Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.5, No.22, 2014
www.iiste.org

# Determinant of Income from Pineapple Production in Imo State, Nigeria
# An Econometric Model Approach

Esiobu, N.S* G.C Onubuogu
Department of Agricultural Economics, Extension and Rural Development, Imo State University, Owerri, Nigeria
*Corresponding Author's Email: successachivers2k@gmail.com

**Abstract**
The study was on determinant of income from pineapple production in Imo State, Nigeria. One hundred and twenty households pineapple farmers were selected using multi-stage random sampling techniques. Well structured questionnaire was the main tool for data collection. Data collected were analyzed using descriptive statistical tools gross income analysis and multiple linear regression. Mean age was 47.24 years. Majority (65.00%) were females. Average household size was 5.68 persons. Farmers cultivated on an average farm size of 1.41Ha. Average farm income was ₦81,810.00 ($545.40). Average farm output was 3910.00 tonnes $Ha^{-1}$ in the 2013 cropping season. Greater proportion (81.11%) practiced mixed cropping system. Positive net farm return and return per capita invested was ₦447,841.50 ($2,985.61) and ₦1.84 ($0.012) respectively. Estimated econometric result shows that household size, farm income, extension contact, educational level, farm size and membership of cooperative society influence income at 1% level of probability respectively. The F-ratio was (43.291), revealing the overall significant of the regressors at 1% level of probability. Pineapple production is lucrative and efficient in the area. However, farmers complained of inadequate production capital and inadequate storage and processing facilities. It was therefore recommended that farmers should be encouraged to form agricultural co-operatives to eliminate the exploitative activities of input agencies as well as enable them obtain credits from the government and other credits institutions. Good storage and processing facilities should also be provided for the farmers to reduce spoilage and distressed sales. Government at all levels and private's sector support is required for provision of improved pineapple technologies to the farmers through strengthened extension service system.
**Keywords:** Pineapple, Production system, Gross income analysis, Output, Econometric model, Constraints, Imo State

## INTRODUCTION

Pineapple (*Ananas comosus*) is the third most important tropical fruit in the world after banana (*Musa spp*.) and Citrus *spp.* (Esiobu *et al.,* 2014a). Important producing countries are Brazil, India, China, Nigeria, Mexico and Colombia. They produce the fruit primarily for fresh fruit markets and processing industry. Nigeria ranked 6th on the list for world pineapple production with nearly 800,000 tonnes produced annually (CADP Manuel, 2012). According to Ubi *et al.,* (2008) the crop is drought tolerant and well adapted to the tropical acid sand with pH ranging from 4.5 to 6.5. The crop is propagated by new vegetative growth. Okoli *et al.,* (2014) revealed that pineapple is a delicious fruit with fine flavour and high nutritive value, its contents makes it a good raw material in confectionary industries for making sweet, fruit drinks and household food addictives. It has medicinal value and a fragment consumption of pineapple juice immunes one against fever parasite (Amao *et al.,* 2011). Pineapple is used mainly as food in the form of snacks and fruit-juice, while in most parts of the world the fermented juice is used to make vinegar and alcoholic spirit. Pineapple leaves are used to make cloth and rope, while the whole plant is used as a source of energy. However, despite the nutritional and commercial value of pineapple its production remains low in Nigeria when compared to other nations of the world (Esiobu *et al.,* 2014a).

Apart from Nigeria's agriculture not producing enough to meet the food requirements of the increasing population, one of its greatest problems is that of inadequate vitamins in the diet of a large proportion of the population, especially in the rural areas which constitute over 70% of the country's population Furthermore, research development and investment effort have often been focused primarily on production of other staple foods and vegetables while paying little or no attention on pineapple production. However, particularly, in Imo State, Nigeria, little or no study has rigorously modeled the determinant of income from pineapple production along with econometric model. The absence of these studies has left a void in research. Empirical evidence remains largely scanty, isolated and devoid of in-depth analysis of income from pineapple production. This creates a deep vacuum in research, knowledge and literature. Thus, to fill this dearth in research, it becomes pertinent that the study is undertaken.

## METHODOLOGY

The study was carried out in Imo State, Nigeria. Imo State is located in the eastern zone of Nigeria. It is delineated into 27 local government areas. The State lies between latitudes $5^0$ $48^1$N and $6^0$ $08^1$N of the equator and longitudes $6^0$ $14^1$E and $7^0$ $02^1$E of the Greenwich Meridian (Chineke *et al.,* 2011). It occupies the area between the lower River Niger and the upper and middle Imo River. It is bounded on the east by Abia State, on the west by the River Niger and Delta State; and on the north by Anambra State, while Rivers State lies to the south. Imo State covers an area of about 5,067.20 $km^2$, with a population of 3,934,899 (NPC, 2006 and NBS, 2007) and population density of about 725$km^2$ (Ministry of Lands and Survey Owerri, 1992). The State has three Agricultural zones (Orlu, Owerri, and Okigwe Zones). These divisions are for administrative and extension services and not for any agro-ecological difference. The State has an average annual temperature of 28°C, an average annual relative humidity of 80%, average annual rainfall of 1800 to 2500mm and an altitude of about 100m above sea level (Imo ADP, 2004). Ultimately, Imo State was selected because of proximity, cost, familiarity and predominates by farmers. Multistage random sampling technique was in selection of respondent. Firstly, the three agricultural zones of the State were selected. In each agricultural zone, two Local Government Areas (LGAs) was randomly selected. In each of the selected LGA, ten communities were randomly selected. Ultimately, twelve farmers were randomly selected in each of the community to give a sample size of one hundred and twenty households pineapple farmers for the study. The main tool for data collection was a set of structured questionnaire and it was supplemented with oral interview in places where the respondents could neither read nor write. The questionnaire sought for information on socio-economic characteristics of the farmers, production systems, costs and return, output per hectare and constraints to sustainable agricultural development. The list of farmers in the communities, which forms the sample frame, was obtained from extension agents in the communities. Data collected were analyzed with descriptive statistics, gross income and multiple linear regression.

