IMPACT OF ADOPTION OF IMPROVED OIL PALM TECHNOLOGIES ON FARMER'S LIVELIHOOD IN SOUTH-SOUTH, NIGERIA.

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ABSTRACT
The study assessed the adoption impact of improved oil palm technologies on farmers' livelihood in south-south, Nigeria. A structured questionnaire was used for data collection from 322 sampled oilpalm farmers. Specifically, the study identified the socio-economic characteristics of the farmers, determined the level of adoption of improved oil palm technologies, identified the important oilpalm livelihood activities to the farmer and assessed the impact of adoption of Improved Oilpalm technologies on the farmers' livelihood activities. Findings of the study revealed that the oilpalm farmers were dominated by male: (79.5%), majority, (77.3%) of the farmers are married with household size of 5-8persons. Most of the farmers (31.1%)have 11-15 years farming experience. The farmers age distribution were within 41-50 years and calculated mean age of 49.19. 53.1% of the farmers belong to farmers' Social organizationand20% of the farmers had no formal education. The mean monthly income of the farmers was N30,800.00. The study revealed among the identified oilpalm livelihood activities that marketing of palm produce x=3.65, transport of palm products x=3.58, harvesting of palm fruits x=5.58 and palm oil processing x= 3.52 were rated as very important livelihood activities to larger proportion of the oilpalm farmers. Adoption level of improved oilpalm technologies was observed to be very high among the farmers. Adoption of improved oilpalm technologies had positive impact on the farmers' livelihood at household and farm levels. Perceived farmers' impact showed that there was increases in farm income, increased farm yields, improved farmers food security; there is oiipalm plantation expansion, and improvement general farmers well-being in health care contribution to children education and feeding of households: The regression analysis result revealed that p-values of age -0.004, household size <0.001, farming experience 0.008 and educational level<0.001 had Significant and positive relationship between farmers perceived impact at household and farm levels. Also Pearson Product Moment Correlation analysis showed that Significant and positive relationship existed between farmers' perceived impact of improved oilpalm technologies on farmers' livelihood and adoption of oilpalm technologies.

Keywords: Adoption, Improved oilpalm, Technologies, Oilpalm farmers, Livelihood, South-south Nigeria.

INTRODUCTION

In recent years, there has been growing concern to assess the impact of agricultural technologies at farmers' level to determine who benefit from technological change and in what specific ways at both small-scale and societal level (Sanginga et al., 2007). Presently, impact on the lives of resource poor farmers is probably being recognized as the most functional benefit of agricultural technologies and the dominant preoccupation of various stakeholders (Jahnke et al., 1987; Collinson and Tollen 1994). Against this background, several low income countries in sub-Saharan Africa have adopted agricultural programmes and strategies that could induce necessary impact on farmers' livelihood sustainable increase in food production. Of particular note in the generation of research technologies among the National Agricultural Research System (NARS) is the Nigerian Institute for Oilpalm Research (NIFOR) since 1939. This was,based on the identification of the oilpalm industry as one of the effective avenue to enhance farmers' livelihood for income generation especially among women who process and sell palm oil in both local and national markets, employment generation along the oilpalm production chain, food security and economic growth and stability.

Oilpalm is a major source of livelihood for many rural farmers in the oilpalm growing areas of Nigeria. According to Ayodele (2010), the rural smallholder's oilpalm farmers in Nigeria account for more than 80% of the total palm oil and palm kernel production. Oilpalmhas a tremendous potential as an important agricultural crop and sources of food. Its main products - the palm oil, palm kernel and palm kernel cake are important raw materials for many foods and industrial products. Originally, palm oil is used in its crude form for cooking. It has evolved into an international commodity with many bio fuels production. Also about 80% of current world palm oil production is consumed in form of food as cooking oil and as ingredient in packaged food such as margarine, ice cream, cookies and chocolates. Others are bakery products and shortenings, vitamin A and animal feeds (NIFOR, 2009; Basiron,2010). The non-food uses of palm oil include soaps, cosmetics, detergents and surfactants, pharmaceuticals, nutra-ceuticals, some households and industrial products (IFC, 2011). 'Besides, palm wine, palm, Kernel shell, the fronds and trunk fibers provide others, industrial and domestic applications(Gere and Gwaram, 2004). The oilpalm

as a source of edible oil contributes to food security health and well-being of the citizenry (Ikuenobe, 2010). The fruits of the oilpalm contain 45 to 55% oil compared to other vegetable oils and it contains high level ofbeta-carotene and Tocotrienolswhich has been found to help protect against Cancer (Azizan, 2006).

