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Backyard Orchard Ownership: Implications For Rural Poverty Alleviation And Food Security Management in Nigeria

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ABSTRACT

Orchards can generate financial benefits and are thus capable of alleviating poverty and food insecurity. It is important to broaden and clarify the existing body of knowledge on the dual impact of orchards ownership among indigenous farmers. This study empirically investigated the direct and indirect impact of orchards on household food security, poverty status and ownership decision of orchards. Cross sectional data were collected with structure questionnaire from randomly drawn sample of 150 farmers. Primary data collected were analyzed using relevant descriptive and inferential statistical tools (mean, percentage, standard deviation, logistic regression and chi-square). The test of hypothesis indicated significant difference in the income (poverty) level of owners and non-owners of orchards. Marketing of tree fruits generated 13% and 24% of household food security and income respectively. Multiplier index of 28% was generated by orchards ownership. Income derivable via tree diversity and food security are the most significant factors that influenced tree crop ownership decision among rural farmers. It was recommended that international organizations such as World Bank, United Nations with poverty alleviation and food security policies targeted at developing countries should consider the dual potentials of backyard orchards in this regard.

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INTRODUCTION

Orchards are permanent crops whose benefits can be exploited for many years. They are common sights in rural communities in Nigeria ranging from a few stands to plantation sizes. Economically valuable ones in this region include; Avocado pear *(Persea americana),* mango *(Mangifera indica),* coconut *(Cocos nucifera),* orange *(Citrus sinensis),* ogbono *(Irvingia gabonensis),* cocoa *(Theobroma cacao)* and pepper fruit *(Dennettia tripetala).* Economically valuable in this context is defined as having power to generate income owing to steady demand for that commodity. Studies have shown that some of these orchards not only improve nutrition and boost food supply, they also enhance economic conditions of farmers especially in rural areas and bring in needed cash for sustainable development. Marketing and processing of orchard fruits could provide employment and source of income for a good number of rural people and very relevant in poverty reduction (Achoja, 2013; Oladipo, 2008). There are indications from related literatures that orchards are important components of rural economic system and environment. The volume of the tree fruitssold by fruits marketers in market places, the bulk of which comes from the rural environment is an indication that these tree crops have income generating potentials and deserve a documented study (Chukwuji, et al 2001).

However, the continued increase of poverty and food insecurity levels in the rural economic system have not been linked to the potentials of orchards ownership especially in the emerging economic reality conditions that envelop agricultural production. In spite of being common features in Nigerian environment, orchards have received less attention in poverty studies. A need therefore arises for this gap to be filled.

It is argued that in order to reduce poverty or increase household income, it is fundamental that economic policies be directed at strategies that promote rapid rural economic growth (Bigsten *et al,* 2003; Amalu 2005). It becomes pertinent to find out if orchards through its direct and indirect effects have the potential to influence poverty alleviation in Nigeria.

There are arguments that job creation through orchards plantation are irregular and therefore cannot

sustain livelihood development (Mayers, 2006). The need to dispute, accept or modify this assertion is of relevance to this study. Deepening our understanding on poverty alleviating potential of orchards could unfold some variables that correlate with orchards ownership. There is need to identify factors that motivate farmers to consider orchards as alternative source of income and employment. A clear understanding of such factors is important in formulating policies to develop the tree crop sector of economy.

Inadequate information has also been published about the multiplier effects (chain reaction) of orchards in rural economy through the owners of plantation (producers) and marketers of orchards products.

With food security being an important indicator of welfare of every rural household, it becomes necessary to bring to the limelight the positive relationship between orchards ownership and food security.

