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INFORMATION FLOW ON AGRONOMIC PRACTICES AMONG OIL PALM FARMERS IN DELTA STATE, NIGERIA

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ABSTRACT

The study focused on information flow on improved agronomic practices among oil palm farmers in Delta State, Nigeria. A multi-stage sampling procedure was adopted in selecting 90 respondents and data were collected with the aid of well-structured and validated questionnaire. The data obtained from the study was analyzed using simple descriptive statistics such as frequency counts, means, standard deviation and percentages while the logit regression was used to test the hypothesis. The results of the study showed that majority (95.6%) of the respondents were males, small farm holders and 61.1% in the middle age group; literacy level of the respondents was also low. The regression analysis showed that age, marital status, education, gender and farm sizes significantly (P < 0.05) influenced the access of information to oil palm farmers in Delta State, Nigeria. There is the need for extension agents to intensify effort in improving, educating, and encouraging the farmers to share information on improved agronomic practices among themselves.

Key Words: information flow, oil palm, agronomic practices, Delta State
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INTRODUCTION

Oil palm (*Elaeis guineensis* (Jacq), is indigenous to Nigeria and a native to West Africa (Ikuenobe, 2010). Oil palm was and is still a major export crop in Nigeria and is one the most commonly used oil crop in the world with great potential for production of biofuel and high energy balance (Fairhust and Mutert, 1999). The importance of oil palm is obvious in the palm oil yield per hectare which depends on the nature of planting materials utilized coupled with good agronomic practices (Anaglo *et al*, 2014). Most of the land devoted to oil palm production comes from a large number of private small-scale holdings. About 34 percent of the world's annual production of vegetable oil and 63 percent of the global exports of vegetable oils is from palm oil (Initiative for Public Policy Analysis, 2010). Among the

vegetable oil crops, oil palm possesses the highest oil yield per hectare. The oil palm industry has can be one of the agriculturally leading foreign exchange earners for Nigeria. Nigeria used to be the largest exporter of palm oil. Between 1966 and 1970 (period of the civil war) and beyond, Nigeria is no longer the largest exporter of palm oil while Indonesia and Malaysia had surpassed Nigeria and indeed Africa's total palm oil output. Ninety percent of global production of palm oil occurs in South-East Asia in Indonesia, Malaysia and Thailand. Nigeria is currently the third largest producer of palm oil in the world after Indonesia and Malaysia; however it remains a net importer. Thus the oil palm tree although very productive and indigenous to West Africa remains under-utilized in many farms in the region.

Despite the extensive development of the oil palm sector in Nigeria, the yields per unit area are still very low. This may be circumvented through good agronomic practices, which includes, land preparation, nursery practices, appropriate field lay out (Hartley, 1988; Corley and Tinker, 2003), improvement of soil fertility through the use of organic and inorganic fertilizers, recycling of some of the waste (Goh and Chew, 1995; Khalid *et al*, 2000; Coley and Tinker,2003; Rupani *et al*, 2010), spacing in the field, pruning, maintenance of soil cover with leguminous crops and perhaps intercropping before canopy covers ((Aya and Lucas, 1977 ; Ofoh and lucas, 1988) and enhances productivity of the groove (Omoti, 2009). Moreover, integrated pest management (IPM) enhances sustainable pest control, improves fruit yield, their biological balance and when supplemented with appropriate disease control and timely harvesting of fruit from the field and maximizes quality of the palm produce.

Oil palm producers in West Africa especially Delta State have limited access to the knowledge that plantations farmers in South-East Asia have gathered over decades in intensifying yields with fertilizer and other agronomic practices. For most small to medium-scale oil palm farms in Nigeria and the sub-region once planted, oil palm trees in the plantation are not cared for as par weeding, pruning, fertilizer application and plantation replacement. Plantation owners and farmers neglect the farms and only go occasionally to harvest a few fruits. What could be adduced for these poor agronomic practices may be lack of information or poor access of oil palm farmers to sources of information. Different information sources are available to farmers in general and oil palm farmers in particular (Oladele, 1999; Agbamu, 2006). Sources of information available to farmers include mass media (radio, television, print media and traditional media) (Agbamu, 2006; Oso,1993; Folarin, 1993; Omotayo, *et al*,1997; Obibuaku,1983; Nwachukwu,2003; Adebayo,1997). According to Oladele (1999), the efficacy of technologies/innovations generated and disseminated depends on effective communication which is the key process of information flow. It is expected that the message from the client (effect) be passed back to the source or research (feedback) for the communication process to be complete.