However, NIFOR that is in forefront of Oilpalmresearch over the years has made significant contributions through the development and introduction of improved oilpalm production technologies that are particularly tailored and aimed at boosting the yield and productivity of both large scale and small scale Oilpalm farmers. These improved oilpalm technologies include; new seed variety - Tenera hybrid Oilpalmseeds; Agronomic practices for Oilpalmplantation, field establishment, Oilpalm nursery establishment, weed management strategies, fertilizer application and soil management, pruning and harvesting techniques, pests and diseases control practices, small scale palm Oil. processing equipment palm wine tapping and bottling technology among other production techniques (NIFOR, 2009).

Drucker (1998), stated that Nigeria has the needed potentials to increase her production of palm oil and palm kernel through the application of improved technologies. The adoption of these oilpalm technologies can appreciably induce the necessary impact on the national palm oil output thereby increasing the peoples' livelihood outcomes – increased income, health, employment, nutrition, etc., and or reduce poverty and food insecurity in the country.

The objective of the study therefore sought to assess the impact of adoption of improved oilpalm technologies on the farmer's livelihood in the oilpalmgrowing areas of south-south, Nigeria. The specific objectives were to; describe the socio-economic characteristics of the oilpalmfarmers; examine the level of adoption of improved oilpalm technologies among the farmers; identify the farmers' Ollpalm livelihood activities and farmers' perception of importance of these livelihood activities; andassessment of impact: farmers' perceived impact of adoption of improved oilpalm technologies on the farmers' livelihood at household and farm levels. Hypothesis tested: There is no significant relationship between farmers' perceived impact of adoption of improved oilpalm technologies on the farmers' livelihood at household and farm' levels and adoption of improved oilpalm technologies.

METHODOLOGY

The study was carried out in the south-south agro-ecological zone of Nigeria. The south-south area lies between Latitudes 4^0 10^1 and 7° 30^1 north and longitudes 4^0 30^1 and 9° 45^1east. It has a total land area of 112,110 sq. km. the area has a population of 21,044,081 million people and with a growth rate of 2.83% per year (NPC, 2006; NDDC, 2008). More than 65% of the total populations of the zone are farmers who produce food crops such as cassava, plantain/banana, yams, maize, rice, cocoyam, pineapple, and vegetables. Oilpalm, rubber, and to aless extent cocoa are some of the important tree crops including forestry and timber. The oilpalm in particular form a very important part of the vegetation of the south-south agro-ecological zone and where it is widely distributed and cultivated as a major cash crop.

The target population was individual oilpalm farmers who established oilpalm farms for over 5years and more. The reason for farmers in this category was that the oilpalm takes about four years for harvesting to commence and for any impact to be observed in farmers' livelihood outcomes. From the three states - Edo, Bayelsa and AkwaIbom of the south-south agro-ecological zone, a sample size of 146, 60 and 116 were selected respectively. This gave a total sample size of 322 used for this study. Data were collected using structured questionnaire and focus group discussion. The improved oilpalm technologies considered in this study include, improved oilpalm planting materials (oilpalm hybrid tenera seed/seedlings) (1), oilpalmnursery establishment techniques: use of polythene bags nursery (double and single nurserymethods) (2), oilpalm plantation/field establishment/planting methods: 9m x 9m triangular spacing planting (3), oilpalm plantation management techniques: methods of weed control, Pruning of palm leaves, mulching (4), Fertilizer application methods (7), Harvesting techniques (5), Disease/Pests control methods (8), Palm oil processing techniques/use of Small Scale Processing Equipment (6), Palm wine tapping techniques (9), Palmwine preservation and bottling techniques: use of crown cork glass bottles and plastic bottles (10)

Objective 2 examined the level of Adoption of ten (10) improved oilpalm techniques among the farmers and were measured on a Six(6) point Likert type scale of: no awareness = 1, awareness = 2, interest =3, evaluation =4, trial =5, adoption = 6, The Likert type scalingmeasuring instrument is represented by the formula: $\bar{X} = \frac{\sum Fx}{N}$. Where $\sum$ = summation sign, $\bar{X}$ = mean score, F= frequency, N= number of fanners, x = number of nominal value or each of responding category ie. 1+2+3+4+5+616 = 3.5 weighted mean. Therefore, mean value <3.5 is negative; mean ≥3.5 is positive.

