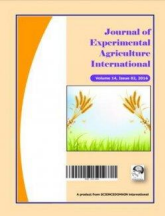

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Analysis of Constraints and Prospects of Pineapple (*Ananas comosus*) Production in Delta State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author AD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author MYO managed the analyses and the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Pineapple is a delicious tropical fruit with a fine flavor and high nutritive value. It is one of the most important commercial fruits crop in the world. The study examined the constraints and prospects of pineapple in Delta State. Multi stage sampling technique was used to extract relevant information from sixty pineapple farmers from one Agricultural Zone in Delta State. Data collected were analyzed using descriptive statistics such as frequency distribution, percentages and mean. The result indicates that majority (47%) of the farmers are within middle age with a mean of 45.2. The average farming experience of pineapple farmers was 12.8years. The result also revealed that most (78.3%) of the farmers are located far from their residence, while majority (50%) of the pineapple farmers cultivated local variety. Respondents attested to the fact that there are high prospects for new pineapple investors and exiting farmers in the area. The study identified the potentials of pineapple production in the area. These includes; boosting of income (mean =2.60), promotion of good health through consumption among farmers ((mean =2.52) and checking of social vice as a result of idleness ((mean =1.84) among others. The major identified problems of

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pineapple farmer's include; lack of improved planting materials, high fruit perishabilty and low fruit price e.tc. The study recommends that government should established cold storage facilities to reduce fruit perishability, make available improved pineapple suckers to farmers and easy access to loan by farmers from government and NGO to expand their farm size.

Keywords: Pineapple production constraints, potentials, management practices Ananas comosus and Delta state.

1. INTRODUCTION

Pineapple is the most economically plant by most family. It belong to the family bromediodeae. It is known as the queen of fruits because of his excellent flavor and taste. Pineapple contribute over 20% of its world production of tropical fruits [1]. Pineapple has a wonderful flavor and immense health benefits [2]. According to [3], pineapple plant is drought tolerant and well adapted to the tropical sandy soil with PH ranging from 4.5 to 6.5. The plant is propagated by suckers which grow on top of the pineapple 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 metric tonnes.

Production of pineapple in Nigeria accounted for 1.4 metric tonnes in 2011 which place it in the seventh position [4]. It is grown and consumed fresh and processed into other products which make it an important food [5]. In developing country like Nigeria, particularly in Delta State most fresh pineapple produced are sold in domestic markets and transported to major cities [6]. Moreso, the fruit juice market in Nigeria has witnessed a tremendous growth since 2002 [7]. Furthermore, [8] opined that Nigeria is the largest producer of fresh pineapple on the African continent. Below is a table showing the quantity of metric tonnes of fruits produce in Nigeria, Kenya and South Africa as reported by [8].

Crops	Nigeria	Kenya	South Africa
Pineapple	920,000	371,310	108,636
Mangoes	795,000	636,585	52,318
Watermelon	139,223	66,196	77,993

Similarly, [8] posited that pineapple is more popular due to its sweet sour taste containing 15% sugar, malic and citric fruit acids. Pineapple is high in vitamin B_1, B_2, B_6 and C [8]. Pineapple contains protein digesting enxyme called bromelain that help in digesting at the end of a heavy protein meal [9]. Pineapple leaves can be used in three forms; dried and in silage [10]. Moreso, centrifuge sludge left over from pineapple juice production may be used as pork feed [11], while fruit core is used in preparing candy. Pineapple is used as ornamentals symbolizing welcome, high living and opulence.

Until recently, about 80% of pineapple produced in Nigeria from small scale farms were managed under mixed cropping system. Access to international markets has given rise to value addition of fresh fruits, resuscitation of pineapple cultivation, local processsing and development of few pineapple large scale farms where pineapple is produced as a mono crop [12] and [13].

Despite Nigeria position and potential in pineapple production in the World and the enormous economic advantage the country derive from the crop; Nigeria has the lowest productivity of about 7 tonnes per hectare when compared with the other nine top producers in the World. Nigeria has only a small share of 5% in the World wide pineapple production [14 and 15]. In other words the Nigeria pineapple production is low and inadequate to meet the increasing demand in the country [15]. This study was designed to examine the problems and prospects of pineapple production with a view to increasing pineapple productivity in Delta state, Nigeria. Specifically, the study objectives are, identify the social-economic characteristics, pineapple production practices, potentials of pineapple production and constraints of pineapple farmers in the study area.

