

Original Research Article

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

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 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. Results indicated that 76% of the farmers were males, aged 50 years on average and are mostly married (95%) with a mean household size of 7 persons 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 extension agents. The gross margin analysis revealed that Pineapple production is a profitable venture in the study area with total variable cost and gross return of N167,121.00 and N772,854.00 respectively resulting in a gross margin of N605,733.00 per hectare. In spite of the profitability in Pineapple production, a number of constraints which include inadequate credit facilities, weather and disease, poor road network and high transportation cost, lack of land and herbicides and poor extension services were perceived by farmers to hinder Pineapple production in the study area. These constraints, if addressed, would lead to increase in the productivity of Pineapple in the study area in particular and Nigeria in general and also increase the producers' disposable income and well-being.

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

1. INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Fruit production forms a substantial percentage, about 25%, of the major food crops cultivated in the tropics and so it is the source of livelihood for a considerable section of the population (Abba, 2004). Fruits have been significantly singled out in human nutrition for the supply of minerals and 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 per head per day as recommended by the World Health Organization (WHO). In Nigeria, numerous quantities of fruits such as citrus species, Pineapples, pawpaw, guava, coconut, mangoes, avocado pears, plantain and bananas are produced and staggering figures are given as estimated annual production level.

The Pineapple (*Ananas comosus* L. Merr.) is an important fruit crop produced in Nigeria. The crop is grown throughout the country with Nigeria ranked 7th on the list for world Pineapple production as well as the leading Pineapple producer in Africa. The nation's Pineapple production 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). In Nigeria, Pineapple production constitutes an important livelihood activity for most of the farmers and plays a significant role in food consumption, nutrition and health of the households, offering employment opportunities, supplementing incomes, and improving the quality of rural life.

Until recently, about 80% of Pineapple produced in Nigeria came from small scale farms managed under mixed cropping system. Recent access to international markets, enhanced value of fresh fruits, resuscitation of Pineapple cultivation and local processing have 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 thereby, contributing a small share (5%) of the world Pineapple production (FAOSTAT, 2010, Mark, 2010) thus, reflecting a low yield in Pineapple production in the country (Mark, 2010) which is currently 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. The need for this study can, therefore, be seen in the desire to increase the level of productivity of Pineapple production and also to throw more light on the problems associated with its production in the study area in particular and Nigeria in general. Therefore, this study was designed to examine the socio-economic characteristics of Pineapple farmers and to determine the resources, costs and returns, and other factors affecting Pineapple production in Edo State in particular and Nigeria in general. It is expected that the findings would help in providing information and solution to the declining productivity and yield of Pineapples per hectare thereby leading to 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, Esan West and Ovia South-West LGAs. The State is made up of 18 LGAs and has Benin City as the State capital. Edo State is situated between Latitudes 05°44'N and 07°34'N and Longitudes 05°4'E and 06°45'E. The State has an estimated land mass of 19,794 km² and share 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 has a population of 3,209,434 persons (NPC, 2006) given it a projected population of 3,867,105 persons for

2013 based on a population growth rate of 3.2%. 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 cultivated include cash crops such as rubber, oil palm, kola nuts, cashew and cocoa and 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 and bananas, tomatoes, peppers, amaranthus species, okra, melon, water leaf and cherry.

2.2 SAMPLING PROCEDURE AND SAMPLE SIZE

For this study, a multi-stage sampling technique was used to select the study area and sample size. 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 communities selected include Emuhi, Ughiyiokho, Ujamen, Uke, and Uhi for Esan West LGA while Ogubazuwa, Iguoriaki, Okoro, Udo, and Ugboqui were the communities selected 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) in the study area informed the population of 1748 Pineapple producers out of which a sample size of 175 respondents, representing 10 percent of the population, was randomly drawn from the Pineapple producers in the study area.

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) and Pineapple harvested (kg) and market prices of all inputs employed in production and output) as well as respondents' perceived problems affecting the economic production of Pineapple in the study area.

2.4 ANALYTICAL TECHNIQUES

Data collected were analyzed using descriptive statistics and gross margin analysis. The descriptive statistics used include 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 could be attributed to the labour intensive nature of Pineapple farming which could be very tedious, hectic and time consuming especially for females who have to combine farming activities with their domestic chores. This result compares favourably with the findings of Fawole (2008) and Baruwa (2013) who reported that Pineapple farming is a male-dominated enterprise with 60% of Pineapple farmers in Edo State and 86% of Pineapple farmers in Osun State respectively been males. Another reason for male dominance could be attributed to the general belief in the study area that a woman should not inherit a farmland except in 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 determine household size, hence married respondents tend to have larger household size and produce more output because of family labour availability. As regard household size, 45.1% of the respondents had between 4 – 6 persons, 30.3% of the respondents had 7 - 9 persons per household, 14.9% had between 10 - 21 persons per household while 9.7% of the respondents had 1 - 3 persons. The household size ranges from 1-21 persons with an average of 7 persons per household indicating that Pineapple farmers in the study area had relatively low household size. This implies that additional labour would have to be hired or would be required to work on the farm especially were the farm size is large as the greater the household size, the more family labour will be made available for Pineapple production which is a labour intensive enterprise. This assertion agrees with those of Effiong (2005) and Idiong (2006) who reported that a relatively large household size enhances the availability of labour. Ogungbile *et al.* (2002) also reported that adoption index may be positively or negatively related to the household size depending on the nature of age structure and the amount of labour contributed among household's members.

