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DETERMINANTS OF LEVEL OF ADOPTION OF IMPROVED AGRICULTURAL TECHNOLOGIES AMONG RADIO FARMER PROGRAMME LISTINERS IN IMO STATE, NIGERIA

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ABSTRACT
This study examined determinants of level of adoption of improved agricultural technologies among agricultural development programme (ADP) radio farmer programme listeners in Imo State-Nigeria. The specific objectives included to: examine the socioeconomic characteristics of the radio programme listeners, ascertain major sources of agricultural information to farmers in the study area, determine the level of adoption of the various identified improved technologies disseminated to the farmer listeners through the radio farmer programme, and identify constraints to effective utilization of the radio farmer programme. The data for the study were collected through questionnaire administered to 270 farmers in the three agricultural zones (Okigwe, Orlu and Owerri) of Imo State. The data were analyzed using descriptive statistics and likert scaling type multiple regression model. The results revealed that the majority (81%) of the farmers were males and most (82.9%) of them were married. The mean level for education was 8.1 years. Majority (70%) of the farmers were involved in crop production while 78.5% belonged to farmer associations. The study identified major available sources of agricultural information to farmers to included, farmer cooperative organizations (X=2.5), fellow farmers and friends (X=2.6) and extension agents (X=2.5). Findings on level of adoption indicated among others, that farmers were at the adoption stage for technologies like weed and weed control (X=6.0), harvesting and storing of yam/maize/cassava (X=5.9), fertilizer and its application (X=5.9), appropriate spacing of cassava/yam/maize (X=5.6) and supply of vacancies to cassava/maize plots (X=5.9). Level of education, farming experience, farm size, farmer organization membership and ownership of radio were socioeconomic characteristics significant in determining the level of adoption. It was recommended among others that educated farmers as well as farmers being members of farmers' organizations be encouraged if the objectives of adequate food supply and improved standard of living be archived in Imo State through this laudable programme.

KEY WORDS: Determinants, Agricultural Technologies, Radio Farmer Programme, Adpotion.

INTRODUCTION

Today's farmers are under unprecedented pressure. The world's population is closing in on seven billion, and it is projected to reach nine billion by 2050 (Towery and Werblow, 2010). Poverty eradication and food security have moved to the centre stage of the global development agenda. Worldwide, 854 million people still remain hungry and undernourished, of whom 820 million live in the developing countries (FAO, 2006). World Bank (2000) observed that despite the emphasis on development in most third world countries towards rural/agricultural model as against urban design in the recent past, developments are still hindered by institutional and administrative programmes characterized by schemes and programmes imposed on the rural poor, rather than clientele participation. The need for rapid improvement in the strategies for agricultural production in the developing countries and in Nigeria does not warrant any more serious debate. According to Ewuola and Ajibefun (2002) the Nigerian population increased by between 2.5 and 3.0 percent annually, while food production increased by only 1.5 to 2.0. It is therefore, very obvious that hunger and starvation are not only being felt but have become precarious. This is because food prices have gone beyond the reach of the average persons and therefore affecting their living standard. Technology can be defined as specific methods, materials and devices used to solve practical problems. Otherwise, Agricultural technology can be defined as any behaviour or practice that involves the interaction of individuals within the farming production system. Consequently, those practices and/or behaviours applied by both farmers and agricultural professionals constitute agricultural technologies (CTA, 1997, Asiabaka, 2002). Agricultural technologies include both components (seeds, fertilizers, pesticides, and Machinery) and the process that is elements needed by the producer. The latter include information on the component and the management and the technical know-how to use the components and its adaptation. Farmers are the ultimate users of the modern or improved agricultural technologies developed through research. Many workers have defined technology transfer in different ways to suit their purpose. According to one such definition, technology transfer is "an ongoing process of getting useful information to people and assisting them to acquire the necessary knowledge, skill and attitude to quicken the

