Original Research Article

The Profitability Analysis and Perceived Constraints of Farmers in Pineapple Production in Edo State, Nigeria

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ABSTRACT

This study examined the profitability and farmers' perceived constraints in pineapple production in Edo State, Nigeria. Structured questionnaire and interview schedules were used to collect data from 175 pineapple farmers who were selected through a multi-stage sampling technique during the 2012/2013 cropping season. The data were analyzed using simple descriptive statistics and gross margin analysis. The results indicated that 76% of the farmers were males, aged 50 years on average, were mostly married (95%) with a mean household size of 7 people and engaged full time in agricultural production. The respondents were fairly educated with 86% of them having attained some form of formal schooling and only 21.6% being members of cooperative societies. The average period of experience in pineapple farming was 12 years with 59% of the respondents having no contact with the extension agents. The gross margin analysis revealed that pineapple production was a profitable venture in the study area with total variable cost and gross revenue of ₦167,121.00 and ₦772,854.00 respectively resulting in a gross margin of ₦605,733.00 per hectare. However, a number of constraints, such as inadequate credit facilities, weather and disease, poor network of roads, high transportation cost, lack of land & herbicides and poor extension services were perceived by farmers to hinder pineapple production in the study area. If addressed, these constraints will lead to an increase in the productivity of pineapple not only in the study area, but also in Nigeria in general, by contributing to the wellbeing of farmers as well as their disposable income.

Keywords: Gross Margin, Pineapple Production, Production Constraints, Profitability

1. INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Fruit production forms a substantial percentage, of about 25%, of the major food crops cultivated in the tropics and therefore, it is a means of livelihood or a source of income for a considerable section of the population (Abba, 2004). Fruits have been significantly singled out in human nutrition for the supply of minerals, vitamins, some hormone pre-cursors in addition to protein and energy (Taylor, 1999). In spite of their importance in the diet, per capita consumption of fruits in Nigeria is only 100g compared with 400g of daily consumption per head as recommended by the World Health Organization (WHO). Numerous quantities of fruits, such as citrus species, pineapples, pawpaw, guava, coconut, mangoes, avocado pears, plantain and bananas are produced in Nigeria and staggering figures are given as the estimated annual production level.

The pineapple (*Ananas comosus* L. Merr.) is an important fruit crop in Nigeria. The crop is grown throughout the country, making Nigeria the leading pineapple producer in Africa as well as the seventh country on the world list of pineapple producers. The pineapple production in Nigeria is estimated at about 1.4 million metric tonnes of fresh pineapple having the largest land area of about 180,000 ha for pineapple production in the world and yield of about 7,778 tonnes/ha (FAOSTAT, 2011). The pineapple production in Nigeria is an important means of livelihood for most of the farmers since it offers employment opportunities, supplements incomes and improves the quality of rural life in addition to its significant role in the nutrition and health of the households.

Until recently, about 80% of pineapple produced in Nigeria came from small scale farms that were managed under mixed cropping system. Access to international markets, enhanced value of fresh fruits, resuscitation of pineapple cultivation and local processing have recently encouraged the development of few large scale farms where pineapple is produced as a mono crop (Adesope *et al.,* 2009). Despite Nigeria's position and potential in pineapple production in the world and the enormous economic advantages the country has over the crop, Nigeria has the lowest productivity of about 7 tonnes/ha when compared with the other nine top producers in the world. Nigeria has only a small share of 5% in the worldwide pineapple production (FAOSTAT, 2010; Mark, 2010). In other words, the Nigerian pineapple production is low (Mark, 2010) and inadequate to meet the demand in the country.

Since pineapple production is a fast growing agricultural business in Nigeria, the profitable production of the crop is essential. Therefore, the need for this study can be seen in the desire to increase the level of productivity in pineapple production and also to throw more light on the problems associated with its production in the study area in particular and in Nigeria in general. As a consequence, this study was designed to examine the socio-economic characteristics of pineapple farmers and to determine the resources, costs & returns and other factors affecting pineapple production in Edo State in particular and Nigeria in general. It is expected that the findings will help to provide information and a solution to the decreasing productivity and yield of pineapples per hectare, leading to an improvement in pineapple production.

1.2 RESEARCH HYPOTHESIS

i. Pineapple production is not profitable in the study area.