$Y = f(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_9,X_{10}+e_i)$

Where Y = Output (Tonnes)

$X_1$=Age (Years)

$X_2$=Membership of cooperative society (member=1, otherwise=0)

$X_3$ =Educational level (Years)

$X_4$ =Farm size (Hectares)

$X_5$ =Household size (Number of persons)

$X_6$ =Gender (1=male, 0=female)

$X_7$ = Marital status (married =1, single =0)

$X_8$ =Farm experience (Years)

$X_9$ = Extension contact (number of visits per month)

$X_{10}$ = Annual farm income (₦)

$e_i$ = error term

While the Gross income analysis was computed using the formular;

GI = TR - TVC

Where = Gross Income

TR = Total Revenue

TVC = Total Variable Cost

NR = TR – TC

Where NR = Net Returns

TR = Total Revenue

TC = Total Cost

**Gross Margin Analysis:-** The gross margin is taken as the difference between the total value of production and the total variable cost of production.

GM = TR – TVC

Profitability =TR-TC where = Profit; TR = Total Revenue;

TVC = Total Variable Cost;

TC = Total Cost.

## RESULTS AND DISCUSSION

### Socio-economic Characteristics of Pineapple Farmers

**Table** 1 reveals that majority (50.83%) of the farmers fell within the age bracket of 41-50 years. The mean age was 47.24years. The implication of the finding is that these younger farmers are more likely to adopt new innovation in pineapple production fasters than the older ones. This finding is in line with Esiobu *et al.,* (2014a) who reported that majority of farmers within the age range of 41 to 50 years are still in their active age, more receptive to innovation more technically efficient, effective and could withstand the stress and strain involved in

 

agricultural production. As shown in **Table** 1 majority (65.00%) were females. This result indicates that both men and women are involved in pineapple production in the study area but males were more involved than women. The finding is a positive hope for huge vitamin availability in the area as both gender are key in achieving efficient and effective pineapple production in the study area. The implication of females greater proportion may be that technical efficiency and productivity is expected to be higher because females have the tendency to be more labour efficient (Onubuogu *et al.,* 2014). Entries in **Table 1** also show that majority (40.00%) of the farmers had secondary education. The mean educational level was 12.13 years. The result implies that approximately 87.87% of the farmers had trainings in formal educational institutions which no doubt increases their literacy levels. It is expected that the higher level of education of the farmers in the area will contribute significantly decision making of the farmers. Extension agents in the study area will have less work to do in educating the farmers due to the findings. The result supports the finding of Okoli *et al.,* (2014) who reported that exposure to high level of education is an added advantage in terms of achieving huge income and running efficient agribusiness enterprise and sustainable pineapple production. **Table** 1 also reveals that majority (71.66%) were married. This shows that agricultural production in the area is an enterprise of married individuals, who are seen to be responsible according to societal standards (Onubuogu *et al.,* 2013). The implication of the finding is that married farmers would be more involved in sustainable and efficient pineapple production than their single counterpart. Since they have easy access to production variables such as farm land and large family size which are traditionally owned and provided by household heads (husbands) to compliment family labour to enhance production, reduce the cost of hired labour and resource use efficiency of the household farmers.

