Adoption of Organic Agricultural Technologies: Implications for Radio farmer Agricultural Extension Programmes in Imo State, Nigeria.

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The study determined farmers' adoption of Organic agricultural technologies disseminated via radio farmer agricultural Extension programme in Imo state, Nigeria. An interview schedule was used to collect data from a sample of 200 farmers. Results show that radio farmer broadcast and co-farmers were the major sources of information to greater proportion of the farmers. Data on relevance of the organic agricultural technologies disseminated showed that almost all the technologies were perceived to be relevant except the use of biological pest control farming. The radio farmer agricultural programme enhanced the extent of adoption of organic agricultural technologies namely; crop rotation practice, planting of indigenous varieties, application of compost, mulching of crops, intercropping, mixed cropping, crop residues, animal manuring, planting of legumes, green manure, off farm organic waste, minimum tillage and alley cropping. Nevertheless, the adoptions of the technologies were generally low. Age, farming experience and social participation significantly influenced adoption of organic agricultural technologies disseminated via radio farm agricultural Extension programme. Major constraints identified include short duration of programme, inappropriate scheduling of programme, inability to ask relevant questions and get feed back from the radio presenter. The study recommends among other things the rescheduling of the radio programme to very late in the evenings when the farmers will be opportune to listen to the programme.

Key words: organic agricultural technologies, Adoption, extension, radio programme.

Introduction

Radio is a very powerful communication tool. Experience with rural radio has shown the potential for agricultural extension to benefit from both the coverage and the relevance that local broadcasting can achieve by using participatory communication approaches. The importance of sharing information locally and opening up wider information networks for farmers is explored with reference to the specific radio programmes based on research on organic Agricultural technologies. There are several approaches to using radio for development, and to harness radio for agricultural extension. Radio initiatives as part of broader communication for development strategies have been used by international organisations such as the United Nations Children's Fund (UNICEF), the United Nations Educational Scientific and Cultural Organization (UNESCO) and the Food and Agriculture Organization (FAO) of the United Nations since the late 1960s. Other media such as video, television, the internet and information communication technologies (ICTs) are also the focus of an increasing number of international organisations, nongovernmental organisations (NGOs) and governments investigating the role of communication in development. This paper describes this specific experience in the context of radio farmer agricultural extension programme as a tool for agricultural extension and rural development, with reference to the dramatically changing technology environment that is currently influencing information and communication processes worldwide. The implications for policy makers of harnessing radio farmer programmes to improve agricultural extension delivery.

In Nigeria, one serious constraint to agricultural development is the limited access to agricultural information (Anthott, 1993). This has given rise to calls for establishment of sustainable agricultural extension policy. However, the concept of information in general

and of agricultural information in particular, as a resource for development is only just beginning to gain ground in Nigeria. Government policy makers, planners and administrators are increasingly recognizing the fact that information is indispensable to the development process. In spite of this growing realization, the essential social and information mechanisms and infrastructural facilities are

not yet sufficiently developed in Nigeria to foster the generation, storage, preservation, repacking, retrieval, dissemination and utilization of information (Hannah, 1991).

Recently, to keep the Nigerian farmers abreast with tested and proven agricultural technologies in the developed countries, the National Food Reserve Agency (NFRA) distributed over one hundred and thirty "Farm Radio" to Nigerian farmers and is also planning to make information "interconnectivity" between farmers in different states of Nigeria.

Historically speaking, radio broadcasting in Nigeria dates back to 1932. For two decades after its founding, local station for the empire service for the British Broadcasting Corporation (B.B.C), served merely as a hand maiden of the colonial enterprise, being the cultural arm of a political and economic process that consolidates British rule on our shores. However, in 1957 the Nigerian Broadcasting Corporation was established as an independent institution designed to be neutral of existing political forces on the ground and to treat all parties equally. Section 36 (2) of the 1979 Constitution then ushered in the revolution of radio broadcasting in the country. By proclaiming that "the federal and state government or any other person or body authorized by the president can own, establish or operate a television or wireless broadcasting station in the country" it gave statutory basis to the ultimate emergence of private / commercial radio broadcasting 13 years after, when in 1992, the then government finally, through the creation of the National Broadcasting Commission, decreed into existence a new era for private broadcasting. A year after, the first set of licenses was handed out. It is worthy to recall that in 1987 when the National Mass Communication policy met in Badagry, it recommended that private licenses be issued to interested Nigerians. The government rejected the recommendation. Radio remained a monopoly of the state for 41 years after its independence. As a matter of drawback, Nigeria is the only West African country without a community radio; how then is Nigeria the giant of Africa? Our law-makers would effectively respond to this question.