utilization of necessary supply of inputs and agro-services (Ekpere and Durant, 1996). Adoption is the process by which an individual accepts to use innovation or technology after due consideration of its merits and demerits. The initial step towards the adoption of new practice is that the innovation is available to the farmer. Rogers and Shoemaker (1971) and Asiabaka (2002) stated that adoption is a decision to make full use of new idea as the best course of action available over a period of time; this is why an innovation can be accepted or rejected after adequate consideration has been made. The adoption process consists of five stages or steps namely awareness, interest, evaluation, trial and adoption that an individual goes through in adoption of innovation/technology. The transfer of information could be done by the use of information media. Such information media include newsletters, radio/television programme, extension publications/bulletins, field days, field trips, jingles, posters, leaflets, agricultural shows and exhibition. Research is developing appropriate and adoptable technologies and transferring such technology to the farmers. According to Unamma *et al*, (2004), the job of research is to develop technologies and prove their worth to a relatively small number of farmers, using various combinations of upstream and downstream research. The extension service and/or any other similar organization complement this role of research through diffusing the innovations to as many farmers as practicable using appropriate strategies. Consequently, the extension service is responsible for informing, advising and teaching large number of farmers and other input agencies in a timely fashion. Asiabaka (2002) noted that extension has educational component. This is underscored by the continued use of the Agricultural Development Programme (ADP) extension system as the main organ for extension delivery for the past three decades. Since the inception of Imo ADP, one of its major responsibilities is the dissemination of information on improved modern technologies to the rural farmers in the three agricultural zones, namely Okigwe, Owerri and Orlu. Various methods of information dissemination have been utilized and they include bulletins, leaflets, radio/television programme, film shows, farm demonstrations, cooperative organizaios and posters (Onu, 1990; Ekumankama 2000).

In spite of the growing realization, the essential social and information mechanisms and infrastructural facilities are not yet sufficiently developed to foster the generation, storage, preservation, repacking, retrieval, dissemination and utilization of information (Agwu, *et al*, 2008). However, radio programmes are most widely used because majority of the farmers can afford radio set, and radio programmes are quick in information dissemination. Regardless of power failure or inadequate supply of power, absence of good road, etc. Also, although most of the farmers are illiterates, they understand communication in their local language (Onu, 1990). Serious doubts have been expressed as to whether the extension services bureaucracy, are capable of providing effective educational services to the rural clientele (Obibuaku, 1986; Onu, 1990). The use of contact farmers as an extension communication strategy has been described as alienating to non-contact farmers and caused disparity in client treatment (Agbanu, 2005). Although some contact farmers have been egalitarian in sharing extension messages and training experience with non-contact farmers, other contact farmers have been known to hide information on innovations from farmers in their neighbourhood. In other instances contact farmers distort messages. However, the great potential of these media like radio and televion for adult education in agriculture is yet to be fully exploited for high cost of transmission to absence of proper framework, within which to integrate media into the agricultural programme (Egbule and Njoku, 2008). In addition, the media system in many states in Nigeria are highly centralized and clustered in urban areas. Consequently very little of the needed information reaches rural communities, where more of the population live and actual farming takes place. Nwachuchwu (2008), on a study on adoption level of organic agriculture technologies, through radio broadcast programme, identified among others, low level of adoption, inadequate exposure of farmers due to poor radio reception and lack of group listenership among farmer listeners in Imo State Radio farmer programme (RFP) is an educative and informative broadcast through which farmer listeners are reached in their various official and local languages at their various homes or work places with new and improved agricultural technologies developed by experts in specialized fields of agriculture for adoption to improve their productivity and economic enhancement. To meet the food requirement of the populace at affordable cost through the massive adoption of improved agricultural technologies, the Imo State extension service in 1997 introduced the radio farmer programme (ADP, 2004). However, since the inception of the radio farmer programme, no valid and concerted effort has been made to ascertain the adequacy and determinants of the level of technology adoption among the radio farmer programme listeners as it affects its effectiveness in information dissemination.

This study therefore aimed at identifying determinants of level of improved technologies adoption among the ADP radio farmer programme listeners in Imo State as it affected the lives of the rural farm families with a view to unraveling the obstacles to effective communication and adoption of technologies by use of radio farmer programme among farmer listeners. The specific objectives of this study include to;

1. examine the socioeconomic characteristics of the radio farmer programme listeners;
2. ascertain major sources of agricultural information and
3. determine the level of adoption of the various identified technologies disseminated to the farmer listeners through the radio farmer programme.