Orchards have a lot of untapped potentials with regards to poverty alleviation. Households in the study area are faced with the problem of making ends meet. The study wishes to postulate a concept first of its kind where rural households can make substantial ends meet from owning orchards thereby checkmating rural poverty. According to Chukwuji, et al.(2001) the fact that some of these trees do not exist by deliberate act of propagation by rural dwellers but by accident and unintended human activities relegate them to the background of unfocused economic attention. Hence, the information gap with regards to multiplier effects of orchards products on rural economy as well as the usefulness of orchards in addressing food security and poverty alleviation among households and climate change mitigation will be filled. The various opportunities in local and foreign markets for orchards products can be harnessed through policy advocacy, thus enabling rural dwellers especially youths to see orchards ownership as alternative source of income and employment.

In view of the above, the study was aimed at stimulating the formulation of policies by relevant authorities capable of attracting fruit-based cottage industries to the rural areas. This can further encourage more households in rural communities to participate in backyard orchard ownership. It is also aimed at attracting the attention of stakeholders and international organizations such as United Nations, World Bank etc. to support this concept which will revolutionize orchards sub-sector in the future

The broad objective of this study was to examine the dual impact assessment of selected orchards ownership among rural households in Delta State, Nigeria. However, the specific objectives of the study were to:

i. determine the direct impact of orchards ownership on household income level;
ii. determine the indirect impact of orchards ownership on orchards fruit marketer's income level;
iii. determine the multiplier index of orchards ownership on rural economy;
iv. identify the factors that determine the ownership decision of orchards and
v. determine the impact of orchards on food security level of rural households

The following hypotheses were tested to guide the study:

Ho_1: The poverty status of orchards owners is not significantly different from those without orchards.

Ho_2: The selected socioeconomic factors do not significantly determine orchards ownership decision in the study area.

Ho_3: The food security level of orchards owners is not significantly different from the food security level of those without orchards.

MATERIALS and METHODS

Area of Study, Sampling Procedure and Data Collection Techniques

The research was carried out in Delta State, Nigeria. This area was chosen because of the presence of Orchards of interest to this study. The major economic activities of people include, trading, farming, menial jobs and civil service. Major crops cultivated include, cassava, maize, plantain, banana, vegetables and fruit trees. Livestock reared include poultry, piggery, sheep, goat and fishery.

A two staged sampling procedure was adopted to compile the sample for the study. The sampling frame was gotten from the respective clan chairmen as informant.

Stage 1: Of the seven (7) clans, six (6) clans were randomly selected these are; Agbarha, Ogor, Ewreni, Owheru Agbarho and Orogun clans.

Stage 2: Ten (10) orchards owners with at least each owning one of the seven (7) orchards being studied, ten (10) non-owners of orchards and five (5) sellers of orchards fruits were randomly and respectively selected from each of the 6 clans. This gave a total of (150) one hundred and fifty respondents that were selected and studied.

Data for the study were obtained from primary and secondary sources. Primary data was gathered using structured questionnaires which were personally administered to and retrieved from the respondents in the study area. The questionnaire was sectioned according to the specific objectives of the study such that it could effectively capture the required and relevant information needed for this study. Secondary data was gathered from published articles, journals and books.

Method of Data Analysis

Base on the specific objectives and hypothesis of the study both descriptive and inferential statistics were employed in the analysis of data collected. In addition to income level of orchards owners was assumed to respond to number of trees possessed (tree diversity) as derived from Simpsons Diversity Index.

Model specification for Simpson Diversity Index Determination.

Simpson Index (D) $= \frac{\sum n(n-1)}{N(N-1)}$ ... ...Equation 1

Where;

n = Number of tree of a particular specie

N = Total number of all tree species in the population

Decision rule: The closer the **SDI value** to **1** the higher the impact it creates on orchards owner's income and vice versa.

Poverty status determination proxy

Poverty status of orchards owners and non-owners of orchards were determined using annual income as a proxy (Achoja and Oguh. 2017).

- High income level = low poverty level
- Low income level = high poverty level

Determination of direct impact of orchards ownership on household income level.

