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Adoption of Agricultural Technologies Transferred Via Radio-Farmer Programme Among Farmers In Imo State, Nigeria

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Abstract

The study analyzed the adoption of technologies transferred via Radio-Farmer programme among farmers in Imo State, Nigeria. A sample of 360 farmers were interviewed using structured questionnaire. The Multi stage, proportional random sampling procedure was used in sample selection. Data analysis involved use of descriptive statistics. Result showed that most of the socio-economic characteristics of the farmers significantly influenced the adoption of technologies transferred. Result further shows that fourteen improved technologies were transferred. Results revealed that level of adoption of improved technologies was generally low. Result show that majority of the farmers had more than N150,000 as their farm income with mean annual income of N161, 4623.61. The modal age group was 40-49 years while the mean age was 46 years. Majority (50.9%) had between 5 to 8 persons in their households with mean household size of 8 persons. Also most of the farmers (60.8%) had spent 7-12 with mean literacy level of 8.5 years. Majority had enough years of farming experiences which was approximated to 11 years with the modal class of 11-15 years. Result shows that fourteen improved technologies were disseminated to farmers via Radio-Farmer programme only one was adopted. Fertilizer application had the highest level adoption ($\bar{x}$=5.7) followed fish pond construction technique.($\bar{x}$=4.1). Result show that major technologies perceived to be highly disseminated were practical tips (=2.9) fertilizer application ($\bar{x}$ = 2.8) cassava processing (2.8) soil conservation ($\bar{x}$=2.8) and timely harvesting of crops ($\bar{x}$=2.8). Furthermore, the improved technologies perceived to be moderately disseminated were cassava/yam/melon ($\bar{x}$=2.7) weed control ($\bar{x}$=2.7) and staking of yam ($\bar{x}$=2.7) while plantain production technologies ($\bar{x}$=2.3) was lowly frarely transferred. The major constraints were high cost of inputs ($\bar{X}$=2.9), lack of collaboration between farmers, research and extension ($\bar{x}$=2.9) and lack of feedback ($\bar{x}$ = 2.9). The major recommendation is that farmers should form Radio-Farmer programme listeners group and arrange to listen to the Radio-Farmer programme together in order to avail themselves the opportunity to interact and discuss the content of the broadcast.

Keywords: Radio-farmer, Technologies, Adoption.

Introduction

The role of technology in agricultural development has long been recognized and it plays an important role in reducing poverty and serves as an engine for growth in developing countries (Torado and Smith, 2009). Research studies on adoption of agricultural technologies have tried to identify the determinants of technology adoption and potential obstacles to it (Foster and Rosenzweign, 2010). Mgbada (2010) explained that rural poor farmers contribute greatly to the agricultural growth of Nigeria. At the same time, they are constrained to farm on degraded land that is increasingly unable to meet their needs because of lack of appropriate improved agricultural technologies (IFAD, 2007).

Today, technologies are the key driving force in social and economic progress of any nation. Unlike the situation in the past when economic growth was underpinned by

traditional factors of production, such as land, labour and capital, the critical drivers of global economic trends today are technologies and creativity (Eboh, 2009). The aim of agricultural technology transfer is to make farmers see, experience, learn and adopt new improved technologies in order to increase their agricultural production, as well improve their standard of living. Agricultural technology transfer is the dissemination of agricultural technologies to farmers in a codified and understandable message through appropriate channel (Mgbada, 2010). The aim of extension work is to use all the available resources to persuade rural farmers to change from traditional methods to modern methods of farming in order to bring about desirable changes in knowledge, skill and attitude in order to develop them, to solve their day-to-day problems that they can encounter in their agricultural practices (Nwachukwu, 2010). Radio-Farmer is a mass media channel or vehicle used in disseminating improved agricultural information to farmers. The programme is a joint effort of an agricultural expert and communication expert used for disseminating improved agricultural technologies to farmers. Radio-Farmer programmes are used to reach large number of farmers quickly, create awareness of new ideas and practices (Ufot, 2012). Some of the improved agricultural technologies disseminated via radio-farmer in Imo State to the farmers include; soil conservation technologies, improved cassava stem varieties. (TMS 419 homestead fish pond, irrigation technique, yam minisett technique, yam staking, organic farming techniques, cassava/maize/yam intercrop and weed control practices.

