



Adoption of ICT as source of information on agricultural innovations among farm households in Nigeria: Evidence from Benue state

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Abstract

The study analyzed adoption of ICTs as source of information on agricultural innovations in Nigeria. Data were collected through a structured questionnaire administered to one hundred and twenty (120) Agricultural Development Programme (ADP) farmers sampled in Benue State. Results show that Radio (46.7%), Newspapers (45.8%), contact farmers (42.5%), and extension agents (41.7%) ranked first, second, third and fourth respectively in terms of adoption by farmers. Level of education, and incomes were the significant ($P < 0.05$) determinants of ICT adoption. Enabling policy environment that would encourage utilization of ICTs through deliberate programmes that expose farming communities to ICTs and support incomes such as highly subsidized ICT trainings and increased credit facilities to rural farmers would enhance adoption of ICTs in Nigeria.

Keywords: ICT, Agricultural innovations, Nigeria, Adoption

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1. Introduction

The Training and Visit (T&V) agricultural extension is essentially a train-the-trainer education system in Nigeria in which researchers from Research Institutes train Subject-Matter Specialists (SMS) during a Monthly Technology Review Meeting (MTRM) who in turn train Village Extension Agents (VEAs) during Forth Nightly Training (FNT) sessions who in turn train a fixed number of Contact Farmers on improved agricultural practices. Unfortunately, the T&V system has faced the challenge of low ratio of Agricultural Extension Agent to farmer due to inadequate extension personnel.

The use of modern ICTs in agricultural extension service delivery has enhanced the efficiency of Research-Extension-Farmer linkage system much greatly. ICTs have ushered in the much desired advantage of reaching a wider audience (Obinne, 1994) in creating awareness on recommended farm practices in most rural household in Nigeria.

In the literature, several authors have conceptualized ICT. Heeks (1999) defined ICTs as electronic devices for capturing, storing, processing, and communicating information. Also, CTA (2003) interpreted ICTs as technologies that facilitate communication and processing and transmission of information by electronic means. However, ICTs in a broader sense, refers to sets of tools, equipment, applications, and services that are utilized to produce, capture, store, disseminate and exchange information (Raji, 2008).

In the light of these definitions, ICT tools that have great potential for application in Agricultural extension communication for rural development include: Radio and Television, Telephones, Short Message Services, The Web, Search engines, Cameras, Video, E-mail, Computers, CD-ROM, DVD, Web publishing, Printed materials, Photographs, Questions and Answer Services, Group meetings, and meetings and Workshops. All these are sources of Agricultural information available for farmers world wide.

In most of sub-Saharan African countries, conventional media for example Radio, Newspapers and Television have played key roles in rural development. Agricultural innovations are disseminated to rural farmers through these media. Despite the crucial role of ICTs in meeting information needs of rural households, social economic and cultural conditions such as poverty, illiteracy, and poor rural infrastructural base have limited the capacity of farmers in making wide range of choices and use of ICTs in most rural economies. However, Yaghoubi- Farani , Gholinia, & Movahedi (2011) noted that ICTs must first be well adopted for livelihood of rural communities.

2. Materials and methods

The study was conducted in Nigeria. One Hundred and Twenty (120) farmers registered with the Agricultural Development Programme (ADP) in Benue State was the sample for the study. Primary data collected through a set of structured and validated questionnaire and interview schedule were analyzed through the use of descriptive statistics such as frequency counts and percentages. Chi-square analyses were applied to determine the association of socio-economic factors of farmers with ICT utilization. Chi-square statistic (X^2) was specified as follow:

$$X^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i}$$

Where,

O_i = Observed frequency for the i th farmer

E_i = expected frequency for the i th farmer

3. Empirical results and discussion

3.1. Socio-economic characteristics of the respondents

The findings show that majority (60%) of the farmers was male and agricultural workers (96%) in their active labour force ages of between 20 and 59 (Table 1). Farmers had low literacy levels with about 33% and 36% respectively having secondary and post-secondary school qualifications. This may account for the low percentage adoption of magazines (31.7%), newspapers (45.8%), internet (25%) and pamphlets (17.5%) by the farm households (Table 2).