There are several factors affecting farmers' access to information on farm practices. These factors include: illiteracy, cost of accessing the information, complexity of the information, compatibility with beliefs and values, among others. Most farmers in Nigeria are illiterate; this may cripple the ability to access information on best management practices. Ferrand *et al*

(2004) asserted that transaction cost must be incurred in order to access information; and because of this cost, most farmers may not be able to gain access to relevant information.

Farmers equipped with best management practice skills have good opportunities to boost yield and profitability on existing land, and this can only be possible if the right information flows to oil palm farmers. If best practices are adopted the oil palm industry in Nigeria in general and Delta State in particular, a huge potential to grow through increased production and possible export of crude palm oil exist. It is possible to increase palm oil production in West Africa especially among smallholder.

A number of improved oil palm production practices and a number of technologies have been introduced to help small-scale oil palm farmers boost yield and improve their livelihoods. This includes improved production practices which comprise improved oil palm planting materials, lining and pegging, rodent control measures, use of live mulch, fertilizer management, pruning, weed control management and harvesting (Unilever, 2010; Sustainable Palm Oil, Good Agricultural Practice Guidelines, 2007). These technologies, when adopted could lead to improved livelihood assets such as physical, financial, natural, social and human capital. However, not all innovations adopted have impacted positively on adopters. Literature shows that negative influences and environmental impacts are associated with modern technologies such as high yielding varieties and chemical use of fertilizers (IFPRI, 2002). There is evidence that adoption of improved production practices can boost yields which in turn can improve upon the acquisition of livelihood assets (IFPRI, 2002; Rahman, 2002). This should have motivated farmers to adopt the improved production practices. Nevertheless, if information on these modern practices does not get to farmers, they can scarcely adopt them. However, there is yet any study carried out in Delta State to ascertain whether information on improved practices flowed to and are used by oil palm farmers. Moreover, farmers' access to modern agronomic practices has not been ascertained. This study therefore attempts to assess the flow of information on improved oil palm production practices in Delta State, Nigeria. The primary objective is to determine information flow on agronomic practices among oil palm farmers in Delta State. The specific objectives were to:

i. examine socio-economic factors relating to the adoption of improved oil palm production practices.

ii. determine the various sources of information on agronomic practices to farmers

iii. determine the nature of agronomic information available to oil palm farmers in the area.

iv. determine the proportion of farmers that have access to information on improved oil palm production practices.

v. ascertain the level of information flow on agronomic practices to oil palm farmers.

vi. determine the nature of constraints hampering the flow of information among oil palm farmers.

The following hypothesis stated in the null form was tested: Ho there is no significant relationship between some selected variables and farmers access to information on agronomic practices in oil palm.

RESEARCH METHODOLOGY

Study Area: The study area was Delta state, Nigeria. Delta State is situated in the Niger Delta floodplain on the coast of Nigeria. It comprises twenty five (25) local government areas. Delta state shares common boundaries with Imo and Anambra States to the North-East, Ondo and Edo States to the North-West, Bayelsa and Rivers to the South-East. In the South and South-West Delta State bounded by the Bight of Benin on the Atlantic Ocean with approximately 122 kilometers of coast line. Delta State is located between longitude $5^{o}00'$ and $6^{o}45'$ East and latitude $5^{\circ}00'$ and $6^{\circ}30'$ North of the equator. Delta State has a total land area of 18,050 square kilometers with one-third as swampy and waterlogged with an estimated population of 4, 098,291 (NPC, 2006). The state is divided into three agricultural zones namely, Delta South, Delta North and Delta North.

Delta State climatic belts comprise the following, namely: derived savannah; mangrove forest and coastal vegetation; freshwater swamp forest and lowland rain forest. There are two distinct seasons, namely: the relatively long wet season (March to October) and the dry season (late November to March). The dry season is usually characterized by harmattan (in December or January). The mean annual rainfall ranges from over 4000 mm in the coastal areas to 1500 mm inland. Mean annual temperatures range from 21 ºC to 33 ºC (NIMET, 2011).

Sampling Techniques and sample size:

Ninety respondents were purposively selected from predominantly oil palm producing areas. The state was stratified into three subgroups based on the three agro-ecological zones.

Data Collection: The primary data were collected and used for this study. Primary data were collected using a well-structured and validated questionnaire and oral interview while secondary sources of information were obtained from past studies, books, internet, etc. The instruments for primary data collection included a five point Likert's scale with values: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1= strongly disagree. From equal to or greater than three points (≥ 3.0) was regarded as serious while lower than 3.0 as not serious based on the variables measured (Akwiwu *et al,* 2000).

