Factors Influencing Adoption of Agricultural Innovations in Oyigbo Local Government Area of Rivers State

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Abstract: The study determined the factors influencing adoption of agricultural innovations in Oyigbo Local Government Areas of Rivers State. The specific objectives of the study were to determine the adoption of the identified agricultural innovations by the farmers. Evaluate the various sources of information to respondents, and constraints to adoption of agricultural innovations by farmers in the study area. The sample size of the study area was 120 respondents. Questionnaire was used for data collections. The data collected were analyzed with frequency and percentage. The hypothesis of the study was tested with the multiple regression analysis. Results shows that crop technologies were more adopted than all others. The extension agent was the major sources of information to farmers with 25.00%. Result shows that the highest constraint of respondents was insufficient extension contact with 28.33%. This was followed by insufficient agricultural information in the media with 12.33%. Poor public relation of extension workers was third constraints with 9.16%. The study recommends increase in the number of extension agents in the study area, improved relationship between extension workers and respondents, improved media programme on agriculture.

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1.0 Introduction

Agriculture is the main pillar of any economy because of the many significant roles it play. It is a major source of food to the population, provides employment opportunities, foreign exchange earnings as well as sources of industrial raw materials for the nation's industries. In the past, effort of government on agriculture was centered on export crops to the neglect of food production and hence low productivity in the area of food crops. There are other factors that could account for this low productivity since after independence.

Among this is the "oil boom" of the seventies which resulted in the migration of labour from agricultural sector to other parts of the economy rendering many indigenous land owners landless and in some cases a reduction in the acreage farmed. There is rural-urban movement because of lack of social amenities. Many middle-aged men moved to the urban centers in search of white collar jobs because of the disparity in amenities that existed between urban and rural areas hence women and their children were left behind to carry on agricultural production activities which resulted in many households been headed by women.

This situation thrusts on them responsibility of taking decisions on issues on the farm (Lily Hutjes *et al*., 2011). Increasing agricultural productivity is critical to meet expected rising demand and, as such, it is instructive to examine recent performance in cases of modern agricultural technologies (Challa, 2013).

Agricultural technologies include all kinds of improved techniques and practices which affect the growth of agricultural output (Jain et al., 2009). According to Loevinsohn et al. (2013) the most common areas of technology development and promotion for crops include new varieties and management regimes; soil as well as soil fertility management; weed and pest management; irrigation and water management.

By virtue of improved input/output relationships, new technology tends to raise output and reduces average cost of production which in turn results in substantial gains in farm income (Challa, 2013). Adopters of improved technologies increase their productions, leading to constant socio-economic development. Adoption of improved agricultural technologies has been associated with: higher earnings and lower poverty; improved nutritional status; lower staple food rices; increased employment opportunities as well as earnings for landless laborers (Kasirye, 2010).

Adoption of improved technologies is believed to be a major factor in the success of the green revolution experienced by Asian countries (Ravallion and Chen, 2014; Kasirye, 2010). On the other hand, non-adopters can hardly maintain their marginal livelihood with socio-economic stagnation leading to deprivation (Jain et al., 2009). A new agricultural technology that

enhances sustainable production of food and fiber is therefore critical for sustainable food security and economic development. This has made the dynamics of technical change in agriculture to be an area of intense research since the early part of twentieth century (Loevinsohn *et al.*, 2013).

These technologies are particularly relevant to smallholder farmers in developing countries because they are constrained in many ways, which makes them a priority for development efforts. These farmers for instance, live and farm in areas where rainfall is low and erratic, and soils tend to be infertile. In addition, infrastructure such as irrigation, input and product markets, and credit as well as extension services tend to be poorly developed (Muzari et al., 2012). Over the years many studies have been conducted on innovation and uptake of new technologies in developing countries. In addition the process of adoption and the impact of adopting new technology by farmers have been studied. However new agricultural technologies are often adopted slowly and several aspects of adoption remain poorly understood despite being seen as an important route out of poverty in most of the developing countries (Bandiera and Rasul, 2010; Simtowe, 2011). This paper therefore tries to review various studies done on adoption of new technology and factors that are responsible for slow rate of technology adoption.

