefit derived from it was estimated using gross margin analysis (Table 2).

Table 2 . Cost and Return Analysis of Respondent

Variable		Cost(N) ha	Percentage
Cost of seed	(X ₁)	1256.20	4.45
Cost of land	(X ₂)	2374.04	8.4
Cost of family labour	(X ₃)	2,010.30	7.11
Cost of hired labour	(X ₄)	8,393.78	29.7
Cost of Fertilizer	(X ₅)	6,377.50	26.11
Cost of chemical	(X ₆)	3561.50	12.60
Cost of mechanized	(X ₇)	3282.60	11.60
Total variation cost		28,255.92	100
Total Revenue		750,32.26	

Source: field survey, 2008

$$GM = TR - TVC \text{ N}75,032.26 - \text{N}28,255.92$$

$$GM= \text{N}46,780.08$$

The result shows that cost of hired labour account for (29.7%) highest of the total cost in cowpea production with estimated cost of N8, 393.78per hectare. While cost of seed incurred less which accounted for (4.45%) of the total cost of cowpea production. The gross margin was 46,780.08 indicating that cowpea farming is profitable.

The result from Table 3 shows that farmers were not efficient in the utilization of all the source use as cowpea production is concerned in the study area. There was under utilization of variables such as seed, chemical, fertilizer and labour seed. It could be noted that the MVP of the variables used were not those resources within economically rational range. The total sum of the elasticity of production of the resources is 894.5. This suggested that there is increasing return to scale.

Table 3. Resources use efficiency in cowpea production.

	MVP	MFC	$\frac{MVP}{MFC}$	Elasticity of Production	Efficiency Gap	Divergence %
Cost seed	295.7	200	14785	456.671	95.7	3236
Cost of rented land	48613	4200	11574	112485	6613	15.74
Cost of family labour	470	350	5.8064	0.016	120	25.53
Cost of hired labour	917	500	1.834	82.380	417	83.4
Cost of fertilizer	4957.56	4500	1.102	2.521	457.56	9.2
Chemical	1767.72	1200	1.473	897.005	567.72	32.12
Cost of Mechanized	4251.22	3000	1.417	251.529	1251.22	29.43
Total				894.5		

Source: field survey: 2008

Different functional forms were tried for the analysis, this include linear, double log and exponential function. (Table 4) The choice of best function form (lead equation) were en based been on both statistical and economic Criteria (T-test, F- statistic, R²) and a priori expectation of the signs of the coefficients. Semi-log regression analysis was for the result of cowpea producers in study area.

In coefficient for farm size (ha) β_1 is significant at (10%) showing that output from farm is directly related to the farm size (ha) cultivated; This implies that abundant land is which lead to sustained output.

The coefficient for hire labour (man days) was insignificant at (10%) this suggests that labour is indirectly related to output. This confirms the need for hired labour by female farmers especially in traditional agriculture.

The coefficient for fertilizer (kg) was significant at (10%) and carries a positive sign showing that application of fertilizer increases yield. This is probably because fertilizer was applied at the appropriate time. Coefficient for mechanized labour was significant at (1%) showing that output responded well to the use of mechanization in the study area. According output because, at appropriate level of application each of the independent variable determine the output of cowpea.

Table 4. The Estimated Multiple Regression Analysis for Cowpea Production.

Variable	Estimated Parameter	Coefficient	Standard error	T Value	Significant
Constant	(X ₀)	-2113.299	14930.820	-142	.888
Cost of seed	(X ₁)	-456.671	1478.777	-309	.758
Cost of land	(X ₂)	112.671	61.993	1.814	.073**
Cost of Family Labour	(X ₃)	0.16	0.42	388	.699
Cost of hired Labour	(X ₄)	82.382	43.220	1.906	0.60
Cost of fertilizer	(X ₅)	2.521	.498	5.067	.000*
Cost of chemical	(X ₆)	8,976.005	643	002	998
Cost of mechanizes	(X ₇)	231.539	31.982	7.239	.000*
R ² = 792					
F statistic 50.043					
N	100				

Source: field survey, 2008

*Significant at 1%** = significant at 10% and Not significant Ns.