Hypothesis of the Study

There is positive significant relationship between level of adoption of technologies of radio farmer programme listeners and the farmers socioeconomic characteristics.

METHODOLOGY

This study was conducted in Imo State. The state is located in the South Eastern part of Nigeria with a population of about 3,934,899 people made up of 2,032,286 males and 1,902,613 females (NPC, 2006). It is

strategically located within the five South Eastern States and boarded on the East by Abia State, on the West by River Niger and Delta State, on the North by Anambra State, while the Rivers State lies to the South (MLS, 2002). The people are predominantly farmers as an average family engaged in the production of food crops like yam, cassava, cocoyam, rice and maize, and livestock like sheep, goat, rabbit, poultry birds and pig. Cash crops cultivated include palm produce, rubber, oil bean, pear, mango, and oranges.

Imo State is divided into 27 Administrative units known as Local Government Areas (L.G.A.). The state is also sub-grouped into zones both for political and agricultural administrative purposes. These are Owerri Zone, Orlu Zone and Okigwe Zone. The settlement structure is still rural with over seventy percent (70%) of the people living in rural areas (ISGN, 2007). The state is culturally homogenous and predominantly inhabited by the Ibo ethnic group of Nigeria, where Igbo language is spoken with minimal difference in dialects. The people are predominantly Christians and English language is however the official language. There are three (3) agricultural zones in Imo State namely Okigwe, Orlu and Owerri with six (6), ten (10) and Eleven (11) Local Government Areas (L.G.A.s) respectively, making a total of twenty seven (27) L.G.A.s (fig 3.1). A random sampling of 2, 3 and 4 L.G.A.s from Okigwe, Orlu and Owerri zones respectively was taken, given a total of nine (9) L.G.As. The list of communities in each selected LGA was collected from the community Development Officer at the LGA headquarters. Three (3) communities were selected from each of the LGAs giving a sample size of twenty seven (27) communities. The list of Extension contact farmers (programme listeners) in each community was compiled with the assistance of the Imo ADP Extension Agents. The list formed the sampling frame. From this sampling frame totaling 431 radio farmer programme listeners, proportionate sampling technique was used to select 60, 90 and 120 radio farmer programme listeners from Okigwe, Orlu and Owerri agricultural zones respectively making a sample size of 270 radio farmer programme listeners for the study. Random sampling technique was employed in each agricultural zone to select the radio farmer programme listeners after the proportionate sampling was performed

Data were collected using questionnaire. The questionnaire was administered on the respondents with the help of Imo ADP extension agents and other relevant agents who were well briefed on the information needed. Qualitative as well as quantitative analytical techniques were used for the analyses of the data. Simple descriptive statistics such as mean, scores, percentages and frequency distribution, likert scale type were used to analyze not only quantitative socioeconomic data but also to determine how well empirical distribution of variables fit theoretical distribution in the test of the hypothesis.

Frequency distribution, percentages, and mean were used to analyze objective 1.

Objective 2, a three point likert type scale of 'often' =3, 'sometimes' =2, and 'not at all' =1 was applied. Objective 3 a six point likert type scale of 'adoption' 'trial' =5, 'evaluation' =4, 'interest' =3, 'awareness' =2, and 'not aware' = 1 was used. For objective 4, the following three point likert scaling procedure was adopted; 'very serious constraints' =3, 'serious constraints' =2, and 'not serious constraints' =1.

The likert scaling type measuring instrument is represented by the formula:

$$\overline{X} = \frac{\sum Fx}{N}$$

Where $\overline{X}$ = mean score

$\sum$ = summation sign

F = frequency

N = no of respondents.

x = no of nominal value of each response category

$$\frac{3+2+1}{3} = 2 \qquad \frac{6+5+4+3+2+1}{6} = 3.5$$

for objectives 2 and 4 & for objective 3

Therefore, 2 is the weighed mean of the scaling statement for objectives 2 and 4 while 3.5 is the weighed mean for objective 3.

Decision rule: Any mean value greater or equal 2 is positive for objectives 2 and 4. Also mean value greater or equal to 3.5 is positive for objective 3

Mean value less than 2 and 3.5 for objectives 2, 4 and 3 respectively are negative.

