

PROFITABILITY AND CONSTRAINTS OF PINEAPPLE PRODUCTION IN OSUN STATE, NIGERIA

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ABSTRACT

Pineapple is a delicious tropical fruit with a fine flavour and high nutritive value. It is one of the most important commercial fruit crops in the world. Despite its popularity, no proper data on the costs of its production in Nigeria are available. The study determines profitability and constraints of pineapple production in Osun State, Nigeria. Multistage sampling technique was used to obtain information from 50 respondents using purposive and random selection. Data collected were analysed using descriptive statistics and budgetary technique. Results indicated that majority of the farmers were males, aged 53.7 years on average and engaged full time in pineapple production. The modal level of farmer's education was primary. The average period of experience in pineapple farming was 13.5 years. The gross margin and net profits in Naira (Nigerian currency) were ₦182 725 and ₦162 045, respectively. The questionnaire in the study contained the most serious problems confronting pineapple farmers: limited availability of high quality planting materials, high fruit perishability, low fruit prices, low access to credits and plant diseases. Availability of high yielding pineapple varieties, establishment of cold storages to reduce fruit perishability, agricultural price support programmes, easier access to credit from formal sources and farmers' education were considered essential to improve productivity and profitability of pineapple production in Nigeria.

Key words: *Ananas comosus*, costs and profitability of production, constraints of production, Nigeria

INTRODUCTION

Pineapple (*Ananas comosus* L.) Merr.) belongs to the family *Bromeliaceae*. It is known as the queen of fruits because of its excellent flavour and taste. According to Ubi et al. (2005), the pineapple plants are drought tolerant and well adapted to the tropical sandy soils with pH ranging from 4.5 to 6.5. The plants are propagated from suckers or from the crowns, which grow on top of the fruit. It is one of the most important commercial fruit crops in the world available throughout the year. Pineapple production in 2011 constituted more than 19 million MT (metric tons) (FAOSTAT 2013). Thailand is the largest producer of pineapple, accounting for 13% of global output, followed by Brazil and Costa Rica. Production of pineapple in Nigeria accounted 1.4

million MT in 2011 (about 7% of the world production), which placed it in the seventh position (FAO-STAT 2013). The fruits are used mainly for fresh consumption and fruit juice, while in some parts of the world the fermented juice is used to make vinegar and alcoholic spirit. Leaves can be used in three forms: fresh, dried and in silage (Geocoppens 2001). Centrifuge sludge left over from juice production may be used as pork feed (FAO 2004), while fruit core is used for preparing candy. The leaves yield a silky fibre, which is used for making a fine fabric popularly known as piña cloth in the Philippines and Taiwan. Pineapple fibres in some countries are exploited for paper production. Pineapple is also used as ornamentals symbolizing welcome, high living and opulence.

Pineapple is a well-positioned fruit since its trade is oriented towards developed countries such

as Japan, the USA and the European Community (Coveca 2002). The pineapple is the third most important tropical fruit crop after banana and citrus (Hassan et al. 2012), contributing to over 20% of the world production of tropical fruits (Coveca 2002). In countries producing the pineapple, nearly 70% is consumed as fresh fruit.

In Nigeria, pineapple production is the main source of income for many farmers. Until recently, about 80% of the fruits came from small farms managed under mixed cropping systems (Kochhar 2006). However, there are no proper data on economics of its production. The accurate figures on establishment cost, operating cost and labour input requirement in pineapple orchard would be of a great importance for pineapple producers as well as for financing institutions. The general objective of the study therefore is to determine profitability and constraints of pineapple production in Osun State, Nigeria. Specifically, the study objectives are to determine (i) the socio-economic characteristics of pineapple producers and pineapple farms enterprises, (ii) associated costs and returns and (iii) constraints to pineapple production. This study will assist the present or potential pineapple farmers in identifying problems associated with pineapple farming and agricultural policy makers in taking decisions and making recommendations that will improve production and profitability of pineapple enterprises.

MATERIALS AND METHODS

The study was conducted in the most popular pineapple growing area of Osun State in south-western Nigeria. The study area occupies 2 local government areas (LGAs) out of the 30 LGAs in the State. It is located on the forest savannah mosaic with an annual rainfall of 1570 mm and temperature between 25 and 27.5 °C. It lies between 6.83 and 6.88°N latitude and 4.21 and 4.26°E longitude. The two LGAs are semi-rural communities, occupying an area of 588 km² with a population density of 326 person · km⁻². A three-stage sampling technique was used for selecting pineapple farmers. The first stage involved purposive selection of two LGAs (most popular pineapple growing areas). The second stage was the selection of five villages from

each of the two LGAs. The final and third stage involved the selection of 6 farmers from each of the villages earlier selected using simple random selection method at each sampling stage to make 60 respondents. Pretested structured questionnaire was used to collect information from the pineapple farmers. The data collected included socio-economic characteristics of the farmers and the farms, price and quantity of inputs used and output produced and problems associated with pineapple farming. Data were collected from May to October 2011. Descriptive statistics was used to describe the socio-economic characteristics and identify production constraints. A budgetary analysis was used to determine the profitability of production. A farm budget is divided essentially into the sections of revenue, variable cost, fixed cost, and return to management. The total fixed cost was calculated using straight-line method with the value of the used-up material assumed to be zero.