In Nigeria, Federal Radio Cooperation of Nigeria (FRCN). Control all the radio stations, while state government has their own radio stations. The first radio station in Nigeria was run by the Nigerian broadcasting Service in Lagos in the mid-1940s. There are 136 radio stations in Nigeria of which 43 are Owned by federal government, 41 owned by state government, 25 private owned station and 27 campus radio station (Ebomuche and Ihugba, 2010). Radio farmer programs in Imo state started in 2005, to complement the effort of extension serves in agricultural technology transfer to farmers. Radio-Farmer is a product of Agricultural Development Programme. It is aired twice in a week both in Igbo and English languages. The English version is called radio farmer, while the Igbo version is called ‘onyeoruubi” (Njoku and Mereikwu, 2014).

Despite the overwhelming efforts by radio-farmer, evidence of research shows that the adoption of radio-farmer technologies transferred in various parts of Imo State was not high. For example, Echetama (2013) in a study carried out in Imo State showed that adoption rates for intercropping, among farmers were on the average. The study also showed that those for mulching and fish pond construction practices, were very low. Njoku, and Meremikwu (2014) observed that farmers’ low adoption of soil conservation technologies is due to unfavourable trade-off between the cost of such technologies and their benefits in the short-run. However, farmers’ responses to cost and technology adoption depends on certain socio-economic factors. However, these studies had the limitations of data deficiency and measurement problems. Ukoha and Echebiri (2003) observed that shifting cultivation is the most common soil conservation technologies adopted in the area because it suits their land tenure system and is therefore appropriate. It is in this regard that this study analyzed the adoption of improved technologies transferred via-

radio-farmer programme among farmers in Imo State, Nigeria. The specific objectives of the study were to; describe socio-economic characteristics of rural farmers; identify the major radio-farmer technologies transferred to farmers; determine farmers' levels of adoption of technologies transferred via radio-farmers, analyze constraints to adoption of improved technologies transferred via radio-farmers programme among farmers.

Methodology

Imo State is located in the rainforest area of Southern-eastern Nigeria. Imo State was used for the study because of its high population density and which is one of the major food producing States in South-East Nigeria. The State has a land area of about 5,530km^{2}and a population of over 3, 934,899 persons hence its population density is 710 persons per square kilometer. The main occupation of the people is farming. Some major cash crops cultivated by the people are soil occupation of the people is farming. Some major cash crops cultivated by the people are oil palm (*Elaeis guineensis*), cashew (*Anacardium occidentials*) cocoa (*Theobroma cacao*). The major food crops include cassava (*manihot spp*), yam (*Dioscorea spp*), and maize (*Zea mays*). The major animals reared include; small ruminants, and non-ruminants, fishes and poultry. Imo State is divided into three agricultural zones namely: Owerri, Orlu and Okigwe.

A list of Radio-Farmer programme listeners was collected from Agricultural Development Programme (ADP). The sample frame consisted of 1800 from Owerri agricultural zone, 1080 from Orlu and 720 from Okigwe agricultural zones. The State consist of eleven extension blocks from Owerri agricultural zone, ten extension blocks from Orlu agricultural zone and six extension blocks from Okigwe agricultural zone which summed up in Imo State (ADP, 2014).

