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Profitability Analysis of Sole Cowpea Production in Ganye Local Government Area of Adamawa State, Nigeria

Oaya, D. S.

Senior Lecturer, Department of Agricultural Extension and Management,
College of Agriculture Ganye, Adamawa State, Nigeria

Adebayo, E. F.

Professor, Department of Agricultural Economics and Extension,
Modibbo Adama University of Technology Yola, Adamawa State, Nigeria

Maurice, D.C.

Professor, Department of Agricultural Economics and Extension,
Modibbo Adama University of Technology Yola, Adamawa State, Nigeria

Tilson, T. K.

Senior Lecturer, Department of Agricultural Extension and Management,
College of Agriculture Ganye, Adamawa State, Nigeria

Abstract

The study analysed the Economics of Sole Cowpea Production in Ganye Local Government Area of Adamawa State, Nigeria. The study's specific objectives were to; describe respondents' the socio-economic characteristics, assess the profitability of sole cowpea production and identify the constraints to sole cowpea production in the study area. Multistage sampling technique was adopted to collect primary data at random from 120 respondents. The data were analysed using descriptive statistics and gross margin analysis. The results revealed that the majority (75%) of the farmers were young (20-49 years). Most of the farmers (77.50%) had one form of formal education or the other and were mostly male with farming experience of 5 years and above having cultivating an average of 1.76 hectares of farmland. Costs and returns analysis revealed an estimated average gross margin and net farm income per hectare of ₦326,970.12 and ₦306,050.12 respectively. The study also revealed that high incidence of pests and disease infestation, inability to access adequate credit facilities, and high cost of inputs. Key among the recommendations of the study is the need for the provision of adequate farmers training/education on cowpea production technologies, and also enhance access to credit facilities.

Keywords: Profitability, analysis, production and sole cowpea, Adamawa State

1. Introduction

Cowpea (*Vigna unguiculata (L.) Walp*) is a native of tropical Africa and is one of the most important legumes in the world. It is a legume that is extensively grown throughout sub-Saharan Africa (FAO, 2011). The crop has been playing a significant role in promoting nutrition and also enhancing income earning capacities of farmers (Usman *et al.* (2014). The crop is rich in protein (having about 23% content), hence, having the ability to cover a gap created by the inadequacy of animal protein in the diet of common people in Nigeria. The appreciating economic importance may be due to its food value which made it a good supplement/complimentary source of animal protein (Ya'aishe *et al.*, 2010).

According to the FAO (2017), about 81% of the global cowpea production is being produced in West Africa. Similarly, Nigeria is the leading producer of the crop in region contributing about 58.5% of the region's total production. Despite all these, cowpea production has not increased significantly to match the demand and its production has not been fully exploited by most Nigerian farmers. Stephen and Mshelia (2008) attributed to their production systems, use of limited resources, and local varieties. Agwu (2001) stated that cowpea produced in Nigeria is cultivated by small scale farmers who are resource-poor and obtained smaller output from their production. However, efficiency in the use of resources is a major pivot for a profitable farm enterprise.

Across Nigeria, the crop is mostly produced in Northern parts of the country. Adamawa State is among the leading producers of the commodity. However, studies have attributed the low production level of the crop the inefficiency in the use of resources by farmers (Omonona *et al.*, 2010). This study was aimed examining the profitability of sole cowpea production in Ganye Local Government Area of Adamawa State. The study's specific objectives were to;

- Describe sole cowpea farmers socio-economic characteristics;
- Estimate the profitability of sole cowpea production;
- Determine the constraints associated with sole cowpea production in the study area.