The impact of orchards ownership on household income level as stated in objective 1 was analyzed using counterfactual information obtained from t-test of income differential between orchards owners and non-owners of orchards. Following Achoja and Oguh (2017), the model is specified and modified as:

$$t = \frac{x - y}{\sqrt{\frac{SDx^2}{Nx-1} + \frac{SDy^2}{Ny-1}}}$$

Where;

x = Mean income of orchards owners

y = Mean income of non-owners of orchards

SDx^2 = Variance of income of orchards owners

SDy^2 = Variance of income of non-owners of orchards

Nx = Number of orchards owners

Ny = Number of non-owners of orchards

Determination of indirect impact of orchards ownership on household income level.

The proportion of income of orchards crop fruit marketers attributed to the sales of fruit was used as a measure of the indirect impact of orchards ownership on rural economy in objective 2. This is shown in the following model;

Model specification of proportion of income of orchards fruit marketers

$$= \frac{income\ from\ economic\ tree\ fruit\ sale}{Total\ household\ income} * \times \frac{100}{1}\ Equation\ 5$$

Determination of multiplier index of orchards ownership on rural economy

Multiplier index of orchards on rural economy as stated in objective 3 was analyzed using the percentage difference in income of orchards crop owners and non-owners of orchards. This is shown in the following model;

Model specification on multiplier index

$$= \frac{Income\ differential}{Bench\ mark\ income} \times \frac{100}{1} \ldots\ldots\ldots Equation\ 6$$

Where;

Income differential = Difference in income between orchards owners and non-owners of orchards

Bench mark income = income of non-orchards owners

Factors that determine the ownership decision of orchards

The factors underpinning ownership decision of orchards as captured in objective 4 were analyzed with the aid of logistic regression model. This is shown in the following model and description of symbols of variable in model is shown in Table 1;

Model specification for ownership decision

$\ln (Pij/C\text{-}Pij) = \beta_0 + \beta_1 ELO + \beta_2 AVMKT + \beta_3 EINC + \beta_4 FOL + \beta_5 ENSHT + \beta_6 PFSC + \beta_7 POP + \beta_8 LGP + \beta_9 AIGN + \beta_{10} AES + \beta_{11} TDI + \beta_{12} AST + \beta_{13} BDE + ei$ ... ... Equation 7

Determination of the impact of orchards on food security level of households.

Effect of orchards on food security level of rural household as stated in objective 5 was analyzed with the aid of annual household food consumption expenditure (food security index) as used by Achoja and Oguh (2017). This is given as;

Model specification on effects of orchards on food security level of household

Food security status determination proxy

Using the United Nations US$1 a day expected food security bench mark

- <US$1 = Food Insecure
- >US$1 = Food Secure

% difference in food security level

$$= \frac{HFCEe - HFCEn}{HFCEn} \ldots\ldots\ldots Equation\ 8$$

Where;

HFCEe =Household food consumption expenditure of orchards owners

HFCEn= Household food consumption expenditure of non-owners of orchards

Table 1. Description of symbols of variable in model

Symbol	Description	Measurement	Expected signs
Pij	Probability of owning orchards	1, if yes, O, otherwise	
ELO	Evidence of land ownership	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
AVMKT	Availability market	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
EINC	Expected income	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
FOL	Fertility of land	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
ENSHT	Enterprise shift	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
PFSC	Perception of orchards as food security crop	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
POP	Price of products	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
LGP	Long gestation period	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	-ve
AIGN	Actual Income generated	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	-ve
AES	Access to extension information on trees	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
TDI	Tree diversity index	$0 \leq TDI \geq 1$	+ve
AST	As a lifelong asset	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
BDE	Boundary demarcation	Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree= 2, Strongly Disagree = 1	+ve
$\beta_1 - \beta_{13}$	Co-efficient of parameter estimate		
β_0	Intercept		
ei	Stochastic error term		

RESULTS and DISCUSSION

Socio-demographic Characteristics of Respondents

Table 2 shows results of socio-demographic characteristics of the surveyed backyard orchard owners in the study area.