The purpose of agricultural communication is to bring about change of attitude, knowledge, skills and aspiration of the receivers. In Nigeria, various communication media are being used to transmit agricultural information to farmers in line with national policy on agriculture. The communication media include farm magazine, leaflets, newsletters, newspapers, pamphlets, radio and television, (Dare, 1990). Among them, radio is the most preferred tool of mass communication in Nigeria (Ekumankama, 2000).

Basically, the information required in agricultural sector can be grouped into technical and business information. The technical information is information related with cropping practices and the related activities, including agro-environment analysis, land preparation, nursery, irrigation and fertilization, crop protection, harvesting, post harvest handling and product processing. Business information is information related with economical aspect of agricultural sector, including capital, finance, and market information. All of that information theoretically can be produced and used by the related elements in the whole agricultural system so that it forms an information network. It involve government as the policy makers, experts as researchers and knowledge sources, extension workers as farmers' consultants, industrial sectors and businessman as the suppliers of production factors, financial institutions and investors as source of capital, business practitioners and distributors as market mediators, and farmer groups, farmer cooperatives or individual farmers as agricultural produce producers.

As the agricultural macro-production system in Nigeria is set to explore the internet which offers great opportunities for addressing the information needs of agricultural development and food security, there is need to overcome the evident limitations for finding and retrieving relevant information using existing internet tools and technologies through farmer radio programmes. With the ICT revolution, several national and multinational agencies as well as local and international Non governmental agencies have embarked on interventions in terms of the provision of ICT facilities and infrastructure. In Nigeria, it may be interesting to know that VSAT and other Satellite equipment are already installed in some rural communities and large agricultural markets. These are to link producers, input and produce marketers worldwide. The effect of the infrastructure and the equipment will be greatly limited if publicity is not given to it through the farmer radio programme.

With the poor literacy level of farmers and low level of education among agricultural extension agents, the use of local language to provide agricultural information in Nigeria will maximize the exploration of the full potential of the information services. Translation of specialized information into local

language is necessary notable in agriculture because it is often crucial for the final end users who do not master the source language due to the low literacy level of farmers in Nigerian situation.

Prah (2001) draws a crucial connection between language, culture and development by stating that in Africa, the cultural base of mass society which is in reality premised on African languages provides the only credible condition for the development of a society which involves the masses and uplifts them socio-culturally and economically from where they are on the basis of what they have. Egbokhare, *et al.* (2001) noted that over 400 languages in Nigeria can be reduced to less than 100 mutual intelligibility clusters and the proportion of those who speak 10 major and medium languages either as first or second languages would cover close to 90 percent of the population. Egbokhare (2004) reported the nature and types of language barriers to include illiteracy, linguistic diversity, linguistic deficit and technology deficit.

The mandate of disseminating agricultural information in Nigeria rests with National Agricultural Extension and Research Liaison Service (NAERLS), and the Agricultural Development Projects (ADPs). The evolution of NAERLS was through five major stages namely: 1920 - 62 - Agricultural Research and Advisory Services, 1963 - 68 - Research Liaison Services, 1969 - 75 - Extension Research Liaison Services, 1976 - 86 - Agricultural Extension Research Liaison Service, 1987 - present - National Agricultural Extension and Research Liaison Service (NAERLS). The mandate of the NAERLS is to co-ordinate the overall planning and development of extension liaison service throughout the country, collaborate with research institutes, and co-ordinate national training activities, conferences and workshops, and conduct research on technology transfer and adoption. Zonal offices are located throughout the country depending on the agro-ecological division of the country; they include Southwest, Southeast, Northwest, Northeast and Middle Belt.

The Agricultural Development Project (ADP) approach began as a World Bank assisted integrated rural development package, within the establishment of three pilot/enclave ADPs in Funtua, (Kaduna state) Gombe, (Bauchi state) and Gussau, (Sokoto state) in 1975. The ADP strategy was based on the premise that a combination of inter-related factors comprising the right technology, effective extension, access to physical production enhancing inputs, adequate market and other infrastructural facilities are essential to get agriculture moving (FACU, 1986). The core elements of the ADP include: An input delivery and credit supply system through a network of farm service; A massive rural feeder road network, A revitalized intensive and systematic extension training programme backed by synchronized input supply, credit and adaptive research services; and A solid project management together with built in project monitoring and evaluation (Patel, 1983). The success recorded by the pilot ADPs led the Federal government to establish six more enclaves at Ayangba, Lafia, Bida, Ilorin, Ekiti-Akoko and Oyo North between 1979 and 1982. The success of the ADP encouraged the creation of the nation-wide Agricultural Development Project (ADP). While the previous agricultural development scheme involved extension services within the frame of operations of the state Ministries of Agriculture, the ADPs operated as a separate organisation structure. The World Bank, the Federal Government and the state government tri-partitely funded the ADP. The Federal Agricultural Co-ordinating Unit (FACU) co-ordinates the project. The ADP, according to Idachaba (1988), constitutes the single largest agency charged with the responsibilities of agricultural extension in Nigeria. Nasko (1989) reported that the programme had demonstrated a close and positive correlation between the development of infrastructures, agricultural credit and extension services from research technical back up through on-farm adaptive research trials.