There is an emerging knowledge base on the effectiveness of strategies to close the knowledge-practice gap, less is known about how attributes of an innovation and other contextual and situational factors facilitate and impede an innovation's adoption. However, there is a large literature on the adoption of agricultural technology (for good overviews see Rogers, 2013; Sunding and Zilberman, 2001; Feder and Umali, 2013). Viewed through a broad cross disciplinary lens, there is agreement that the adoption of agricultural technology depends on a range of personal, social, cultural and economic factors, as well as on the characteristics of the innovation itself (Pannell et al., 2009).

A meta level analysis of this type of research undertaken by Prokopy et al (2008) shows that education levels, capital, income, farm size, access to information, positive environmental attitudes, environmental awareness and utlilisation of social networks are generally positively, associated with the adoption of best management practices. The characteristics of the technology itself are also an important influence on farmers' technology adoption and usage decision. Looking at the differences between capital-intensive and management-intensive technologies, El-Osta and Morehart (2012) found that age, size and specialization increases the likelihood of adopting a capital-intensive technology, whereas education and size of operation positively impacted the decision to adopt a management-intensive technology. In this context, the risk preferences of farmers are also important in influencing the technology adoption decision, especially if capital-intensive technology costs are irreversible (Sunding and Zilberman, 2011). Other parts of the social science literature emphasise the role of distance and geography in the adoption of agricultural technologies (Rogers, 2013; Diamond, 2009).

In this case, any significant travel costs involved in the initial learning about a technology and subsequently establishing it might reduce the likelihood of that technology's adoption. More recently, some economists and other social scientists have focused more explicitly on farmers' motivations, values, objectives and behavioural influences in the context of technology adoption (e.g. Rehman et al., 2007). This literature focuses on explaining how social norms, beliefs about a technology's performance and importance and farmers' intentions to change practices impact on the adoption of technologies.

Many studies concur that interaction with extension services (Millar, 2010; Garforth et al., 2013; Butcher, 2008) and peer-group behaviour (Sauer and Zilberman, 2010) also positively impact farmers' technology adoption decisions. Many efforts in Agricultural development today are aimed at improving the method used in the transfer of information in Agricultural technologies to farmers. However, only a few of those involved in this development effort have understood the information delivery constraints to farmers in Nigeria.

The ultimate test of success of agricultural technology transfer is the extent of technology adoption by the end-users. The adoption of new innovation to rural areas requires the services of the extension agent. Extension service is an out-of-school system of education in which adult and young people study by practical experience.

The sole aim of extension service is to teach rural people and farmers how to increase food production, raise their income and subsequently, their living standard with minimum assistance from government, and their own effort using their own resources. This research primarily assesses the factors influencing the adoption of agricultural innovation by farmers in Oyibo Local Government Area of Rivers State in relation to their productivity. The local economy of Oyibo Local Government Area is dominated by farming. Several extension technologies have been transferred to the farming communities in this Local government Areas in recent.

Despite these efforts, farmers are still inclined to their normal traditional farming systems with a resultant low yield in agricultural production. The

question that readily comes to mind is why are farmers still inclined to their traditional system of farming instead of adopting the new and improved system introduced by research institutions?

It is based on the above observed challenges that this research was designed. This research is therefore carried out to identify and proffer solutions to problems that hindered the effectiveness of agricultural technologies transferred to farmers in the study areas. This study seeks to answer the following questions: What are the types of agricultural technologies available to the famers in the study area?, What were the sources of these agricultural technologies?, Through what channels do these agricultural technologies get to the farmers?, What factors hinder the adoption of these agricultural technologies on farmers who were able to adopt them.

2.0 Methodology

2.1.1 The Study Area

Oyibo Local Government Area of Rivers State is the one (1) of the 23 local government area of Rivers State. It was created on the 3rd of May 1991. The local government area is bounded by Port Harcourt city local government area on the south east, Tai/Eleme local government area west, Ikwere and Emohua local government at the north. Oyibo is found or situated on the west side of Rivers State.