Data Analysis and Presentation: The data obtained from the study was statistically analyzed using Statistical Packages for Social Sciences (SPSS) software version 16 for simple descriptive statistics such as frequency counts, means, standard deviation and percentages while the inferential statistics {logistic regression (binary logit) }was also used to

test the stated hypothesis. The dependent variable used in this study is farmers' access to information on agronomic practices of oil palm. It is binary indicating whether or not a farmer has access to information. The set of explanatory variables hypothesized to influence farmers' access to information includes age (AG), gender (GE), education (ED), marital status (MS), farming experience (FE), farm size (FS), household size (HS), and monthly income (MI).The empirical model for determining the factors influencing foil palm farmers' access to information is explicitly specified as follows:

$$p\ (Y = 1) = \frac{e^{\beta x}}{1+e^{\beta x}} \quad \text{..... (1)}$$

$$p(Y = 0) = 1 - \frac{e^{\beta x}}{1+e^{\beta x}} = \frac{1}{1+e^{\beta x}} \quad \text{..... (2)}$$

The logistic regression equation can be explicitly specified as:

$Yi = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + et$

Where: Yi = the dependent variable defined as having access to information by oil palm farmers Y = 1 and 0 otherwise; b_0 = constant and intercept of the equation; X_1 = age of the respondent, X_2 = gender; X_3 = educational level; X_4 = marital status; X_5 = farming experience; X_6 = farm size; X_7 = household size; X_8 = monthly income and et = stochastic error term.

According to Harrell (2001), binary logit has only two categories which are event A and non-event A as the response variable. Further, Harrell (2001) also showed a relationship between a set of explanatory (predictor) variables (X's) to a dichotomous response variable Y(ln

(Pi/1 – Pi). The dichotomous response variable Y= 0 or 1 with Y=1 denotes the occurrence of the event of interest while Y=0 denotes otherwise. The indicators and bound variables, also known as dummy variables, characterize dichotomous responses. In this study, since only two options were available, namely ''access to information" or "no access to information" a binary model was set up to define Y= 0 for situations where the farmer did not have access to information and Y=1 for situation where the farmer had access to information. Assuming that **X** is a vector of explanatory variables and *p* is the probability that Y=1, two probabilistic relationships as stated by Wooldridge (2009) are thus considered as follows:

$$\text{Logit } [\Theta(x)] - \log\left[\frac{\Theta(x)}{1 - \Theta(x)}\right] - \alpha + b_1x_1 + b_2x_2 + ...b_nx_n \qquad (3)$$

RESULTS AND DISCUSSION

Socio – Economic characteristic of oil palm farmers

The results of the socio-economic characteristics of oil palm farmers are indicated in Table 1; 22.2% of the respondents falls within the age group of 51 - 60 while 33.3% falls above 60

years of age. Thus, majority of the respondents were within the economically active age group which could have positive effect on adoption of innovation or modern techniques (Rahman *et al* 2002). Majority of the respondents were males (95.6%) while only 4.4% were females. This may be connected with the perennial nature of tree crops which often leads to permanent holding on land which traditionally are owned by men. This is in tandem with Solomon (1994, 2008) on oil palm farmers in Ondo state, Nigeria.

The study indicates that 80.0% of the respondents were married, 6.7% of the respondents were never married, 4.4% of the respondents are widow and finally 5.6% of the respondents are divorced or separated as shown in Table 1. The results in Table 1 further reveals that almost all the respondents (96.7%) have one form of formal education or the other. Moreover, 6.7% of the respondents earn less than 20,000, 62.2% of the respondents earn between 20000– 40000, while 31.1% of the respondents earn over 40000 as shown in Table 1. Most of farmers have a lot of experience in farming. No oil palm farmer sampled had farming experiences less than 6 years. This agreed with Rahman *et al* (2002) who posited that length of time of farming business are linked to the age of farmers, access to capital and experience in farming explains the adoption of new technology innovations. Thus, majority of the interviewed are interested in sourcing information on best practices. Farm size of the farmers in the study area was rather small, majority of the farmers (71.1%) have between 1 to 10 hectares. According to Alamu *et al* (2002) farmers with more resources including land are more likely to take advantage of a new technology. Fragmentation due to land tenure systems, nearness to farms and resource endowment of farmers may be responsible. This result agreed with Onemolease (2005) who posited that the average farm size was less than 10 hectares in Edo State. Also, Okunlola and Adekunle (2000) observed that 53% of Nigerian farmers have less than 4 hectares of land while Koyenikan (2002) indicated that the average farm size for tree and arable crops such as oil palm, kolanuts and cocoa was 1.45 hectares in Ondo State. The implication is that majority of the oil palm farmers operate small holdings. For a tree crop like oil palm, it could be concluded that the farm size in the area is very small.