Experience in agribusiness enhances output performance. Result in **Table** 1 also indicates that majority (59.16%) had 10-19 years of farming experience. The mean farming experience was 23.27 years. The finding supports Onubuogu and Esiobu (2014) who reported that farmers with higher years of experience would be more efficient, have better knowledge of climatic conditions, better knowledge of efficient allocation of resources and market situation and are thus, expected to run a more efficient and profitable agribusiness enterprise. The implication of the findings is that farmers would set realistic time and cost targets, allocate, combine and utilize a better approach to efficient pineapple production in the area. Result in **Table** 1 also show that majority (60.83%) had household size of 6-10 persons. The mean household size was 5.68 persons. This implies that farmers in the study area have large household size. Large household size ensures availability of labour and expansion of farm size. This finding supports the result of Onaiwu (2011) who reported that large household size compliment labour to enhance production and reduce the cost of hired labour. A household comprises all persons who generally live under the same roof and eat from the same pot. Esiobu and Onubuogu (2014) also defined a household as all people who live under one roof and who make or are subject to others making for them joint financial decision. For the purpose of this study, a household comprises the head, the wife/wives, children and other dependents that live in the same house. The implication of the findings is that, since farmers have pool household size as well as labour, there would be a significant increase in farmers production as well as income as large house makes for large labour availability. Membership of cooperative is also shown in **Table** 1 and it reveals that greater proportions (65.83%) of the farmers are members of cooperative society. The implication of this result is that majority of the farmers have access to credit facilities through cooperative society to which they belong, to pineapple production. Membership of cooperative society affords farmers the opportunity of sharing information on modern production techniques, purchasing inputs in bulk as well as exchanging labour (Okoli *et al.,* 2014). The result supports the findings of Esiobu *et al.,* (2014b) who reported that membership of cooperative society help agribusiness entrepreneurs obtain information and project a collective demand. Extension contact is also reported in **Table** 1 and it reveals that majority (69.17%) of the farmers receives 1-2 of extension visits per month. The mean visit per month was 2.0 times. This implies that the farmers in the study area are poorly visited by extension agents to ascertain their farming problem and know where they need assistance. The implication of the finding is that extension contact which is a channel through which agricultural innovations and information are passed to farmers for improvement in their standard of living, production and productivity are missing. This could bring about low productivity and threaten the objective of food security in the study area. Farmers average farm income is also reported in **Table** 1. It reveals that majority (55.00%) of the farmers had an average annual farm income of between ₦61,000 – ₦80,000. The mean annual farm income was ₦81,810.00 ($545.40). The implication of the findings is that farmers with the higher farm income will be involved in several pineapple production methods as well as achieve huge yield/output than their counterparts who have poor average farm income in the study area. **Table** 1 also reveals that majority (55.83%) had a farm size of less than 1.0 hectares. The mean farm size was 1.41 hectares. This implies that farmers in the area are mainly small scale farmers operating on less than or equal to 1.50 hectares of farmland. This could be as a result of land tenure system predominant in the area or due to the increasing population. Onubuogu *et al.,* (2014) reported that large farm size increases agricultural productivity and improves farmers technical, allocative and resource use efficiency. This implication of the findings is that farmers might have several pineapple production

 

methods to practices in the study area but limited farm size would compel them to intensively farm on a small plot of land.

**Table 1: Socio-economic Characteristics of Farmers**

| Age (years) | Frequency | Percentage (%) |
|---|---|---|
| Less than 40 | 42 | 35.00 |
| 41-50 | 61 | 50.83 |
| 51-60 | 25 | 20.83 |
| Total | 120 | 100.00 |
| **Gender** | | |
| Male | 78 | 65.00 |
| Female | 46 | 15.00 |
| Total | 120 | 100.00 |
| **Educational Level (Years)** | | |
| No formal education | 26 | 21.67 |
| Primary | 32 | 26.67 |
| Secondary | 48 | 40.00 |
| Tertiary | 14 | 11.67 |
| Total | 120 | 100.00 |
| **Marital Status** | | |
| Married | 86 | 71.66 |
| Single | 18 | 15.00 |
| Widowed | 16 | 13.33 |
| Total | 120 | 100.00 |
| **Farming Experience (Years)** | | |
| Less than 10 | 15 | 12.50 |
| 10-19 | 71 | 59.16 |
| 20-30 | 24 | 20.00 |
| 31 and above | 10 | 8.33 |
| Total | 120 | 100.00 |
| **Household Size (Number of Persons)** | | |
| 1-5 | 47 | 39.17 |
| 6-10 | 73 | 60.83 |
| Total | 120 | 100.00 |
| **Membership of Cooperative** | | |
| Member | 81 | 65.83 |
| Non member | 41 | 34.17 |
| Total | 120 | 100.00 |
| **Extension Contact (Number of Visits)** | | |
| 1-2 | 83 | 69.17 |
| 3 and above | 38 | 31.67 |
| Total | 120 | 100.00 |
| **Average Farm Income (₦aira)** | | |
| Less than 20,000 | 7 | 5.83 |
| 21,000-40,000 | 21 | 17.50 |
| 41,000-60,000 | 16 | 13.33 |
| 61,000-80,000 | 66 | 55.00 |
| 81,000 and above | 10 | 8.33 |
| Total | 120 | 100.00 |
| **Farm Size(Ha)** | | |
| Less than 1.0 | 67 | 55.83 |
| 1.0-1.5 | 51 | 42.50 |
| 1.6-2-0 | 2 | 1.67 |
| **Total** | **120** | **100.00** |

**Average age = 47.24 years; Mean Educational level= 12.13 years; Average Farming Experience = 23.27 years; Mean household size= 5.68persons; Average farm income = ₦81,810.00 ($545.40); Mean Farm size = 1.41Ha**

**Source: Field Survey Data, 2014**

 

**Production System Used by Pineapple Farmers**

**Figure 1** shows that greater proportion (81.33%) of the farmers practice mixed cropping system in the study area. However, Onubuogu *et al.,* (2014) asserted that farmers adopts mixed cropping practice for many reasons which includes; to efficiently manage a piece of land, check climate change, to ensure food security, food availability all year round, increased income and reduced incidence of pests and diseases. The system is also predominates among subsistence growers as a means of maximizing productivity, diversification on their small land holdings as well as to ensure economies of scale.