Multi-stage proportional random sampling technique was used in sample selection. The first stage involved a proportional random sampling of four extension blocks, three extension blocks and two extension blocks respectively from Owerri, Orlu and Okigwe agricultural zones. Giving a total of ten extension blocks from the three agricultural zones of Imo State. The second stage involved a simple random sampling of 2 circles each from the ten extension blocks, giving a total of 18 circles. The third stage involved a purposive sampling of 20 farmers who own radio set in each of the 18 circles, giving a total of 360 respondents which formed the sample size for the study. Structured questionnaire was used to direct the interview and record responses. Data analysis involved the use of frequencies, percentages, mean scores and standard deviation to achieve objectives I and ii while for objective iii technologies transferred via Radio-Farmer programme were listed and each farmer was asked to indicate the state he/she was on the adoption scale. It was achieved using 5-step/point, likert-type scale of, Aware (1), Interest (2), Evaluation (3), Trial (4) and Adoption (5). The values of the responses were weighed independently against each technology transferred by the score on the adoption scale and divided by the sample size for the study, to obtain a score which fall between 1-and 5 which indicates the stage of the farmer in adopting the particular technology. To analyze the perceived constraints to adoption of improved technologies, a-3 point Likert scale was used to achieve the objective. Farmers with adoption score of 3.0 and above were regarded to be average because they were at evaluate stage constraint with a

score 2.00 and above was considered serious, while those with less than 2.00 were not regarded as serious constraints.

Results and Discussion

Socio-economic characteristics of rural farmers

The socio-economic characteristics of Radio-Farmer listeners are shown in Table 1. The result reveals that majority (78.9%) were males, while 21.1% were females. This that Radio-Framer listenership was dominated by males. Results further showed that larger proportion (48.9%) of the respondents belonged to the age group of 40-49 years, while 2.2% were equal to or less than 19 years old. The result indicate that the mean age of the farmers was 46.0 years. This implies that most of the farmers were at active of their lives. This findings on mean age of the farmers agreed with those of Kolawale *et al*., (2003) and those of Agwu *et al*., (2008) that most farmers in Nigeria are at active stage of life and are not relatively old.

Result also showed that majority (83.9%) of the respondents were married, while 2.5% were divorced. This implies that of the farmers have more family responsibilities and would therefore eager to obtain information through Radio-Farmer programme on recent technologies that would improve their farm income. Result showed that most (56.9%) of the respondents had 5 -8 persons in their households, while 11.9%, 19.2%, 7.5% and 4.7% of the respondents had 1-4 persons. 9-12 persons, 13-16 persons and 17 and above persons in their households respectively. The mean household size was 8 persons. This implies that more family labour would be available which is obviously an advantage with respect to farm labour supply.

The result shows that majority (60.8%) of the respondents had spent 7-12 years in school and were literate, while 5.0% had no formal education. The mean level of education was 8.5 years. This implies that most farmers in Imo State were educated which again is an advantage to adoption of improved technologies. Result also shows that most (54.4%) of the respondents had 1.1-1.6 hectares of farm land, with a mean farm size of 1.3 hectares. This implies that small scale farmers dominated Imo State. Result reveals that most (56.9%) of the respondents had ₦151,000 – ₦200,000 as annual farm income. The annual mean farm income was ₦161,623.61. This implies that farmers in Imo State although small-scale farmers had a good farm income. Results also indicate that majority (87.2%) of the farmers had personal savings as the main source of funds for their farm businesses. Result further shows that 53.6% of respondents had 1-2 extension visits with an overall mean extension contact of 1.4 visit. This implies that farmers had very low extension contact. This could be because of extension agents were not equipped with the necessary logistic to enable them carry out their responsibilities properly.

Table 1: Distribution of socio-economic characteristics of farmers in Imo state, Nigeria (n=360)