Oyibo Local government area comprises of the following communities, Afam Ndiki, Obeti Ndoki, Obeakpu Ndoki, Egberu Ndoki, Obunku Ndoki, Kom Kom Ndoki, Umuoasi Ndoki, Obeama Ndoki. Oyibo Local government area covers a total of 1,232 square kilometer. According to census of 2006, the population of Oyibo Local government area is 125, 331 people. Oyibo Local government area has both Urban and semi-urban areas. National Population Commission of Nigeria (web 21 03 2006).

Thomas Brinkhoff, 01-31-2015. Apart from the indigenous Oyibo origins of the areas, there are settlers from all over the world in the area. Oyibo Local government area have a tropical climate of intensively high rainfall during the rainy season and cool at night due their closeness to some rivers, streams, vegetation over and their adjourning creeks, which were mainly caused by deforestation to increase the land space of the area. In respect of being an urban area, most, of the towns and villages in Oyibo are still engaged in farming and fishing as their occupation utilizing some expands of agricultural land in the area.

In Oyibo Local government area produce includes maize, yam, coco yam, okro, pepper, fluted pumpkin, oranges, banana, cowpea, melon etc. Cash crops like oil palm trees, rubber, kola nut trees, pear trees and cashew tree area also grown. These crops are produced both subsistent and in commercial quantity. A sizeable proportion of the people in the study area are also engaged in fishing, trading, hunting and food processing. The inhabitants are also involved in livestock production.

2.1.2 Population of the Study

The population of the study is made up of farmers, fishermen in Oyibo Local Government Area of Rivers State.

2.1.3 Method of Data Collection

Primary and secondary data were collected and used for the study. Primary data were collected using two sets of structured questionnaire administered to both farmers and agricultural extension workers the area. The questionnaire was structured in such a way as to cover the objectives of the study. ADP extension workers were employed in administering the question to the contact farmers.

However, personal observation technique was also employed in administering the data collection instrument to the respondents especially the illiterate ones. The nature of primary data collected were related to such issues as socioeconomic attributes of the respondents and other variables associated with adoption of agricultural innovation in relation to the research objectives. Secondary data were mainly sourced from textbooks, journals, internet and other publications relevant to this study.

2.1.4 Sample Size and Sampling Techniques

The sample size is made up of 120 respondents in cropping, animal husbandry; fishing etc. the same frame will involve farmers in Oyibo Local government area. A multi-stage sampling technique was used to sample the respondents used for the study. In the first Stage four (4) different communities, Obeti Ndoki, Kom Kom Ndoki, Umuoasi Ndoki, Obeama Ndoki were selected using random sampling technique for the study. In the second stage 30 famers were randomly selected from each of the community already selected. This brings the total to 120 respondents.

2.1.5 Method of Data Analysis

The data generated for this study were analyzed using both descriptive statistics such as means, tables, frequency and percentage distributions and inferential statistics.

2.1.6 Test of Hypothesis

The hypothesis of the study were tested with multiple regression analysis, using a four-functional form, using linear, semi-log, double log and exponential function.

3.0 Results

This chapter presents the results of the analysis of the data presented for the study. These results were discussed based on the responses given by the 120 rural farmers and representatives of four communities

that constituted the actual sample sizes of the study in the following sub-sections:

3.1 Personal characteristics of the rural farmers

The socio-economic characteristics of the respondents analyzed and described include: gender, age, marital status, educational qualification, monthly income, household size. It is expected that these characteristics have influences on the adoption of agricultural innovation in the study area.

3.1.2 Gender of the Respondents

The respondents according to gender were classified into male and female and the results obtained are presented on Table 1.

Table 1: Distribution of respondents according to their gender

Sex	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
Male	75	62.5%
Female	45	37.5%
Total	**120**	**100**

Source: Field Survey, 2016.

Table 1 Shows that 62.5% of the respondents were males while 37.5% were female

3.1.3 Age of the respondent

Age of the respondents was categorized using age range expressed in years as shown in Table 2.