Within the socio-cultural milieu of Nigerian farmers, several studies have reported that the most important sources of information to farmers in the decreasing order of importance are extension agents, radio, and neighbour/relatives. It is therefore important to examine the adoption of Organic Agricultural Technologies and ways the Radio farmer Agricultural Extension Programmes has enhanced it in Imo State, Nigeria.

Table 1. Presents the farm broadcast programmes on radio and television in Southern, Nigeria.

States	Programme titles[+*]	Dominant location language	Language Of Presentation
Abia	Radio farmer	Igbo	English
Akwa-	The farmer*, **Otoiwon**	Efik, Anang, Ibiobio	English, Efik

Ibom			
Anambra	**Oge Ndi Olu Ubi, Oge ndi Oluugbo***	Igbo	Igbo
Bayelsa	Farming on radio, farmers' hour	Ijaw	English
Cross Rivers	Fellow farmers, Telefarmer*	Efik, Anang, Ibiobio	English
Delta	Country farmer, Green fingers	Itsekiri, Isoko, Urohbo, Ijaw	English
Edo	Better farming, Farming hints*	Edo	English
Ekiti	Agbeloba / Agbelwoyi, Lathered*	Yoruba	Yoruba
Enugu	Radio farmer, Farming half hour*	Igbo	English
Imo	Onye oru ubi, Onye Oruugbo*, Radio farmer, ka anyi yocha oru ubi, Telefarmer*	Igbo	Igbo, English
Lagos	Boluyo	Yoruba, Egun	Yoruba
Ogun	Agbe afokosoro, Agbelere*	Yoruba, Egun	Yoruba
Ondo	Ise Agbe, Boluyo, Olalagbe*	Yoruba	Yoruba
Osun	Aye Agbe, Agbe Ode oni*	Yoruba	Yoruba
Oyo	Agbe loba*	Yoruba	Yoruba
Rivers	Farm*	Ijaw, Calabari	English

Source: OLADIMEJI I. O.'s Multilinguality of Farm Broadcast and Agricultural Information Access in Nigeria. ***Nordic Journal of African Studies 15(2): 199–205 (2006)***

[+] Programmes in local languages of the area are bold faced
[*] Television programmes, where a single programme is asterisked implies the same programme for radio and television.

The content of farm broadcast is primarily information needed by farmers in each of the area of coverage of the broadcast for different months of the year. The broadcast cover several farming activities on different farming enterprises such as fishing, livestock, agro-forestry, agro-processing, crop production among others.

The Imo State Agricultural Development Programme (ISADAP) in collaboration with the Imo Broadcasting Corporation (IBC) has through the radio farmer programme (established in early 1997) transferred ISADAP technologies to farmers. The programme is broadcast in English and Igbo with the aim of reaching farmers with improved agricultural technologies so as to increase agricultural production in the state. The programme lasts for thirty minutes starting after four in the afternoon of every Monday of the week. The various aspects of the programme include crop production, crop protection, and women in agriculture, livestock, livestock/crop enterprises, agro forestry and organic farming. Through this radio programme some organic technologies were transferred to farmers. The technologies that have been disseminated include land preparation and planting of early season crops, soil conservation in food crops, crop rotation practice, planting of indigenous varieties, application of compost, mulching of crops, intercropping, mixed cropping, crop residues, animal manuring, planting of legumes, green manure, minimum tillage and alley cropping and others (ISADAP, 2005; 2006; 2006; and 2007). At the end of each discussion, interested farmers were advised to consult IBC or ISADAP for further explanation. However, because of the obvious limitation of radio in overt behaviour change, it then become necessary to determine the farmer's perceived extent to which the programme has enhanced the adoption pattern of the organic agricultural technologies disseminated. The foregoing however raises some pertinent questions such as: how do farmers' perceived relevance of the organic agricultural technologies disseminated through the radio farmer programme? What is the level of adoption of the technologies? To what extent has the programme helped to influence the adoption patterns of the farmers? What are the farmers' extents of satisfaction with the programme? What are the personal and institutional factors that influenced the adoption of organic agricultural technologies disseminated via radio farmer programme? And what problems militate against the effective utilization of agricultural information aired on radio programme?