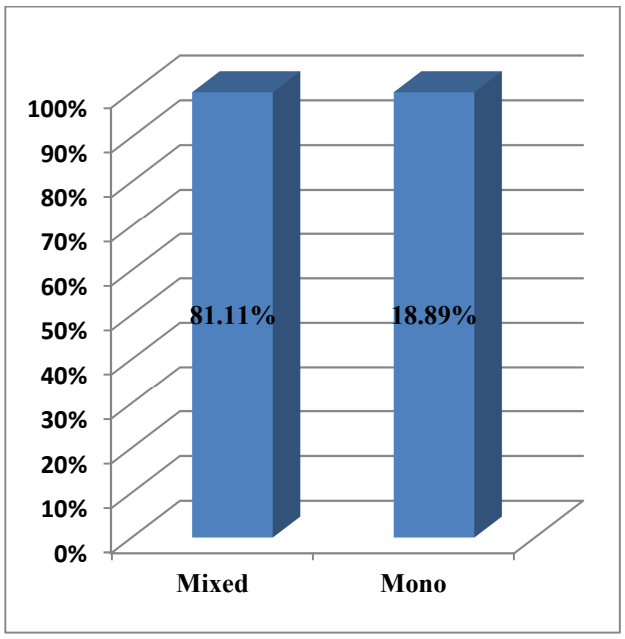


**Figure 1: Bar Chart Distribution of Famers Production System; *Source: Field Survey Data, 2014***

**Annual Output/Yield (Tonnes) Size of the Pineapple Farmers**

**Figure 2** shows that majority (38.33%) of the pineapple farmers produced between 2001-4000 tonnes of pineapple annually. The average annual output of pineapple produced was 3,910.00 tonnes while the average per hectare is 2773.05 tonnes. The finding is in line with Okoli *et al.,* (2014) who reported that farmers in Agwu Local Government Area of Enugu State, Nigeria realized similar yield per hectare in pineapple production. The implication of the finding is that there is a significant high output/yield of pineapple production in the study area. These suggest that there could surplus for sale which would enhance farm income, increase production and raise the standard of living of the pineapple farmers in the area. The result advocate that land tenure system be carefully addressed by government at all levels, as this would give farmers access to more farm land to increase income and sustain pineapple production in the area and beyond.

 

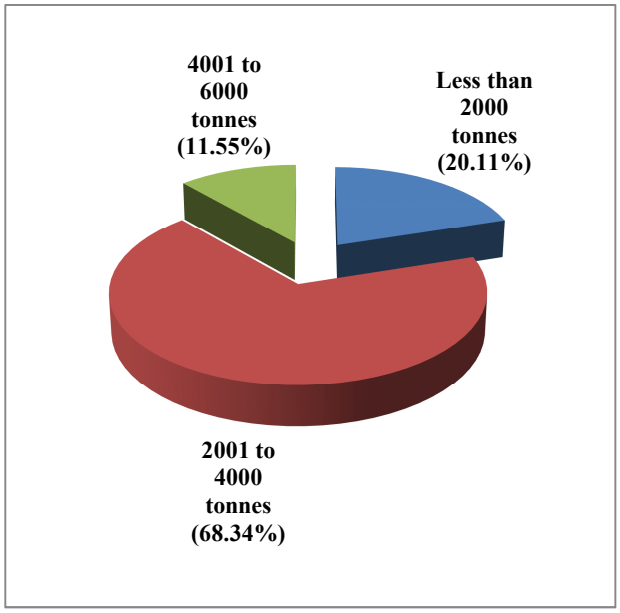


**Figure 2: Pie Chart Distribution of Famers Output per Hectare; *Source: Field Survey Data, 2014***

**Costs, Return and Profitability Analysis of Pineapple Production in Imo State**

**Table 2** reveals that greater proportion (73.97%) of the total variable cost was recorded in planting materials such as the pineapple suckers used for production. Planting materials such as pesticides (litres), fertilizer (kg), irrigation water (litres), transportation recorded 1.85%, 1.85%, 1,48% and 0.01% respectively. Pre-planting operation such as land preparation incurred 2.77% of the total variable cost. 2.77%, 2.22%, 1.23%, 1.23%, 1.23% and 1.23% of the total variable cost was seen in planting operation, weeding operation, harvesting operation, fertilizer application, pesticides application and irrigation application respectively. The contribution of the total fixed cost was low compared to the total variable costs incurred in production. The fixed cost contributed approximately 7.8% of the costs of involved in pineapple production in the area. The return on capital invested was found to be ₦1.84. It could be inferred that for every naira invested, there is 184.00 kobo returns for pineapple production in the area. The result also reveals total revenue (TR) of ₦610,070.00, gross margin (GM) of ₦460,070.00 and net farm income (NFI) of ₦447,841.50. The result also show that the profitability index was ₦0.97, This implies that for every naira earned as revenue from the pineapple production enterprise, 97.00kobo returned to farmers as net farm income (NFI). The finding suggests that pineapple production is a profitable and lucrative and would yield more output/income when invested in a large scale in the area and beyond. The implication of the findings is that when efficiently, effectively, carefully and heavily invested and managed pineapple production is capable of producing good output/yield as well as reasonable net return over time to any agribusiness entrepreneur.