Hypothesis

To determine the relationship between level of adoption of technologies of radio farmer programme listeners and their socioeconomic characteristics, the ordinary least squares multiple regression techniques was employed.

The model was implicitly specified as follows;

Y = f(x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, e)

Where

Y= Level of adoption of Technologies (the stage the farmer was on the adoption scale involving 6-steps (not aware to using)

X_1= Age of the farmer (years)

X_2= Level of formal education (number of years spent in school).

X_3= Household size (number of household members)

X_4= Farming experience (years)

X_5= Farm size (hectares)

X_6= Extension contact (numbers of visits paid by extension agents in one month).

X_7= Gender (dummy variable, male= 1, female= 0)

X_8= Occupation (dummy variable, 1 if farming is major occupation, 0 if otherwise).

X_9= Social organization membership (dummy variable, 1 if membership of a cooperative or farmer group, 0 if otherwise)

X_{10}= Ownership of radio (dummy variable, 1 if the farmer owns a radio, 0 if otherwise).

E= Error term

It was expected a *priori* that the coefficients of X_2, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, >0, X_1, X_3, <0. Four functional forms of the ordinary least squares multiple regression model namely, linear, semi-log, double –log and exponential were fitted to select the lead equation on the basis of the functional form that produced the highest value of the coefficient of multiple determination (R^2), highest number of significant variables and conformity to a *priori* expectations.

The multiple regression analysis produced t-ratios that were compared with the tabulated t-values at the specified

alpha level and degrees of freedom to determine the significance of the variable for testing the hypothesis.

RESULTS & DISCUSSION

Table 1: Socioeconomic characteristics of Respondents

The percentage distribution of radio farmer programme listeners by socioeconomic characteristic is presented in Table 1. Data in the table show that majority (81.5%) of the farmers were males, with a greater proportion (57.4%) of them being between 51 and 60 years of age with a mean age of 50.5 years**,** and most (82.9%) of them were married. Most (66.7%) of the farmers had 5-8 persons in their households with mean household size of 6 persons. The table indicated that most (60.7%) of the farmers spent 7-12 years in school with mean level of education of 8.1 years. Majority (70.7%) of the farmers were primarily engaged in farming with majority (70%) of them involved in food crop production like cassava, yam, cocoyam, maize and rice. Only 18.9% of them were involved in livestock production and reared poultry, sheep, goat, rabbit and pigs. Also, 11.1% of the farmers were involved in fish farming. Majority (51.9%) of the farmers had 11-20 years of farming experience with a mean farming experience of 12.2 years. Long farming experience is an advantage for increase in farm productivity since it encourages rapid adoption of improved technologies (Obinne, 1991). A large proportion (53.7%) of the farmers had 1-2 contacts with extension agents, 37% of them had no contacts with extension agents, while 9.3% of them had 3-4 contacts with extension agents in the last one month. The mean contact with extension agents in one month was 1.4, which implied low extension contact.

TABLE 1: Percentage Distribution of Radio Farmer Programme Listeners by socioeconomic Characteristics (N=270

Socioeconomic Characteristics	Frequency	Percentage	Mean
Sex			
Male	220	81.5	
Female	50	18.5	
Age (Years)			
31-40	34	12.6	
41-50	74	27.4	
51-50	150	57.4	
61-70	7	2.4	50.5
Marital Status			
Single	14	5.2	
Married	224	82.9	
Divorced	10	3.7	
Widowed	20	7.4	
Separated	2	0.8	
Household size (No. of persons)			
1-4	70	25.9	
5-8	180	66.7	
9-12	15	5.6	
13-16	5	1.8	5.8
Level of Education (years)			
O (No formal education)	15	5.6	
1-6	65	24.1	
7-12	164	60.7	
13-18	26	9.6	8.1
Primary occupation			
Farming	191	70.7	
Trading	37	13.7	
Civil Service	29	10.7	
Artisan	13	4.9	
Type of farming practiced			
Livestock production	51	18.9	
Food crop production	189	70.0	
Fish farming	30	11.1	
Farming experience (years)			
1-10	112	41.5	
11-20	140	51.9	
21-30	13	4.8	
31-40	5	1.8	12.2
Farm size (Hectare)			
0.5-1.0	81	30.0	
1.1.-1.6	135	50.3	
1.7-2.2	38	14.1	
2.3-2.8	16	5.9	1.3
(Fish Ponds)			
0	239	88.5	
1-3	20	7.4	
4-6	10	3.7	