Table 3.1.3 Distribution of respondents according to their age

Age range (years) Note	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
11-20	02	1.60 %
20-30	14	11.60 %
31-40	32	26.60 %
41-50	44	36.60 %
51-60	20	16.60 %
61-70	8	6.10%
Total	120	100

Source: Field Survey, 2016.

The result shows that respondents within the age bracket of 41-50 years had the highest frequency with 36.60%. This is followed by those in age bracket of 31-40 years with 26.60% while the least is those in the age bracket of 11-20 years with 1.60% others are those in the age brackets of 20-30years and 60-70 with 11.60% and 6.10% respectively. However, the mean age of the Respondents was about 45 years. This still falls within the working age that is adopts innovations.

Table 3.1.4 Distribution of respondents according to their farm size

Farm size (hect.) Note	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
0.1-0.5	20	16.66 %
0.6-10	15	12.50 %
1.1-1.5	40	33.33 %
1.6-2.0	35	29.16 %
Above 2.0	10	8.33 %
Total	120	100

Source: Field Survey, 2016.

The result shows that the farm size of the respondents (33.33%) ranged between 1.1-1.5 hectares while only 8.33% had farm size above 2.0 hectares. This means that most of the farmers cultivates on small portion of land usually fragmented which does not encourage commercial agriculture.

3.1.5 Marital Status Respondents

In the analysis of the respondents according to their marital status, it was categorized into the groups that were married, single, widowed, divorced or separated. The result obtained is presented below.

Table 3.1.5 Marital status respondents

Marital status Note	Local government Area (Oyibo) Frequency (n=120)	Percentage (%)
Single	22	18.33 %
Married	38	31.66 %
Divorced	15	12.50 %
Widowed	25	20.83 %
Separated	20	16.70 %
Total	120	100

Source: Field Survey, 2016.

Analysis on Table 3.1.5 indicated that respondents who were married were the majority with 31.33% while divorced had the least with 12.50%. Those that were single, widowed had 18.33% and 20.83% respectively.

3.1.6 Educational level of the respondents

Respondents were classified according to their educational attainment as shown in Table below.

Table 3.1.6 Distribution of respondents according to educational qualification

Educational status Note	Local government Area (Oyibo) Frequency (n=120)	Percentage (%)
No Formal Education	34	28.33 %
Primary School Completed	17	14.16%
Secondary School Completed	20	16.70%
Tertiary education	49	40.83 %
Total	120	100

Source: Field Survey, 2016.

Result of the analysis on Table 4.1.5 indicated that majority of (40.80%) of the respondents had first school leaving certificate (completed their primary school), and those with no Formal education (38.33%) while those that possessed Degree certificate was the least with 14.16%.

3.1.7 Total annual Income of the respondents

This refers to both the yearly accrued revenue from farmer's investment of the respondents. It is expressed in Naira. Results obtained and presented in Table 4.1.6.

Table 3.1.7 Distribution of respondents according to their total annual income

Total Annual income (₦) Note	Local government Area (Oyibo) Frequency (n=120)	Percentage (%)
Below 10,000	4	3.33 %
10,001-20,000	10	8.33 %
20,001-30,000	15	12.50%
30,001-40,000	15	12.50%
40,001-50,000	12	10.00%
50,001-60,000	8	6.66%
60,001-70,000	56	46.66%
Total	120	100

Source: Field Survey, 2016.

The result of the analysis shows that the majority 46.66% of the respondents earn an income bracket (₦ 60,001- ₦ 70,000) while the least those that earn below with a percentage of 3.33%.

3.1.8 Household Size

Table 3.1.8 Distribution of respondents according to their household size

Household size Note	Local government Area (Oyibo) Frequency (n=120)	Percentage (%)
1-4	14	11.66 %
5-10	15	12.50%
11-14	40	33.33%
15-20	26	21.66%
21-25	16	13.33%
26 above	9	7.50%
Total	120	100

Source: Field Survey, 2016.