Objective 3: farmers identified important livelihood activities in preference rating from a list of oilpalm livelihood activities on a 4-point scale as follows: 1 = Not important, 2 = Less important, 3 = Important and 4 = Very important; and which was assigned weight of 1,2,3,4 respectively was used to measure the importance of the different oilpalm livelihood activities. i.e, 1+2+3+414 = 2.5 (mean score).

Therefore, mean score <.2.5 is negative; mean score ≥2.5 is positive. Objective 4: Household and farm level Impacts Household level impact outcome indicators includes- Increased Farmers Enhanced Income(l), Improved Food security (2); Increased Financial contribution to family needs (children Education; Health. care, provision of food, etc.,) (3), Improved Farmers' materials well-being (4), Farmers' Decision making(5), and Farm level Impact outcome indicators:- Increase in Farm Yield (output) (6);oiipalm varietal replacement (7), Land use/Farm expansion (8), Availability of wild vegetables due to intensification of Oilpalm production practices (9), Increase Farmers' knowledge (10), Increaseinput use (11), Increase On-farm employment(12), Reduce vulnerability (risk, theft, fire etc.) (14), Decrease Soil Fertility (15). Farmers' perceived impact of these impact indicators were measured on the farmers' preference rating of a 15 statement or the impact indicators presented at both household and farm-levels on a 5-point Likert, type scale of: Strongly agree, Agree, Disagree, Strongly disagree and Undecided, (and which also correspondto impact rating of; Very high impact, High impact, Moderate impact, Low impact, and No impact). These were assigned weight of 5,4.3,2,1 respectively and used to measure the impact of adoption of improved oilpalm technologies on the farmers' livelihood i.e. 5+4+3+2+1/5 = 3 (mean score). Therefore, mean score < 3 is negative; mean score ≥ 3 is positive. Multiple responseswere recorded by the farmers.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Farmers

Findings on the oilpalm. Farmers' socio-economic characteristics in Table 1 showed that 79.5% of the farmers were male and 20.5% female. 77.3% of the farmers'respondents are married with only 11.5% being single and 5.35% divorced. The implication is that these married farmers were matured and can take crucial farming decisionsjointly with their spouse. The age distribution of the farmers revealed that the age bracket of 41-50 years constituted the largestage class of about 32.6% of the total oilpalm farmers.The mean age was 49.19. It implies that most of the oilpalmfarmers are middle age and can be regarded as active and agile in agricultural activities. 93.7% of the farmers had one form of formal education or the other and only about 6.2% of the farmers had no formal education. This suggest therefore that there isa relatively high level of literacy among the farmers and which might have positive effects on the farmers' determination to adopt improved technologies. About 56.5% of the total oilpalm farmers had household size of 5-8 people intheir household with mean household size of 6.69 people per household and could be said to be large on the average. It implies that more labour would be available for farming activities. 31.0% of the farmers had oilpaim farming experience ofbetween 11-15. years, while 25.5% and 23.3% had 6-10 and 16-20years of farming experiences respectively. The mean farming experience was 16.01 years. 46.6% of the oilpalmfarmers having farming as their major source of income while 30.7% and i6.5% engaged in business/trading and wage labour respectively besides farming as their major source of income. However, majority of the oilpalm farmers 38.2% earned monthly income of less than 50,000.00 and with mean monthly income of 30,800.00.

Table 1: Distribution of Farmers Socio-Economic characteristics

Variables	Freg.	(%)
Sex		
Male	256	79.5
Female	66	20.5
Age		
21-30	20	6.2
31-40	59	18.3
41-5.0	105	32.6
51-60	93	28.9
Above 60	45	14.0
(Mean Age = 49.19)		
Marital Status		
Single	37	11.5
Married	249	77.3
Divorced	19	5.9
Widowed	17	5.3
Education level		
No formal Education	20	6.2
Primary Education	60	18.6
Secondary Education	127	39.5
Higher Education (OND, HND, Degrees)	115	35.7
(Mean Education level = 3.06)		
Household Size (No. of Persons)		
1-4	54	16.8
5-8	182	56.5
9-12	58	18.0
13 persons and more	28	8.7
(Mean Household size = 6.69)		
Farming Experience (years)		
1-5	19	5.9
6-10	82	25.5
11-15	100	31.1
16-20	75	23.3
20 years above	46	143
(Mean Farming Experience = 16.01)		
Farmers Monthly Income Level (₦)		
<₦50,000.00	123	38.2
₦50,000.00-100,000.00	73	22.7
₦ 101,000.00-150,000.00	39	12.1
₦ 51,000.00-200,000.00	35	10.9
Above ₦200,000.00	52	16.1
(Mean Monthly Income = 30,800.00)		