2. METHODOLOGY

2.1 Area of Study

The study was restricted to three (3) local government areas of Delta State, namely Isoko North, Isoko South and Ughelli South. The study focused on all the pineapple farmers in the study area. The study area experiences two seasons; the rainy season which last from April – October and the dry season from November to March. The annual temperature varies between 27°c and 37°c with relative humidity of between 70°c and 80°c in July/August. The soil in the study area is predominantly clay-loam in texture. The major crops produced in the area include pineapple, cassava, pepper, plantain and maize etc.

2.2 Method of Data Collection

Primary and secondary data were used for this study. The primary data were collected through the help of structured questionnaire and interview schedules. These were administered to (64) notable pineapple farmers in the chosen communities with the assistance of the Block Extension Supervisor (BES) and Extension Agents (EA) attached to the three selected local government area. On the other hand, the secondary data were obtained from relevant publications.

Relevant information extracted from farmers includes; socio economic characteristics of the pineapple producers, pineapple production practices i.e. variety of pineapple grown, source of planting material, cropping pattern adopted, method of land preparation, problems and prospect of pineapple production. 60 questionnaires were retrieved from the farmers and four were not returned.

2.3 Sampling Technique

A three- stage sampling technique was adopted to select the targeted farmers. Firstly one Agricultural Zone- Delta Central was randomly selected out of the three agriculture zone in Delta State i.e Delta South, Delta central and Delta North. Secondly, three LGA- Isoko North, Isoko South and Ughelli South were purposively selected from Delta Central out of eight local government that makes up the Zone due to the existence of high population of pineapple producers in the area. Thirdly, three communities were purposively sampled from each LGA to give a total of nine communities. The communities include Ozoro, Owhelogbo, Iyede, Oleh, Aviara, Emede, Otujeremi, Ewhu and Ekakpreme

Finally, eight pineapple farmers were sampled purposively from each selected communities. A total of 64 respondents based on farm size and their level of involvement in the pineapple production were interview.

2.4 Analytical Technique

The data collected were presented and analyzed using descriptive statistics such as frequency distribution, percentages and mean.

3. RESULTS AND DISCUSSION

3.1 Socio Economic Characteristics of the Pineapple Farmers

Table 1 revealed that pineapple production enterprise is dominated by male farmers' i.e (70%). The predominance of male farmers in the study area can be attributed to the labour intensive nature of pineapple farming. Pineapple cultivation is very tedious and time consuming especially for females who have to combine farming activities with their domestic duties. Another reason for male dominance is the belief that women in the area do not inherit farmlands. This finding is corroborated by the work of [16] and [17]. Majority (50%) of the pineapple farmer were 51years of age and above. This shows that respondents were ageing. The mean age of respondent was 47.4 years. This means that effort should be geared towards encouraging youths into pineapple production. This is because aged farmers are often not amenable to change and not likely to adopt improved technologies nor have the desired physical strength to do manual work as the youth [18] and [19]. Moreso, the result in Table 1 also revealed that majority (65%) of the respondents were married with a high proportion (60%) of the farmer's household size of 1-5person with a mean of 5.5. Furthermore, Nwaru [18] asserted that household size is expected to enhance labour availability. On the contrary, Okike [20] opined that the use of available family labour on small sized farms will result in over iodization and hence inefficiency. The larger the farm household size the more likely the farmer labour will be available to enhance the practice of various improved pineapple technologies. Furthermore, a higher proportion (83.3%) of the pineapple farmers had one level of education or the other. This implies that most of the respondents were literate. The result also shows that 16.7% are illiterate.

Table 1 revealed that majority (48.3%) of the respondents have farming experience between 1-5 years, while the remaining 51.7% of the respondents has experience between 6-15 years. The mean farming experience of the respondents was 12.8 years. The result shows that there is relative high farming expensive in pineapple production in study area. This implies that the pineapple farmers in the study area have sufficient experience in the pineapple farming.