Analysis on Table 7 shows that the majority (33.33%) of the respondents had large family size of 11-14 while the lowest in the family size is 7.50% with the family size of 26and above.

3.1.9 Major Occupation

Table 3.1.9 Distribution of respondents according to their occupation

Major Occupation Note	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
Farming	40	33.33%
Trader	26	21.66%
Civil Servant	14	11.66%
Public	15	12.50
Total	120	100

Source: Field Survey, 2016.

Result of the analysis on Table 8 indicated that majority of (33.33%) of the respondents 40 engages in farming while the least is the public servant with a percentage of 11.66%.

Table 4.0 Distribution of respondents on sources of agricultural information

Sources of agricultural Information Note	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
Community library	16	13.33%
Newsletters	13	10.83%
Posters	12	10.00%
Exhibitions	8	6.66%
Leaflets	14	11.66%
Radio	7	5.83%
Television	2	1.66%
Extension workers	30	25.00%
Friends and other Farmers	18	15.00%

Source: Field Survey, 2016.

Agricultural Innovations

1. Crops Sector

4.1 Agricultural Innovation Already Existing in the Study Area

Planting in well-drained soil
Planting of improved varieties
Planting healthy materials
Planting crops in rows
Maintaining correct plant population per hectare
Keeping farm weed free
Application appropriate rate of fertilizer.
Harvesting as at when
Introduction of improved cassava varieties
TMS 30572, TMS 30555, TMS 50395.
Cassava/Mazie/Cassava/Telfairia inter crop.
Yam/Mazie/Cassava/Telfairia inter crop single alternative row.
Introduction of upland rice production
Sole cowpea production
Cassava/ Cowpea inter crop
Plantain/ cocoyam inter crop

Fisheries Sector

Selecting sit with constant water supply
Construction of economic pond size
Boasting pond microflora with NPK fertilizer
Feeding fish with recommend fish feed
Protect fish from predators

Livestock Sector

Maintenance of pen sanitation
Feeding stocks with balanced diet
Feeding stock with locality prepared ration
Harvesting of fishponds
Rabbits Rearing
Establishment of browse plants

Agro-Forestry Sector

Snailery
Alley crop farming.
Okazi Production

4.2 Awareness of Respondents to Identify Agricultural Innovations

Table 4.0 shows that 25.00% of the farmers in the study area get their agricultural information from extension workers%. While 15.00% obtains information from other fellow farmers and famers. The least get from television with a percentage of 1.66%. Table 4.4 indicates 28.33% of the farmers in Oyibo Local Government Area encounters problem on adoption as a result insufficient of extension worker in

the study area with a frequency of 34, also insufficiency of agricultural information on media with a percentage of 13.33 while insufficient fund for inputs with 11.66% was equally identified as the constraints of the respondents.

Table 4.2 Distribution of respondents on types of agricultural innovations

Types of agricultural Innovation Note	**Local government Area (Oyibo) Frequency (n=120)**	**Percentage (%)**
Crop	115	95.83%
Livestock	80	66.66%
Fisheries	60	50.00%
Agro-processing	45	37.50%
Agro-Forestry	35	29.16%

Source: Field Survey, 2016.

4.3 Discussion

The major findings of this work were discussed in this chapter. This was done by discussing the implications of these findings and in most cases relating them with existing knowledge.

4.4 Personal Characteristics of the Rural Farmers

The result of the analysis on Table 1 Shows that 62.5% of the respondents were male while 37.5% were female. This implies that a greater number of males access to adoption of agricultural innovation and this may be due to the fact that they bear risk more than the female and also has access to loan to engage in the innovation. Ayanwale and Alimi (2014) asserted that more of male requests for agricultural loan for the adoption and practice of innovation than the female counterparts. This makes it difficult for them to adopt agricultural innovation in the study area. Farmers between the age of 41-50 years in Oyibo local government area participated more in farming and adoption of agricultural innovation.

This implies that those within the age of active force were more involved in the adoption of agricultural innovation in the study area, and r as a result could easily be engaged in the adoption process. This agrees with Okunade (2007) who opined that mostly the middle aged farmers adopts innovation as people in this age bracket are known to be more productive and tends to utilize every opportunity in productive activities than any other age brackets.