Variables	Frequency	percentage	Mean $\bar{x}$
Sex			
Male	2.84	78.9	
Female	76	21.1	
Age (years)			
≤ 19	8	2.2	
20-29	21	5.8	
30-39	33	9.2	
40-49	176	48.9	
50-59	70	19.4	46 years
60 and above	52	14.4	
Marital status			
Married	302	83.9	
Single	21	5.8	
Separated	9	2.5	
Widowed	28	7.8	
Household size			
1-4	43	11.9	
5-8	204	5.8	
9-12	69	19.2	
13-16	27	7.5	8 Persons
17 and above	17	4.7	
Education (years)			
(no formal education)	18	5.0	
1-6	79	21.9	
7-12	219	60.8	8.5 years
13-18	41	11.4	
19 and above	3	0.83	
*** Farming experience (years)**			
1-5	37	10.3	
6-10	10.3	28.6	
11-5	158	43.9	11.6 years
16-20	43	11.9	
21 and above	19	5.3	
Farm size(in hectare)			
0.5-1.0	106	29.4	1.3 hectare
1.1-1.6	196	54.4	
1.7-2.2	39	10.8	
2.3-2.8	13	3.6	
2.9-3.4	6	1.6	
***Source of fund**			
Personal saving	314	87.2	
Money lender	32	8.9	
Relatives	189	52.5	
Microfinance	90	25.6	
Extension contact	114	31.7	
1-2	193	53.6	
3-4	41	11.4	
5 and above	12	3.5	
Annual Farm Income (Naira)			
≤ 50,00	4	1.1	
51,000-100,000	32	8.9	
101,000-150,000	56	15.6	
151,000-200,000	205	56.9	
201,000 and above	63	17.5	
***Membership of Rural Organization**			
Cooperative Society	108	30.0	
Farmers Association	319	88.6	
Women Group	149	41.4	
Age Grade	271	75.3	
Church Organization	168	46.7	

Source: Field Survey, 2015 * Means Multiple Responses

Major-Farmer technologies transferred to farmers in Imo State

Distribution of farmers by major technologies received via Radio-Farmer programme is presented in Table 2. The Table show that all the technologies had mean scores of 2 and above, implying that all the technologies listed were disseminated to the farmers. The result shows that Radio-Farmer had enhanced the transfer of thirteen technologies. They include, practical tips towards crop production techniques (X = 2.9), fertilizer application, (X = 2.9), dry season vegetable production technologies (X = 2.8), cassava processing technique (X = 2.8) and timely harvesting of yam (X = 2.8), which were highly transferred. Result further indicates that soil conservation practice (X = 2.6) and home stead fish pond construction (X=2.6) were moderately transferred, while plantain production technique (X =2.3) was lowly or rarely transferred. The reason could be that these technologies involved practical demonstrations, and farmers placed least interest on the Radio-Farmer as a basis for trying out these technologies. Result also indicate that the standard deviations were closely packed and small.

This implies that the data were highly reliable and uniform, Result also showed a grand mean of (X=2.7). This implies that technologies equal to (X = 2.7) were moderately transferred while technologies above (x = 2.7) were highly transferred and the technologies less than (X=2.7) were lowly/rarely transferred. Result further revealed a grand mean of (X=2.2) and standard deviation were closely packed and small. This implies that the data had high degree of uniformly and reliability of the result,. This findings is in line with those of Onuh and Igwemma (2007) who stated that the smaller the standard deviations the higher the degree of reliability of the estimates.

Table 2: Respondents' perception on major technologies transferred via Radio-farmer programme in Imo State, Nigeria (n=360)

Major Technologies Transferred	Farmers Responses						Mean ($\overline{X}$)	Std dev
	Highly (3)		Moderately (2)		Not All (1)			
	Freq	%	Freq	%	Freq	%		
Practical tips towards crop production	316	87.7	41	11.4	3	0.8	2.9	0.3608
Fish pond construction	258	91.7	72	20.0	30	8.3	2.6	0.6324
Fertilizer application	324	90.0	33	49.2	3	0.8	2.8	0.3391
Dry season vegetable production	297	82.5	45	12.5	18	5.0	2.8	0.5238
Cassava processing technique	285	79.2	61	16.9	14	3.9	2.8	0.5120
Soil conservation practice	263	73.1	59	16.3	38	10.6	2.6	0.6678
Cassava/yam/melon intercrop	271	75.3	52	14.4	37	10.3	2.7	0.6580
Yamminisett multiplication	253	70.3	64	17.8	43	11.9	2.6	0.6941
Cassava/yam/intercrop technique	258	71.7	65	18.1	37	10.2	2.6	0.6655
Plantain production technique	189	52.5	73	20.3	98	27.2	2.3	0.8497
Timely harvest of crop/storage	303	84.2	48	13.3	9	2.5	2.8	0.4469
Weed control technique	285	79.2	53	14.7	22	6.1	2.7	0.5648
Staking of yam technique	274	76.1	69	19.2	17	4.7	2.7	0.4700