Table 1. Distribution of socio economic characteristics of 60 pineapple farmers

Characteristics	Frequency	Percentage (%)
Age (years)		
21-30	3	5
31-40	8	12.5
41-50	18	30.5
51 and above	30	50
Total	60	100
Sex(gender)		
Male	42	70
Female	18	30
Total	60	100
Marital status		
Single	5	8.3
Married	39	65
Widowed	10	16.7
Divorced	6	10
	60	100
Educational level		
On formal education	10	16.7
Primary education	14	23.3
Secondary education	28	46.7
Tertiary education	8	13.3
	60	100
Farming experience (years)		
10-Jan	29	48.3
20-Nov	18	30
21-30	13	21.7
	60	100
Household size (persons)		
5-Jan	36	60
10-Jun	18	30
11 and above	6	10
	60	100
Annual income(N)		
No response	5	8.3
5,000-50,000	15	25
51,000-100,000	23	55
101,000-150,000	16	10
151,000-200,000	Nil	-
201,000 & above	1	1.7
	60	100
Mode of farming		
Fulltime	11	18.3
Part time	49	81.7
	60	100
Sources of finance		
Personal savings	36	60
Loan	6	10
Inheritance	18	30
	60	100

Source: Field Survey, 2017/2018 cropping season]

This finding is in agreement with the work of [17] who reported that the average farming experience of pineapple farmers in Osun State was 13.5 years.

With regards to the respondents household income, the result showed that majority (55%) of the respondents annual income was between ₦100,000 to ₦150,000 annually, while the means annual income per pineapple producer was ₦70,958.33 and monthly income was ₦5,913.19.

Moreso, Table 1 revealed that all the farmers (100%) interviewed agreed that they are into pineapple farming. The result also showed that the pineapple producers source their capital from personal savings and they affirmed that they have difficulty getting the desired finance to expand their production level.

3.2 Pineapple Production Practices

3.2.1 Production location

Table 2 shows that majority (78.3%) of the pineapple farmers has their pineapple production farm located far from their home, while 21.7% of the farmer planted their pineapple in nearby farmlands. This implies that there will be an increase in the cost of transportation of pineapple from the point of production to the market simply because most of the farmer's pineapple farms are sited far from their residence. It will also probably result in consumers paying higher price for pineapple product. It will also mean that the pineapple farmer may find it difficult to maintain their farm land in terms of weeding as well as rodent control. Often a time, there could be resultant losses and damage of produce during transportation due to poor road.

3.2.2 Variety of pineapple grown

The result in the Table 2 revealed that majority (50%) of the pineapple farmers source their suckers locally, while 40% and 10% make use of improved variety and combine both improved and local variety respectively. The result implies that a high proportion of pineapple farmer's harvests are very low, thereby affecting their source of income. This could possibly discourage prospective and existing farmers in the area from investing and expanding their pineapple farms.

3.2.3 Cropping pattern

Table 2 revealed a high proportion (70%) of the pineapple farmer practiced mixed cropping, while the remaining 30% are into sole cropping. Iwuchukwu et al. [5] reported that mixed cropping offers the farmers insurance against total crop failure. This practice helps to control soil erosion and weeds. Moreso, when farmers practice mixed cropping better distribution of farm labour is guaranteed compared to sole cropping. Mixed cropping is used traditionally by peasant farmers to avert risk through the diversification of production.

3.2.4 Type of fertilizer

Entries in table 2 revealed that most (50%) of the pineapple farmers do not make use of fertilizer in their pineapple farm, while the remaining 50% of the respondent used either organic or inorganic and both organic and inorganic. The implication of this is that when farmers apply suitable fertilizer in their farmlands that are not fertile good yield will be recorded.

3.2.5 Method of weed control

Table 2 revealed that majority (75%) of pineapple farmers controlled their weed using manual weeding, 25% of the farmers made use of chemical weeding. This implies that most farmers adopt manual weeding, which often result in intensive use of labour that constitute heavy task and high cost. The finding shows that their production is purely organic and environmental friendly and their produce are usually healthy for consumption.