**Determinants of Pineapple Farmers Output/Income**

**Table** 3 shows the result of determinant of pineapple farmers socio-economic characteristics on their output/income. A multiple regression analysis was carried out in four functional forms (linear, semi-log, double-log and exponential forms). Based on the statistical significance of the coefficient, goodness of fit and the econometric model that supports production concept, the double-log function was chosen as the lead equation. The double-log regression function was chosen as the lead equation based on the value of $R^2$(0.937), F-Ratio value (46. 015), and highest number of significant variable (six variables). The coefficient of multiple determinations ($R^2$) was found to be 0.937 (93.7%). This is an indication that 93.7% of the variation in the output of the pineapple farmers was explained by the explanatory variables (socio-economic characteristics) while approximately 6.30% was accounted-for due to error term (ei) or un-captured variables in the model. Hence, the findings present the marginal effects of the estimated econometric analysis.

***Membership of Cooperative* Society ($X_2$):** Membership of cooperative society had a positive coefficient with output/income of the pineapple farmers and it is statistically significant at 1% level of probability. the implication of the finding is that farmers who are members of cooperative society realized huge income than there counterpart who do not belong to cooperative society. Membership of cooperative society affords farmers the opportunity of sharing information on modern production techniques, purchasing inputs in bulk as well as

 

exchanging labour. The result supports the findings of Esiobu *et al.,* (2014a) who reported that membership of cooperative help agribusiness entrepreneur to have easy access to information and project a collective demand.

***Educational level ($X_3$):*** Education had a positive coefficient with the output of the pineapple farmers hence it is statistically significant at 1% level of probability. It is expected that the higher level of education will contribute positively to decision making of a farmer. Exposure to high level of education is an added advantage in terms of achieving huge yield/output, efficient marketing and sustainable pineapple production. This finding was in line with Onubuogu *et al.,* (2013) who opined that higher level of education determines the quality of skills of farmers, their technical and allocative abilities, efficiency and how well they are informed of the innovations and technologies around them.

***Farm Size* ($X_4$):** Farm size was found be positively related to output/income of the pineapple farmers in the study area. It is expected that farmers with large farm size would realize more yield/output than their counterpart with less farm size. Adeyemo (2009) reported that large farm size increases farmers productivity, improves their technical, allocative and resource-use efficiency. The relationship is significant at 1% level of probability.

***Household Size* ($X_5$):** Household size had a positive coefficient with the output/income of the pineapple farmers in the study area. This could be that increase in household size makes for increase in labour hence ensures expansion of farmland. Pineapple farmers who had large household size made more yield/income than their counterpart with less household size. Large household size reduces the cost of hired labour, ensures availability of labour as well as expansion of farm size. This findings support the result of Oluwatayo *et al.,* (2008) who reported that large household size compliment labour to enhance production and reduce the cost of hired labour. The relationship is statistically significant at 1% level of probability.

***Extension Contact* ($X_9$):** Extension contact was found to be positively related to the output of the pineapple farmers in the study area. This implies that a farmer who receives much extension visit realized more yield than their counterpart with poor extension contact. The reason for this could be that those who receive much extension visit acquire new farming techniques than their counterpart with less extension contact. Chukwu (2013) reported that extension contact is the channel through which agricultural innovations and information are passed to farmers for improvement in their standard of living and production. The relationship was significant at 1% level of probability.

***Annual Farm Income* ($X_{10}$):** Annual farm income had a positive coefficient with the income/output of the pineapple farmers and the relationship is statistically significant at 1% level of probability. Esiobu *et al.,* (2014b) reported that farmers with the higher annual farm income will easily realize more yield/income in production than their counterparts who have poor annual farm income.

**Constraints Encountered by Pineapple Farmers**

**Figure 3** reveals that greater proportion (97.35%) of the farmers complained of inadequate information. This could be attributed to dearth in research on pineapple production as well as poor information dissemination on the part of the extension agents in the area, thus, information is lacking for farmers in the area. Inadequate information left the farmers unaware of modern technique for pineapple production as well market situation for pineapple in the study area. About (94.45%) identified adequate production capital. This could be attributed to high cost of inputs used in production. Inadequate fund hinders farmers from getting the necessary resources and technologies which assist them to produce efficiently and remain in production (Esiobu *et al.,* 2014b). This constraint makes the farmers unable to attain large scale production which could pose serious a threat to already acute vitamins shortage in the country. Also due to the high cost of inputs and inadequate production capital achieving economics of scale by the small scale pineapple farmers in the study area becomes completely impossible. About 90.28% of the farmers complained of poor processing and storage facilities. Poor processing and storage facilities lead to all possible gains from the production effort going into the drains of post-harvest losses. Pineapple are only stored for few days in which case, it must be disposed even when the price is not favourable, this accounts for the severe losses suffered by pineapple farmers (Okoli *et al.,* 2014).