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

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 are relatively advanced in age. Thus, output productivity will be quite low since age determines the physical strength of the farmers. This corroborates the finding of Ekunwe *et al.* (2008) and Baruwa (2013) that Pineapple farmers in Delta and Kogi States as well as in Osun State are aging with mean ages of 52 and 53 for Delta and Kogi States respectively and 53.7 years for Osun State. Adegbite *et al.* (2014) also reported that older farmers were 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 and further

The result 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. It could, therefore, be said that the Pineapple farmers in the study area were sufficiently experienced in Pineapple farming implying a significant level of specialization and expertise in Pineapple production. This agrees with the findings of Baruwa (2013) who reported average farming experience of 13.5 years for Pineapple farmers in Osun State, Nigeria indicating that farmers were not new to Pineapple cultivation and were knowledgeable on the operations and constraints of Pineapple production. Years of farming determine farmers' ability to make effective farm management decisions, not only in 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%) belong to cooperative societies while 78.3% do not belong to any cooperative society. About 15% of the respondents had between 5 - 9 years of participation in cooperative societies and 6% had 10 – 16 years of membership. Membership of a cooperative society avails a farmer the opportunity of not only obtaining credit and agricultural inputs but also information on how to improve farming activities and/or productivity.

About 14% of the respondents had no formal education while 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 showed that an average farmer in the study area was fairly educated and therefore can take a better decision as regards the acceptance of innovation and also applies better agronomic practices that will help to increase Pineapple production. This agrees with the finding of Ewuola and Ajibefun (2000) who indicated that education enhances the capacity of individual 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			

241	1 – 3	17	9.7	
242	4 – 6	79	45.1	
243	7 – 9	53	30.3	
244	10 and above	26	14.9	7
245				
246	Extension Services			
247	Visit	72	41.1	
248	No Visit	103	58.9	-
249				
250	Level of Education			
251	No formal Education	24	13.7	
252	Primary Education	74	42.3	
253	Secondary Education	59	33.7	
254	Tertiary Education	18	10.3	-
255				
256	Age (Years)			
257	25 – 40	40	22.9	
258	41 – 56	88	50.3	
259	57 – 72	45	25.7	
260	73 – 88	2	1.1	50
261				
262	Farming Experience (Years)			
263	1 – 10	82	46.9	
264	11 – 20	82	46.9	
265	21 – 30	9	5.1	
266	31 – 40	2	1.1	12
267				
268	Years of Participation in Cooperatives			
269	0 – 4	137	78.3	
270	5 – 9	27	15.4	
271	10 – 16	11	6.3	4

272 *Source: Field Survey, 2012/13 Cropping Season*

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274 3.2 COST AND RETURNS ANALYSIS OF THE PINEAPPLE FARMERS

275

276 Pineapple farming may not be for the purpose of only satisfying the household food need or
 277 subsistence. Thus the farmers, like any other entrepreneur, would be interested in the
 278 profitability of the farm enterprise. The various costs incurred on different type of inputs used
 279 and the revenues obtained from sales were estimated based on the prevailing market prices.
 280 Because the sampled respondents were small scale farmers and employing mostly obsolete
 281 farming implements, their fixed cost was negligible and so only the Total Variable Cost
 282 (TVC) was considered.

283

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

285

286	Variables	Unit Price (N)	Quantity/ha	Value (N)/ha	Percent
287					
288	1. Gross Return (GR)	60	12,880.90	772,854.00	
289	2. Inputs				
290	a. Suckers	25	2,015.97	50,399.25	30.2
291	b. Fertilizer	45	243.95	10,977.75	6.5
292	c. Labour	800	132.18	105,744.00	63.3
293	3. Total Variable Cost (TVC) = (a+b+c)			167,121.00	

294	4. Gross Margin (GM) = (GR – TVC)	6033.00	
295	5. Operating Expense Ratio (TVC/GR*100)		21.6
296			