Level of Adoption of Improved oilpaJm technologies among the farmers

The level of adoption refers to the intensity of use of improved technology by fanners and measured by using the adoption scores. Estimating the level of adoption that is the proportion of farmers that used the technology is an essential step in assessing the impact of a technology. Data in Table 2 showed the level of adoption improved oilpalm technologies among the farmers and to what extent the oilpalmfarmers adopted the improved oilpalm technologies in the study area. The result in Table 2 indicated thatoilpalm plantation management techniques (weed control, pruning of palm leaves, mulching) $\bar{X}$=5.46, had the highest level of adoption closely followed by use of oilpalm plantation establishment/planting methods (9m x 9m triangular spacing planting method) $\bar{X}$ =5.09 and improved oilpalm planting material (hybrid oilpalm tenera seeds/seedlings) x=5.07; Harvesting methods of oilpalm fruits (use of harvesting chisel and hook knife) $\bar{X}$ = 4.9, fertilizer application methodsin nursery and plantation palms $\bar{X}$ = 4.48, and small scale palm oil processing $\bar{X}$ = 4.12, level of adoption were recorded. Palm wine tapping and palm wine bottling/preservation techniques with mean level of adoption of $\bar{X}$ = 1. 72 and $\bar{X}$ = 1.18, respectively are the less adopted by the farmers.It was observed at the

trial stage;only 1.2% and 5.9% of the farmers had trials for oilpalm nursery establishment techniques and pest/disease control methods respectively. While L6%, of the farmers had interest for palm wine tapping techniques; only 0.6% had interest for palm wine preservation and bottling techniques. At the evaluation stage of the adoption process, the farmers did not evaluate any of the oilpalm technologies.

The high level of adoption ofthese improved oilpalm technologies indicated that farmers in the study area are well educated, having high awareness and better access to information and other resources on the improved oilpalm technologies. The result revealed. that the technologies the farmers adopted were those they had awareness. These farmers' awareness could probably due to the fact that these technologies increase yield of theoilpalm and invariably enhance their livelihood and the cultural practices of the crop could be accomplished by use of family labour/hired labour. This result confirmed the views and findings of different studies that for adoption of improved technologies to take place, there. must be awarenessof those technologies (Asiabaka et al., 2001; Agwu,2002) and Ajayi, 2002). The high adoption level recorded for the oilpalm technologies also indicated that the farmers had good chances of making money through high yield and probably dueto the material nature ofthe technology of transfer (Swanson, 1996). The high level of adoption. could have been influenced also probably by the same determinants of the technologies' attributes of Its compatibility with the farmers' existing farming practices, profitability and/or simple or easy nature ofthe technology. This result further confirmed the findings of Asiabakaand MicheIle (2002), in their study of adoption behavior of rural farmers in Nigeria, that technology attributes are significant determinants offarmers' adoption behavior. Farmers are also known tobe more likely to adopt a technology when the technology is simple, has comparative advantage, compatible with the farmer's existing farming practices, its availability and affordable (Rhoades, and 1992; Asiabaka and Michelle, 2002). Also the high adoption level with regard to these oilpalm technologies' components could be associated with the farmers' high awareness of the fact that these technologies increase yields and invariably enhance their livelihoods and its cultural practices could be accomplished by use of family labour and/or hired labour.

Table 2: Percentage distribution of oil palm farmers by level of adoption of improved Oil palm technologies in the study area