Sources of information on improved practices

Results in Table 2 indicate that friends/relatives (M=3.89; S=0.53), Research institute (M=3.88; S=0.62), Agricultural development programmes (ADPs) (M =3.76; S=0.45), Local government departments of agriculture (M=3.52; S=0.81), radio (M=3.22; S=0.55), Television (M=3.01; S=0.48), Print media (M=2.77; S=0.41) were the major sources of information on production practices by oil palm farmers in Delta state. Use of mobile phones (M=2.34; S=0.76), seminars/workshops (M=2.11; S=0.58), extension agents (M=1.87; S=0.44), and computers/internets (M=1.56; S=0.51) were regarded as minor sources of information to the oil palm farmers. This is in tandem with Oladele (1999) Nwachukwu (2003) and Agbamu (2006) on different sources of information available to farmers.

Nature of information utilized by oil palm farmers

The results in Table 3 indicates that the commonly utilized sources of information are those on utilization of improved varieties, good spacing, chemical control of weeds, and processing

techniques. All the farmers utilize information on these practices. Ninety percent of the farmers utilize information on harvesting techniques, while no farmer in the study area received and utilize information on irrigation. Rahman (2002) posited that adoption of improved production practices led to increase in yield.

Constraints militating against the Free flow of information

Table 4 shows constraints facing the oil palm farmers in acquiring information. Respondents agreed that cost of gaining access to information (X = 4.30) and complexity of the information source (X= 3.80) were the most serious constraints encountered by the oil palm farmers. Illiteracy, compatibility of the information to farmers' practices and others were not regarded as serious constraints. This cost of access to information may have probably reduced oil palm productivity in Delta State since information is vital for improved farming practices needed for oil palm cultivation.

Socioeconomic determinants of information flow to oil palm farmers

The binary logit model was used to estimate the parameters of the determinants of oil palm farmers' access to information on agronomic practices in Delta state, Nigeria. Table 5 shows the results of the estimated regression model. The Pseudo R-squared value indicates that 79 percent of the variation in the farmers' access to information is explained by the independent variables. The significant Wald chi-square value of 66.00 indicates that the explanatory variables jointly influence farmers' access to agronomic practices. Farmers' access to information on agronomic practices is significantly determined by household size, educational, marital status, farm size, farming experience and monthly income. Apart from household size which was negatively related to farmer's access to agronomic information, the other four variables were positively related to farmers' access to information.

Education level was positively associated with the probability of farmers' access to information. This is probably due to the fact that education enlightens a farmer which can enable him to gain access to information. The result is corroborated by the findings by Tambo and Abdoulaye (2011), Enete and Igbokwe (2009) and Udoh *et al* (2008) who reported that education promotes access to information processing used for increased agricultural productivity.

Household size was negatively associated with access to information. Larger households were less likely to access information. Farmers with larger households usually have many responsibilities which includes ensuring the well-being of the household members. These responsibilities may distract the farmer from sourcing for information.

The probability of farmer's access to information is positively influenced by monthly income. Farmers that earn higher monthly income are more likely to pay for the cost of accessing information than those who earn lower income. The result agreed with the findings of Tambo and Abdoulaye (2011).

An experienced farmer is likely to be a focal point for sourcing information. Most of these farmers are engaged by agricultural development and research organizations. This makes information more available to wide range of farmers that consult them.

Conclusion and recommendation

In this study, an assessment of information flow on agronomic practices among oil palm farmers in Delta State, Nigeria was carried out. The study established that the major sources of information flow to oil palm farmers in the area were friends/relatives, research institutes (NIFOR), ADP, local government areas Departments of agriculture, radio, television print media and mobile phones. Most oil palm farmers in the study area have good access to information on agronomic practices of oil palm in spite of some serious constraints.

However, in the wake of the findings of the study, the under listed are suggested:

1. Farmers should be sensitized on the need of accessing information through the use of print media, mobile phones, internet and other sources not popular in the area
2. Farmers should be encouraged to attend seminars/workshops on oil palm where they can source more information to improve their farm practices.
3. Since extension agents are change agents, extension agents in the state should be increased so as to reduce the extension agent to farmer ratio.
4. Since cost of gaining access to information and complexity of the information source were the most serious constraints encountered by the oil palm farmers, it is suggested that there should be adequate publicity especially through the various sources of information. The information packages on agronomic practices of oil palm should also be broken down or simplified so that most oil palm farmers, if not all, could comprehend the content therein.
5. Information packages and dissemination on the following agronomic practices should be intensified: land preparation, nursery practices, integrated pest control, use of inorganic and organic fertilizers, irrigation, and control of erosion. It is hoped that if these recommendations are effected the prospect of the oil palm industry will be brighter.

