

Comparative Profit Analysis of Dry and Rainy Season Okra (Abelmoschus Esculentus) Production among Women in Ayamelum Local Government Area of Anambra State, Nigeria

Nwalieji, H.U., Okeke, M. N. and Uzuegbunam, C.O.

Department of Agricultural Economics and Extension, Anambra State University, Igbariam campus, Anambra State, Nigeria

Abstract: *The study determined profitability of dry and rainy season okra production among women in Ayamelum local government area of Anambra State, Nigeria. Purposive sampling technique was used to select a total of 100 respondents. An interview schedule was used to collect data, while mean and gross margin (GM) analyses were used for data analysis. Results of the findings showed that okra production had various potentials such as less capital for establishment, low cost of production, quick cash return, high frequency of harvest, high land utilization, can thrive well in varieties of soil among others. The GM analysis for okra production per 0.5 hectare of the farmers during 2013 rainy and dry season cropping showed profit margins of ₦ 62,250 and ₦ 74,450; 107.8% and 134.0% for percentage margins; and 2.08 and 2.34 benefit cost ratios, respectively. These imply that okra production in both seasons is profitable but more in dry season. Serious problems identified included: difficulty in harvesting, poor storage facility, poor extension services and poor access to credit among others. It was recommended that improved packages for okra production, harvesting, processing and marketing be introduced to farmers through extension services in order to increase productivity and income.*

Keywords: *Anambra State, Nigeria, okra production, profitability, women farmers*

I. Introduction

Okra (*Abelmoschus esculentus*) is a flowering plant in the mallow family. It is valued for its edible green pods. The economic importance of okra cannot be overemphasized. According to Uzowuru (2010) [1], all parts of the okra plant are useful, its leaves and tender shoots which are equally rich in nutrients can be cooked and eaten. The pods are either consumed in fresh or dried form. The edible portions of the pod are good sources of protein as well as an ascorbic acid content of 20g\100g and high level of calcium, fiber ash; and mature seeds contain about 21% of edible oil (Uguru, 2011) [2]. Okra is also a potential oil and protein crop which also has an exporting value. It contains carbohydrate, protein and vitamin C in large quantities and the essential and non-essential amino acid it contains are comparable to that of soyabean (Adeboye and Oputa, 1996) [3]. Hence it plays a vital role in human diet. It commands a high market price in Nigeria markets because it features daily in the diet of most Nigeria.

However okra's potential for research and contribution to enhanced livelihoods according to National Academies Press (NAP, 2006) [4] included the following criteria: Food and nutritional security- Pods contain high amounts of dietary fiber and they are often dried, stored, and consumed as soup/souse much like a staple food; market/income security- because it can easily be dried, mould (powder) and stored for long periods (unlike perishable vegetables), producers, and processors are better able to add value and take advantage of seasonal fluctuations in price; and other industrial uses.

Okra is a potential oil and protein crop which also has an exporting value. All parts of the okra plant are useful, its leaves and tender shoots which are equally rich in nutrients can be cooked and eaten. The pods are either consumed in fresh and dried form. The edible portions of the pod are good sources of protein as well as ascorbic acid content of 20g/100g and high level of calcium, fiber, ash, mature seeds contain about 21% of edible oil (Uzowuru, 2010) [1]. Immature okra pods are commonly consumed as a vegetable. In addition, okra has attributes that could permit it to be used for other purposes. Leaves, buds, and flowers are edible; dried seeds could provide oil, protein, vegetable curd, and a coffee additive or substitute (Adeboye, Awokoya and Oluseyi, 2009) [5].

In Nigeria, there are two distinct seasons for okra production, the peak and the lean seasons. During the lean (dry) season, okra fruit are produced in low quantities, scarce and expensive to get. In the peak (peak) season, it is produced in large quantities much more than what the local populace can consume (Farinde, Owolarafe and Ogungbemi, 2009) [6]. Alimi (2005) [7] in his study of economics of mono cropping okra under tropical conditions during the rainy and dry seasons found that the highest ranked constraints to okra production were low output prices and high perishability in the rainy season and moisture stress and scarcity of cultivable farmland in the dry season.