5-8	1	0.4	0.4
(Animal Head)			
0	217	80.0	
0-20	10	3.7	
20-500	29	10.3	
500-1000	14	5.0	10.7
Animal Farm Income			
131000-160000	40	14.8	
161000-190000	38	14.1	
191000-220000	64	23.7	
221000-250000	103	38.1	
251000 and above	25	9.3	208046.30
Membership of farmers association			
Non-member	58	21.5	
Member	212	78.5	
Frequency of Extension			
Agent Contact in one month			
No visited	100	37.0	
1-2	145	53.7	
3-4	25	9.3	1.4

Source: Field Data 2013

Table 2: Major sources of agricultural information

The study identified various major information sources to the farmers in the study area and classified them under professional interpersonal sources, non professional interpersonal sources and finally print and broadcast sources.The distribution of radio farmer programme listeners by their major sources of agricultural information is presented in Table 2. Data in the table show that the major sources of agricultural information from professional interpersonal sources was extension agents (x=2.5). The non-professional interpersonal sources had fellow farmers and friends (X=2.6) and farmers' cooperative organization (x = 2.5) as major sources of agricultural information. Broadcast sources had radio farmer programmes (x=2.6) as major sources of agricultural information. This agrees with Nwachukwu (2003) that these are major souces of agricultural information to farmers.

The farmers did not consider professional interpersonal sources which included staff of research institutes and agricultural shows as major sources of agricultural information. This could be because staff of research institutes rarely have contacts with farmers and agricultural shows are not done regularly. Also the major function of research institutes is to make discoveries and make available their findings to extension organization.

Village heads/Ezes as a non- professional interpersonal source of agricultural information was not regarded as a major source of agricultural information by the farmers, and this could be due to the fact that most Village heads/Ezes have not recognized agricultural development as one of their responsibilities.

Table 3: level of Adoption of the Technologies Disseminated through the Radio Farmer Programme.

Table 3 shows level of adoption of improved agricultural technologies disseminate through the Radio Farmer Programme. Data in the table show that weed and its control had the highest level of adoption (x = 6.0). This was followed by harvesting and storing of yam/maize/cassava (x = 5.9), supply of vacancies to maize and cassava plots (x = 5.0), harvesting and processing of cassava roots (x = 5.9), fertilizer and fertilizer application, (ring, broadcast, band, etc) (x =5.9). Others were timely harvesting of yam/maize and its proper storage (x =5.9), and appropriate spacing of cassava/yam/maize (x = 5.6).The mean adoption scores of these technologies indicated that the farmers were at the adoption stage of improved technology adoption process. The high adoption scores of these technologies could be because they are the staple food crops in Imo State which are cultivated by all farming households in the State (Ekumankama, 2000).Yam minisett production technology had adoption score of (x=4.6) which implied that the farmers were at the trial stage of the technology adoption process

Results of mean percentage responses indicated that a large proportion (49.6%) of the farmers were using the technologies, 32.4% of them were at the awareness stage of technologies in the adoption process.

Similarly, 18.1% and 3.9% of the farmers were at the interest and trial stages of technologies in the adoption process. The data equally show that 5.5% of the farmers were unaware of the improved technologies disseminated through the Radio Farmer Programme while 0.5% of them were at the evaluation stage of improved technologies of the adoption process.low farm income among the farm households in Imo State. According to Ekumankama and Nwankwo (2002), poor exposure of farmers to appropriate agricultural information is one of the major reasons for low yield recorded by many Nigerian farmers.

Table 4. Test of hypothesis

This hypothesis stated that, there was positive significant relationship between level of adoption of technologies of Radio Farmer Programme listeners and their socio economic characteristics. To test the hypothesis, four functional forms of the ordinary least squares multiple regression model; linear, semi-log, double-log and exponential were fitted to the data to produce t-ratios that were compared with tabulated t-values at 5% level of probability to determine the significance of the variables. The lead equation was determined by applying both statistical and economic criteria such as having the highest value of coefficient of multiple determination (R^2), highest number of significant variables and conformity to prior expectations. The double-log function met the criteria for selection as lead equation, and was therefore selected for discussion and further analysis.