2. Methodology

This study was conducted in Ganye LGA of Adamawa State, Nigeria. Geographically, the area is situated between latitude 8° 45' and 8° 26'N and longitude 12° 09' and 12° 03'E, covering area of about 14,561,120 km². The area shares international boundary with Cameroun Republic to its South East border. Similarly, Toundo and Jada Local Government Areas are located in Southern parts, while Taraba State is to the West. The climate of the area is the tropical South-Humid type with marked dry and rainy seasons. The rainy season commences in April with the highest rainfall mostly being recorded in September. The area has a good rainfall pattern with some areas having as high as 1,400mm (Adebayo, 1999). And moderately hot temperature estimated at 28°C which is normally being experienced between March and April. The area is well noted for its agricultural potentiality which earned it the name food basket of Adamawa State due to the varieties of food and cash crops being cultivated and marketed in the area. Yam is one of the major cash crops that the area produced. The area is located within the Guinea Savannah vegetation belt and has rich agricultural land suitable for growing all types of crops, vegetables, fruits, cereals, cash crops such as sugarcane, cashew among others. Domestic animals such as cattle, goats, and sheep are also being reared to supplement the farmers'/marketers' income. It was estimated that about 300,000 heads of cattle and 400,000 sheep and goats are being reared as either solitary or through mixed farming (Adebayo, 1999).

3. Analytical Technique

The analytical tool used was descriptive statistics. The descriptive statistics included the use of mean, frequency distribution, and percentages in the analysis of socio-economic characteristics of the respondents, gross margin analysis, and problems associated with sole cowpea production in the area. The gross margin was used to estimate the cost and returns to Sole Cowpea Production. According to Adebayo (2005), the gross margin is the difference between gross income per hectare and total variable cost per hectare and is expressed as;

$$GM = GI - TVC \dots \dots \dots (1)$$

Where;

GM = gross margin from sole cowpea production (₦/ha)

GI = Gross income from sole cowpea production (₦/ha)

TVC = Total variable cost of Sole Cowpea Production (₦/ha)

Furthermore,

The Net farm Income was obtained as;

$$NFI = GM - TFC \dots \dots \dots (2)$$

Where;

NFI = Net farm Income from Cowpea (₦/ha)

TFC = Total fixed cost of cowpea production (₦/ha)

The average annual depreciation cost for all fixed inputs was calculated using the straight-line method of annual depreciation. The straight-line depreciation method assumes that an asset loses value at a constant rate (Olukosi and Erhabor, 1988).

4. Result and Discussion

The respondents' socio-economic characteristics are presented in Table 1. The Table indicates that the majority of the cowpea farmers (75%) are young and were within the age bracket of 20 – 49 years. The high percentage of respondents within 20 – 49 years means that their productivity is expected to be high since they are in their active age and expected to be energetic. The result also reveals that 80% of the respondents are male, while 20% are female. The analysis indicates that men participate more in cowpea farming than their female counterparts. The predominance of the male in cowpea production may be attributed to the fact that cowpea is a cash crop where returns on investment are high; hence, is a source of security to households. The majority of the respondents (63.33%) were married. The contribution of marital status to agricultural production can be explained in terms of the supply of agricultural family labour. Because large household size determines the availability of family labour for farm-work and increases production output and technical efficiency thus, eases hiring of labour (Usman and Bakari, 2013). 77.50% of the respondents had one form of formal education or the other, this is an indication that the majority of the farmers are literate and could be receptive to agricultural innovation. The majority of the farmers (98.33%) operated within a farm size ranging from 1-4 ha, with a mean farm size of 1.7ha. The result shows that most of the farmers are peasant farmers. The majority of the farmers (65.83%) have farming experience of more than five years. The mean farming experience is 9 years. This implies that the majority of the farmers have more knowledge for improvement in their production. This agreed with the findings of Shehu *et al.* (2010) who asserted that years of farming indicated an increase in the number of years of experience/knowledge in agricultural production, thereby reducing inefficiency. Findings of the study indicated that a large proportion (53.33%) inherited their farmlands. The majority using inherited land implies that it would lead to fragmentation of farmland as a result of sharing among siblings, hence reducing the size of farmland for agricultural productivity (Jirgi *et al.*, 2010). The majority of the respondents (73.33%) were not visited by the extension agent. The implication is that the level of efficiency of sole cowpea farmers might be static since the extension workers were not visiting them.