About 85.81% complained of long distance between farm and market area. The constraint makes farmers to resort to farm gate sales after harvest thereby losing greater proportion of their fruit produce to exploitative and dubious middlemen in the area. Often times, farmers are compelled if not forced to sell their fruits at a very low price to avoid huge wastage or total loss and this reduces their production efficiency. Pineapple are only stored for few days in which case, it must be disposed even when the price is not favourable, this accounts for the severe losses suffered by pineapple farmers (Esiobu *et al.,* 2014a). About 82.75% identified limited availability of farm land. This could be attributed to land tenure system predominant in the area or due to the increasing population. Onubuogu *et al.,* (2014) reported that large farm size increases agricultural productivity and improves farmers technical, allocative and resource use efficiency. This implication of the findings is that farmers might have several pineapple production methods to practices in the study area but limited farm size would continue compel them to intensively farm on a small plot of land. Other 76.29% complained of poor improved pineapple suckers. This could be attributed to poor extension contact between farmers and extension agents in the study area as earlier identified from the study. Planting of poor improved

 

pineapple suckers is tantamount to waste of effort because such suckers are positioned to get infected with pests and diseases than good pineapple suckers. Poor improved suckers make farms investment less profitable if not a complete loss. Okoli *et al.,* (2014) opined that inappropriate improved suckers is one of the major constraints affecting pineapple industry in Nigeria. Ultimately, there is no doubt that these constraints are responsible for poor pineapple production recorded in the study area. Fighting these problems will be vital in promoting not just subsistence production but commercial pineapple production in the area and beyond.

## CONCLUSION AND RECOMMENDATIONS

The study was on determinant of income from pineapple production in Imo State, Nigeria. One hundred and twenty households pineapple farmers were selected using multi-stage random sampling techniques. Well structured questionnaire was the main tool for data collection. Data collected were analyzed using descriptive statistical tools gross income analysis and multiple linear regression. Mean age was 47.24 years. Majority (65.00%) were females. Average household size was 5.68 persons. Farmers cultivated on an average farm size of 1.41Ha. Average farm income was ₦81,810.00 ($545.40). Average farm output was 3910.00 tonnes $Ha^{-1}$ in the 2013 cropping season. Greater proportion (81.11%) practiced mixed cropping system. Positive net farm return and return per capita invested was ₦447,841.50 ($2,985.61) and ₦1.84 ($0.012) respectively. Estimated econometric result shows that household size, farm income, extension contact, educational level, farm size and membership of cooperative society influence income at 1% level of probability respectively. The F-ratio was (43.291), revealing the overall significant of the regressors at 1% level of probability. Pineapple production is lucrative and efficient in the area. However, farmers complained of inadequate production capital and inadequate storage and processing facilities. It was therefore recommended that farmers should be encouraged to form agricultural co-operatives to eliminate the exploitative activities of input agencies as well as enable them obtain credits from the government and other credits institutions. Good storage and processing facilities should also be provided for the farmers to reduce spoilage and distressed sales. Government at all levels and private's sector support is required for provision of improved pineapple technologies to the farmers through strengthened extension service system. The government must also design policy that would be geared on subsidizing agricultural inputs in order to enhance pineapple production within the area and beyond. Extension agents in the state should be properly trained and provided with all necessary technological packages required to teach and guide farmers on improved pineapple production technologies. The government or any other interest group should as a matter of urgency commercial the production of pineapple as subsistence management cannot sustain the nations increasing population.

 

**Table 2: Estimated Costs, Return and Profitability Analysis of Pineapple Production in Imo State (Naira)**

| Items | Average Cost (₦) | Number owned/used | Total cost (₦) | Percentage (%) |
|---|---|---|---|---|
| **C. Total Revenue** | **610,070.00** | | | |
| **Variable Costs** | | | | |
| Land preparation | 1,500.00 | 3 man hour | 4,500.00 | 2.77 |
| Suckers used | 40.00 | 3000 suckers | 120,000.00 | 73.97 |
| Pesticides | 1,500.00/15litres | 2 bags | 3,000.00 | 1.85 |
| Fertilizer | 1,500.00/25kg | 2 bags | 3,000.00 | 1.85 |
| Irrigation water | 1,200.00/200litres | 2 tanks | 2,400.00 | 1.48 |
| Transportation | 500.00 | 2.0km | 1,000.00 | 0.01 |
| Planting operation | 1,500.00 | 3 man hour | 4,500.00 | 2.77 |
| Weeding operation | 1,200.00 | 3 man hour | 3,600.00 | 2.22 |
| Harvesting operation | 1,000.00 | 2 man hour | 2,000.00 | 1.23 |
| Fertilizer application | 1,000.00 | 2 man hour | 2,000.00 | 1.23 |
| Pesticides application | 1,000.00 | 2 man hour | 2,000.00 | 1.23 |
| Irrigation application | 1,000.00 | 2 man hour | 2,000.00 | 1.23 |
| **A. Total Variable Cost** | | | **150,000.00** | |
| **Fixed Costs** | | | | |
| Depreciation on knife | 55.00 | 3 | 165.00 | 0.10 |
| Depreciation on machete | 205.00 | 3 | 615.00 | 0.38 |
| Depreciation on hoe | 155.00 | 3 | 465.00 | 0.29 |
| Depreciation on spade | 155.00 | 3 | 465.00 | 0.29 |
| Depreciation on leather hand gloves | 15.00 | 3 | 45.00 | 0.03 |
| Depreciation on wheel barrow | 4,550.00 | 2 | 9,100.00 | 5.61 |
| Depreciation on file | 15.00 | 1 | 15.00 | 0.009 |
| Depreciation on measuring tape | 15.00 | 1 | 15.00 | 0.009 |
| Depreciation on Farmland | 1,250.00 | 1.41 hectare | 1,762.5 | 1.09 |
| **B. Total Fixed Cost** | | | **12,228.50** | |
| **Total Cost (TFC+TVC)** | | | **162,228.50** | **100.00** |
| **Revenue** | | | | |
| Average tonnes yield | 200.00 | 2773.05 tonnes/Ha | 554,610.00 | |
| Average suckers yield | 40.00 | 1386.50 suckers | 55,460.00 | |
| Net farm income **[C-(A+B)]** | 447,841.50 | | | |
| **D. Gross Margin** | 460,070.00 | | | |
| Return on Capita Invested | 1.84 | | | |
| Profitability index | 0.97 | | | |