Sex: The result showed that majority of the tree owners are males (70%) while females were (30%)(Table 2). The implication is that backyard orchards owners are male owing to the fact that they are family heads. This is similar to Ajayi and Solomon (2010) who studied; Influence of extension contact on farmers socio-economic characteristics on adoption of oil palm technologies in Aniocha North LGA of Delta State and discovered that 74% and 26% were male and female respectively.

Age: From the study it is seen that respondents aged between 51-60 years ranked highest (36.7%) (Table 2). This is a clear indication that backyard orchard owners are advanced individuals and this is due to the long gestation period of the trees. In studying small scale palm oil processing business in Nigeria, Elijah, et al (2014) discovered that 50 years and above ranked second highest with 30% after 31-40 age bracket representing 31%.

Marital Status: The study showed that majority (81.7%) of the respondents is married while (18.3%) are single (Table 2). This is related to having a large household size for the purpose of having companionship and family labor.

Household Size: The study showed that (53.3%) of backyard orchards owners have a household size of 6-8 persons, 43.4% have a household size of 1-5 persons and 3.3% a household size of 11-15 persons (Table 2). This result is similar to that of Ekine and Onu (2008) who reported that 58.3% of households had a population of 6-10 members. This high number of household size derives from the polygamous nature of rural households in Africa and high birth rate which constitute family labor.

Level of Education: The study shows that majority of backyard orchard owners are literate. That is 38.3% of them have primary education background others had secondary and tertiary education (26.7%) and (1.7%) respectively (Table 2).

Table 2. Distribution of Socio- demographic Characteristics of Respondents

S/N/ Variables	Features	Frequency (Percentage) /N=60	Mean/Mode
1.Sex			
	Male	42(70.0	male
	Female	18(30.0)	
2.Age			
	<20	-	
	21-30	2(3.3)	
	31-40	7(11.7)	
	41-50	11(18.3)	
	51-60	22(36.7)	55.5
	≥61	18(30.0)	
3.Marital status			
	Single	3(5.0)	
	Married	49(81.7)	married
	Widowed	8(13.3)	
	Divorced	-	
4.Household size			
	1-5	26(43.4)	
	6-10	32(53.3)	8 persons
	11-15	2(3.3)	
	16 and above		
5.Level of education			
	No formal education (illiterate)	20(33.3)	
	Primary education (literate)	23(38.3)	literate
	Secondary education (literate)	16(26.7)	
	Tertiary education (literate)	1(1.7)	
6.Years of experience			
	1-5 years	18(30.0)	
	6-10years	22(36.7)	6-10 years
	11-15years	06(10.0)	
	16-20years	04(6.7)	
	Above 20 years	10(16.7)	
7.Major Occupation			
	Farming	37(61.6)	
	Civil service	12(20.0)	
	Trading	07(11.6)	
	Others	04(6.6)	
8.Farm size			
	< 0.50hectares	57(95.0)	< 0.5hectares
	0.50-1.00hectares	03(5.0)	
	>1.00hectare	00(00.0)	
9.Orchard ownership pattern			
	personal	30(50.0)	Personal ownership
	on lease contract	10(16.6)	
	purchased	6(10.0)	
	inherited	14(23.3)	
10.Annual income(₦)			
	<40000	1 (1.7)	
	41000-80000	3(5)	
	81000-120000	9(15)	
	121000-160000	1(1.7)	
	161000-200000	45 (75)	₦169.937.29
	201000-240000	0 (0)	
	241000-300000	1 (1.7)	

Source: 2018 field data

*Figures in parenthesis are the corresponding percentage values.

About 33.3% of them did not receive formal education. In Ekine and Onu (2008) studied tree crops and revealed that 32% of the tree crop farmers had primary education while 7% and 9% had diploma and tertiary education respectively. The most likely reason for this trend in low tertiary and high primary education level could be poor family economic background during childhood and teenage years.