Okra production is one of the major primary sources of cash income for farmers especially women in Ayamelum local government area of Anambra State, Nigeria. The women engage in production of various crops such as rice, plantain/banana, okra, maize and cassava. However, these women are highly involved in both dry and rainy season okra production. The question now is: What potentials do okra production has and how profitable is it? What problems militate against its production in the study area? The possible answers are what this research seeks to provide.

II. Objective Of The Study

The main objective of the study was to determine profitability of dry and rainy season okra production among women in Ayamelum local government area of Anambra State, Nigeria. Specifically the study was designed to:

1. examine potentials of okra production;
2. compare cost and return of okra production of the farmers in dry and rainy seasons; and
3. identify problems of okra production in the study area.

III. Methodology

3.1 The study area

The study was carried out in Ayamelum Local Government Area of Anambra State which is located in the South-East region of Nigeria between longitude $6^{\circ} 36'E$ and $7^{\circ} 21'E$ and latitude $5^{\circ} 38'N$ and $6^{\circ} 47'N$. Ayamelum LGA is made up of eight communities (towns) and these include Omor, Anaku, Umerum, Umumbo, Igbakwu, Ifite-Ogwari, Umueje, and Omasi. It covers an area of 650 km² with a total population of 158, 152 (NPC, 2006) [8]. It is one of the major food baskets of the state, hence larger percentage of the people are predominantly farmers and depend solely on agriculture for livelihood. The climate is characterized by two distinct seasons (rainy and dry seasons). The soil types of the area are suitable for varieties of crop production. The mean annual rainfall is between 1,500mm to 1,600mm and is distributed through April to October every year. There is existence of natural spring water in some part of the area that serve as source of irrigation for okra and vegetable production during dry season. The main stocks in the farming system of the local government are crops and fisheries. Off – farm activities like processing and marketing are also vital components.

3.2 Population and sampling procedure

The population of the study comprised all okra farmers in the eight communities of Ayamelum LGA of Anambra State. Out of this, five (5) communities were purposively selected due to their high level of okra production. These communities include Omor, Ifite-Ogwari, Anaku, Umumbo and Omasi. Twenty (20) women okra farmers who engaged in both rainy and dry seasons farming for 2013 cropping season were purposively selected from each community. This gave a total sample of hundred (100) respondents. An interview schedule was used to collect data for the study.

3.3 Measurement of variables

The information on potentials of okra production was achieved by asking the respondents to indicate on a 4-point-Likert type scale, their perception of the potential of okra production. Their response categories and the corresponding weighted values were: strongly agree (SA) = 4; agree (A) = 3; disagree (D) = 2; and strongly disagree (SD) = 1. These values were added to obtain a value of 10 which was divided by 4 to get a mean score of 2.5. The respondents mean was obtained on each of the items. Any mean score (M) ≥ 2.5 was regarded as having high potential; while any mean score (M) < 2.5 was regarded as low potential.

The cost and return of 0.5 hectare of okra production of the farmers for 2013 rainy and dry season production were obtained for profitability realization. To achieve this, the average operating input and labour cost; and revenue per 0.5 hectare of okra production of the farmers, were ascertained for computation. The operating input and labour costs were measured as follows: planting materials (okra seeds in milk cup); rent on land (1 plot = 8 chains = 0.5 hectares); land clearing (in chain/man-day); herbicide (in litre); fertilizers (in kg/bag); insecticide (in litre); sowing (in chain/man-day); manual weeding (in chain/man-day); labour on agro-chemical application (man-day/ plot); feeding of labour (number); harvesting (plucking) (man-day); and handling & transportation (number of okra baskets harvested). The revenue per 0.5 hectare was measured in number of 60kg local baskets of fresh okra pods harvested in every native week (4 market day's interval) for 1.5 months and 1.25 months period of harvest in rainy and dry seasons, respectively. The gross margin (GM)/net profit (NP) was calculated as the total revenue (TR) less total variable cost (TVC). Also, benefit/cost ratio (BCR) or return on investment (RI) which is the return the okra farmers are getting from their investment in okra production enterprise was computed as the ratio of the total revenue (TR) or GM to the total variable cost (TVC). Benefit/cost ratio (BCR) was computed as: TR/TVC