Result of the analysis on Table 4 indicated that married people topped the list of the respondent who was engaged in adoption of agricultural innovations with the 31.66 % while those divorced forms the least with 12.50 %. This implies access the agricultural innovation more than any other groups as they are usually faced with more family responsibilities. And so combine their efforts by employing various means to increase their level of adoption. The levels of education of the respondents' shows that majority of those who access adoption of agricultural innovations have first degrees.

This was evidenced by result on Table 4 which shows that about 40.83% of the respondents attain an average educational level tertiary education while about 14.16% attain primary school. The implication of this, is that most of the highly educated people engage more in adoption of agricultural innovation. The result of the analysis on the result on the level of total annual income of the respondents as it is on Table 6 shows that fairly higher number of respondents (46.66%) earn within 60,001-70,000 while 3.33% earn a total annual income of below 10,0000 only.

This implies that the total annual income distribution of the respondents where high and therefore, encouraging. This is in line with the findings of Diagne and Zaller (2011) who noted that access to agricultural innovation has a positive and significant effect on the total annual income of the participant of agricultural innovation programmes. It was also identified that the annual farm income as analyzed in Table 6 shows that a slightly greater percentage (46.66%) of the respondents, had annual farm income of more than was a N50, 000, while those earning below N10, 000-N50, 000 is 3.33%. This result shows that there was a drop in the annual farm income when compared total annual farm income discussed in Table 6.

This contravenes the findings of Oladele and Oyewole, (2008) which inferred that average income of most farmers in Nigeria was as low as N34, 050 as a result of their large household size. The result of the Table 7 indicated that the respondents owned mostly basic assets such bicycles and motorcycles which serve as modes of transportation for the farmers. The implication is that majority of respondents were predominantly poor as they be could only afford assets with lesser values. This is backed up by findings of Schafter (2008), who argued that rural farmer lacked economic assets and other basic amenities of life due to lack of fund a d other resources.

4.5 Sources of Information Available to the respondents

The result of the analysis in Table 5.2 shows that 25.00% of the farmers in the study area get their agricultural information from extension workers%. While 15.00% obtains information from other fellow farmers and famers. The least get from television with a percentage of 1.66%.

4.6 Awareness of Respondents to Identify Agricultural Innovations

The result of the analysis presented in Table 5.3 on the innovations the respondents are aware of, are recently indicated that the majority of the respondents 95.83% are most familiar with crop production as an agricultural innovation while 66.66% are engage in livestock production. This implies that it could be easier to adopt agricultural innovation in the study areas.

The agricultural innovation that already existing in the study area is categorized into crop, livestock, fisheries, Agro-processing and Agro- forestry. 95.83% of the farmers in Oyibo Local Government Area are aware of agricultural innovation, 66.66% are aware of livestock innovation, 50.00% are aware of fisheries, 29.16% are aware of Agro- Forestry and 37.50% are aware of Agro-processing.

4.7 Constraints on Adoption of Agricultural Innovations

Result of the finding as shown in Table 5.4 indicated that the two most important problem encountered by farmers in accessing agricultural innovation are insufficient of Extension workers, Poor public relation of the extension workers and insufficient agric information on media with 38.33, 13.33% and 13.33% respectively, while the least problem opined by the respondent was the problem insufficient power supply with 5.00%. This confirmed the findings of Agbayehai (2004) who listed the problems of adoption of agricultural innovation Poor public relation of the extension workers, Insufficient of Extension workers, Poor radio and television signals, Oddtiming of radio/TV Programmes, Insufficient power supply, Poor road network, insufficient agric information on media, Language problem and Insufficient fund for inputs. Adam (2005) and Tacoli (2004), in the same vein insisted that insufficient of Extension workers poses a problem in adoption of agricultural innovations. One of the most important implications of the finding s is that insufficient of Extension workers topping the list of the constraints on adoption of agricultural innovations.