Years of Experience: The finding of the study in Table 2 indicates that the average backyard orchard owner's farming experience falls within a modal group that ranges from 6-10 years. The result further shows that backyard orchard owners have 1-5years experience (30%), 11-15years experience (10%), 16-20years experience and above 20years experience

Major Occupation: The result shows that the major occupation of backyard orchard owners is farming (61.6%) (Table 2). The finding further shows that 20% of them were civil servants; 11.6% were traders and the others (6.6%) were into other means of livelihood.

Farm Size: The result in Table 2 indicates that the farm size of backyard orchard owners was below 0.5ha (95%). Very few (3%) had a farm size of 0.5-1.0ha.

Backyard Orchards Ownership Pattern: Majority of backyard orchards (50%) were personally established by the owners in their personal compounds (Table 2). Further finding indicates that 16.67% of them was on lease contract; 10% was purchased together with buildings as landed properties, while 23.3% was inherited from late parents. This finding could be attributed to the fact that the backyard orchards were established on private lands or within family owned compounds. However, a backyard orchard could be leased out to fruit marketers for an agreed period of time.

Annual Income from Orchards Fruits: The study showed that 75% of the respondent had an annual income of between ₦ 161000 - ₦ 200000, 15% had #81000 - ₦120000, 5% had between ₦41000 - ₦80000, 1.7% had less than ₦40000, another 1.7% had between ₦121000- ₦160000 while another 1.7% had between ₦241000 - ₦300000 (Table 2). This study agrees with Unaeze, et al. (2013) study on; Collecting and marketing bitter kola (Garcinia kola) in Nkwere Local Government Area of Imo State Nigeria. The study revealed high profit margins in the sale of bitter kola by producers and intermediaries. The reason for this variation gap in income is as a result of seasonal price fluctuation, tree diversity index and high returns from some orchards such as "pepper fruit" and "ogbono".

Distribution of orchards ownership among respondents

Table 3 shows the distribution of the 7 orchards investigated by this study. The result shows that in order of frequency, coconut was highest with (84 stands) followed by mango (80 stands), ogbono (79 stands), orange (57 stands), pear (31 stands), pepper fruit (27 stands) and cocoa (11 stands) respectively. This result expresses the diversity in the ownership of orchards among the respondents thus justifying the use of Simpson Diversity Index as a determinant of orchards ownership owning to the income derivable from the diversity.

Table 3. Distribution of orchards ownership among respondents

S/N	Orchards	Frequency	Mean Income (₦)
1	Pear trees	31	43200
2	Mango trees	80	57600
3	Coconut trees	84	48400
4	Orange trees	57	82050
5	Ogbono trees	79	91500
6	Cocoa trees	11	28100
7	Pepper fruit trees	27	31200

*Note: Multiple responses were recorded

Direct impact of orchards on household income level

Table 4 shows the t- test result at 1% level between the annual income of orchards owners and non-owners of orchards shows that there is a significant difference between the income of orchards owners and non-owners of orchards. This is so because orchards owners have a higher mean annual income level than non-owners of orchards resulting from the extra income of ₦37,394.92 gotten from owning orchards. According to Chukwuji et al (2001) the annual cash income from compound tree crops though small in magnitude was appreciated when viewed in the light of being the major supplemental income of rural dwellers annual income.

Table 4. T- test result of annual income of orchards and non-owners of orchards

Variables	Mean	SD	Df	t. cal	T critic
Orchards owners	₦169,937.29	61812.93	58	46.04**	1.67
Non owners of orchards	₦132,542.37	53450.37			

Hypothesis testing

Ho1: The poverty status of orchards owners is not significantly different from those without orchards. From the result in Table 4 since the T-cal. is greater than T- tab, the null hypothesis is rejected. Thus the alternate is accepted that there is a significant difference in the poverty status of orchards owners and non-owners of orchards.

Indirect impact of orchards ownership on household income level

Contribution of orchards fruit marketing to households' income in rural areas is shown Table 5.