3.2.6 Method of trapping rodents

Table 2 revealed that high proportion (50%) of the respondents make use of trap to control rodents, while 35.0% and 15% make use of scare crows and chemical respectively to control rodents. The result shows that pineapple farmers usually suffer loss due to rodent attacks since their farmlands are surrounded by thick bushes and located far from their residence.

3.2.7 Methods of harvesting

Result in Table 2 shows that all (100%) the pineapple farmers harvested their produce manually. This implies that the farmers are constrained by the absence of basic equipment and this affects their scale of production.

3.3 Constraints to Pineapple Production

Table 3 shows the problems militating against the effective production of pineapple in the study area. The identified problems are ranked in descending order of severity. According to the

perception of the pineapple farmers as indicated in table 3 the prevalent problems identified include; lack of improved planting material, high fruit perish ability, low fruit price, high cost of lab our, lack of access to credits, insufficient land, rodent attack, weather and diseases, lack of processing and storage facilities and high cost of transportation.

The result of the study revealed that lack of improved planting materials is identified to be the most serious (83.3%) constraint in pineapple production in the study area. This result is in the agreement with the research of [21] that reported that shortage of quality planting materials affect small scale pineapple growing in Ngoma District of Rwanda. The lack of improve planting materials has often result to low productivity because the local variety used for planting by majority of the farmers does not give enough yield. A high quality planting materials enable high yield in production.

Data contained in table 3 revealed that 73.3% of farmers complained of perishability of the pineapple fruit. This result is in conformity with the finding of [22] who stated that perishable nature of pineapple fruit is the major constrained to pineapple trade in selected markets of Osun state, Nigeria. High fruit perishability is ranked second among the factors militating against pineapple production.

Table 3 reveals that majority (55%) of the respondents attested that low fruit price of pineapple product is one of the constraints of pineapple production. The study revealed that the producers share in consumer price is very low due to market intermediaries. This result is in conformity with the finding of [16] who reported that producers share in consumer price

Table 2. Distribution of farmers based on pineapple production practices

Variables	Frequency	Percentage (%)
Production location		
Farm located far from residence	47	78.3
Nearby farm	13	21.7
Within the residence	Nil	--
Total	60	100
Variety of pineapple		
improved	24	40
local (indigenous)	30	50
Both improved and local	6	10
	60	100
Cropping pattern		
Sole	42	30
Mixed	18	70
	60	100
Types of fertilizer used		
Organic	9	15
Inorganic	15	25
Both organic and inorganic	6	10
None	30	50
	60	100
Method of weed control		
Use of chemical	15	25
Manual weeding	45	75
	60	100
Method of trapping rodents		
Use of scare crows	21	35
Use of traps	30	50
Use of chemical	9	15
	60	100
Method of harvesting		
Manually	Nil	--
Mechanically	60	100

Source; field surrey, 2017/2018 cropping season

is quite very low due to unnecessary market intermediaries. Furthermore, the result shows that 46.7% of the respondents mentioned that high cost of labour is a problem. It is the 4th identified problem affecting pineapple farmers. Available labour in the area is competed for agricultural activities and non agricultural activities, thereby reducing the labour required to maintain the pineapple farms. The cost of engaging labour in the farm to cultivate and maintain new pineapple farm is quite high.

Table 3 shows that lack of access to credit facilities is the 5th most serious constrains to pineapple farmers. 43.3% of the farmers complained of the difficulty of getting loan from the bank due to their demand for collateral and high interest charge which the farmers cannot afford. These have resulted in reduction in scale of production due to their inability to acquire better farming implements for pineapple production. When pineapple farmers lack access to credit, it will be most impossible for them to operate on a commercial and cost effective manner. This finding is in agreement with the report of [23].

The study revealed that 36.7% of pineapple farmers complained about the insufficient land. Communal system of land ownership prevailed among farmers in the study area in which an individual ownership of land is through inheritance. Communal ownership of land in Nigeria has been associated with the problems of limited tenure security. Most farmers explained that adequate land is needed if they are to attain enough yield. No doubt growing smaller farms give rise to low yield and inevitable fragmentation of land holding among rural farmers. This finding agrees with [24].