Grand mean ($\overline{X}$=2.7) Benchmark = 20

Source: Field Data, 2015

Respondents' Level of adoption of Technologies Transferred via Radio-Framer Programme in Imo State, Nigeria

The distribution of farmers by level of adoption of improved technologies transferred via Radio-Farmer is shown in Table 3. Result reveals that fourteen improved agricultural technologies were transferred to farmers via Radio-Farmer programme. Fertilizer application had the highest level of adoption (X=5.7), followed by homestead fish pond construction (X=4.1), cassava/yam/maize intercrop technique (X=3.9), weed control technique (X=3.9), cassava processing technique (X=3.2), cassava/yam/melon intercrop (X=3.8) and yam staking technique (X=3.7). This could be because the crops were either the staple crops or the regular maintenance practices for food crops cultivated by farming households in the State.

Results show that yam minisett technique had adoption score of (X=3.5). This implies that rural farmers were at the evaluation stage of agricultural technology in the adoption process. Results showed that only fertilizer application technique was adopted out of the 14 technologies transferred. This implies that level of adoption of the technologies was generally low among farmers in Imo State. Results of mean percentage responses show that a moderate proportion (42.1%) of the farmers were using the agricultural technologies, 19.8% of them were at the trial stage of technologies in the adoption process. Also, 18.3% and 10.9% of the farmers were at the evaluation and interest stage of agricultural technologies respectively in the adoption

process. The results equally showed that 7.8% of the farmers were at the awareness stage of agricultural technologies disseminated via the Radio-Farmer programme. This results show that the standard deviations were closely packed and small. This implies that the data had high degree of uniformity and reliability of the result. This is in line with the findings of Onuh and Igwemma (2007) that the smaller the standard deviation the higher the degree of reliability of the estimates.

Table 3:Distribution of Respondents by Level of Adoption of Technologies Transferred via radio-farmer programme (n=360)

Radio-Farmer technologies transferred	Aware (1) freq	%	Interest (2) freq	%	Evaluation (3) freq	%	Trial (4) freq	%	Adoption (5) freq	%	Mean ($\bar{X}$)	SD
Practical tips towards crop production	46	12.8	47	13.1	50	13.9	55	15.2	1.62	45.0	3.7	1.4665
Fish pond construction technique	19	5.3	32	8.9	42	13.3	56	15.6	205	45.3	4.1	1.2974
Fertilizer Application	6	1.7	12	3.3	16	4.4	29	8.1	297	82.5	5.7	0.8438
Dry season vegetable production techniques	30	8.3	28	7.8	15.9	46.9	63	17.5	70	19.4	3.3	1.3964
Cassava processing techniques	34	9.4	44	12.2	65	18.1	49	13.3	170	47.2	3.8	1.9803
Soil conservation methods/mulching	25	6.9	52	14.4	161	44.7	73	20.3	49	13.6	3.2	1.0615
Cassava/yam/maize intercrop techniques	28	7.7	42	11.7	52	14.4	65	18.1	173	48.1	3.9	1.4233
Yam minisett production techniques	40	11.1	50	13.9	65	18.1	97	26.9	108	30.0	3.5	1.4651
Cassava/yam/melon intercrop technique	30	8.3	38	10.6	55	15.2	90	25.0	147	40.8	3.8	1.3751
Plantain/banana production techniques	24	6.7	43	11.4	71	19.7	89	24.7	133	36.9	3.7	1.2603
Timely harvesting of yam/maize and melon technique and its proper storage	27	7.5	39	10.8	45	12.5	92	25.6	161	44.7	3.9	1.4108
Weed control technique	28	7.8	34	9.4	45	12.5	89	24.7	1.64	45.6	3.9	1.4245
Staking of yam and vine trimming technique	28	9.8	53	14.9	51	14.2	85	23.6	143	39.7	3.7	1.4767
Mean (X)		7.8	10.9			17.9		19.89		41.46		

SOURCE: Field Data, 2015

Constraint to Adoption of Radio-Farmer Technologies Transferred to Farmers in Imo State Nigeria