Table 5 shows the result shows that 24.2% of the income of fruit marketers is attributable to the sale of tree fruits. Further result (Table 5) shows that backyard orchard owners realized 75.8% (N184,600) of total household income from other sources. This finding implies that backyard orchard owners derive additional income from the orchards to support household income as a strategy to alleviate poverty. This agrees with Rana and Islam (2010) earlier study on the role of tree husbandry in the rural economy of the south-eastern region of Bangladesh and reported that palm trees contributed 26% of total annual income of the households. This proportion can be seen as the indirect contribution of orchards ownership on household income in the rural economy.

Table 5. Contribution of orchards fruit marketing to households' income in rural areas

S/N	Variable	Mean income	Proportion of Household Income
1	Income from the sale of Tree fruit	₦59000	24.2%
2	Income from other sources	N184600	75.8%
3	Total income of fruit marketers	N243600	100%

Multiplier index of orchards ownership on rural economy

From Table 6 the result shows that general income level in the rural economy will increase by 28.2% as a result of mean income of orchards owners injected into the rural economy. This finding implies that backyard orchard owners are more empowered by the income derived from orchards to address rural poverty. Similarly, Hiralal (2015) study emphasized the importance of backyard coconut farming in Indian agriculture by exerting profound influence on the rural economy of many states in India; providing economic sustenance to more than 10 million people. It also showed that processing and related activities centered in backyard coconut farming generate employment opportunities for over two million people in India'

Table 6. Result of multiplier index of orchards ownership on rural economy

S/N	Variable	Mean income	Income differential	Multiplier index
1	Tree crop owners	₦ 169937.29	₦37394.92	28.2%
2	Non owners	₦132542.37		

Table 7 shows the result of the Logistic regression of factors that determine orchards ownership decision. The R^2 of this analysis implies that 67.7% of the variation in tree ownership decision is as a result of the changes in the identified factors while the other 32.3% is attributed to other variables not captured in the study one of which is transplanting shocks **(TM)**. The result shows that of the 13 identified variables 7 were significant and their test of significance help to indicate their importance in explaining the orchards ownership decision.

Table 7. Regression Result showing the Factors that determine the ownership decision of orchards

Variables	coefficient	Standard error	P. value	t.value
ELO	1.620	0. 881	0.067	1.83
AVMKT	0.629	0..434	0.148	1.45
EINC	0.590	1.137	0.604	0.52
FOL	1.387	0.655	0.034*	2.12
ENSHT	- 1.007	0.485	0.041*	-2.47
PFSC	3.098	0.971	0.016*	3.19
.907	.907	.907	.907	.907
LGP	-0.073	1.128	0.948	-0.07
AIGN	0.907	1.013	0.371	0.90
AES	0.911	0.431	0.034*	2.11
TDI	3.089	0.971	0.001**	3.18
AST	-0.888	1.349	0.510	-0.66
BDE	2.663	1.336	0.046*	1.96

** = 1% significant level, * = 5% significant level, R^2 = 67.7%

Fertility of land (FOL):The study revealed that Fertility of land was positive and significant at 1%. It therefore means that the more fertile the land the more the tendency to grow or own orchards and vice versa.

Enterprise shift (ENSHT):Enterprise shift was identified to be significant at 1% and negative implying an opposite direction in movement that is the higher the tendency to shift to other on farm agricultural enterprises the lesser the tendency to own orchards and vice versa. This shift could be attributable to the long gestation period of orchards in terms of growth and returns.

Access to extension information on trees (AES): Access to extension information on trees was also significant at 1% and positive implying that the more information farmers receive with regards to orchards the more the desire to own them and vice versa.

Factors that determine the ownership decision of orchards

Tree diversity index (TDI): Tree diversity index was discovered to be positive and significant at 1%. TDI is a measure of how the ownership of more than one kind of orchards influences income and thus ownership decision. The study revealed that the higher the TDI the higher the tendency to own orchards and vice versa.