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APPENDIX

Variables and their units of measurements

Variable	Measurement	Unit
Access to information	1,access,0 otherwise	Dichotomous
Gender	1,male, 0 otherwise	Dummy
Age	Chronological years	No of years
Marital status	1, married, 0 otherwise	Dummy
Educational level	1,formal education, 0 otherwise	Dummy
Household size	No of people in a house	Number
Farming experience	No of years as oil palm farmer	No of years
Farm size	Size of land under cultivation	Hectares
Monthly income	Earnings of farmers per month	Naira

Table1: Socio–economic characteristics of oil palm farmers in Delta State

S/No	Variables	Frequency (90)	Percentage (%)
1	**Gender**		
	Male	86	95.6
	Female	4	4.4
2.	**Age (years)**		
	Less than 20	5	5.6
	21 – 30	9	10.0
	31 – 40	12	13.3
	41 – 50	14	15.6
	51 – 60	20	22.2
	61and above	30	33.3
3	**Marital status**		
	Never married	6	6.7
	Married	72	80
	Widow/widower	7	7.8
	Separated/divorce	5	5.6
4	**Educational level**		
	No formal education	3	3.3
	Primary school	18	20
	Secondary	28	31.1
	Tertiary	41	45.6

5	**Household size (number)**		
	1- 5	26	28.9
	6 -10	49	54.5
	More than 10	5	5.6
6	**Farming Experience (year)**		
	Less than 5	nil	0.0
	6 – 10	24	26.7
	11 – 15	24	26.7
	16 and above	42	46.6
7	**Farm size (hectares)**		
	1 - 10	64	71.1
	11- 20	22	24.5
	> 20	4	4.4
8	**Monthly income(N)**		
	<20000	6	6.7
	20000-40000	56	62.2
	> 40000	28	31.1

Source: Field survey data, 2014

Table 2: Sources of information to oil palm Farmers

Source	Standard deviation	Mean	Rank of mean
Friends/relatives	0.53	3.89	1st
Research Institute(NIFOR)	0.62	3.88	2nd
ADP	0.43	3.76	3rd
LGA dept of Agric	0.81	3.52	4th
Radio	0.55	3.22	5th
Television	0.48	3.01	6th
Print media	0.41	2.77	7th
Mobile phone	0.76	2.34	8th
Seminars/ workshops	0.58	2.11	9th
Extension agents	0.44	1.87	10th
Computer internet	0.54	1.56	11th
Others	0.88	1.29	12th

Table 3: Nature of Information on Agronomic Practices utilized by Farmers

Agronomic Practice	Frequency*	Percentage
Land preparation	50	55.6
Use of improved varieties	90	100
Recommended spacing	90	100
Nursery practices	28	31.1
Chemical weed control	90	100
Integrated pest control	46	51.1
Use of organic manure	33	36.7
Use of fertilizers	25	27.8
Irrigation practices	0	0.0
Harvesting techniques	81	90.0
Erosion control	6	6.7
Processing techniques	90	100

- Number > 100 due to multiple responses

Table 4: constraints militating against farmers' access to information

Constraint	Mean	Standard deviation	Rank of mean
Illiteracy	2.4	0.55	3rd
Cost of information	4.3	0.48	1st
Complexity	3.8	0.71	2nd
Compatibility	1.8	0.37	4th
Others	0.7	0.96	5th

Likert scale coded: 5= very serious, 4= serious, 3= neutral,2= not serious,1= not very serious

Table 5: Logit regression results of socio-economic determinant of information flow

Variable	Co-efficient	Standard error	Wald statistics	Level of sig.	Exp (B)
Ge	1.091	0.234	0.127	0.699	1.022
AG	-0.698	0.402	2.995	0.061	0.411
MS	0.544	0.386	2.112	0.122	1.674
ED	1.356	0.599	4.744	0.030*	4.385
HS	-1.555	0.653	4.984	0.018*	0.167
FE	1.211	0.577	4.003	0.033*	3.255
FS	1.590	0.685	4.922	0.041*	1.749
MI	1.472	0.628	4.799	0.039*	1.566

Chi-square=66.01; percentage correct classification = 87.1; pseudo R^2 = 78.99