The problems militating against okra production in the study area were identified. To fulfill this, the respondents were asked to indicate on a 3-point Likert type scale, how serious by which each of the various problems militates against okra production. Their response categories were: very serious (VS) = 3; serious (S) = 2; and not serious (NS) = 1. These values were added to obtain a value of 6 which was divided by 3 to get a mean score (M) of 2.0. The respondents mean were obtained on each of the items. Any mean score (M) \geq 2.0 was regarded as very serious problem affecting okra production; while any mean score (M) $<$ 2.0 was regarded as not serious problem.

3.4 Data analysis

Objectives 1 and 3 were achieved using mean, while objective 2 was analyzed using Gross Margin (GM) analysis.

IV. Results And Discussion

4.1 Farmers’ perception of potentials of okra production

Table 1 shows that the respondents strongly agreed that okra production had various potentials. These included less capital for establishment (M=3.80), low cost of production (M= 3.68), less managerial skills and ability (M= 3.26), quick cash return and turnover (M= 3.60), high frequency of harvest (M= 4.00), high demand by outsiders for industrial usage (M= 3.00), low risk management (M= 3.46), more predictable and assurance of yield (M= 3.26), less labour intensive (M= 2.92), high land utilization because of intercrop (M= 3.76), can be double cropped both rainy and dry season without irrigation (M= 2.98), can thrive well in varieties of soil (M= 2.72), more drought tolerance (M= 2.98) and low incidence of crop failure (M= 3.04). Only low incidence of pest, diseases and rodent; and less affected by climate change with low weighted mean (M) of 1.48 and 1.94 respectively were strongly disagreed as potential of okra production. This implies that okra has great and vast potentials. Also the implication of the finding is that farmers may divert or shift to the production of okra with more favourable potentials. Alabi and Esobhawan (2006) [9] in their study on relative economic value of maize - okra intercrops in rainforest zone, Nigeria reveal that Land Equivalent Ratio (LER) was 0.82. This means that 82% of the yield on intercrops is monocrops. In other words, the farmers will be using 82% of the land in intercrops of maize or okra to produce the same quantity of maize and okra if they are planted singly.

Table 1: Mean distribution of respondents according to their perception of the potential of okra production

Potential	Mean (M)
Requires less capital for establishment	3.80*
Low cost of production	3.68*
Less managerial skills and ability	3.26*
Quick cash return and turnover	3.60*
High frequency of harvest	4.00*
High demand by outsiders for industrial usage	3.00*
Low risk management	3.46*
Yield are more predictable and assured	3.26*
Low incidence of pest, diseases and rodent	1.48
Less affected by climate change	1.94
Less labour intensive	2.92*
High land utilization because of intercrop	3.76*
Can be double cropped, both rainy and dry season without irrigation	2.98*
Can thrive well in varieties of soil	2.72*
More drought tolerance	2.98*
Low incidence of crop failure	3.04*

Source: Survey, 2014 *= M \geq 2.5 = high potential

4.2 Cost and return of 0.5 hectare of okra production for 2013 planting season

To realize profitability of okra production, a specific unit of land (0.5 hectare) was used to compute cost and return of okra production of the farmers in both rainy and dry seasons for 2013 cropping season. The variables considered and used for comparison in both rainy and dry season okra production were variable cost, yield, revenue, gross margin and benefit-cost ratio (BCR).