2. MATERIAL AND METHODS

2.1 THE STUDY AREA

This study was conducted in two local government areas (LGAs) of Edo State, namely Esan West and Ovia South-West. The State is made up of 18 LGAs and has Benin City as the capital. Edo State is situated between the latitudes 05º44′N and 07º34′N and longitudes 05º4′E and 06º45′E (Microsoft Corporation, 2009). The State has an estimated land mass of 19,794 km^2 and shares boundaries with four other states of the federation, namely Kogi State to the north, Ekiti and Ondo States to the west and Delta State to the east and south (Edo State Government, 2007). Edo State has a population of 3,218,332 people (NPC, 2006 and NBS, 2007). The climate of the State is typically tropical with two major seasons; the wet (rainy) season and the dry (harmattan) season. The wet season lasts from April to November and the dry season lasts from December to March. Agriculture dominates economic activities in the State and the common agricultural crops that are cultivated include cash crops such as rubber, oil palm, kola nuts, cashew and cocoa with food crops, such as cassava, rice, maize, yam and groundnut. Major fruits and vegetables cultivated in the State include citrus species, pineapples, pawpaw, guava, coconut, mangoes, pears, plantain, bananas, tomatoes, peppers, amaranthus species, okra, melon, water leaf and cherry.

2.2 SAMPLING PROCEDURE AND SAMPLE SIZE

A multi-stage sampling technique was used to select the study area and sample size in this study. Esan West and Ovia South-West LGAs were purposively selected due to the high population of pineapple producers in the LGAs. Five communities each were purposively selected from the two LGAs, based on the high number of pineapple producers in the respective communities. The selected communities include Emuhi, Ughiyiokho, Ujamen, Uke and Uhi for Esan West LGA and Ogubazuwa, Iguoriaki, Okoro, Udo and Ugboqui for Ovia South-West LGA respectively. A reconnaissance survey conducted with the aid of village extension agents (VEA) of Edo State Agricultural Development Programme (EADP) informed a population of 1748 pineapple producers in the study area. A sample size of 175 respondents which represented ten per cent of this population was randomly drawn from the pineapple producers.

2.3 METHOD OF DATA COLLECTION

Primary and secondary data were used for this study. The primary data were collected by means of structured questionnaire and interview schedules administered to one hundred and seventy-five (175) pineapple producers selected for the study. On the other hand, the secondary data were obtained from relevant publications.

The data collected include the socio-economic characteristics of the pineapple producers (such as age, sex, marital status, household size, years of schooling, years of experience in pineapple production, cooperative membership and extension contacts), the input and output data (consisting of farm size (ha), family and hired labour (man-days), number, quantity and weight of suckers (kg), fertilizers (kg), pineapple harvested (kg) and market prices of all inputs employed in production and output) as well as the perceived problems of respondents affecting the economic production of pineapple in the study area.

2.4 ANALYTICAL TECHNIQUES

The data collected were analyzed using descriptive statistics and gross margin analysis. The descriptive statistics included the frequency distribution, mean and percentages. Gross

margin (GM) analysis was used to estimate the cost, return and profitability of pineapple production in the study area. The GM model is represented as follows:

GM = TR – TVC

Where GM = Gross margin in Naira; TR = Total receipts/returns to pineapple output in Naira; TVC = Total variable cost in Naira (the cost incurred in the use of variable inputs).

3. RESULTS AND DISCUSSION

3.1 SOCIOECONOMIC CHARACTERISTICS OF PINEAPPLE FARMERS

The distribution of the pineapple farmers according to their socio-economic characteristics is presented in Table 1. The study observed that 76% of the respondents were male while 24% were female. The predominance of male farmers in the study area can be attributed to the labour intensive nature of pineapple farming which can be very tedious, hectic and time consuming especially for females who have to combine farming activities with their domestic chores. This result is in the same direction with the findings of Fawole (2008) and Baruwa (2013) reporting that pineapple farming is a male-dominated enterprise. According to their study, 60% of pineapple farmers in Edo state and 86% of pineapple farmers in Osun state respectively are males. Another reason for male dominance can be attributed to the general belief in the study area that a woman should not inherit a farmland except for very few cases.