S/N	Oilpalm Technologies	Not Aware (1) Freq.(%)	Aware (2) Freq.(%)	Interest (3) Freq.(%)	Evaluation (4) Freq.(%)	Trial (5) Freq.(%)	Adoption (6) Freq.(%)	Mean $\bar{X}$
1	Improved Oilpalm planting materials oil palm Tenera seeds/seedlings)	55(17.1)	6(1.9)	0(00)	0(00)	0(00)	261(810)	5.07
2	Oilpalm nursery establishment techniques use of polythene bags nursery (Double & single stage nursery methods)	92(28.6)	13(4.0)	0(00)	0(00)	4(1.2)	213(662)	439
3	Oilpalm plantation/field establishment/planting methods: 9m x 9m triangular spacing planting	53(16.5)	7(2.2)	0(00)	0(00)	0(00)	262(81.3)	5.09
4	Oilpalm plantation management techniques (methods of weed control; pruning of palm leaves; mulching	29(9.0)	6(l.9)	0(00)	0(00)	0(00)	287(89.1)	5.46
5	Harvesting methods of Oilpalm fruits: use of harvesting chisel, hook knife.	54(16.8)	21 (6.5)	0(00)	0(00)	0(00)	247(76.7)	4.9
6	Small-scale palm oil processing methods-: use of digester screw press mill; nut cracker/nut cracker separator	92(28.6)	36(11.2)	0(00)	0(00)	0(00)	194(60.2)	4.12
7	Fertilizer application methods: in nursery and plantation palms	68(21.1)	37(11.5)	0(00)	0(00)	0(00)	217(67.4)	4.48
8	Pests/Disease control methods for nursery and plantation palms	101(31.4)	22(6.8)	0(00)	0(00)	19(5.9)	80(55.9)	4.09
9	Palm wine tapping techniques Palm wine preservation and bottling	239(74.2)	48(14.9)	5(1.6)	0(00)	0(00)	35(10.9)	1.72
10	techniques: use of crown cork glass bottles and plastic bottle	263(81.7)	54(16.8)	2(0.6)	0(00)	0(00)	3(0.9)	1.18

Source: Field survey, 2018 Percentages in parenthesis (Multiple responses recorded)

Identification of farmers' Oilpalm Livelihood activities in the study area

Table 3 identified various oilpalm livelihood activities and their importance to the farmers' well-being in the study area is summarized in table 4.19. The result revealed that about 55.3% of the farmers identified oilpalm field establishment and cultivation activities $\bar{X}$= 3.51 and ranked 5thas very important livelihood activities. Oilpalm fruits harvesting activities ($\bar{X}$ = 3.56) ranked 2ndwas also very important livelihood activities to 62.1 % of the farmers in study area. Although 60.90% of the farmers identified palm oil milling/processing activities as very important with $\bar{X}$= 3.52 and ranked 4th, Basket weaving, $\bar{X}$= 2.34, ranked 11thand Rope making $\bar{X}$= 2.21, ranked 12thwere not important livelihood activities to 36.3% and 37.3% of the farmersrespectively in the study area. Also, while palm wine tapping $\bar{X}$= 2.17, ranked 13thand local gin(ogogoro) distilling $\bar{X}$= 2.05, ranked 14th were less important livelihood activities to over 68.9% and 70.8% of the farmers respectively, on-farm employment (hired farm labour) $\bar{X}$= 3.25 ranked 7th was very important livelihood activities to about 86.9% of the respondents in the study area. Moreover, for the non-from oilpalm production livelihood activities, marketing of palm produce (palm oil, kernel, palm fruits, etc.) $\bar{X}$= 3.65, ranked 1st and Transport operation of oilpalm produce/products $\bar{X}$= 3.5, ranked 2ndwere also very important livelihood activities to 67.1 % and 66.1 % of the farmers respectively.

The result clearly revealed that there was a high cluster of farmers around such livelihood activities as marketing of palm products (palm oil, palm kernel, palm fruits): $\bar{X}$= 3.65, ranked 1stfollowed by oilpalm fruits harvesting $\bar{X}$= 3.58 and Transportation of oilpalm produce/products $\bar{X}$= 3.58 both ranked 2ndrespectively as major livelihood activities among the farmers in the study area. This involvement of farmers around these oilpalm production. activities, on-farm and off-farm made it as major vocation for many households. This implies that oilpalm production has the potentials to meet the basic needs of the farmers, increase their income, employment generation, reduce poverty and raise their living standard. Thus, oipalmproduction/cultivation activities in the study area have formed part of the culture and ameans of livelihood for many families and also serve as a bailing out of poverty.

Table 3: Percentage distribution of farmers' perception according to the importance of oilpalm livelihood activities