***Source: Field Survey Data, 2014;*** **Depreciation on knife, machete, hoe, spade, leather hand glove, wheel barrow, file, measuring tape and farmland were calculated using the Straight Line Depreciation Method (SLDM).**

 

**Table 3. Estimated Econometric Analysis of Pineapple Farmers Socio-economic Characteristics and Determinants of Output/Income in Imo State**

| Explanatory Variables | Double-Log | Semi-Log | Linear | Exponential |
|---|---|---|---|---|
| Constant | 8276.814 | -7921.739 | 7492.321 | -8313.821 |
| | (21.870)*** | -(23.881)*** | (25.488)*** | (-15.421)*** |
| Age ($X_1$) | 1311.417 | 3821.71 | 0.711 | 5161.942 |
| | (0.215) | (1.071)* | (0.821) | (0.510) |
| Membership of cooperative society ($X_2$) | 5161.518 | 5181.81 | -1.536 | 6153.542 |
| | (2.131)*** | (0.011) | (-0.291) | (1.618) |
| Educational level ($X_3$) | 7153.313 | 8213.42 | 0.632 | 5452.317 |
| | (5.110)*** | (0.120) | (1.210)** | (3.161)*** |
| Farm size ($X_4$) | 5171.317 | -4911.01 | -0.015 | -8161.156 |
| | (2.619)*** | (-0.415) | (-1.212)* | (-0.819) |
| Household size ($X_5$) | 5116.928 | 1287.11 | 0.582 | 7151.450 |
| | (4.021)*** | (1.210)* | (0.931 | (2.131)** |
| Gender ($X_6$) | 1319.417 | 5141.91 | 1.912 | 3165.109 |
| | (0.217) | (0.267) | (6.670)*** | (0.315) |
| Marital status($X_7$) | 1124.315 | 9121.29 | 1.841 | 3.005E-309 |
| | (0.021) | (5.101)*** | (4.027)** | (7.215)*** |
| Farming experience ($X_8$) | 5151.318 | 9848.32 | -0.621 | 6114.618 |
| | (0.411) | (1.982)* | (-1.792)** | (1.311)* |
| Extension contact ($X_9$) | 5.392E-467 | -7521.017 | -6.157 | 0.916 |
| | (6.163)*** | (-0.710) | (-0.615) | (0.915) |
| Annual farm income ($X_{10}$) | 4.319E-155 | -8057.514 | -8.393 | -0.617 |
| | (2.515)*** | (-0.510) | (-0.472) | (-0.518) |
| $R^2$ | 0.937 | 0.913 | 0.812 | 0.717 |
| $R\text{-}^2$ | 0.922 | 0.902 | 0.761 | 0.704 |
| F-Ratio | 46.015*** | 41.310*** | 38.111*** | 33.171*** |
| Sample Size (n) | 120 | 120 | 120 | 120 |

**Source: Computer Printout of STATA (2014); Values in Parenthesis are t-ratio * Significant at 10%; ** Significant at 5% and *** Significant at 1% level of probability**

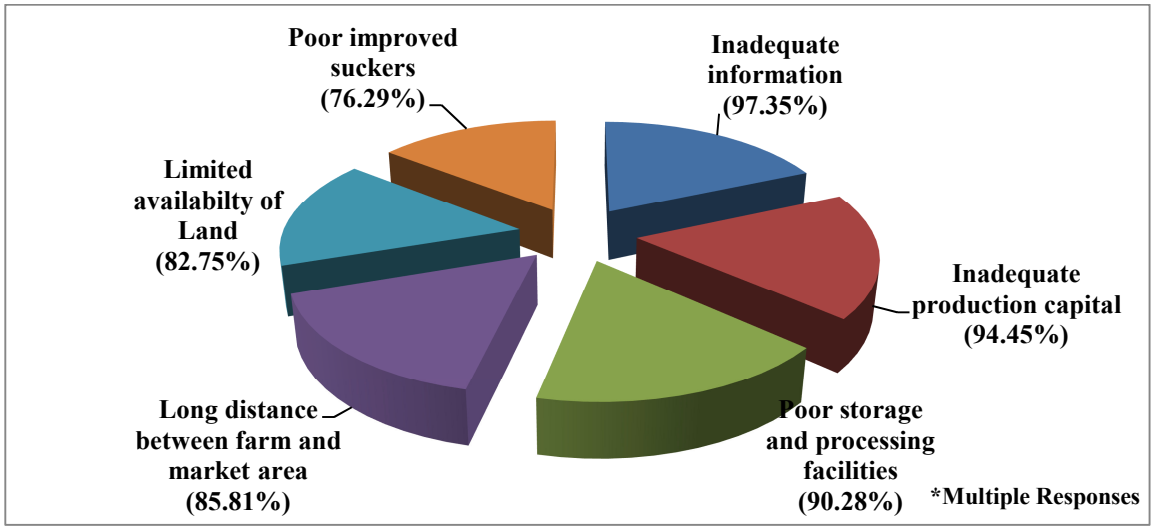


**Figure 3: Pie Chart Distribution of Pineapple Famers Constraint in Production; *Source: Field Survey Data, 2014***

 