4.2.1 .Variable cost

Table 2 clearly reveals that the total mean variable cost for okra production per 0.5 hectare of the farmers during rainy season cropping was ₦ 57,750 while that of dry season was ₦ 55,550. This implies that the cost incurred by farmers in okra production in 0.5 hectare during rainy season cropping is slightly higher than that of dry season. The findings also indicate that the total variable costs of okra production in both cropping seasons are generally low and this may be one of the reasons for engaging in the enterprise. This is in agreement with the earlier observation of this study that okra production requires low capital for start-off or establishment.

4.2.2 Revenue/yield

Data in Table 2 show that total mean revenue per 0.5 hectare of okra production of the farmers during rainy and dry seasons were ₦ 120,000 and ₦ 130,000, respectively. The total revenue of okra was got from the sale of an average 30 number of 60kg-size raffia baskets at the average price of ₦ 5,000 per basket during rainy season for 12 native weeks (4 market days = 1 native week), while sale of an average 20 number of 60kg-size raffia baskets at the average price of ₦ 6,500 per basket during dry season for 8 native weeks. The figures indicate that the revenue generated from okra production during dry season is higher than that obtained during rainy season, although higher yield is obtained during rainy season. This implies that okra production attracts high income in both season but higher in dry season. The findings are in line with Bamire and Oke (2003) [10] which observed that okra yield was higher during the rainy season, while higher total revenue was obtained under dry season conditions.

4.2.3 Gross margin, percentage margin and benefit/cost ratio (BCR)

As a result of the total variable cost-total revenue interactions in Table 2, the outcome shows a profit margin of ₦ 62,250 and ₦ 74,450 for okra production during rainy and dry seasons, respectively; while the percentage margin for okra production during rainy and dry seasons was 107.8% and 134.0%, respectively. Also further analysis in the same table indicates that benefit/cost ratio (BCR) per 0.5ha of okra production were 2.08 and 2.34 for rainy and dry seasons, respectively. This means that for every Naira invested in okra production during rainy season, the farmer realizes ₦ 2.08, while farmer realizes ₦ 2.34 during dry season. This implies that okra production during dry season is more cost effective than during rainy season, although both seasons compared are lucrative and profitable. It is concluded that okra production in both seasons is profitable but more in dry season, hence the reasons for engaging in the production as it can serve as an additional source of revenue for households in the area.

This is in agreement with Alimi (2005) which observed that monocropped okra production was profitable in both seasons, but profits were higher in the dry season. Also, in line with this, Edet and Etim (2010) [11] indicated from profit analysis carried out that okra production is profitable with an average profit of N35, 781.7 per hectare; and commends a high market price in Nigeria markets because it features daily in the diets of most Nigerians.

Table 2: Average variable cost and returns per 0.5 hectare of okra production for 2013 rainy and dry season cropping

Operation/Item	Unit	Rainy Season			Dry Season		
		Qty	Unit price ₦	Total Value ₦	Qty	Unit price ₦	Total Value ₦
Planting materials	Milk cup	35	150	5250	35	150	5250
Rent on land	plot	1	2000	2000	1	2000	2000
Land clearing	chain	8	800	6400	8	800	6400
Herbicide (round – up)	litre	3	850	2550	3	800	2400
Fertilizer (Urea)	kg/bag	1	5500	5500	1	5500	5500
Insecticide	litre	1	1000	1000	1	1000	1000
Sowing	man-day	3	1000	3000	3	1000	3000
Manual/chemical weeding	man-day	2	1000	2000	2	1000	2000
Cost of agro-chemical application	times	4	500	2000	4	500	2000
Feeding of labour	man-day	30	100	3000	30	100	3000
Harvesting (plucking)	man-day	12	2000	24000	10	2000	20000
Handling & transportation	60kg basket	24	150	3600	20	150	3000
Total variable cost/ 0.5ha				57750			55550
Total revenue per 0.5 hectare	60kg basket	24	5000	120000	20	6500	130000
Gross margin/ 0.5ha				62250			74450
Percentage margin (%)				107.8			134.0
BCR (TR/TVC)				2.08			2.34