S/N	Oilpalm Livelihood Activities	Very important Freq (%)	Important Freq (%)	Less Important Freq (%)	Not Important Freq (%)	Mean Score $\bar{X}$	Rank Order
	On-farm Oilpalm Activities						
1	Oil plantation field establishment/cultivation	178(55.3)	132(41.0)	11(3.4)	1(0.3)	3.51	5th
2	Oilpalm nursery establishment activities	148(46.0)	109(33.9)	43(13.4)	22(6.8)	3.19	8th
3	Palm oil milling/processing activities	196(60.9)	103(32.0)	18(5.6)	5(1.6)	3.52	4th
4	Palm kernel cracking	147(45.7)	138(42.9)	24(7.5)	13(4.0)	3.30	6th
5	Oilpalm fruit harvesting	200(62.1)	112(34.8)	6(1.9)	4(1.2)	3.58	2nd
6	Palm wine tapping	36(11.2)	65(20.2)	138(42.9)	83(25.8)	2.17	13th
7	Local gin (Ogogoro) distilling	28(8.7)	66(20.5)	123(38.2)	105(32.6)	2.05	14th
8	Broom making	74(23.0)	123(38.2)	97(30.1)	28(8.7)	2.75	10th
9	Basket weaving	30(9.3)	112(34.8)	117(36.3)	63(19.6)	2.34	11th
10	Rope making	34(10.6)	84(26.1)	120(37.3)	84(26.1)	2.21	12th
	Non-farm Oilpalm Activities						
11	Transportation of oilpalm produce/products	213(66.1)	88(27.3)	16(5.0)	5(1.6)	3.58	2nd
12	Fabrication of oulpalm processing equipment	89(27.6)	121(37.6)	77(23.9)	35(10.9)	2.82	9th
13	On-farm employment (hired farm labour)	126(39.1)	154(47.8)	40(12.4)	2(0.6)	3.25	7th
14	Marketing of farm produce (palm oil, kernel, palm fruits)	216(67.1)	102(31.7)	1(0.3)	3(0.9)	3.65	1st

Source: Field survey, 2018 Percentages in parenthesis (Multiple responses recorded)

Assessment of Impact of adoption of improved oilpalm technologies on farmers' livelihood:

The data in Table 4 presents descriptive analysis of the impact of adoption of improved oilpalm technologies on farmers' livelihoods in the study area. The result indicates generally that there was high impact as reflected by the farmers' perceived impact ratings at both household and farm levels as shown in Table 4. The findings revealed at household level that about 46% and 40.7% of the farmers strongly agreed and agreed respectively that there Was increase farmers income (Savings/financial independent) with mean score($\bar{X}$) impact rating of 4.21, indicating high impact. Also about 50.9% and 54.7% of the farmers agreed that there was improved food security ($\bar{X}$=4.06), and improved household nutrition ($\bar{X}$ =3.88) impact ratings respectively and indicating high to very high impact among the farmers in the study area

The result further indicated that there was Improved farmers' material well-being from the acquisition of assets:- house, cars, Tv, household items, etc., among 43.5% of the farmers who recorded agreed at $\bar{X}$=3.60 impact rating. While another 44.4% of the farmers agreed that there was increased financial contribution to family needs (children education, health care, provision of food, etc.) with $\bar{X}$ =4.00, impact rating; about 45.3% of other farmers agreed also that therewas an enhanced farmers' decision making ($\bar{X}$ =3.84) impact rating.

Furthermore, at the Farm level impact indicators, high impact ratings were observed among 51.6% of the respondents who agreed that there was oilpalm varietal replacement with recorded mean score of $\bar{X}$=3.87. Besides, 42.5% and 43.5% of the farmers strongly agreed and agreedrespectively, that there was increased farm yield (increased farm outputs) recorded $\bar{X}$= 4.18 impact rating in the study area. The data also revealed at Farm level that only about 19.5%ofthe farmers strongly disagreed/disagreed that there was reduced farmer's vulnerabilitytorisks theft of palm produce, bush fire, etc. compared to 48.1% of the farmers who agreed to reduced farmers' vulnerability at $\bar{X}$=3.40 impact rating recorded, While 44.7% ofthe farmers agreed that there was decrease soil fertility in their farms with recorded $\bar{X}$ =3.48 impact rating, 46.6% of other farmers strongly agreed that there was increased on-farm employment ($\bar{X}$=3.92) impact rating and among other livelihoods impact indicators as perceived by the farmers in the study area (Table 4).

It must be noted that impact can be positive or negative. Therefore, not all impact rating as expressed in the findings of this study had positive impact on the farmers' livelihoods. There are also negative impacts to the farmers' livelihoods in thestudy area. For example, the result shows that reduced farmers' vulnerability to risk, theft of farm products and bush fire had negative impact on over 63.3% of the farmers. Also decrease soil fertility on farmers' significant negative impact on over 44.7% of the farmers In the study.

The result recorded in this study Table 4 implies that the technologies had Impacted positively on the livelihoods of the farmers. Thesepositive impacts ofoilpalm technologies adoption on farmers' livelihoods stemmed from the different opportunity created by oilpalm production activities provided to the rural people as means of livelihoods.This is probably let to the impressive diffusion and high level of adoption by more farmers.