RESULTS AND DISCUSSION

Socio-economic characteristics of the pineapple farmers

Out of the 60 copies of the questionnaire returned only 50 were found analysable. The 50 respondents consisted of 86% males and 14% females, which indicate that the enterprise ownership is male-dominated (Table 1). This may be a result of the labour-intensive nature of the enterprise, which could be very hectic and time consuming, especially for females, who would have to combine this activity with their domestic work. The farmers were between 30 and 70 years of age. The mean age of respondents was 53.7, which shows that the farmers are relatively old considering that the average life expectancy in Nigeria is 42 years. This contradicts the findings of Fakayode et al. (2012) who reported that 61.3% of the vegetable growers fall within the age bracket 21-40 years. This generally high age of pineapple farmers could have negative implications on the future pineapple cultivation in the study area (FAOSTAT 2009). About 21% of the respondents had no formal education while 50% completed primary school.

Table 1. Characteristics of pineapple farmers and farms in Osun State, Nigeria, based on 50 questionnaires

Characteristics	Distribution (%)	Average
Age (years)		
30–39	10.0	53.7
40–49	18.0	
50–59	42.0	
60–69	30.0	
Sex		
Male	86.0	
Female	14.0	
Literacy level (years of education)		
No formal education	21.0	6.1
Primary education (6)	50.0	
Secondary education (10)	25.0	
Tertiary education (15)	4.0	
Farming experience (years)		
5–9	10.0	13.5
10–14	28.0	
15–19	40.0	
20–24	12.0	
Above 24	10.0	
Mode of farming		
Full time	82.0	
Part time	18.0	
Sources of financing		
Personal savings	60.0	
Loan	10.0	
Inheritance	30.0	

Less than 25% of the pineapple farmers had secondary education, and 4% possessed post-secondary school certificate. On average, the respondents have had six years of formal education, which is the primary school duration period in Nigeria. The poor literacy level of the respondents could affect their choice of inputs and the utilization of existing inputs and their willingness to adopt improved technologies. Most (82.5%) of the pineapple farmers were smallholders cultivating on average 1.3 ha and might require financial support to produce on a larger scale. This observation confirms the report of Onaiwu (2011) that small-scale producers dominate pineapple production in Edo State. Of these respondents, 82% were full-time farmers while 18% were farming part time with off-farm employment

to augment income. About 10% of the pineapple farmers in the study area had between 5 and 9 years of experience and 62% had more than 15 years of experience. The average farming experience for the pineapple farmers is 13.5 years, which indicates that farmers were not new to pineapple cultivation and knowledgeable on the operations and constraints of pineapple production (Table 1). High proportion (60%) of the respondents used personal savings to finance the farming enterprise, 10% had access to loans, and the remaining 30% inherited the farm land.

Budgetary analysis

The estimated costs and revenue of pineapple enterprise were ₦197 955 and ₦360 000, respectively (Table 2). The gross margin and return to management were ₦182 725 and ₦162 045, respectively. The profit margin was 45% while rate of return on investment was 81.9%. In general, narrow profit margins indicate increased volatile earnings. For enterprise with significant fixed costs, wide profit margins could reduce the risk that a decline in sales will cause a net profit loss.

A value of 0.492 (49.2%), estimated as operating expense ratio of pineapple enterprise, indicates that 49.2% of total revenue was used to cover operating expenses. The benefit to cost ratio of pineapple enterprise implied that for every ₦1 spent on the enterprise, ₦0.8 was returned as profits. These ratios are indicative of the profitability of pineapple enterprise in the study area. Profitability of pineapple production appears to be low but is not in comparison with other fruit crops (Afolami & Ayinde 2001; Tijani et al. 2010). The reasons for the low profit were shortage of improved planting materials, low level of production technology and high perishability of the crop, which led to low output price.

Constraints to pineapple production

The constraints that affect production and profit of pineapple production are presented in Table 3. The most prevalent constraints to pineapple production in the study area in descending order of importance are shortage of high quality planting materials (valuable genotypes and free of pathogens), high fruit perishability, low sale price, lack of access to credit and plant diseases.