The result also showed that most of the respondents (95%) were married while the others (8%) were single, separated or divorced and compares favourably with the findings of Fawole (2008) who reported that majority or 66% of pineapple farmers in Edo State were married. Marital status determines the household size since married respondents tend to have a larger household size and produce more output because of the availability of family labour. As regard the household size, 45.1% of the respondents had 4 – 6 people, 30.3% of the respondents had 7 - 9 people per household, 14.9% had 10 - 21 people per household while 9.7% of the respondents had 1 - 3 people. The household size ranges from a single person to 21 people with an average of 7 people per household indicating that pineapple farmers in the study area have a relatively low household size. This implies that additional labour should be hired to work on the farm especially where the farm size is large. This assertion agrees with those of Effiong (2005) and Idiong (2006) reporting that a relatively large household size enhances the availability of labour. Ogungbile *et al.* (2002) also reported that adoption index might be positively or negatively related to the household size depending on the nature of the age structure and the amount of labour contributed by the members of the household.

The result also revealed that only 41% of the respondents had contacts with extension agents while 59% of the respondents had no contacts. This low frequency of contact with extension agents can be attributed to the limited number of extension agents (1:4000 farmers) in Nigeria which makes it impossible to reach all farmers by interpersonal means (Fawole, 2008). This is in agreement with Ovharhe and Okoedo-Okojie (2011) reporting that that extension service in Nigeria is poorly organized and in some cases, unavailable.

The age of the farmers ranged between 27 - 86 years. About 41% of the respondents were between the ages of 27 – 46 years, 55% were between the ages of 47 – 66 years and 5% were between the ages of 67 - 86 years. The mean age of the farmers was 50 years implying that they were relatively advanced in age. Thus, output productivity will be quite low since the age determines the physical strength of the farmers. This result corroborates the

findings of Ekunwe *et al.* (2008) and Baruwa (2013) that pineapple farmers in Delta and Kogi States as well as the farmers in Osun State are aging with the mean ages of 52 and 53 for Delta and Kogi States respectively and 53.7 years for Osun State. According to Adegbite *et al.* (2014), older farmers are involved in pineapple production in Osun State, Nigeria with 75.8% of them within the 41 – 60 years age bracket. Most communities in Nigeria are populated with aged men and women who are left behind as a product of rural-urban drift in search of white collar jobs.

The result also revealed that 46.9% of the pineapple famers in the study area had between 1 and 10 years of experience and 53.1% had more than 10 years of experience in pineapple faming. The average farming experience for the pineapple farmers in the study area was 12 years. Therefore, it can be mentioned that the pineapple farmers in the study area have sufficient experience in pineapple farming. This situation agrees with the findings of Baruwa (2013) who reported that the average farming experience of pineapple farmers in Osun State was 13.5 years. In other words, the cultivation of pineapples was not a new subject to those farmers and they were knowledgeable with the operations and constraints of pineapple production. Farming experience determines the ability of farmers to make farm management decisions effectively, not only by adhering to agronomic practices, but also with respect to input combination or resource allocation.

With respect to the respondents' years of participation in cooperative societies, the result showed that (21.6%) belonged to cooperative societies while 78.3% did not belong to any cooperative society. About 15% of the respondents had 5 - 9 years of participation in cooperative societies and 6% had 10 – 16 years of membership. Membership of a cooperative society avails a farmer of the opportunity of obtaining not only the credit and agricultural inputs, but also information on how to improve farming activities and/or productivity.

Regarding education, about 14% of the respondents had no formal education, 42% had primary education, 34% had secondary education and 10% had tertiary education. Baruwa (2013) reported similar findings when he observed that 21% of pineapple farmers in Osun State had no formal education while 79% of them had some form of formal (primary, secondary and tertiary) education. This finding shows that an average farmer in the study area is fairly educated and therefore can take a better decision as regards the acceptance of innovation. Moreover, such a farmer can apply better agronomic practices that will help to increase pineapple production. This result agrees with the finding of Ewuola and Ajibefun (2000) who indicated that education enhanced the capacity of individuals to understand, manage and work with ideas.