TABLE 2: Percentage distribution of radio farmer programme listeners by their major sources of agricultural information

Information Sources	Farmers' Responses						
	Not at all Freq	(1) %	Sometimes Freq	(2) %	Often Freq	(3) %	Mean
1.Professional Interpersonal Sources							
(a)Extension agents	34	12.6	66	24.4	170	63.0	2.5*
(b)Staff of research institutes	156	57.8	76	28.1	38	14.1	1.6
(c)Agricultural shows	174	64.5	66	24.4	30	11.1	1.5
2.Non-professional interpersonal Sources							
(a)Fellow farmers and friends	28	10.4	48	17.8	194	71.8	2.6*
(b)Village Heads/Ezes	182	67.4	56	20.7	32	11.9	1.4
(c)Farmers Cooperative Organization	26	9.6	78	28.9	166	61.5	2.5*
3.Printed Sources							
(a)Imo ADP News letters	184	68.2	56	20.7	30	11.1	1.4
(b)Posters	168	62.2	66	24.4	36	13.4	1.5
(c)Academic Journals	180	66.7	56	20.7	34	12.6	1.5
4.Broadcast Sources							
(a)Radio farmer programmes	28	10.4	46	17.0	196	72.6	2.6*
(b)Television farmer programmes	200	74.1	44	16.3	26	9.6	1.4
Mean		45.8		22.1		32.1	1.9 *

Major sources of agricultural information **Source:** Field Data 2013

TABLE 3: Percentage distribution of radio farmer programme listeners by level of adoption of improved agricultural technologies through the radio farmer programme

	Technologies	Not Aware (1) Freq	%	Aware (2) Freq	%	Interest (3) Freq	%	Evaluation (4) Freq	%	Trial (5) Freq	%	Using (6) Freq	%	Mean ($\overline{X}$)
1.	Yam minisett production	6	2.2	50	20.7	18	6.7	4	1.5	56	20.8	136	48.1	4.6
2.	Staking of yam and vine trimming	30	11.1	130	48.1	16	5.9	4	1.5	20	7.5	70	25.9	3.2
3.	Dry season vegetable production	38	14.1	136	50.4	12	4.4	16	5.9	60	22.2	8	3.0	2.8
4.	Appropriate spacing of cassava/yam/maize	16	5.9	4	1.5	0	0.0	0	0.0	0	0.0	250	92.6	5.6
5.	Fertilizer and fertilizer application(ring, broadcast, band, etc)	0	0.0	10	3.7	0	0.0	0	0.0	0	0.0	260	96.3	5.9
6.	Line planting	28	10.4	132	48.8	82	30.4	0	0.0	28	10.4	0	0.0	2.5
7.	Weed and its control	0	0.0	2	0.7	0	0.0	0	0.0	4	1.5	264	97.8	6.0
8.	Supply of vacancies to maize, cassava plots	4	1.5	0	0.0	0	0.0	0	0.0	0	0.0	266	98.5	5.9
9.	Fish pond treatment and flooding	28	10.4	164	60.7	60	22.2	0	0.0	0	0.0	18	6.7	2.4
10.	Stocking of rabbit wieners	60	22.2	182	67.4	24	8.9	0	0.0	4	1.5	0	0.0	1.9
11.	Harvesting and processing of cassava root	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	270	100.0	5.9
12.	Drugs for de-worming of sheep and goat	72	26.7	150	55.5	48	17.8	0	0.0	0	0.0	0	0.0	1.9
13.	Fish seed production stocking	72	26.7	168	62.2	12	4.4	0	0.0	2	0.7	16	6.0	2.0
14.	Feeding/housing requirement in poultry keeping	30	11.1	162	60.0	38	14.1	0	0.0	0	0.0	40	14.8	2.5
15.	Harvesting and storing of yam/maize/cassava	0	0.0	0	0.0	12	4.4	0	0.0	0	0.0	258	95.6	5.9
16.	Fish pond maintenance/management	58	21.5	136	50.4	30	11.1	0	0.0	0	0.0	4.6	19.0	2.6
17.	Fish handling, processing, preservation and storage	56	20.7	144	53.3	42	15.6	0	0.0	0	0.0	28	1 0.4	2.4
18.	Timely harvesting of yam/maize and its Proper storage	0	0.0	0	0.0	0	0.0	0	0.0	14	5.2	256	94.8	5.9
	Mean		5.5		32.4		8.1		0.5		3.9		49.6	3.9