Table 2. Average enterprise budget output for pineapple production on 1 ha in Osun State, Nigeria, based on 50 questionnaires

Item	Mean amount
Revenue	
Income from fruits (10 200 kg output at * ₦ 30/kg)	306 000
Income from suckers	54 000
Total revenue (TR)	360 000
Variable costs (VC)	
<i>Labour cost:</i>	
Land preparation and planting	28 000
Weeding	9 340
Fertilizer application	11 120
Pesticide application	9 000
Harvesting and marketing	31 340
Total labour cost	88 800
<i>Inputs cost:</i>	
Pineapple suckers	54 000
Fertilizers (312.5 kg at ₦ 100/kg)	31 250
Herbicides (3 L at ₦ 850/L)	2 550
Pesticides (0.9 L at ₦ 750/L)	675
Total cost of inputs	88 475
Total variable cost (TVC)	177 275
Gross margin (TR – TVC)	182 725
Fixed costs (FC)	
Land rent	6 000
Machetes	1 100
Hoes	430
Wheelbarrows	10 500
Baskets	2 328
Knives	322
Total fixed costs (TFC)	20 680
Others	
Total cost (TC) = TVC + TFC	197 955
Net profit (NP) = TR – TC	162 045
Profit margin (%) = TR/TC×100%	45%
Rate of return on investment (RORI) = NP/TC	81.9%
Operating expense ratio (%) = TVC/TR × 100	49.2%
Benefit to cost ratio (BCR) = TR/TC	1.8

*~~₦~~ (Nigerian currency) = 1 \$ = ~~₦~~163

Table 3. Constraints to pineapple production in Osun State, Nigeria, based on 50 questionnaires

Production constraint	Number of farmers	Percentage (%)
Lack of improved planting materials	25	50
High fruit perishability	15	30
Low fruit price	5	10
Lack of access to formal credits	3	6
Plant disease	2	4

This conform with Kayitesi (2011) who observed that inadequate planting materials, unhealthy (diseased) planting materials and poor farming practices, little access to credits, high transport costs and poor routes from the farms to the main highways and lack of adequate market information are constraints to small-scale pineapple growing in Ngoma District of Rwanda.

Shortage of high quality planting materials was ranked as the first constrain by 50% of the farmers. This resulted in low production and productivity because the local variety used in cultivation by majority of the farmers does not give a high yield. A high quality planting material enables dense planting. Hence, this calls for technological development to increase planting density in order to increase the productivity of the crop. Almost 30% of the respondents complained on perishability of the product. This agrees with the findings of Amao et al. (2011) who reported that perishable nature of pineapple is the major constraint to pineapple trade in selected markets of Osun State, Nigeria. Storage of the agricultural commodities has a very important role to play to enhance the shelf life of the products and thus offer the commodity for sale in a phased manner to avoid unnecessary glut on the market and therefore the slump in the prices. The problem is more acute in the case of perishable commodities like pineapple.

Mature pineapple fruits cannot be stored for more than 4-5 days after harvesting. Therefore, fruits should be placed on leaves or a sawdust bed alternated with crowns, to avoid any injury to fruits while transporting to major consumption centres. It is not advised to pile up too many layers of fruit.

The establishment of cold storages would improve the marketability of the fruit. Nearly 10% of farmers faced the problem of low fruit price. The highly perishable nature of pineapple coupled with lack of effective storage and preservation technology results in dumping of all harvests on the market thereby creating gluts and slump in the prices. The study revealed that the producers' share in consumer price is very low contrary to market intermediaries that shares are higher than producers are. In order to reduce unnecessary intermediaries, the producers themselves can market the produce at a distant market by collective marketing process. Six percent of the respondents mentioned unavailability of formal credit. They could not get credit from institutional agencies; the source of their credit was moneylenders. This resulted in high cost of borrowing. Provision should be made by the governments and other stakeholders in the agricultural sector to provide pineapple farmers with access to credit through micro financing institutions and informal sources. Furthermore, extension agencies should monitor the beneficiaries of such loans to ensure that farmers do not divert these funds for other purposes and repay the loans regularly.

Heart rot of pineapple caused by *Dickeya dadantii* (*Erwinia chrysanthemi*) was another major problem, which needs to be addressed effectively, that was indicated by 4% of respondents. Research and extension machinery has to be geared up in the study area to educate farmers on the needs for good drainage and dipping the suckers in Bordeaux mixture before planting.

The poor literacy level of the respondents could affect the effectiveness of pineapple farmers' training, which in turn can affect the yield and production efficiency and the income. This confirms the earlier conclusions of Adinya (2001) and Idiong et al. (2006) that technical and commercial education broaden the knowledge of farmers and enable them to farm intelligently, accurately and efficiently, leading to increased yield, productivity and farm income.

CONCLUSIONS

The survey of pineapple production in Osun State of Nigeria based on 50 questionnaires enables to the following conclusion:

1. Pineapple production is male-dominated, the mean age of farmers is 53.7 years, 50% have primary school education, they are smallholders (1.3 ha) and their farming experience is 13.5 years.
2. The mean net profit is ₦ 162 045 per ha.
3. The main constraints are: lack of high quality planting materials, high fruit perishability, low fruit price, lack of access to formal credits and plant diseases.
4. High proportion (60%) used personal savings to finance the farming enterprise, 10% had access to loans, and the remaining 30% inherited the farmland.

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