Table 1: Socio-economic Characteristics of Pineapple Farmers in the Study Area

Variables	Frequency	Percentage (%)	Mean
Sex			
Male	133	76.0	
Female	42	24.0	-
Marital Status			
Single	8	4.6	
Married	167	95.4	-
Household Size			
1 – 3	17	9.7	
4 – 6	79	45.1	
7 – 9	53	30.3	
10 and above	26	14.9	7
Extension Services			
Visit	72	41.1	
No Visit	103	58.9	-
Level of Education			
No formal Education	24	13.7	
Primary Education	74	42.3	
Secondary Education	59	33.7	
Tertiary Education	18	10.3	-
Age (Years)			
25 – 40	40	22.9	
41 – 56	88	50.3	
57 – 72	45	25.7	
73 – 88	2	1.1	50
Farming Experience (Years)			
1 – 10	82	46.9	
11 – 20	82	46.9	
21 – 30	9	5.1	
31 – 40	2	1.1	12
Years of Participation in Cooperatives			
0 – 4	137	78.3	
5 – 9	27	15.4	
10 – 16	11	6.3	4

Source: Field Survey, 2012/13 Cropping Season

3.2 THE ANALYSIS OF COST AND RETURNS OF PINEAPPLE FARMERS

Pineapple farming may not be for the purpose of only satisfying the need for household food or subsistence. Thus the farmers, like any other entrepreneur, will be interested in the profitability of the farm enterprise. The various costs incurred on different type of inputs used and the revenues obtained from the sales were estimated based on the prevailing market prices. Due to the fact that the sampled respondents were small scale farmers and they

employed mostly obsolete farming implements, their fixed cost was negligible and so only the Total Variable Cost (TVC) was considered.

Table 2: Gross Margin of Pineapple Farming per Hectare in the Study Area

Variables	Unit Price (₦)	Quantity/ha	Value (₦)/ha	Percent
1. Gross Return (GR)	60	12,880.90	772,854.00	
2. Inputs				
a. Suckers	25	2,015.97	50,399.25	30.2
b. Fertilizer	45	243.95	10,977.75	6.5
c. Labour	800	132.18	105,744.00	63.3
3. Total Variable Cost (TVC) = (a+b+c)			167,121.00	
4. Gross Margin (GM) = (GR – TVC)			605,733.00	
5. Operating Expense Ratio (TVC/GR*100)				21.6

Source: Field Survey, 2012/13 Cropping Season

As shown in Table 2, labour constituted the largest component (about 63%) of the total variable cost among all the variables and this reflects the importance of labour in pineapple farming in the study area. This is followed by the cost of suckers which make up about 30% of the total variable cost and by fertilizer application that has the lowest cost percentage. This finding implies that fertilizer is not commonly applied in pineapple farms in reasonable quantity in the study area. It costs ₦167,121.00 to cultivate one hectare of farmland in the study area with an average of ₦772,854.00 as revenue of the farmer, leaving a gross margin of ₦605,733.00 per hectare. A value of 0.2162 or 21.62% estimated as the operating expense ratio of the pineapple enterprise indicates that only 21.62% of total revenue is used to cover operating expenses. This is a clear indication that pineapple production in the study area is profitable. This result is consistent with the findings of Fawole (2008) who reported that 75% of pineapple farmers in Edo State attributed their main purpose of pineapple production to profit making. Moreover, Adegbite *et al.* (2014) reported that pineapple production using crown and sucker production techniques were privately (N550,438/ha and N679,138/ha) and socially (N730,228/ha and N841,828/ha) profitable in Osun state with sucker production technique having a higher competitiveness with Baruwa (2013) also reporting the profitability of pineapple production with gross margin of N182,725.00 and net profits of N162,045.00 in Osun state, Nigeria.

3.3 THE CONSTRAINTS ENCOUNTERED BY PINEAPPLE FARMERS

The major constraints to the effective production of pineapples in the study area were ranked according to their severity as presented in Table 3. The most prevalent constraints in the study area are the lack of credit facilities, weather and diseases, lack of road and high cost of transportation, low prices and lack of market outlet, high post-harvest losses, lack of herbicides, land and storage facilities and high cost of labour. This conformed to some of the findings of Kayitesi (2011) who observed that inadequate planting materials, unhealthy (diseased) planting materials and poor farming practices, little access to credits, high transport costs, poor routes from the farms to the main highways and lack of adequate market information were the constraints to small-scale pineapple growing in Ngoma District of Rwanda. In addition, Baruwa (2013) observed the shortage of high quality planting materials (valuable genotypes and free of pathogens), high perishability of fruits, low sale price, lack of access to credit and plant diseases as the most prevalent constraints to pineapple production in Osun State, Nigeria.