The adoption impact of oilpalm technologies led to changes in factors' productivity, increase in yields, increase farmers' income, improved food security among households and improved farmers' material well-being. It also led to farm: expansion of the oilpalm, including oilpalm varietal replacement and contributing to significant increase in farm employment.

Implicitly, Oilpalm production activities have great potential as means of livelihood as its serves as a major vocation for many communities in the oilpalm growing areas of Nigeria. It implies therefore, that an efficient and strong oilpalm agricultural subsector in Nigeria will enable the rural poor smallholder farmers to be part of the solution to poverty challenges through the provision of employment and a means of livelihood. The justification for this is probably dueto the numerous ways in which the oilpalm can be used and many would be employed in the process.

Table 4 Distribution of farmers according to perceived Impact of adoption of improvedoilpalm technologies on farmers' livelihood at Household and Farm levels

	Statement	**Farmers' Response**					
S/N	**Household Level Impact Indicators**	**Strongly Agreed Freq (%)**	**Agree Freq (%)**	**Undecided Freq (%)**	**Disagree Freq (%)**	**Strongly Disagree Freq (%)**	**Mean Score $\bar{X}$**
1	There is increase farmers income (saving/financial independent)	148(46.0)	131(40.7)	12(3.7)	24(7.5)	7(2.2)	4.21
2	There is improved food security	111(34.5)	164(50.9)	8(2.5)	33(10.2)	6(1.9)	4.06
3	There is improved nutrition	76(23.6)	176(54.7)	31(9.6)	34(10.6)	5(1.6)	3.88
4	There is improve farmers' material well-being (properties Acquisition-houses, cars, TV, motor cycle etc.	80(28.4)	140(43.5)	22(6.8)	52(16.1)	28(8.7)	3.60
5	There is increase financial contribution to family needs (children education, health care, provision of food etc.)	121(37.6)	143(44.4)	14(34)	26(8.1)	18(5.6)	4.00
6	There is an enhanced farmers' decision making	87(27.0)	146(45.3)	43(13.4)	43(13.4)	3(0.9)	3.84
	Farm Level Impact Indicators						
7	There is increased farm yield (output)	137(42.5)	140(43.5)	15(4.7)	27(8.4)	3(0.9)	4.18
8	There is oilpalm varietal replacement	83(25.8)	116(51.6)	31(9.6)	31(9.6)	11(3.4)	3.87
9	Farm expansion/land use	68(21.1)	162(50.3)	37(11.5)	48(14.9)	7(2.2)	3.73
10	There is increased use of inputs	95(29.5)	151(46.9)	25(7.8)	44(13.7)	7(2.2)	3.88
11	Increase farmers' knowledge	150(46.6)	133(41.3)	20(6.2)	18(5.6)	1(0.3)	4.28
12	Increase on farm employment was significant	90(28.0)	150(46.6)	49(15.2)	31(9.6)	2(0.6)	3.92
13	Availability of wild vegetation due to intensification of oilpalm production	61(18.9)	119(37.0)	56(17.4)	78(24.2)	8(2.5)	3.46
14	There is reduced farmers vulnerability to risk, theft, bush fire etc.	49(15.2)	155(48.1)	23(7.1)	61(18.9)	34(10.6)	3.40
15	Soil fertility decreased significantly	54(16.8)	144(44.77)	38(11.8)	74(23.0)	12(3.7)	3.48

Source: Field survey, 2018 Percentages in parenthesis (Multiple responses recorded)

Result of hypothesis testing

Ho 1: The Pearson Product Moment Correlation (PPMC) was used to analyze this hypothesis that: there is no significant relationship between fanners' perceived -impact of livelihood and adoption of oilpalm technologies by fanners in the study area. The result in Table 5 showed that Correlation Co-efficient (r) between farmers perceived impact of improved oilpalm technologies on farmers' livelihood and adoption of oilpalm technologies was 0.454 (45.4%) r = 0.454 (45.4%). This implies that in terms of strength and direction, there was asignificant and positive relationship between farmers' perceived impact of oilpalm technologies on farmers' livelihood and adoption of oilpalm technologies at p-value of < 0.001. Therefore, the hypothesis that states that there is no significant relationship between farmers' perceived impact on livelihood and adoption oilpalm technologies by the farmers was rejected in favour of the alternative hypothesis.