The distribution of farmers perceived constraints to adoption of the Radio-Farmer technologies transferred is presented in Table 4. The Table shows that out of nineteen possible constraints investigated in this study, twelve (12) were considered to be serious constraints to adoption of technologies transferred through the Radio-Farmer programme by farmers in Imo State. These serious constraints included; high cost of inputs ($\bar{X}$=2.9), lack of collaboration between farmers, research and extension ($\bar{X}$=2.9), lack of feedback ($\bar{X}$=2.9), irregular supply of electricity ($\bar{X}$=2.8), language problem associated with it ($\bar{X}$=2.7, high level of illiteracy ($\bar{X}$=2.7), lack of incentive to the farmers ($\bar{X}$=2.7), language translation of message transferred ($\bar{X}$=2.7), and timing of the programme is not convenient ($\bar{X}$=2.6).Famers perceived constraints to adoption of improved technologies transferred via radio-farmers in Imo State, Nigeria. Results further indicate that the standard deviation were closely packed and small. This implies that data obtained were reliable.

Table 4: Distribution of Respondents on perceived constraints to adoption of Radio-Farmer technologies.

Constraints to adoption of radio-farmer technology	Not serious (1) Freq	%	Serious (2) Freq	%	Very serious (3) freq	%	Mean ($\bar{X}$)	SD
Lack of awareness of the radio programme	312	86.7	41	11.4	7	1.9	1.2	0.4103
Language problem associated with it	29	8.1	63	17.5	268	74.4	2.7	0.6198
Irregular supply of electricity	14	3.9	28	7.8	318	88.3	2.8	0.4583
High level of illiteracy	32	8.8	47	13.1	281	78.1	2.7	0.6253
Limited coverage	294	81.7	52	14.4	14	3.9	1.2	0.4345
Inadequate radio signals	281	78.1	63	17.5	16	4.4	1.3	0.5321
Insufficient funding	23	6.4	44	12.2	293	81.4	2.8	0.5619
Inadequacy of the presenter	287	79.7	59	16.4	14	3.9	1.2	0.5109
Lack of incentive to the farmers	28	7.8	45	1.4	287	79.8	2.7	0.5978
Inappropriateness of the technologies	288	80.0	63	17.5	9	2.5	1.2	0.4737
High cost of inputs	13	3.6	26	7.2	321	89.2	2.9	0.4427
Lack of collaboration between low literacy farmers, research and extension	12	3.3	25	6.9	323	89.9	2.9	0.4293
Timing of the programme is not convenient	43	11.9	69	19.2	248	68.9	2.6	0.6957
Language translation of message transferred	22	75.0	48	13.3	290	80.6	2.7	0.6354
limited coverage and poor reception signal of radio stations	270		81	22.5	9	2.5	1.3	0.4993
Improper method of presentation	280	77.8	73	20.3	7	1.9	1.2	1.2528
Limited air time	14	3.9	32	8.9	314	87.2	2.8	0.4655
Lack of feedback	12	3.3	29	8.1	319	88.6	2.9	0.4384
Complexity of language	16	4.4	31	8.6	313	87.0	2.8	0.4829

Serious constraints ≥2.0
Source: Field data, 2015

Conclusion

The study has shown that Radio-Farmer programme plays important role in disseminating agricultural technologies and its adoption had remained very low. Results showed that socio-economic characteristics of rural farmers such as age, household size, level of education and annual income influenced the adoption of improved technologies. Result further indicate that twelve major constraints hindered the adoption of improved technologies. Among them were lack of feedback, lack of opportunities to ask questions and high cost of input leading to low levels of adoption of improved technologies, and consequently low food production.

Recommendations

Following from the results of the study, the following recommendations are put forward. Since socio-economic characteristics of rural farmers influenced adoption of improved technologies, governments should consider socio-economic characteristics of the rural farmers when designing future technologies and adoption policies, as well as ensure its proper implementation. Farmers should form Radio-Farmer listeners group and arrange to listen to the Radio-Farmer programme together in order to avail themselves the opportunity to interact and discuss the content of the broadcast. Adult education classes should be organized for farmers to assists in develop their reading and written kills.

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