The harmful effect of rodent attack was ranked 7th constraint that faces pineapple farmer in the area. This closely followed with the problem of rodents. 30% of the farmers reported that rodents such as grasscutters, rabbit and squirrel destroy pineapple products (fruits) in the field because the farms are located far from residence. The 8th problem is that of weather and diseases. The problem of disease results in losses in pineapple production in the study area. Pineapple disease is often caused by unhealthy planting materials and poor farming practices. Farmers indicated that they are unable to get enough suckers that would plant there prepared farmland for pineapple, hence they collect free and buy pineapple suckers from other farmers which are mostly infected by diseases. Pineapple mealy bug disease was reported to the commonest pineapple disease in the area. Unfavorable weather makes pineapple production to be low, while during favorable weather the yield is usually very high and give room to high profitability in pineapple farming.

Lack of processing and storage facilities was ranked as the 9th constraint by 21.7% of the farmers. The mature pineapple fruit cannot be stored for more than 4 to 5 days after harvesting. The farmers must consider injuring the fruits during harvesting and during transporting to major consumption centre. There are no processes facilities and cold storage to improve the marketability of fruit. Hence, farmers are forced to sell of their pineapple fruit cheaply to marketers at very low price. Pineapples are chill-sensitive and should not be stored in the refrigerator.

Finally, high cost of transportation also affects the production of pineapple in the study area. The study revealed that 16.7% of the farmers' interview claimed that because pineapple fruit are heavy they pay huge money to transport them to major consumption centers and to the cities.

The finding shows that pineapple farmers in the area do not have access to qualitative market information system as this is very important to enable them benefit maximally through value addition.

3.4 Potentials of Pineapple Production

Table 3 revealed the potential for pineapple investors in the study area. The potential for investors of pineapple as shown below in table 3 and their weighted mean in descending order includes; boosting of income (mean=2.60), promote good health through consumption among farmers (mean=2.52) check social vises as a result to idleness (mean=1.84), minimize urban immigration (mean=1.81).

Variables revealed the mean values of the various challenges of pineapple production in the study area. The mean value of equal to or greater than (≥) 2.50 were found to be significant and capable of influencing investment in pineapple production, while variables with mean below (<2.50) were regarded as not significant

Table 3. Distribution of respondents based on constraints encountered by pineapple famers (60 respondents)

Received constraints	Number of farmers	Percentage (%)	Ranking
1. Lack of improved planting materials	50	83.3	1st
2. High fruit portability	44	73.3	2nd
3. Low fruit price	33	55	3rd
4. High cost of labour	28	46.7	4th
5. Lack of access to credit	26	43.3	5th
6. Insufficient land	22	36.7	6th
7. Rodent attack	18	30	7th
8. Weather and diseases	15	25	8th
9. Lack of processing and storage faculties	13	21.7	9th
10. High cost of transportation	10	16.7	10th

Source: Field survey, 2017/2018 cropping season

Table 4. Distribution of perception of respondents based on potentials of the pineapple production

Perception of farmers on potential of pineapple production	Mean	Ranking
Source/ boasting of income	2.6	1st
Promote good health through consumption among farmers	2.52	2nd
Check social vices as a result of idleness	1.84	3rd
Minimize rural –urban migration	1.81	4th

Source: Field Survey, 2017/2018 cropping season

and do not influence investors in pineapple production in the study area. This finding is in agreement with the research of Iwuchukwu et al [5]. The above result shows that boosting of income with a mean score of (mean =2.60) and good health through consumption (mean =2.52) were find to be significant to potential of pineapple production in the study area among the farmers.

4. CONCLUSION AND RECOMMENDATION

The problems of pineapple production in the study area includes; lack of improved planting materials, high fruit perishability, low fruit price, high cost of labour among others.

The identified prospects of investors in pineapple production in the study area are; boosting of income, promote good health through consumption among farmers, check social vices as a result of idleness and minimize rural urban migration among others. The study recommends as follows,

(1) That government should established cold storages facilities to reduce fruit perishability.
(2) That government should make available improved varieties of pineapple (high yielding) to enhance farmer's productivity.
(3) That government should revive the agricultural prices support programmes.
(4) That government and NGOs should support pineapple farmers with loan also subsidized cost of production inputs.
(5) That government should promote research targeted at improving pineapple production.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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