Across the sample, Radio (46.7%), Newspapers (45.8%), Contact farmers (42.5%), and Extension agents (41.7%), ranked first, second, third and fourth respectively in terms of their adoption by respondents.

3.2. Extent of ICT adoption

Results show that Opinion leaders, Drama, Indigenous music, slide, and Town criers constituted insignificant sources of agricultural information, accounting only for about 16.7%, 7.5%, 6.7%, 1.7% and 12.5% of the respective total ICT use in the area (Table 2). The greater use of conventional ICTs suggested preferences of farmers for modern sources of information, given financial power and the skills for their use.

Chi square test of discrepancy indicated a significant ($p < 0.10$) positive relationship between age of farmers and use of Radio (Table 3.0). Level of education was significantly related to adoption of Newspapers, News bulletins, Radio, Television, Internet, Extension agent, Friends/Relations, groups/Associations and Magazines at 5% level of probability; Posters, and Town criers however, at 10% Level. This indicated that education/literacy level is a powerful policy variable required for increased use of a wide range of ICTs. Information in Table 3 revealed that Income is significantly correlated with use of Newspapers, Televisions, and magazines at 5 Probability level. This suggested that improvements in farm income would significantly increase the extent of use of modern ICTs.

Sex of respondents was significantly associated with use of News bulletins ($P < 0.05$). Marital Status of the respondents was positively, significantly correlated with use of Television, Extension agents, Friends/Relations and Groups/Associations at 0.10 probability level. Further, Community leaders, and Town Criers were significantly associated with farming experience at 0.05 level. Farm experience significantly

influenced use of friends/Relations at 0.10 levels. Size of farm holdings has a strong influence on use of Newspapers, and Internet (10% level), Poster (0.05 level). Thus large-sized farm households are likely to source agricultural information in the Media, and Online.

4. Conclusion and recommendations

The study showed that education was the most important factor influencing choice and utilization of a wide variety of both traditional and conventional ICTs by the respondents for information on agricultural innovations in the area of study. Also, farm income mostly influenced use of conventional sources of information in the area.

It is, therefore, recommended, that government should provide more vocational training on ICTs. There should be deliberate policies to train and expose farming communities to modern ICTs as well as policies that would serve as income support such as increased provision of credit to farmers.

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Table 1. Socio-economic characteristics of Farm households in the study area (field survey data, 2011)

Characteristic	Frequency (N=120)	Percentage (%)
Sex	72	60.00
Male	48	40.00
Female		59.20
Marital Status	26	21.70
Married	11	9.20
Single	3	2.50
Widowed	9	7.50
Widower		
Divorced		
Level of education	18	15.00
No formal education	19	15.80
Primary School	40	33.30
Secondary school	43	35.80
Tertiary Institution		
Age (yrs)	36	30.00
20-29	44	36.70
30-39	22	18.30
40-49	14	11.70
50-59	4	3.30
60+		
Occupation	72	60.00
Farming	29	24.20
Civil service	18	15.00
Trading	1.0	0.80
Artisan		
Farm size (hectare)	28	23.30
0.5 to <1.0	30	25.00
1 to <2	32	26.70
2 to <3	24	20.00
3 to <4	6	5.00
4 to <5		
Annual income (Naira)		
1000 to < 40000	51	42.50
40000 to < 80000	31	25.80
80000 to < 120000	16	13.30
120000 to < 160000	16	13.30
160000 to < 200000	6	5.00
Family size (persons)		
1-5	29	24.20
6-10	58	48.30
11-15	11	9.00
16-20	13	10.80
21-25	9	7.50
Farming experience (years)		
1-12	64	
13-24	28	53.30
25-36	17	23.30
37-48	10	14.20
49-50	1	8.30
		0.80

Table 2. Level of ICT Adoption

Characteristic	Frequency (N=120)	Percentage (%)
Magazines	38	31.70
Newspapers	55	45.80
Posters	27	22.50
Pamphlets	21	17.50
News bulletins	20	16.70
Radio	56	46.70
Television	49	40.80
Internet	30	25.00
Extension agents	50	41.70
Slide	2	1.70
Community Leaders	25	20.80
Town Criers	15	12.50
Friends/Relations	47	39.20
Indigenous Music	8	6.70
Groups/associations	40	33.30
Drama	9	7.50
Opinion Leaders	20	16.70
Contact Farmers	57	42.50