4.8 Effects of Personal Characteristics on the Adoption of Agricultural Innovations in the Study Area

Multiple regressions Analysis was done to determine the effects of socio-economic characteristics on the rural farmers on their adoption of agricultural innovations. Result obtained was presented in Table 4.9.

Table 4.9: Result of Multiple Regression Analysis

Variables	Variables NAMES	Regression coefficient	Standard error	T-value	Level of significance
Y	Adoption of agricultural innovation by rural farmers				
Bo	Constant	-2.072	0.485	-4.277	S*
X_1	Age (years)	-0.018	0.010	-1.833	S**
X_2	Farm size (ha)	0.030	0.013	2.373	S**
X_3	Household size (member)	0.005	0.009	0.528	NS
X_4	Marital status	0.540	0.061	8.916	S*
X_5	Educational level (yrs)	0.005	0.031	0.175	NS
X_6	Annual Income (Naira)	0.0013	0.011	1.142	NS
X_7	Occupation	0.133	0.143	-0.93	NS

Source: Data analysis, October, 2015.
S* indicates significant at 1% level.
S** indicates significant at 5% level.
S*** indicates significant at 10% level.
$R^2 = 0.649 = 64.90\%$
Adjusted $R^{2} = 0.627 = 62.7\%$
F-ratio = 29.559
Standard error of estimates (SEE) = 0.46582
Durbin-Watson (DW) = 2349

The result of multiple regression analysis in table 5.5 shows that the coefficient of multiple determinations R^2 was 0.649 64.90%. This means that about 64.90% variation in the dependent variable (adoption of agricultural innovations of rural farmers) was explained by the combined changes of explanatory variable used in the regression model. It is believed that explanatory power of the chosen model were not exaggerated since R^2 (64.90%) was in numerical value closely related to the adjusted R^2 627%. This was further confirmed by the values of the overall standard error of estimate (SEE 0.46.582) which constituted about 37.7% of total variation that was not explained. This regression model is of good fit because the co-efficient of multiple determinations was very high.

The statistical reliability of the estimates of regression co-efficient was established using standard deviations from the estimates or standard errors of the co-efficient which were less than half of the estimates showing their statistical reliability. Most of the explanatory variables were significant at 1%, 5% and 10% level of significance as shown in Table 5.5. The overall significance of the regression result *was* also confirmed by the F* value. (F-29.559) since F* ratio is high and is greater than F* Table at *5%* level of significance, the regression is statistically reliable.

The coefficient of age (x_1) was negative; indicating negative relationship with adoption potentials. This is true and conforms to the prior expectation because to the significant factor that can influence an individual's adoption potential. Increase in age decreased the adoption potential of the farmers because the old farmers in the study area may be reluctant to adoption in agricultural innovations. This is in consonance with the findings of Okumade (2007) who opined that older people may be able to cope with vigorous farming activities and hence the level of adoption of agricultural innovation may be diverted to other non-agricultural activities.

The sex of the respondent (x_2) bore positive coefficient meaning that there is no gender bias in the adoption potentials of the rural farmers in the study area. This is in disagreement or a contrary view with the findings of Mbam (2010) who cited Ayanuwale and Alimi (2004) maintained that men folks have more of Joan request granted to them than that of women counterpart. The co-efficient of household size (x_3) was positively signed,

indicating that positive relationship exists between the respondents adoption size. The higher the household size, the higher the adoption potential.

This seems to be true because farmers with high household size embark on more investment venture in order to get more income for household sustainability. This conforms with the findings of Hudon (2007) who asserted that rural farmers adoption level of innovations, to enable them increase their farm size and output level. Iganiga (2008) also maintained that any innovation available to rural farmers' disposal determine their productive capacity. However, marital status (x_4) was positively signed indicating that positive relationship is existing between farmers' marital status and their adoption potentials. This agrees with the a-priori expectations because both married and single farmers invested in agricultural related activities. And as such there is no martial barrier in adopting agricultural innovation in the study area.