The overall purpose of this study was to determine farmers' adoption of organic agricultural technologies disseminated via radio farmer programme in Imo State, Nigeria. Specifically, this study was designed to ascertain farmers' perceived relevance of the various organic agricultural technologies aired on the radio farmer programme, determine the level of adoption of these technologies among farmers, ascertain the extent to which the radio farmer programme has enhanced farmers' adoption of organic technologies, determine farmers' level of satisfaction with the radio farmer programme, determine the personal and institutional factors that influenced the adoption of organic technologies aired on the radio farmer programme and determine constraints to effective utilization of information aired on the radio farmer programme.

METHODOLOGY

The study area

The study area is Imo state, which is located in south-eastern region of Nigeria. The state covers an area of 5,100 square kilometers and has a population of 2,485,499. Imo state has an undulating topography in the south, which raises gradually towards the north and northeastern parts giving rise to Okigwe rolling hills (Nwadike and Ukawuike 1996). The state lies in the tropical rainforest agro ecological zone, which allows diverse agricultural production. Farming is the main occupation of the people of the state. and shares common boundaries with a number of other states. It is bounded in the east by Abia State, in the North by Anambra State, in the West by Delta State, and in the South by Rivers State. Imo state Nigeria lies between latitude between latitude 50 10' and 60 35' north of equator as well as between longitude 60 35' and 70 31' east of the Greenwich Meridian. It is wherefore in the tropical rain forest zone. The agro climate is typically tropical and annual rainfall ranges from 2.0 cm to 2.5 cm per year. The wet season lasts from April to September while the remaining months are dry. The state is made up of 27 local government areas, and divided into three agricultural zones namely Okigwe, Orlu and Owerri zones. There are about 12, 000 farm families in the state (Imo ADP, 1994).

Sample selection and sampling technique

The population for the study consisted of all farmers in the three agricultural zones of the State. Three L.G.A each was purposively selected from each of the three agricultural zones on the basis of IBC receptivity. A multi-stage sampling technique was employed in this study. Out of the three agricultural zones in Imo State, namely; Owerri, Okigwe and Orlu, three Local Government Areas were selected from each zone, making a total of nine LGAs. Thereafter, five communities were proportionately selected from the selected L.G.As based on existing 34 farm blocks and 63 farm cells in the Agricultural Development Programme (ADP) zones of the state. Five famers were purposively selected from each community, making a sample size of 225 respondents out of which 200 useable questionnaires was analysed.

Data collection/measurement of variables

Data were collected through the use of interview schedule and structured questionnaire. To determine farmers' perceived relevance of the various organic technologies disseminated through the radio programme, a five point Likert- type scale was used. The five (5) points on the scale were weighed according to the degree of relevance. The following scaling procedure was adopted: very strongly relevant = 5; relevant = 4; undecided = 3, not relevant = 2 and very irrelevant = 1. The values of the five responses were added and further divided by 5 to obtain 3.0, which was regarded as the mean. Organic Technologies, with mean scores below 3.0 were regarded to be irrelevant while technologies with mean scores equal to 3.0 or above were regarded as relevant. To determine the extent of adoption, organic technologies were listed out and each respondent was asked to indicate the stage he/she was on, in the adoption scale. The 7 – steps (not aware to rejection) adoption model (Madukwe et al., 2000) were used. Also, the extent to which the radio farmer programme has enhanced farmers' adoption was ascertained using a five – point Likert type scale. Each respondent was required to indicate his/her opinion on the extent to which the radio farmer programme has helped in adopting the technologies disseminated by checking any

of the five options namely; “to a very great extent”, “to a great extent”, “do not know” “to a little extent” and “not at all”. Values that were assigned to these options are 5,4, 3, 2, and 1, respectively. The values were added and further divided by 5 to obtain a mean of 3.0. Organic technologies with the mean scores of less than 3.0 were regarded as technologies which the radio farmer programme has not enhanced the extent of adoption, while Organic technologies with mean scores equal or above 3.0 were regarded as having a great extent of adoption via the radio farmer programme. Information on the level of satisfaction with the radio farmer programme was ascertained by asking each respondent to indicate the option that best describe his or her level of satisfaction. The following response options were used: “Very satisfied”, “Satisfied”, and “Not Satisfied”. Also, to determine personal and institutional factors influencing the adoption of Organic technologies aired on the radio farmer programme, multiple regression analysis was used.
The multiple regression was implicitly specified as follows:

Y = f(X1,X2,X3,X4,X5,X6,X7,X8,X9,X10,X11)

Where Y = Adoption index (number of technologies adopted by the respondent),
X1 = age of the farmer (in years),
X2 = level of formal education (number of years spent in school),
X3 = household size (number of household members),
X4 = farming experience (in years),
X5 = farm size (in hectares),
X6 = extension contact (in number of visits (contacts) by extension agents in the year),
X7 = gender (1 if the respondent is male; 2 if female),
X8 = credit accessibility (1 for access to credit; 0 other wise),
X9 = occupation (1 if farming is major occupation; 0 other wise),
X10 = membership of farmer organization (1 if membership of a cooperative or farmer group; 0 other wise), and
X11 = radio ownership (1 if the respondent own a radio; 0 other wise)
To find out farmers’ perceived constraints to the effective utilization of the radio farmer programme, a list of possible constraints was listed and the respondents asked to indicate their perceived constraints. The following scaling procedure was adopted; Very serious constraints = 3; Serious constraints = 2; Not serious constraints = 1. From these responses the mean scores below 2.0 were regarded as not serious constraints while mean scores equal to 2.0 or above were regarded as serious constraints to the effective utilization of the radio farmer programme. Data relating to socio-economic variables of the farmers were summarized using means, frequency counts and percentages. Multiple regression analysis was used to determine the personal and institutional factors influencing the adoption of organic technologies aired on the radio farmer programme.

RESULTS AND DISCUSSION

Socio-economic characteristics of farmers

Table 2. Percentage distribution of respondents by socio-economic characteristics (n= 200).

SOCIO-ECONOMIC CHARACTERISTICS	PERCENTAGE	$\bar{X}$
SEX		
Male	71.5	
Female	28.5	
Age (years)		
21-30	3.9	
31-40	25.7	
41-50	45.4	53.1
51-60	13.1	
60-70	11.9	
Marital status		
Married	75.3	
	17.3	
	7.4	
	14.6	
	36.5	
	31.9	

Single
Widow
Educational status
Non formal education
Primary school level
Secondary school level
Tertiary institution
Household size
1-4
5-9
10-14
Primary occupation
farming
trading / business
civil services / retired
artisan
Type of farming activities
food crop farmer
livestock farmer
Farming experience (years)
1-9
10-19
20-29
30-39
Farm size
< 1 hectare
1-2 hectares
3-4 hectares
5-6 hectares

Source: Field Survey 2009

Table 2 shows that majority (71.5%) of the respondents were males who were mostly (75.3%) married with a greater proportion (45.4%) of the respondents being between 41 and 50 years of age. This is an advantage for increased investment and organic technology utilization and hence innovativeness. Majority(85.4%) of the respondents were literate and this is an advantage for adoption of farm innovations as education has been shown to be a factor in the adoption of improved practices (Obinne, 1991). In other words, the high level of education among the respondents would likely make them more responsive to many agricultural extension programmes and policies. The Table indicates that 46.1% of the respondents had 5-9 household members. The implication of this finding is that more family labour would be readily available since relatively large household size is an obvious advantage in terms of farm labour supply. The table further shows that 54.4% of the respondents were primarily engaged in farming with majority (84.7%) while only 15.3% were involved in livestock farming. Majority (38%) of the respondents had between ten and nineteen years of farming experience. The result reveals that a greater proportion (48.1%) of the farmers cultivated between 1and 2 hectares of farm land while 20.5% of them cultivated between 3 and 4 hectares of land. The mean farm size was 1.5 hectares. This implies that the study area comprises of small-scale farmers. This agrees with Olayide (1992) that Nigerian farmers are small-scale farmers that cultivated small areas of land. The relatively small farm size of the respondents will inevitably lead to subsistence farming which do not encourage commercial farming. Relatively small farm land could constitute a major constraint to technology adoption.

Distribution of respondents according to institutional characteristics

Table 3. Percentage distribution of respondents by institutional characteristics)
n = 200).