*Multiple responses

Source: field survey data, 2011

Table 3. Influence of Socio-economic characteristics of farmers on ICT adoption

Socio-economic economic characteristic of respondents														
	Age(yrs)		Education		Income		Sex		Marital status		Farm Experience		Farm Size (ha)	
	X ² cal	df	X ² cal	df	X ² cal	df	X ² cal	df	X ² cal	df	X ² cal	df	X ² cal	df
ICT														
Newspaper	.316 ^{Ns}	4	45.093**	3	49.851**	4	0.559 ^{Ns}	1	4.640 ^{Ns}	4	2.618 ^{Ns}	4	9.222*	4
Posters	.591 ^{Ns}	4	7.214*	3	4.328 ^{Ns}	4	2.039 ^{Ns}	1	6.743 ^{Ns}	4	5.217 ^{Ns}	4	10.54**	4

News bulletins	.273 ^{Ns}	4	3	5.181 ^{Ns}	4	24.88**	1	1.448 ^{Ns}	4	2.173 ^{Ns}	4	5.839 ^{Ns}	4
Radio	.881 [*]	4	3	6.006 ^{Ns}	4	0.022 ^{Ns}	1	6.577 ^{Ns}	4	4.150 ^{Ns}	4	6.749 ^{Ns}	4
Television	.228 ^{Ns}	4	3	9.662**	4	0.368 ^{Ns}	1	8.151 [*]	4	2.557 ^{Ns}	4	6.934 ^{Ns}	4
Internet	.857 ^{Ns}	4	3	4.069 ^{Ns}	4	1.667 ^{Ns}	1	6.893 ^{Ns}	4	0.643 ^{Ns}	4	7.817 [*]	4
Extension agents	.129 ^{Ns}	4	3	5.997 ^{Ns}	4	1.286 ^{Ns}	1	8.435 [*]	4	3.482 ^{Ns}	4	5.771 ^{Ns}	4
Community Leaders	.274 ^{Ns}	4	3	7.700 ^{Ns}	4	0.211 ^{Ns}	1	1.485 ^{Ns}	4	11.775**	4	5.110 ^{Ns}	4
Town crier	.166 ^{Ns}	4	3	5.891 ^{Ns}	4	0.317 ^{Ns}	1	2.036 ^{Ns}	4	9.643**	4	5.801 ^{Ns}	4
Friends/Relation	.636 ^{Ns}	4	3	2.042 ^{Ns}	4	0.093 ^{Ns}	1	9.147 [*]	4	8.915 [*]	4	0.801 ^{Ns}	4
Groups/Association	.401 ^{Ns}	4	3	1.417 ^{Ns}	4	0.000 ^{Ns}	1	8.060 [*]	4	3.296 ^{Ns}	4	7.651 ^{Ns}	4
Opinion leaders	.719 ^{Ns}	4	3	4.139 ^{Ns}	4	0.250 ^{Ns}	1	12.031**	4	7.655 ^{Ns}	4	5.040 ^{Ns}	4
Contact farmers	.860 ^{Ns}	4	3	1.722 ^{Ns}	4	0.023 ^{Ns}	1	12.247**	4	5.618 ^{Ns}	4	3.445 ^{Ns}	4

Magazines	.389 ^{Ns}	4	31.085**	3	9.48 2**	4	0.103 ^{Ns}	1	0.000 ^{Ns}	4	5.379 ^{Ns}	4	6.706 ^{Ns}	4
Indigenous music	.676 ^{Ns}	4	1.486 ^{Ns}	3	5.37 9 ^{Ns}	4	0.357 ^{Ns}	1	0.632 ^{Ns}	4	4.378 ^{Ns}	4	2.296 ^{Ns}	4

Source: Field Survey data, 2011

** χ^2 -cal significant at $P < 0.05$;

* Significant at $P < 0.10$. NS=not significant;

df=degree of freedom