Boundary demarcation (BDE): Boundary demarcation was discovered to be significant at 5% and positive that is the more people view or see orchards as a cheaper and long-term form of securing landed property while making returns from sales the higher the tendency to own orchards and vice versa.

Perceived as a food security crop (PFSC): Perceived as a food security crop was identified as significant at 1% and positive that is the higher the perception as a food security the higher the tendency to own orchards and vice versa.

Price of product (POP): Price of product from the study was discovered to be positive and significant at 1%. POP is an income indicator it therefore means that the higher the price of the product the higher the income the higher the decision to own orchards and vice versa. This is particularly true for trees like "ogbono" and "pepper fruit" with high product prices.

Hypothesis testing

H_{O2}: The selected socioeconomic factors do not significantly determine orchards ownership decision in the study area. The result in Table 6 shows that the selected factors significantly determine orchards ownership decision thus the null hypothesis is rejected and the alternate accepted that the selected factors significantly determine orchards ownership decision among rural people.

Effect of orchards ownership on food security level of households

From Table 8 the result of the analysis shows that monthly household food consumption expenditure (HFCE) of orchards owners was ₦12,250 while that of non-owners is ₦10,620. The percentage difference of 13% implies that the household food consumption expenditure of tree owners is higher than that of non-owner of orchards by 13%. This means that the significant difference in the income level of these two groups as seen in Table 1 is relating to the food security level in favour of orchards owners. The table also shows the food security status of the two groups. Using the United Nations 1 dollar a day (₦360.50) expected food security bench mark, the daily actual food security level of orchards owners was discovered to be ₦395 per day weigh above the bench mark thus making them food secure while that of non-owners of orchards was ₦342 per day weigh below the bench mark thus making them food insecured. This also signifies that the significant difference in the income level of these two groups reveals their food security status. This agrees with Jill (1993) study on: Household food security, farm tree, and agro-foresting. A comparative study in Indonesia and Philippines; which revealed that ownership of orchards enhances household food security directly by providing food and indirectly through provision of input to other food producing parts of the farm system. Implying therefore that trees provide cash enabling many rural households to purchase food while for farming household with limited resources, trees provide products to eat or sell.

Table 8. Effect of orchards ownership on food security level of households

S/N	Variable	Monthly HFCE	% Difference	Daily expected HFCE	Daily actual HFCE	Remark
1	Orchards owners	₦12250	13%	$1USD (₦360.50)	₦395	Food secured
2	Non owners of orchards	₦10620		$1USD (₦360.50)	₦342	Food insecured

Hypothesis testing

H_{O3}: The food security level of orchards owners is not significantly different from the food security level of non owners of orchards. The result in Table 8 shows that there is significant difference in the food security level of orchards owners and non-owners of orchards. Thus, the null hypothesis is rejected and the alternate accepted that the food security level of orchards owners is significantly different from the food security level of non-owners of orchards.

CONCLUSION

This study empirically investigated the direct and indirect impact of orchards on household food security, poverty status and ownership decision of orchards. We got sufficient evidence to conclude that the incomes of orchards owners were found to be significantly higher than that of non-owners of orchards. Orchards were also found to have significant indirect impact on the rural economy in through increase in the annual income of fruit marketers. Orchards ownership has extensive (multiplier) effect on rural economy. We found sufficient evidence to conclude that income expectancy is the most significant driving variable that influenced backyard orchard ownership by rural people. In addition, orchards ownership decision was perceived by respondents as strategic food security option. Orchards ownership was found to create significant impact on the food security level of owners.

On the basis of the findings we recommended that tree planting campaigns of the Government and Non-governmental organizations should be anchored on backyard orchard ownership as a means of addressing rural household poverty and food security in developing countries such as Nigeria. Further research should be carried out to examine the attitude of rural people towards orchards planting for environmental sustainability in Nigeria.

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