Educational level attained by the farmers (x_5) bore a positive coefficient; Indicating that the higher the educational level attained by the respondents the more the adoption level in agriculture. This is one true and conforms to the a-priori expectation as educated farmers tend to adopt more than their illiterate ones. This could be attributed to their ability to understand the terms of adoption of innovations. Moreover, the annual income (x_6) of the respondents was positive meaning that their annual income increased with increase adoption of innovations that will in turns increases the in investment potential of the rural farmers.

This is true and met the a priori expectations as farmers' annual income usually increase when their investment potential increase. This is because more income is generated from different sources were investment was made. This result is particularly true and in line with theoretic background of the study. Finally, occupation (x_7) was negative singled. This means that negative relationship exists between their occupation and farmers adoption potential. This did conform to the a priori expectations because occupations are expected to encourage their members to make more investment agricultural activities.

5.0 Summary

The study aimed at determining the factors that is influencing adoption of agricultural innovations in Oyibo Local Government Area of Rivers State. To carry out this study, some specific objectives were outlined, which among others were to investigate the sources of information used by the farmers in the adoption process e determine the adoption of the identified agricultural technologies in the communities selected. And to examine the constraints to famers' adoption of agricultural innovation in Oyibo Local Government Area of Rivers State. Result of the analysis carried out shows that most of the respondents involved in the adoption of agricultural innovation were males (62.5%).

Majority of the respondent were within the age bracket of 41-50, accounting for 36.60% of the total

number of the respondents involved in the adoption of agricultural innovation with 31.66 % of them married. It was identified that majority (46.66%) of the respondents earned above 60,000 while 25.00% of the respondents sources their information through Extension workers. Furthermore, the majority of the respondents (95.83%) indicated that they are aware of innovations on crop production. In the same vein, the most of the respondents (28.33%) identified Insufficient of Extension workers as the major constraints of agricultural innovations. Other major factors identified in their other of importance were house hold size, educational status and occupation.

5.1 Conclusion

The result of the study reveals that factors influencing adoption affects the agricultural innovation positively in the study area. About thirty (30) of agricultural innovation exits in the study area and the agricultural innovation are categorized into Livestock, Fisheries, Agro-processing and Agro-Forestry. The study also reveals the awareness of the farmers to agricultural innovation in the study area. The farmers are aware of almost all the agricultural innovations; they have been able to adopt eighteen of innovations taken to the area. This shows the level of adoption of the farmers. The farmers have not been able to adopt agricultural innovations that have been taken to their area. Out of about thirty (30) innovations, they have been able to adopt eighteen (18) of the innovations. The study equally shows sources of dissemination of information on adoption of agricultural innovations to the farmers in the study area. And the sources includes Community library, Newsletters, Posters, Exhibitions, Leaflets, Radio, Television, Extension workers and Friends and other Farmers.

The study identifies the constraints on the adoption of agricultural innovation that already exists in Oyibo Local Government Area. The major constraints that the farmers are facing were Poor public relation of the extension workers, Insufficient of Extension workers, Poor radio and television signals, Oddtiming of radio/TV Programmes, Insufficient power supply, Poor road network, Insufficient agric information on media, Language problem, Insufficient fund for inputs.

5.2 Recommendations

Based on the findings, the following recommendations were made:

1. Government should embark on sound policy geared towards proper financing and development of agriculture, thus, creating enabling environments for establishment of more network of agricultural innovation center especially in the rural areas. This will enhance rural farmers to access agricultural innovations and thereby, leading to increase in adoption of agricultural innovations.
2. Basic infrastructures like road, electricity, pipe borne water, and model information and communication technology among other basic infrastructures should be provided in the rural areas. This will help improve the performance of the already existing innovations. More so, this will help provide an enabling environment which hitherto will encourage some NGOs and individuals alike to embark on the establishment of more agricultural innovation centers.
3. The extension agents should create awareness to the farmers that are not aware of the innovations.
4. There should be adequate training workshop and demonstrations for farmers.
5. Extension workers should be motivated Eg allowances should be given to them.
6. The extension packages should be relevance to the farmers in need.
7. Incentives should be given to the extension workers enable them to be diligent to their services.

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