Source: Survey, 2014

4.3 Problems militating against okra production

Table 3 shows the mean distribution of identified problems that militate against okra production in the study area. The data reveal that difficulty in harvesting (M= 2.44), poor storage facility (M= 2.44), poor extension service (M= 2.40), poor access to credit (M= 2.38), rodent, pest and disease infestation (M= 2.30), insufficient land (M= 2.28), difficult in transportation due to poor feeder road (M= 2.28), post-harvest losses due to perishable nature of the produce (M= 2.24) and price fluctuation of produce (M= 2.00) were very serious problems militating against okra production in the study area. The problems with low mean scores such as high cost of farm input (M= 1.72), low productivity (M= 1.72) inadequate fund for start-off (M= 1.66), inadequate improved seeds for planting (M=1.66), difficulty in marketing (M=1.58) and high cost of production (M= 1.52)

were regarded as not serious problems. This implies that okra production in the study area is faced with some serious problems and challenges.

The findings are in line with Edet and Etim (2010) [11] who identified insect and disease attack, bad roads, lack of storage facilities, lack of improved varieties of seeds, insufficient capital, lack of extension agents' visit and lack of government assistant as major constraints that affect okra production. The findings imply that extension services, credit facilities, mechanized method of harvesting and others are not enjoyed by the okra farmers in the study area. The implication of this according to Farinde, Owolarafe and Ogungbemi (2009) [5] is that production of okra will always remain stagnant and will not be improved, since improved methods and practices taught by extension will not get to the farmers thereby not having access to improved technologies involved in production, processing and preservation of okra, and this may cause them to continue production at small-scale level. However, problems of okra production in Nigeria are insect pest infestations, disease incidence and poor soil nutrient level (Olawuyi et al., 2010) [12].

Table 3: Mean distribution of identified problems militating against okra production in the study area

Problem	Mean (M)	SD
Difficulty in harvesting	2.44*	0.675
Poor storage facility	2.44*	0.705
Poor extension contact	2.40*	0.700
Poor access to credit facility	2.38*	0.753
High rodent, pest and disease infestation	2.30*	0.789
Insufficient land	2.28*	0.730
Difficult in transportation due to poor feeder road	2.28*	0.757
Post-harvest loses due to perishable nature of the produce	2.24*	0.744
Price fluctuation of produce	2.00*	0.820
High cost of farm input	1.72	0.809
Low productivity	1.72	0.784
Inadequate fund for start-off	1.66	0.772
Inadequate improved seed for planting	1.66	0.772
Difficulty in marketing	1.58	0.731
High cost of production	1.52	0.707

Source: Survey, 2014; *= $M \geq 2.0$ = serious problem

V. Conclusion

Farmers especially women highly engaged in both rainy and dry season okra production enterprises as major source of income more than other crops because of its lucrative nature and various potentials such as less capital for establishment, low cost of production, less managerial skills and ability, quick cash return and turnover, high frequency of harvest, high demand by outsiders for industrial usage, high land utilization because of intercrop, can be double cropped both rainy and dry season without irrigation, can thrive well in varieties of soil, more drought tolerance and low incidence of crop failure among others. Also, the results of gross margin (GM) analysis for okra production per 0.5 hectare of the farmers during 2013 rainy and dry season cropping showed that okra production in both seasons is profitable and lucrative but more in dry season. However, rodent, pest and disease infestation, difficulty in harvesting, poor storage facility, poor extension service, poor access to credit and insufficient land among others were serious problems or challenges of okra production identified in the study area.

It is recommended that efforts be geared toward making okra production more viable and lucrative in the study area. This could be done by educating women farmers on how to increase their productivity, income and sales through extension services. Here improved packages for okra production, harvesting, processing and marketing should be introduced and farmers would be encouraged to embrace and adopt them for improvement and commercialization. Also massive dry season okra production should be intensified through provision of low-cost irrigation facilities to women okra farmers in order to increase production and income. There is also the need for women to have good access to loan facilities with low interest rate in order to motivate them into practicing commercialized okra farming. This should be made available to them by stakeholders such as governments, CBN, donor agencies, etc. through formation of viable co-operatives.

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