**REFERENCES**

Adeyemo AA (2009). Problems militating against commercial egg production in southern Guinea savannah of Nigerian. *Proceeding of the Annual conference of Animal science of Nigeria September 14th-19th, 2009.* LAU-TECH Ogbonoso, Nigeria Mp: 304.

Amao IO, Adebisi-Adelani OFB, Olajide-Taiwo IB, Adeoye B, Olabode I (2011). Economic Analysis of Pineapple Marketing KMin Edo and Delta States Nigeria: *Libyan Agric. Res. Center J. Inter. 2 (5): 205-208, 2011*

Chineke, TC, ME, Idinoba and OC, Ajayi (2011). Seasonal evapotranspiration signatures under a changing landscape and ecosystem management in Nigeria: Implications for agriculture and food security; *Am. J. Sci. Ind. Res.,* 2(2): 191-20

Commercial Agriculture Development Project (CADP) Manuel (2012). *www.cadpnigeria.org*. Accessed online; 10th, August, 2012

Esiobu, NS and GC Onubuogu (2014).Socio-economic Analysis of Frozen Fish Marketing in Owerri Municipal Council Area, Imo State, Nigeria: An Econometric Model Approach; *Scholarly Journal of Agricultural Science* 4(8), Pp: 449-459

Esiobu, NS, CS Nwosu and GC Onubuogu (2014a). Economics of Pineapple Marketing in Owerri Municipal Council Area, Imo State, Nigeria. *International Journal of Applied Research and Technology.* 3(5): 3 – 12.

Esiobu, NS; GC Onubuogu and VBN Okoli (2014b).Determinants of Income from Poultry Egg Production in Imo State, Nigeria: An Econometric Model Approach; *Global Advanced Research Journal of Agricultural Science;* 3(7) Pp. 186-199

Imo State ADP (2004). *Work Programme*, Imo ADP, Owerri, Imo State, Nigeria

Ministry of Land Survey and Urban Planning (1992). *Area of Imo State by LGA,* Government Printer, Owerri. Imo State, Nigeria

National Bureau of Statistics (NBS) (2007): Official Gazette (FGP 71/52007/2,500(OL24*). Legal Notice on Publication of the Details of the Breakdown of the National and State Provisional Totals, 2006 Census.* www.nigerianstat.gov.ng (accessed 20 September, 2014).

National Population Commission (NPC) (2006). Landmass compiled from NPC Report, 1991 and Field Reports.

Okoli, VBN; CN Okereke; GC Onubuogu and NS Esiobu (2014).Analysis of Participating and Non-Participating Commercial Agriculture Development Project (CADP) Farmers in Pineapple Production in Awgu LGA, Enugu State, Nigeria; *Global Advanced Research Journal of Agricultural Science* 3(8) pp. 259-270

Oluwatayo, IB, AB Sekumade and SA Adesoji (2008). Resource use Efficiency of Maize Farmers in Rural Nigeria. Evidence from Ekiti State, *World J. Agric. Sci. 4(1): 91-99.*

Onaiwu SA (2011). Economic Analysis of Pineapple Production: A Case Study of Esan West and Uhunmwode Local Government Areas of Edo State, Nigeria. *M.Sc Thesis Submitted To The Department Of Agricultural Economics And Rural Sociology Ahmadu Bello University, Zaria, Nigeria*.

Onubuogu, GC. and NS Esiobu (2014). Trends, perceptions and adaptation options of arable crop farmers to climate change in Imo State, Nigeria: A logit multinomial model approach; *World Journal of Agricultural Sciences Vol*. 2 (5), pp. 108-122,

Onubuogu, GC; NS Esiobu; CS Nwosu and CN Okereke (2014).Resource use efficiency of smallholder cassava farmers in Owerri Agricultural zone, Imo State, Nigeria; *Scholarly Journal of Agricultural Science Vol*. 7(8), P:. 142-152

Onubuogu. GC., SAND Chidebelu,. and EC Eboh (2013). Enterprise Type, Size and Allocative Efficiency of Broiler Production in Imo State, Nigeria. *International Journal of Applied Research and Technology.* 2(6): 10 – 19

Ubi W, MW. Ubi and VE. Osedeke (2008). Effect of Nitrogen Fertilizer Rates on Dry Matter Yield and Quality of Pineapple propagates (*Ananas comosus*) in Acid Sands of Cross River State. *Global J. Pure and Applied Sci. 14(1)*

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

## CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

**Prospective authors of journals can find the submission instruction on the following page:** http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

## MORE RESOURCES

Book publication information: http://www.iiste.org/book/

### IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar