Determinant of Profitability in Cowpea Production in Takum Local Government Area of Taraba State, Nigeria

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ABSTRACT The study determined the profitability level in cowpea production in Takum Local Government Area of Taraba state, Nigeria. The broad objective of the study was to determine the factors affecting farmer's profit in cowpea production in Takum local government area of Taraba state. A multi stage and purposive sampling procedure was used. The districts were divided into four according to the political zoning. Eight villages were purposively selected from each of the districts based on its importance in cowpea production. Ten farmers were randomly selected from each village using simple random. About 80 farmers were selected to form the sample size. Data collected were analyzed using descriptive statistics, profit function and the gross margin analysis. The profit function analysis revealed that the costs of hired labour and mechanized labour were statistically significant at 5% level of significance while the cost of fertilizer and the cost of rented land were statistically significant at 10% level significance. The negative coefficient shows that the costs of hired labour, mechanized labour and fertilizer were found to be inversely related to profit. The costs and returns analysis revealed that cowpea production in the study area is profitable venture, with the gross margin of ₦ 54,909.75/ha and return per man- day of ₦ 156.89 / ha. Pests and diseases were ranked the most important constraint followed by high cost of inputs, storage handling, transportation and soil infertility. It is recommended that the business of cowpea production should be encouraged since it is a profitable venture. Farmers should also be encouraged to form cooperatives to take advantages of the economies of scale to reduce cost and improve profit.

INTRODUCTION

Cowpea (*Vignaunquiculata*) is considered to be the most important staple food grain in the dry savannah of tropical Africa for both the rural and urban dwellers (Chege 2004). It is rich in quality protein and has content almost equivalent to that of cereal grains and it is a source of quality fodder for livestock and provide cash income (Langyintuo and Lowenberg 2006). However, the domestic production is in the hands of small scale farmers who obtain yield of 200-350kg/ha and in some cases zero yield due to lack of use of the improved technologies available (Singh and Jackai 1985). Similarly, Agboola (1979) reported an average yield of 271.5kg/ha from the vast area of 3.8 million hectares cultivated to cowpea in Nigeria. In addition, Singh and Jackai (1985) further submitted that with the use of improved technologies in cowpea production yield of 1,500-2,000kg/ha can be obtained on sole crops. Resource allocation and productivity is an important aspect of increased food production which is also associated with the management of the farmers who employ these resources in production. Furthermore, efficiency in the use of available resources is a major pivot for a profitable farm enterprise. Therefore, inefficiency in the use of resources, wrong choice of enterprise combination and cropping systems constitute the major constraints to increased food production in Nigeria (Okorji and Obiechina 1985).

Masson and Pattillo (2001) reported that cowpea is widely grown throughout the African countries, especially in the savannah zone of West Africa. They further pointed out that Nigeria and Niger produce about 86% of the world cowpea which is considered the most important food grain. The crop plays a significant role in the dietary of many homes in Nigeria and other developing countries in the world. Over 200 million people in Africa depend on cowpea as a source of food (Chege 2004).

Cowpea is considered the most important crop which is more commercialized in the third world countries. The production of cowpea in the recent years had been popularized in a bid to provide food for the teeming rural and urban populations. United State Agency for International Development (USAID) (2004) observed that continuous use of improved varieties is the only way to boost cowpea production in the region where it is produced in large quantity. Rahman and Lawal (2003) and Iheanacho et al. (2000) used production function analysis to estimate the profit level of cowpea production and found out that the enterprise is a profitable one.

Abubakar et al. (2005) observed that the cost of inputs used in agricultural production is high. They stressed that high cost of inputs serve as disincentive as it negatively affects producer's profit margin from marketable surplus as well as efficiency of resource use. Farmers' motive for increasing output is usually to maximize profit as well as to achieve food self-sufficiency. Inputs are purchased at least cost or output sold at higher price in addition to efficient use of productive resource (Iheanacho 2000). He further stated that farmer is not only expected to be efficient in production but to be responsive to market indicators as may be dictated by cost of inputs.

United State Department of Agriculture (USD) (2004) noted that cowpea is largely grown with direct labour in an intensive crop in most parts of the tropical world which has enhance low productivity due to high level of illiteracy, high cost of inputs, physical and biotic constraints is coupled with the use of primitive crude tools, such as hoe, cutlass, axes etc. these acts affect the agricultural transformation of cowpea. The broad objective of the study was to determine the factors affecting farmer's profit in cowpea production in Takum Local Government Area of Taraba State. The specific objectives are to:

(i)   examine the relationship between profit and costs of inputs used in production.
(ii) determine costs and returns associated with cowpea production and
(iii) examine the major constraints to cowpea production in the study area.

METHODOLOGY

The Study Area

Takum Local Government Area is one of the 16 Local Government Areas in Taraba State and is located in the southern part of the state. It is one of the major cowpea growing regions in Taraba state (TADP 2005). This study was based on farm level data on cowpea crop farmers in Takum local government area of Taraba state of Nigeria. Takum lies between latitude 6^0 30' and 8^0 30'N and longitude $9^0$10' and $11^0$10' East of the Greenwich meridian. Takum Local Government has a tropical climate of 20^0c to 32^0c (minimum and maximum daily temperature). The study area receives an average of annual rainfall of 1020 mm distributed over the four major

districts. A predominantly red loamy, lateral black and alluvial soil suitable for cultivation of cereal, root and fiber crops prevail in the study area.

Sampling Procedure

A multi stage and purposive sampling procedure was usedbecause the study area is divided into four districts (Takum,Chachanji, Rogo and Kashimbila). In the first stage the four districts were purposively selected based on its significant importance in cowpea production. In the second stage two villages were purposively selected because of its importance in cowpea production in the study area.In the third stage 10 farmers were randomly selected from each of the selected village using a simple random sampling technique. In all, 80 respondents formed the sample size. Data were collected with the aid of structured questionnaire to get information on input and output data of farmers for both production and costs analysis. The output data collected include the total value of the commonly grown cowpea obtained by adding cash receipt from selling farm product plus those consumed in the house hold while the input data include land area under cultivation (hectare), family and hired labour in man – days, quantity of fertilizer (kilogram), cost of planting materials and cost of simple farm tools. Data were also collected on socio – economic variables such as age, farming experience, educational level etc.

Method of Data Analysis

Descriptive statistics, budgetary techniques and profit function were used to analyze the data collected. The descriptive statistics used include percentage and ranking. That was used to analyze the major constraints facing the cowpea producers while the budgetary techniques using gross margin analysis formed the basis for profit determination, based on the proxy that fixed cost of production were negligible (Olukosi and Erhabo 1988; Iheanacho and Philip 2002). Profit function analysis was employed to examine the relationship between profit and costs of inputs used in the production. The model is expressed as follows:

$\prod^* = F (Px_i . U)$

Where

$\prod^* =$ Normalized profit of ith form, defined as gross revenue less variable costs.

Px_i = price of ith inputs (₦)
Px_1 = cost of cowpea seeds (₦)
Px_2 = cost of fertilizer (₦)
Px_3 = cost of hired labour (₦)
Px_4 = cost of rented land (₦)
Px_5 = cost of mechanized labour (₦)
U = error term

A budgetary technique was employed to determine the costs and return to cowpea production. The gross margin is expressed as follows:

GM = GR – TVC

Where

GM = gross margin
GR = gross revenue
TVC = total variable cost

The total variable costs comprised cost of cowpea seeds, fertilizer, empty sacks, hired labour, mechanized labour and rented land.

RESULTS AND DISCUSSION

Relation between Profit and Cost of Inputs Used in the Production of Cowpea

The relationship between profit and cost was explained with the profit function. The double log profit function was employed in the analysis of the relationship between farmer's profit and cost of inputs. The selection of the model was based on comparison of coefficient of multiple determinations (R^2), the *apriori* expectation and the statistical significant. The double function log had the best fit and was selected as the lead equation for the analysis of the relationship. The computed result for the relationship is presented in Table 1.

Table 1: Relationship between cost of inputs and profit of double – log profit function

Variable	Coefficient	Standard error	t-ratio
Cost of hired labour	-0.4471	0.1850	-2.417[**]
Cost of cowpea seed	0.0958	0.0840	1.140[Ns]
Cost of rented land	0.1444	0.0750	1.925[*]
Cost of fertilizer	-0.1281	0.0800	1.726[*]
Cost of mechanized labour	-0.2053	0.0690	2.975[**]
Constant	3.25	-	-
R^2	0.72	-	-
Adjusted R^2	0.68	-	-
F – ratio	21.65	-	-

Source: Field data 2011
[*] Significant at 10%
[**] Significant at 5%
Ns: Not Significant

The analysis of the results revealed that the cost of fertilizer and rented land were statistically significant at 10% level significance respectively while the cost of hired labour and mechanized labour were statistically significant at 5% level significance. This result is in agreement of Udoh (2006) who found out that cost of fertilizer and hired labour are statistically significant as far as cowpea production is concerned. The cost of cowpea seed was not statistically significant meaning that the cost of cowpea seed does not have any significant impact in profitability level of cowpea production in the study area. The results of the study clearly revealed that the coefficients such as cost of fertilizer, hired labour and mechanized labour were negative. The negative coefficient reveals that the cost of the inputs are inversely related to profit meaning that as the cost of fertilizer increased by 10% while the cost of hired labour and mechanized labour increased by 5% each farmers profit decreased by 0.78% (0.1281, 0.4471 and 0.2053%). This finding confirmed the finding of Dzemo et al. (2009) and Warning and Sadoulet (1998) who reported that the cost of inputs is inversely related to the profit.

Costs and Returns in Cowpea Production

The result from Table 2 revealed that the average variable cost per hectare for cowpea production during the cropping season was ₦145, 241.05. The total cost of labour incurred in the production of cowpea accounted about 46.78% of the total variable cost. The cost of cowpea seed planted accounted 32.77% of the total variable cost incurred in the production process. The cost of fertilizer and rented land accounted about 3.45% and 17% respectively. The cost of labour was high in cowpea production because of the high cost of ploughing involved in mechanized labour, due to shortage of able bodied men in the rural areas to supply the labour required. The cost of cowpea seed was high and accounted about 32.77% of the total variable cost. This could be attributed to the scarcity of cowpea seed during the planting season. The cost of fertilizer was low and accounted for 3.45% of the total variable cost because most of the farmers did not apply chemical fertilizer on their farm due to the belief that cowpea as a leguminous crop can provide natu-

ral nutrient for itself. They also belief that applying chemical fertilizer on the farm is like wasting the resources that the farmers could have used for other things. The cost of rented land was a little bit high and accounted 17% of the total variable cost. This could be attributed to inadequate productive land in the study area, which makes the cost of rented land high. The result of the finding clearly revealed that cowpea production in the study area is a profitable one. This result agreed with the findings of Abiola and Abiola (2010) and Mbene et al. (2000) who reported that cowpea production is a profitable venture.

Table 2: Estimated costs and returns per hectare of cowpea in Takum L.G.A

Cost and returns	Amount (₦)	Percentage (%)
Gross Revenue	200,150.80	
Variable inputs		
Cost of cowpea seed	46,500.55	32.77
Cost of labour	67,950.00	46.78
Cost of rented land	25,790.50	17.00
Cost of fertilizer	5,000.00	3.45
Total Variable Inputs	145,241.05	100.00
Gross margin /ha	54,909.75	-
Gross margin/ man-day	156.89	-

Source: Field data 2011

Constraints Facing Cowpea Producers in the Study Area

The analysis of this study reveals that cowpea production in the study area was faced with numerous problems. Some of the problems faced by the cowpea farmers include pests and disease, problem of storage and handling, high cost of inputs, soil infertility and transportation. The problem of pests and disease was ranked the most important constraint facing the respondents. The problem of pests and disease accounted for 70%, meaning that pests and diseases were the major problems that militate against cowpea production in the study area.This result is in consonance with the finding of Ricardo (1985) who reported pests and disease as one of the major problems militating against cowpea production. High cost of inputs was ranked the second most important problem of the respondents which accounted about 65%. Lack of storage and handling facilities was ranked third most important problem as revealed by 59% of the respondents (Table 3). Because of the delicate nature of cowpea, they are prone

to pest attack both on the field and in store which makes it difficult to store them satisfactorily.

Table 3: Major constraints facing respondents in order of magnitude

Major problems	Ranked order[*]	Percentage value[**]
Pests and diseases	1	70
High cost of inputs	2	65
Storage and holding	3	57
Transportation	4	53
Soil infertility	5	38

Source: Field data, 2011
[*] Ranked in descending order of magnitude
[**] Multiple responses existed hence exceeds 100%

The problem of transportation was ranked the fourth most important problem of the respondents which accounted for 53%. Meaning that transportation of cowpea seed to farm and harvested crop from farm gate to market was a major constraint to cowpea producers in the study area. The study also discovered that the high cost of transportation was as a result of the bad road nature.

Soil infertility was the fifth most important problems hampering the production of cowpea in the study area. The problem of soil infertility accounted about 38% of the problems facing the respondents. Cowpea is intolerant to many soil types, but requires sandy soil for proper production. Ricardo (1985) reported that cowpea thrive well on sandy soil.

CONCLUSION

The result of the gross margin and the profit function from the study reveals that cowpea production in the study area is a highly profitable enterprise. The result of the study also indicates that relationship exist between cost of inputs and farmers profitability. Findings from the study also revealed that farmers profitability can be improved if inputs are purchased at least cost or output sold at higher prices.

RECOMMENDATIONS

Based on the findings the researcher wish to recommend that:
- The tractor hiring units should be revitalized and made affordable to farmers at the appropriate time and price as this will aid in reducing the cost of hired labour.

- Farmers should form cooperative society to take the advantage of economies of scale in purchasing bulk inputs at a subsidized rate.
- Farmers should also ensure the use of improved varieties and mechanized labour as this will aid to boost cowpea production.
- Government should provide good road to places where cowpeas are produce in large quantity as this will help to reduce the cost of transporting inputs and outputs.

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