Table 5 Result of Pearson Product Moment Correlation (PPMC) analysis of relationship between farmers perceived impact of livelihood and adoption of improved oilpalm technologies

Items	Mean	Std.D	R	Sig	Decision
Farmers' Perceived Impact	11.6667	2.33140			
Adoption of Oilpalm Technologies Components	32.2298	8.76502	0.454	<0.001	Significant

Source: Computed from Field Survey Data, 2018.

Correlations

		Farmers Perceived Impact	Oil palm Technologies
Farmers' Perceived Impact	Pearson Correlation		.454**
	Sig. (2-tailed)	322	.000
	N	322	322
Adoption of improved oilpalm Technologies	Pearson Correlation	.454**	1
	Sig. (2-tailed)	.000	
	N	322	

** Correlation is significant at the 0.01 level (2-tailed).
Source: Field Survey Data, 2018.

H_{02}: The Ordinary Least Square Regression analysis (OLS) was used to detect, the relationship between the socio-economic characteristics and farmers' perceived impact of oilpalm technologies at household and farm level.The result in Table 6 showed the-co-efficient of each contributing variables: Regression equation given as: Perception = 50.65 + 0.05* sex - 0.1378* age + 1.153* marital status + 0.556* household size - 0.0127* farming experience + 0.0117*Farm size - 1.828* education level + 0.4441* oilpalm plantation types. The coefficient of determination R- Square (R^2) was 79.67% and the Adjusted R- Squared (R^2-adjusted) taken at 95% confidence value was 76.35%. The hypothesis which states that there is no significant relationship between socio-economic characteristics of farmers and farmers' perceived farmer's impact at household and farm level was rejected in favour of the alternative hypothesis at p-value < 0.001. The result in Table 6 indicates that the coefficient of age p-value = 0.004, household size (p-value <0.001), farming experience (p-value =0.008), and educational level (p-value <0.001) correlated positively and significantly with farmers' perceived impact of improvedoilpalm technologies at household and farm levels. The Regression co-efficient of sex p-value 0.966, marital status p-value 0.117 and farm size p-value 0.867 are statistically positive but not significant at p-value < 0.001. This implies that farmers in the study area who are advanced in age were likely to perceived more impact from engaging in oilpalm production activities than the younger fanners. This might due to the fact that the older farmers are more exposed and experiences; therefore, more increase in their productivity engaging in oilpalm livelihood activities. The higher educational level of farmers also implies more impact as higher education influence adoption. The longer years of farming experience also implied more impact; and larger household size indicated the needed labour required to carry out farm activities therefore, increase income and more impact derivable by the farmers.

Table 6: Result of Ordinary Least Square Multiple Regression Analysis of relationship between some selected socio-economic characteristics and farmer's perceived impact oilpalm technologies at household and farm levels

Term		Adj SS	Adj MS	Coef	SE Coef	T-Value	P-Value	VIF	F-Value	R-sq	R-sq(adj)
Constant	8	1786.3	223.289	50.65	3.44	14.72	0.000		4.17	79.67	76.35
Sex	1	0.1	0.096	0.05	1.07	0.04	0.966	1.11	0		
Age	1	442.8	442.798	0.1378	0.0479	-2.88	0.004*	1.71	8.28		
Status	1	132.0	131.971	1.153	0.734	1.57	0.117	1.3	2.47		
Household	1	662.4	662.435	0.556	0.158	3.52	0.000*	1.21	12.38		
Farming Exp	1	332.1	323.142	0.0127	0.0522	-0.24	0.008*	1.05	0.06		
Farm Size	1	1.5	1.51	0.0117	0.0697	0.17	0.867	1.11	0.03		
Education	1	746.8	746.799	-1.828	0.489	-3.74	0.000*	1.13	13.96		
Error	312	16694.5									
Total	320	18480.8									

* Significant predictor Source: Computed from Field Survey Data, 2018.

CONCLUSION AND RECOMMENDATIONS

The study was carried out to assess the impact of adoption of improved oilpalm technologies on farmers' livelihood in south-south, Nigeria. TIh study revealed that oilpalm technologies adoption had positive impact on the farmers' oilpalm livelihood activities. Thus the adoptionof oilpalm technologies has the ability to increase the farmers' income, employment generation, meet farmers' basic needs and improve their welfare and farmers' standard of living. It was observed from the findings of the study also that majority of the oilpalm farmers operated and/or have small oilpalm farm holdings. It was therefore recommended that farmers should be encouraged to increasetheir scale of production through land policy review and the provisionof more farm land by the government to the farmers, Also input subsides and financial grants in credit and loans should be given to farmers.

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