INSTITUTIONAL CHARACTERISTICS	PERCENTAGE	χ
Frequency of Extension Agent Contact per year		
Not Visited	60.4	
1-3	23.1	0.9
4-3	9.8	
6-7	6.7	
Membership of farmers' association		
Non member	70.2	
1-2	23.0	0.3
3-4	6.8	
Access to credit facilities		
Yes	17.3	
No	82.7	
Major Source of information		
Radio	27.1	
Co-farmers	32.5	
Co-operative society	9.8	
Farmers forum	5.6	
Workshop on Agric	2.48	
IITA Officials	3.96	
Extension agents	3.92	
TV	2.48	
None	12.16	
Ownership of radio		
Yes	82.6	
No	17.4	
Usefulness of radio as a source of information		
Yes	64.3	
No	35.7	
Listening to radio farmer programme		
Yes	31.7	
No	68.3	

Source: Field Survey 2009

Table 3 shows that majority (60.4%) of the respondents have not had any contact with extension agents, 23.1% had between one to three contacts with extension agents in the last twelve months. From the foregoing analysis, it can be concluded that the respondents did not receive as much extension support as necessary. This does not augur well for innovation adoption and transfer. The low percentage of farmers visited by the extension agents appear to indicate that the extension service/ agents are not playing their roles in promoting agriculture in the area. A greater proportion (70.2%) of the respondents did not belong to any farmer association. This implies low innovativeness among the respondents due to lack of group dynamic effects. Table 3 also shows that about 82.7% of the respondents did not receive any agricultural credit. Only about 17.3% which were mostly male

respondents received agricultural credit. Lack of access to credit facilities constitutes a constraint in purchasing planting materials and farm inputs and leasing more land for farming. Major sources of information on organic agricultural technologies available to the respondents were co-farmers (32.5%); farm broadcast (27.1%) and co-operative society members (9.8). Agricultural information from co-farmers may be wrong and/or obsolete especially if they were not well informed on appropriate agricultural practice and techniques. The result also shows that majority (82.6%) of them indicated ownership of radio sets and 64.3% asserted that radio is a useful source of information on organic agricultural technologies. In other words it is expected that majority will benefit from the radio broadcast and will be well informed on organic agricultural technologies only if they listen to the programme. However, the table shows that (68.3%) of the respondents indicated that they did not listen to the radio farmer programme. This could be as a result of lack of awareness of the programme or that the programme is aired when the respondents were in the farm. This finding suggests the need for ISADAP to create more awareness of the programme and possibly reschedule the time of the programme to the time it will be convenient to the primary target audience.

Perception of farmers towards the relevance of organic agricultural technologies disseminated via radio farmer programme.

Table 4. Mean scores of farmers' perceived relevance of organic agricultural technologies disseminated via radio farmer programme.

Technology	$\bar{x}$
Crop rotation practice	4.3*
Improved soil conservation in food and cash crops	3.7*
Planting of indigenous varieties	3.6*
Application of compost	4.0*
Biological Pest control in food crop farm	2.4
Mulching of crops	4.1*
Intercropping	4.2*
Mixed cropping	4.6*
Crop residues	4.4*
Animal manuring	4.2*
Planting of legumes	4.3*
Green manure	4.5*
Off farm organic waste	4.7*
Minimum tillage	4.3*
Alley cropping	3.6*
Site selection / bush clearing / packing	4.2*
Improved land preparation and planting of early season crops	3.1*

Source: Field Survey 2009

* Relevant organic technologies ≥ 3.0

Table 4 indicate that the relevant organic agricultural technologies disseminated to farmers include Crop rotation practice (x = 4.3), Improved soil conservation in food and cash crops (x = 3.7), Planting of indigenous varieties (x = 3.6). This implies that indigenous knowledge is prevalent in the area and farmers need proper knowledge on how to increase their yield, storage and pest control. Other organic agricultural technologies that were relevant to farmers include Application of compost (x = 4.0), Mulching of crops (x= 4.1), Intercropping (x= 4.2), Mixed cropping (x= 4.6), Crop residues (x = 4.4), Animal manuring (x = 4.2), Planting of legumes (x = 4.3), Green manure (x = 4.5), improved soil conservation in food and cash crops (x = 3.7), Off farm organic waste (x = 4.7), Minimum tillage (x = 4.3), Alley cropping (x = 3.6) and Site selection / bush clearing / packing (x = 4.2). However, Biological Pest control in food crop farm was not considered relevant by the farmers. The reason could be due to management and technicality involved in the technology, which the farmers may not have and/or lack of awareness of the importance of this technology. From the table, it can be seen that

almost the whole organic technologies were relevant because the information bothered on the major crops grown by the farmers in the study area.

Adoption level of organic agricultural technologies enhanced by radio farmer programme

Table 5. Percentage distribution of respondents by levels of adoption (n = 200).