Variable	Frequency	Percentage
Age (Years)	18	15.00
20-29		
30-39	29	24.17
40-49	43	35.83
>49	30	25.00
Mean Age =41		
Sex		
Male	96	80.00
Female	24	20.00
Marital Status		
Single	38	31.7
Married	76	63.33
Divorced	02	1.67
Widowed	04	3.33
Educational Level		
No- Formal Education	27	22.50
Primary Education	18	15.00
Secondary Education	35	31.67
Tertiary Education	37	30.83
Farm Size (ha)		
<1-2	99	8.250
3-4	19	15.83
>4	02	1.67
Mean Farm Size =1.76		
Farming Experience		
1-5	41	34.17
6-10	40	33.33
11-15	20	16.67
>15	19	15.83
Land Acquisition		
Inheritance	64	53.33
Gift	05	4.17
Purchased	06	5.00
Rented leased	45	37.50

Table 1: Socio-Economic Characteristics of the Respondent (N=120)

Sources: Field Survey, 2018

4.1. Costs and Returns in Sole Cowpea Production

The Gross Income of the Farm was obtained by multiplying the total quantity of the output by the prevailing unit's price and measured in ₦/kg. Result in Table 2, shows that the total quantity of the output was estimated at 1,527.13kg/ha and the prevailing market price was estimated at ₦307.13/kg. The gross income of the farming enterprise was estimated at ₦469,027.44/ha, an indication that sole cowpea production is profitable.

The Gross Margin of the Farm was obtained by subtracting the total variable cost (TVC/ha) from the gross income /ha (GI - TVC). Table 2, reveals that the gross income GI was estimated at ₦469,027.44/ha and the total variable cost incurred during the production process was ₦142,057.32/ha, while the gross margin was ₦326,970.12/ha. This, therefore, shows that sole Cowpea production gives a higher margin /ha under existing technology.

The Net Farm Income of the Farm was obtained by subtracting the total cost (TC/ha) from the gross income /ha (GI - TC). Table 2 reveals that gross income (GI) was estimated at ₦469,027.44 and the total cost incurred during the production process was ₦162,977.32/ha, while the net farm income (NFI/ha) was ₦306,050.12. This implies that the return in sole cowpea production is high, indicating that the enterprise is profitable in the study area.

To estimate the Return on Investment, Gross Margin on Naira invested is obtained by dividing gross margin/ha by the total variable cost/ha. While the net farm income on naira invested is obtained by dividing the net farm income by the total cost. Table 2 reveals about ₦1.87k return on every one naira invested, from Net Farm Income/ha of ₦306,050.12 divided by the Total Cost of Production /ha of ₦162,977.32. This is an indication that sole Cowpea production guarantees a higher profit on naira invested.

Inputs	Cost	% of Total Cost
A. Variable cost		
Seed (kg)	10,505.00	6.45
Insecticide (Lt)	8,300.00	5.09
Transportation	6,788.75	4.17
Fertilizer (kg)	12,097.33	7.42
Labour (Man days)	84,505.58	51.85
Storage	5,340.83	3.28
Ploughing	14,520.83	8.91
Total variable Cost (TVC)/ha	142,057.32	87.17
B. Fixed Cost/ha		
Rent on Land	12,180.00	7.47
Farm tools	8,740.00	5.36
Total fixed cost (TFC)	20,920.00	12.83
Total cost (TVC + TFC)	162,977.32	100
C. Returns/ha		
Cowpea output (kg)	1,527.13	
Unit price of output (kg)	307.13	
Gross Income (GI)/ha	469,027.44	
Gross Margin (GM)/ha	326,970.12	
Net Farm Income (NFI)/ha	306,050.12	
ROI	1.87	

Table 2: Costs and Returns Analysis in Sole Cowpea Production/Ha
Source: Field Survey, 2018

4.2. Constraints to Sole Cowpea Production

The problems faced by sole cowpea farmers in the study area are reflected in Table 3. These challenges can also result in various levels of inefficiency. The result shows that the most severe challenges affecting sole cowpea production in the study area are pests and disease infestation, limited access to credit facilities, and high cost of inputs as revealed by the mean constraint of 1.55, 1.53, and 1.50. These problems are ranked 1st, 2nd, and 3rd respectively. The result disclosed that pests and diseases ranked first as one of the major problems faced by sole cowpea farmers in the study area. This is represented by a mean constraint of 1.55 indicating that pest and disease infestation is a severe challenge to cowpea production in the area. Damage by insect pest has a huge consequence on cowpea production if not controlled effectively. This corroborates the findings of Aboki and Yuguda (2013) who reported that the incidence of pests and diseases reduces the quality and quantity of crop both in field and store, thereby lowering the profitability of its production.