297 *Source: Field Survey, 2012/13 Cropping Season*

298
299 As shown in Table 2, of all the variable items, Labour constituted the largest component
300 (about 63%) of the total variable cost and this reflects the importance of labour in Pineapple
301 farming in the study area. This is followed by cost of suckers which make up about 30% of
302 the cost with fertilizer application having the lowest cost percentage. This implied that
303 fertilizer is not commonly applied to Pineapple farms in reasonable quantity in the study
304 area. On the average, it cost ₦167,121.00 to cultivate one hectare of farmland in the study
305 area with an average of ₦772,854.00 accruing to the farmer as revenue leaving a gross
306 margin per hectare of ₦605,733.00. A value of 0.2162 or 21.62%, estimated as operating
307 expense ratio of the Pineapple enterprise, indicates that only 21.62% of total revenue was
308 used to cover operating expenses. This is a clear indication that Pineapple production in the
309 study area was profitable. This result is consistent with the findings of Fawole (2008) who
310 reported that 75% of Pineapple farmers in Edo State attributed their main purpose of
311 Pineapple production to profit making as well as those of Adegbite *et al.* (2014) who also
312 reported that the Pineapple production in Osun State using crown and sucker production
313 techniques were privately (₦550,438/ha and ₦679,138/ha) and socially profitable
314 (₦730,228/ha and ₦841,828/ha) with sucker production technique having higher
315 competitiveness. Baruwa (2013) also reported the profitability of Pineapple production in
316 Osun State, Nigeria with gross margin and net profits of ₦182,725.00 and ₦162,045.00
317 respectively.

318 319 **3.3 CONSTRAINTS ENCOUNTERED BY PINEAPPLE FARMERS**

320
321 The major constraints to the effective production of Pineapples in the study area were
322 ranked according to their severity as presented in Table 3. The most prevalent constraints to
323 Pineapple production in the study area in descending order of importance are lack of credit
324 facilities, weather and diseases, lack of road and high cost of transportation, low prices and
325 lack of market outlet, high post-harvest losses, lack of herbicides, land and storage facilities
326 and high cost of labour. This conformed to some of the findings of Kayitesi (2011) who
327 observed that inadequate planting materials, unhealthy (diseased) planting materials and
328 poor farming practices, little access to credits, high transport costs and poor routes from the
329 farms to the main highways and lack of adequate market information were constraints to
330 small-scale Pineapple growing in Ngoma District of Rwanda and Baruwa (2013) who
331 observed shortage of high quality planting materials (valuable genotypes and free of
332 pathogens), high fruit perishability, low sale price, lack of access to credit and plant diseases
333 as the most prevalent constraints to Pineapple production in Osun State, Nigeria.

334
335 Lack of credit facility (44%) was the major constraint to Pineapple production in the study
336 area. Access to agricultural credit has been positively linked to agricultural productivity in
337 several studies (Nwaru *et al.*, 2004). Yet this vital input has eluded small-holder farmers in
338 Nigeria. Banks with large loan funds are generally difficult to access as issues of collateral
339 and high interest rates screen out most rural small-holder farmers. Cooperatives, friends and
340 family members dominate the sources of farm credit among the farmers in the study area.
341 Weather and Disease (35%) ranked the second most serious constraints faced by farmers in
342 the study area. Weather condition at the time of Pineapple production is very important as
343 the crop requires humid weather to thrive and produce optimally, so adverse changes in
344 weather affect Pineapple production. Lack of road and high cost of transportation (30%) was
345 ranked as the next most severe constraint. Transportation costs were considered very high
346 and road conditions were very poor, and these limit access to purchased inputs, credit, and

output markets, and 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 of 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% complained of 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%) complained of lack of herbicides and a further 9.7% complained of the problem of lack of land. Communal systems of land ownership prevailed among famers in the study area, in which 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 famers. The lack of storage facility (3.4%) ranked second to the last of the constraints and high cost of labour (2.9%) was considered the least among all the constraints faced by the Pineapple farmers in the study area. This could be linked to the family size of the farmers in the study area which constitute 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 and are mostly married (95%) with a mean household size of 7 persons and engaged full time in agricultural production. 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, as producers' stay longer in Pineapple production, are better educated and have more access to extension agents and information as well as formal credit, notably from micro-credit institutions, they would gain more experience thereby improving Pineapple production, adopting the best production practices and making better profit. Having smaller household size, couple with the adoption of mechanized farming and pesticide application would most likely reduced labour cost.

The gross margin analysis of Pineapple production revealed that Pineapple production is a profitable venture. In spite of the profitability in Pineapple production, a number of problems were identified militating against the potentials of the industry. These problems include 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, government and private organizations' participation 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 and 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 increased farmers' education either through the setting up of adult literacy classes, increased extension activities or through increased membership of cooperative societies. Such extension activities should focus on training of the producers on the improved production management practices to enable the use of the available resources efficiently and increase productivity.

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