Technology	Not aware	Aware	Interest	Evaluation	Trial	Using	
Rejection	51.2	3.32	3.32	-	-	42.1	-
Crop rotation practice	65.1	8.61	8.52	-	-	17.0	
Improved soil conservation in food and cash crops	86.5	-	-	-	-	13.4	-
Planting of indigenous varieties	73.2	13.1	10.1	-	-	3.52	-
Application of compost	97.2	2.78	-	-	-	-	
Biological Pest control in food crop farm	86.1	3.7	7.3	-	-	-	-
Mulching of crops	72.5	13.8	12.1	-	-	1.58	
Intercropping	63.5	2.2	2.23			31.8	-
Mixed cropping	51.8	9.30	8.50	-	-	30.1	-
Crop residues	67.3	-	-	-	-	31.7	-
Animal manuring	75.6	-	-	-	-	24.2	-
Planting of legumes	57.1	8.30	9.30	-	-	25.0	-
Green manure	88.5	-	-	-	-	11.3	-
Off farm organic waste	88.0	3.46	8.52	-		-	-
Minimum tillage	75.5	14.5	9.6	-	-	-	-
Alley cropping	78.6	12.0	8.2	-	0.98	-	-
Site selection / bush clearing / packing	75.3	7.13	9.24	-	-	8.3	-
Improved land preparation and planting of early season crops							

Source: Field Survey 2009

Table 5 shows different stages of respondents' adoption of organic technologies. The result shows that crop rotation practice has the highest level of adoption (42.1%).This was followed by mixed cropping (31.8%) among others. This could be because yam and cassava are staple food in the state. According to Ekumankama (2000), mixed cropping especially cassava based mixtures are traditionally practiced in many farming systems in the eastern region of the country. Technologies with high levels of unawareness include off farm organic waste(88.5%), Minimum tillage(88.0%), Biological Pest control in food crop (97.2%). It is worthy of note that the level of adoption of these organic technologies by farmers is low. This might be explained by the fact that radio broadcast has various limitations. For instance, the broadcaster cannot put too much detail on radio because of time limitation. However, the high level of unawareness associated with these organic technologies and the general low level of adoption of the technologies among the respondents suggest inadequate and insufficient exposure of farmers to organic agricultural technologies disseminated via radio farmer programme.

Adoption of organic agricultural technologies through the radio farmer programme

Table 6. Mean scores of extent to which the radio farmer programme has enhanced the adoption of improved technologies disseminated as perceived by farmers.

Technology	$\bar{X}$
Crop rotation practice	3.60*
Improved soil conservation in food and cash crops	2.90
Planting of indigenous varieties	2.40
Application of compost	2.70
Biological Pest control in food crop farm	2.70
Mulching of crops	2.00
Intercropping	2.03
Mixed cropping	3.90*
Crop residues	3.70*
Animal manuring	3.50*
Planting of legumes	2.50
Green manure	3.90*
Off farm organic waste	2.75
Minimum tillage	2.00
Alley cropping	2.00
Site selection / bush clearing / packing	2.00
Improved land preparation and planting of early season crops	2.06

Source: Field Survey 2009

$\bar{X} \geq 3.0$

Table 6 shows that the radio farmer programme has enhanced the adoption of only five technologies. They include: Crop rotation practice (x = 3.6), Mixed cropping (x = 3.9), Crop residues(x = 3.7), Animal manuring (x= 3.5), Green manure (x =3.9), The technologies that the radio farmer programme has not enhanced its adoption include: Planting of indigenous varieties(x= 2.4), Application of compost(x= 2.7), Biological Pest control in food crop farm (x= 3.7),Mulching of crops (x= 2.0), Intercropping (x= 2.03), Off farm organic waste (x= 2.75), Minimum tillage (x= 2.0), Alley cropping (x= 2.0), Site selection / bush clearing / packing (x= 2.0), Improved land preparation and planting of early season crops (x= 2.06). The reason could be that these technologies involve practical demonstration and farmers place least reliance on the radio as a basis for trying out these organic technologies.

Satisfaction as perceived by farmers towards radio farmer programme

Table 7. Percentage distribution of the respondents based on satisfaction with radio Farmer programme. n = 200

Satisfaction	%
Not satisfied	54.6
Satisfied	28.9
Very satisfied	16.5

Source: Field Survey 2009

Table 7 reveals that 16.5% of the respondents were very satisfied with the radio farmer programme. About 28.9% were satisfied, while majority(54.6%) were not satisfied with the radio farmer programme in Imo state. The level of satisfaction of individual farmers with the radio farmer programme will largely inhibit or facilitate their utilization of this source of information.