The Table also revealed that poor or limited access to credit facilities ranked second as a severe constraint faced by sole cowpea farmers in the study area and is represented by a mean constraint of 1.53. The inadequate credit facilities maybe one of the reasons why farmers could not afford to use modern farm inputs such as high-yielding varieties of seed and improve farm practices such as irrigation and farm management practice. It also implies that farmers would not be able to expand their agricultural activities to change from subsistence farming to large-scale farming. This agrees with the findings of Onu (2015) who reported that inadequate financial capital could impede the performance of farming activities and also affect the use of some agricultural inputs to high productivity. In the same vein, indicated that high cost of inputs as a severe challenge facing the farmers in the study area and is represented by a mean constraint of 1.50. The high cost of agricultural inputs will increase the cost of production thereby affecting producers' profit margin. This is in line with the findings of Onu (2015) who reported that the high cost of farm inputs serves as a disincentive, as it negatively affects producers' profit margin from marketing surplus. Table 3 revealed poor produce price as another constraint faced by cowpea farmers in the area. This is represented by a mean constraint of 1.30 indicating that even though poor produce price is a constraint to the farmers, it is not among the most severe challenges they faced. This implies that farmers are not enjoying remunerative prices for their produce which should in turn enhance their production. Low produce price will result in the low return or gain from the production because the selling price is often lower than the production price.

Poor access to storage facilities was also identified as one of the problems faced by sole cowpea farmers in the study area and is represented by a mean constraint of 1.28. This could be attributed to the reason why farmers dispose of most of their farm produce at the farm gate at a cheaper price immediately after harvest. Most farmers could not wait for the offseason to sell their produce when prices are expected to appreciate because of poor storage facilities. This agreed with the findings of Stephen and Mshelia (2008) who reported poor storage facilities associated with low production of cowpea in the north-eastern part of Adamawa State, Nigeria.

Inadequate farmland was also identified as a constraint to cowpea production in the area. It is represented by a mean constraint of 1.23. The land tenure system may also be a reason why the farm size of cowpea farmers is small. Although the country is endowed with agricultural land, the right of ownership of the land and ethnic boundaries makes it hard for farmers to easily acquire land for an agricultural purpose outside their cultural location. This is in line with the findings of Adebayo and Onu (1999) who reported that fragmented small landholdings also deny the farmers benefits of scale economies and this affects the productivity and efficiency of the production. Lack of improved cowpea varieties was also identified as constraints to cowpea production and accounted for a mean constraint of about 1.18. Inputs such as

improved seed varieties should be made available to the farmer so as to increase cowpea yield and reduce technical inefficiency. The local variety is susceptible to pest infestation and causes great losses to farmers.

Production Constraints	Yes		No		Mean	Remarks
	Frequency	%	Frequency	%		
Pests and disease infestation	66	55	54	45	1.55	Severe
High cost of input	60	50	60	50	1.50	Severe
Poor produce price	36	30	84	70	1.30	Not Severe
Inadequate farm land	27	22.5	93	77.5	1.23	Not Severe
Limited access to credit facilities	63	52.5	57	47.5	1.53	Severe
Poor access to storage facilities	33	27.5	87	72.5	1.28	Not Severe
Lack of improve varieties	22	18.33	98	81.67	1.18	Not Severe

Table 3: Constraints Associated with Sole Cowpea Production

Source: Field Survey, 2018

Cut-Off Mean = 1.50

5. Conclusion

This study established that cowpea farming is a profitable venture Ganye Local Government Area of Adamawa State with a return on investment of ₦1.87 for every naira invested. However, this venture is being constrained by some factors, notably; high infestation of pests and disease, inability to access credit facilities, and the high cost of inputs. Hence, the study recommended that need for the provision of adequate farmers training/education on cowpea production technologies, and also enhance access to credit facilities.

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