Source: Field Data 2013

TABLE 4. Multiple regression results of socioeconomic characteristics influencing farmers level of adoption of technologies disseminated through the radio farmer programme

Explanatory Variable	Linear Function	Semi-log Function	Double-log Function	Exponential Function
Constant	18.925(5.063)*	16.544(4.921)*	12.387(6.003)*	10.943 (5.265)*
Age of the farmer (x_1)	-13.106 (-1.653)	-2.056(-1.887)	-0.075(-3.668)*	-0.008(-1.944)
Level of formal education (x_2)	17.552 (3.688)*	4.469(2.803)*	0.049(2.803)*	0.007(3.609)*
Household size (x_3)	-12.118(-1.669)	-3.078 (-1.458)	-0.083(-1.644)	-0.005(-1.812)
Farming experience (x_4)	14.067(2.903)*	2.544(1.692)	0.039(3.116)*	0.003(2.628)*
Farm size (x_5)	10.387 (1.554)	4.825(1.688)	0.066(2.901)*	0.007(3.942)*
Extension contact (x_6)	14.677(1.911)	3.672(1.596)	0.047(1.813)	0.009(1.725)
Gender (x_7)	12.056 (1.745)	1.888(1.602)	0.033 (1.602)	0.004(1.408)
Occupation (x_8)	15.392 (1.833)	2.749(1.813)	0.097(1.884)	0.007(1.384)
Farmer Organization membership (x_9)	14.991(3.467)*	5.394 (2.897)*	0.075(3.081)*	0.008(2.652)*
Ownership of radio ($_{10}$)	10.094 (1.759)	3.507(1.815)	0.048(2.637)*	0.009(2.683)*
R^2	0.593	0.469	0.724	0.639
F-value	37.063*	22.333*	65.8182*	45.643*
Sample size (n) Figures in parentheses are t-ratios	270	270	270	270
* Mean significant at 5% level				

Source: Field Data 2013

The Table indicated that the value of coefficient of multiple determinations (R^2) was 0.724 which implied that about 72 percent of the variation in the level of adoption of farmers was accounted by the joint action of the independent variables included in the multiple regression models. The test of significance of R^2 produced F-Value of 65.8182 which was significant at 5% level indicating that the model gave a good fit to the data.

The coefficients for age (x_1), level of education (x_2), farming experience (x_4), farm size (x_5), farmer organization membership (x_9), and ownership of radio (x_{10}) were significant at 5% level of probability which implied that these variables are important socio-economic factors influencing the level of adoption of farmers.

This finding of coefficient x9 which was found to be significant is similar to that of Murphy (1993) who found that farmers communicate most frequently and effectively with those who are most similar and familiar to them. These farmers are more likely to obtain information from and be influenced in their farming practices and management decision by fellow farmers than by extension workers.

CONCLUSION & RECOMMENDATION

This study dwelt on the determinants of level of adoption of improved agricultural technologies among radio farmer programme listeners in Imo State, Nigeria. The study identified major and available sources of agricultural information as extension agents, fellow farmers and friends, famers' cooperative organization, and radio farmer programme. Farmers through the radio farmer programme adopted some improved technologies which included harvesting and storing of yam/maize/cassava, weed and weed control and supply of vacancies to cassava and maize plots. Level of education, farming experience, farm size, farmer organization membership and ownership of radio were socioeconomic characteristics significant in determining the level of adoption. Based on the findings it was recommended that educated farmers, as well as being members of farmers' organizations and farmer-extension agent contact be encouraged if the objectives of adequate food supply and improved standard of living be achieved in Imo State through this laudable programme.

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