Lack of credit facility (44%) is the major constraint in pineapple production in the study area. Access to agricultural credit has been positively linked to agricultural productivity in several studies (Nwaru *et al.,* 2004). Yet this vital input has eluded small-holder farmers in Nigeria. Banks with large loan funds are generally difficult to reach since issues of collateral and high interest rates screen out most rural small-holder farmers. Cooperatives, friends and family members dominate the sources of farm credit among the farmers in the study area. Weather and disease (35%) ranks the second in the most serious constraints faced by farmers in the study area. Weather condition at the time of pineapple production is very important as the crop requires humid weather to thrive and produce optimally so adverse changes in weather affect pineapple production. Lack of road and high cost of transportation (30%) is ranked as the next most severe constraint. Transportation costs are considered very high and road conditions are very poor. These not only limit the access to purchased inputs, credit and output markets, but also reduce the transmission of market signals. High transport costs are significant constraints to agricultural productivity, reflecting the poor state of rural transport infrastructure in the study area. About 17% of the farmers complained about the problem of low price and poor market outlet. Marketing of horticultural crops, such as pineapples is quite complex and risky due to the perishable nature of the fruit, post-harvest food losses, seasonality of production and bulkiness. Low output price and poor marketing among other things can be attributed to how the fruit was harvested, handled and stored. Improper handling of harvested pineapple reduces the quality thereby leaving farmers at the mercy of the merchants in determining the price of the output. About 16% of farmers complained about the problem of high post harvest loss of pineapples. This is because of the perishable nature of pineapple which accounts for the acute post harvest losses. About 12% of farmers complained about the lack of herbicides and a further 9.7% complained about the problem of the lack of land. Communal systems of land ownership prevailed among farmers in the study area, in which the individual ownership of land is embedded in group or kinship ownership. Communal ownership of land in Nigeria has been associated with such problems as limited tenure security, restrictions on farmers' mobility and the inevitable fragmentation of land holding among rural farmers. The lack of storage facility (3.4%) ranks second to the last of the constraints and high cost of labour (2.9%) is considered the least among all the constraints faced by the pineapple farmers in the study area. This can be linked to the family size of the farmers in the study area which constitutes a large percentage of family labour in pineapple production in the study area.

Table 3: Constraints associated with Pineapple Production in the Study Area

Constraints	Frequency (n=175)	Percentage	Ranking
1. Lack of credit facilities	77	44.0	1
2. Weather and diseases	62	35.0	2
3. Lack of road and high cost of transportation	54	30.0	3
4. Low prices and lack of market outlet	31	17.0	4
5. High post-harvest losses	29	16.0	5
6. Lack of herbicides	21	12.0	6
7. Lack of land	17	10.0	7
8. Lack of storage facilities	6	3.4	8
9. High cost of labour	5	2.9	9

Source: Field Survey, 2012/13 Cropping Season

4. CONCLUSION AND RECOMMENDATION

Attempt has been made to highlight the socio-economic characteristics of pineapple producers in the study area. The result showed that 76% of the farmers were males, aged

50 years on average, were engaged full time in agricultural production and were mostly married (95%) with a mean household size of 7 people. The respondents were fairly educated with 86% of them having attained some form of formal schooling. The average period of experience in pineapple farming was 12 years with 59% of the respondents having no contact with extension agents. Therefore, the longer the producers work on the production of pineapples, are better educated and have more access to extension agents and information as well as formal credit, the more their experience and chances of adopting the best production practices.

The gross margin analysis of pineapple production revealed that pineapple production was a profitable venture. In spite of the profitability of pineapple production, a number of problems were identified militating against the potentials of the industry. These problems included the lack of credit facilities, weather and diseases, lack of roads and high cost of transportation, low prices and lack of market outlet, high post-harvest losses, lack of herbicides, land and storage facilities and high cost of labour. There is the need for the intensification and expansion of the pineapple sub-sector in terms of provision of high yielding, disease-free suckers and/or crowns, the participation of government and private organizations' in the timely availability of high quality farm inputs, such as fertilizers and pesticides and at affordable prices, the establishment of cold storages to reduce fruit perishability, the establishment of agricultural price support programmes, easier access to credit from formal sources by simplifying the lending terms, such as favorable interest rates and using guarantors instead of landed property for collateral security and increasing the educational opportunities of farmers through the setting up of adult literacy classes, extensional activities and membership to cooperative societies. Such extension activities should focus on the training of the producers about improved production management practices that will both enable the use of available resources efficiently and increase productivity.

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