Problems Affecting Cowpea Producing Among Respondents

This section provides information about problems affecting cowpea production of the respondents. The problems include high temperature, disease, and pest, transportation, market outlet, inadequate capital, etc.

The table shows various problems affecting Cowpea production. The majority (80%) of the respondents had problem of inadequate capital or in access to credit. The need more funds to enable them produce more. Absence of formal credit institution in the study area tend to worsen the situation (46%) of the respondents reported that lack of market outlet reduce their production goal (34%) had transportation problems while conveying the products to the market after harvest, (30%) of the respondents reported management difficulties during the production period and storage (28%) complained of high temperature especially in storage while (20%) faced problem of pest and diseases. Losses start on the field during production circle and after harvest and resulting in the reduction of quality and quantity of cowpea.

Summary

The study examined the socio-economics of cowpea production among women farmers in Askira/Uba Local Government Area of Borno State, Nigeria.

The specific objectives were to examine the socio-economics characteristics of producers, estimate resources use efficiency and the cost and return of the cowpea producers, and identify the problems of cowpea producers to estimate the production, determine the resources used efficiently in cowpea production in the study areas. Random sampling technique was used in selecting a hundred (100) respondents within study area. Data was collected from 100 respondents selected using Random sampling procedure and analyzed using descriptive statistics production function model, gross margin

and resource use efficiency.

Table 5: Percentage Distribution of Problems Affecting Cowpea Producers

Problems	Percentage
Inadequate capital or access to Credit	80%
Market outlet	46%
Management difficulty	30%
Transportation	34%
High temperature	28%
Diseases and pest	20%
Total	238%

Multiple resources exists?
Source field Survey, 2009.

The study carried out on women farmers alone which constitute (100, majority 26%) of the farmers were between the age of 25-35, majority were married, and cultivated farm size of 2 hectares. They had farming experience (40%) of 11-15 years of ling Majority 48% had formal education, majority (55%) and used their personal savings.

Analysis of the result determined indicates that the coefficient for far size was positively significant at 10% level, hired labour was negatively significant at 10% level and the coefficient for mechanized was positively significant at 1% level.

The total variable cost per hectare for cowpea production was estimated at ₦128,255. 92, while total farm income was estimated at ₦75,032.26 and total gross margin was estimated at ₦ 146,780.08 respectively.

Lack of adequate capital, high temperature, disease and pest, transportation problem, market outlet and management difficulties were the major problems associated with cowpea production in the study area.

Conclusion

The study revealed that cowpea production is profitable and viable economic means of earning a livelihood. Production of cowpea in the study area would be increased through appropriate use of chemical, fertilizer and improved varieties of seed.

Efforts should also be geared towards providing solution to identified problems with a view to increase productivity thereby maximizing profits.

Recommendations

In order to increase production level of cowpea among farmers, the following recommendations are made:

1. **Access to credit facilities:** Due to high cost of investment of cowpea production, the need for adequate capital for smooth running of the enterprise cannot be over emphasized. It is recommended that formal credit facility should be provided by both the governmental and non-governmental organizations involved in funding agriculture to the target cowpea farmers via direct loan or banks loans with little bureaucracies.
2. **Extension Services:** farmers that are engaged in cowpea production should equally enjoy the

service of well trained extension workers in the study area, especially in management aspect, such as pest and disease control, the use of chemical and fertilizers, etc.

3. **Role of Research Institute:** agricultural research institutes should be tasked with the responsibility of supplying improved cowpea varieties at a subsidized rate on a commercial scale for farmers in the study area.
4. **Transportation:** suitable means of transportation should be provided enable other market outlets, outside the study area to the benefit of the farmer.
5. **Mechanization:** tractors for harrowing and ploughing should be provided to the farmers at the right time and at subsidized rates, to enable them carry out their farming activities such as: Land preparation, Chemical and Fertilizer application on their farm land.

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