Table 8. Multiple regression result of personal and institutional factors influencing farmers' adoption of organic agricultural technology in Imo State

Model	B	Std. Error	Standardized coefficients beta	T	Sig
(Constant)	42.600	12.630		3.026	0.002
AGE	-.362	.237	-.213	-1.830	.050*
EDU	.363	.436	.066	.752	.301
OCU	.392	2.020	.018	.204	.738
FE	.446	.258	.209	1.816	.047*
OM	8.255	3.020	.254	2.180	.023*
EC	2.267	2.041	.121	1.060	.278
CA	5.416	4.617	.109	1.253	.235
RO	2.637	6.534	.041	.342	.601

Source: Field Survey 2009

*Significant at <0.05

Table 8 shows that age, farming experience and membership of farmer association had significant influence on adoption of organic agricultural technologies. Age of the farmer had a positive effect on adoption of organic technologies; this may be as a result of the total age proportion of the respondents. Younger farmers may accept new technologies faster than older farmers. Also membership of farmer association had positive significant effect on adoption. This implies that the higher the number of farmers' organizations a farmer belongs to, the more organic agricultural technologies the farmer would adopt. This could be attributed to the fact that constant interaction with fellow farmers makes for awareness of new technologies. Farming experience of the farmers had a positive significant influence on adoption of the organic technologies. This can be better explained in terms of age. The older the farmer, the more farming experience she/he gains with years. However, education, occupation, extension contact, access to credit and radio ownership were found to have no significant influence on adoption.

Radio farmer programme on organic agriculture utilization and constraints in Imo State

Table 9. Farmers' constraints to utilization of organic agricultural technologies disseminated via radio farmer programme.

Constraint	Mean score
Innovation difficult / complicated to understand	1.56
Lack of adequate time to listen to the radio	1.41
Inability to ask relevant question and get the feedback from the radio presenter	2.47*
Language used in presenting the programme	2.33*
Short duration of programme	2.26*
Lack of radio set	1.43
Lack of money to buy batteries	1.48
Inappropriate schedule of programme	2.35*
Irrelevant contents	1.22
Lack of access of radio set due to family member depending on the same set	1.12
Lack of interest	1.97
Poor reception of radio signal	1.68
Power outage	1.49
Unavailability / cost of batteries	1.62

Source: Field Survey 2009

Serious constraints ≥ 2.0

Table 9 shows that four were considered to be serious constraints to the adoption of improved agricultural technologies by farmers. They include: language used in presenting the programme (x =2.33), inappropriate scheduling of programme (x = 2.35),short duration of programme (x = 2.26), and inability to ask relevant question and get feedback from the radio presenter (x = 2.47). The finding further suggests that the time of airing the programme was not suitable to the farmers. The reason is that most of them were often in their farms during programme airing. This finding agrees with the observation of Ekumankama (2000) that farmers were not satisfied with the period of the day they received information on agricultural technologies from the radio. However, the time allocated for presenting the programme is too short for farmers to understand what the presenter teaches.

Conclusion and Recommendations

Historically, agricultural extension has often failed to communicate technical information to farmers in a way that has enabled it to be adopted locally. The combination of approaches encapsulated in the best examples of farmer radio based programmes strike an effective balance between indigenous and scientific approaches to agricultural development. There are,
however, likely to continue to be considerable challenges in the future in providing farmers, extensionists and radio farmer broadcasters with the training and skills to manage the burgeoning information supply for practical poverty-reducing outcomes. In the midst of a digital revolution a pragmatic focus on increasing access to radio farmer programmes by small-scale farmers in areas with little or no electricity and no formal experience of the extension service would go a long way towards improving agricultural development and rural livelihoods in Nigeria. The findings of this study revealed that major source of information on organic agricultural technologies to farmers were co-farmers followed by radio programmes.
A greater proportion accepted radio as a useful source of information on organic agricultural technologies. The study also revealed that the radio farmer programme had little effect on enhancing adoption of organic technologies by the respondents. A greater proportion of the respondents were not satisfied with the radio farmer programme. Only age, farming experience and membership of farmers' organization significantly influenced adoption of organic agricultural technologies disseminated through the radio while the major constraints to adoption of technologies include inappropriate scheduling of programme, inability to ask relevant questions and get the feedback from the radio presenter and language used in presenting the programme. Based on the study findings it was concluded that the present level of adoption of the organic agricultural technologies disseminated via radio farmer programme to farmers in Imo state is low.
Based on the study findings the following recommendations were made:

1. Policy makers should encourage membership of farmers' organization since it was found to be positively significant on adoption of organic agricultural technologies. This will help in sustainable agricultural practice.

2. Farmers' radio listening groups should be formed and existing ones strengthened by the ADP. The extension agent should participate in the group. After each broadcast, the EA should effectively clarify issues with respect to the technologies disseminated.

3. ISADAP should allocate more air time to the radio farmer programme.

4. The farmer radio programme should be aired at the time when the farmers are available to listen to the programme preferably very late in the evening.

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