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Village extension agents' (VEAs) socio-economic characteristics as factors in usage of information and communication technologies (ICTs): A study of three selected states of north-western Nigeria

T. O. Fadiji¹, T. K. Atala², D. F. Omokore², Z. Abdulsalam²

¹Department of Agricultural Economics and Extension, University of Abuja, Abuja, Nigeria

²Department of Agricultural Economics and Rural Sociology, Institute for Agricultural Research (IAR), Ahmadu Bello University (ABU), Zaria, Kaduna State, Nigeria

Email address

tofadiji@yahoo.com (T. O. Fadiji)

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Abstract

This paper presents the results of investigation into the factors that influenced Village Extension Agents (VEAs)' usage of Information and Communication Technologies (ICTs) in three selected States Agricultural Development Projects (ADPs) in Northwestern Nigeria. Two hundred and four (204) VEAs were sampled as respondents for the study. Results show that significant positive correlation exists between; access to ICT, perceptions on Government policy, and perception on customs/tradition and ICT usage. The paper therefore concludes that both socio-economic characteristics and perceptions of VEAs have considerable influence on their ICT usage. Hence, it was recommended that emphasis should be placed by the VEAs' employers in improving the VEAs' socio-economic characteristics and perceptions.

1. Introduction

There has been an apparent felt concern of development minded people. Consequently, the need for research and development in this context has been widened and intensified among the social scientists.

The world of today is widely acclaimed to be information-driven, getting and transmitting information of various dimensions simultaneously. ICTs have been defined and it comprised of processing and transmission of information by electronic means such as radio, television, telephones (fixed and mobile), computers, Pocket PCs and the internet (CTA, 2003).

In the last one decade, the need to make information and communication channels reachable and available to most,

if not all the people of the world, has been a focus of change agents.

The agricultural sector of Nigeria is a strong springboard for development if it is given adequate attention. Moreso, the Information and Communication Technology (ICT) has been identified as a veritable channel through which development in agriculture of Nigeria could be realized particularly in information dissemination and literacy drive of the extension agents and farmers.

The World Bank-assisted Agricultural Development Projects (ADPs) was introduced into Nigeria agriculture in 1975 and with it the component of the Training and Visit (T & V) extension system, and by 1985, was widely adopted in many states (Idachaba, 2007). The attendant inefficiency associated with the conventional person-to-person information flow mechanism, particularly in extension message delivery, has brought to fore the possibility of application of ICT as a complimentary tool. Specifically, in the delivery of extension messages by extension agents to farmers where the World Bank Training and Visit (T & V) approach is used, for example, the case in Nigeria, the problems and prospects of information delivery are a cause for concern.

A number of problems beset development of agricultural extension service in developing countries. Some of the major notable problems identified by Agbamu (2005) are: inadequacy and instability of funding, poor logistic support for field staff, use of poorly trained personnel, ineffective agricultural Research-Extension Linkages and inefficient/inappropriate agro-technologies for farmers. Others include: disproportionate extension agent to farm family ratio, dilution of extension agents' specific responsibility, lack of clientele participation in programme development, failure of input suppliers to ensure effective and timely distribution to farmers, irregular evaluation of extension programmes and policy, institutional and programme instability of National Agricultural Extension Systems.

Benor and Baxter (1984) have outlined explicitly the responsibilities of extension workers in an organized environment. They classified extension workers' duties into two basic categories; one to farmers and the other to their supervisors. According to them, in a nutshell, an extension worker pay field visit to his contact farmers (CFs), teaches them recommended practices and encourages them to adopt available technologies and proffers solution to their problems.

The rural farmers who should be given adequate attention and support in terms of inputs supply (e.g. fertilizers, seeds, chemicals etc), and indeed information on relevant agricultural technologies are not adequately assisted and informed, thus constituting an uphill task in adopting technologies. Even when informed, they are beset with confusing and late information (Arokoyo, 2003; Arokoyo, 2007 and Adekoya, *et. al.* 2002). Hence, the expected performance level of the rural farmers has not

been realized making the nation's desire to achieve agricultural transformation a mirage. Thus, the nation's goal in providing food security and self-sufficiency has not been attained.

Leeuwis and van den Ban (2004) documented an extensive work on communication for innovation looking at the changing perspectives and the organizational and inter-organizational issues involved. Specific to the media methods, and process management, the work outlined issues related to farm management, pre-defined issues, exploration and training. Their work went further to examine methods related to information provision with discussion on written and computer-based search and access facilities as well as information-needs assessment.

Rogers and Shoemaker (1972) defined communication as "the process by which messages are transferred from a source to a receiver". The authors observed that communication is part of social change process. Contreras (1980) examined the impact of communication on modernity thus generating a thesis that communication has not played as important role in rural development in developing countries because of a series of structural constraints under which it has operated and, of course, will probably continue to operate.

Barraket and Scott (2003) identified, in addition to access, level of information literacy as a paramount factor on ICT. In similar vein, Selwyn (2003) agreed that information literacy is a necessary prerequisite to accessing and using of ICT. It is however pertinent to note that generally, other issues connected with determinants of ICT usage include: cost, time, quality of technology, convenience, safety, availability and facilities.

For instance, Allan *et al.*, (2003) illustrated a framework of factors that play a part in influencing ICT and Security technology adoption among Australian SMEs - based on a framework by Rashid and Al-Qirim (2001):

- (a) Individual Factors: CEO's (Manager's) Innovativeness and CEO's (Manager's) IS/IT/EC/ACT knowledge.
- (b) Organizational Factors: Size, Quality of systems, Information intensity, specialization and Management support.
- (c) Environmental Factors: Competitive pressure, Supplier/buyer pressure, Public policy and Government Role.
- (d) Technological (Innovative) Factors: Relative advantage, Complexity, Compatibility, Cost and Image.

The three specific objectives of the study were to:

1. analyse the socio-economic characteristics and perceptions of VEAs on ICT?
2. identify the relationship between socio-economic/institutional /geographical factors and VEAs' usage of ICT
3. make recommendations toward facilitating ICT usage by VEAs

2. Methodology

The respondents for this study were the Village Extension Agents (VEAs). Three States ADPs in the North-West Geo-political Zone were purposively chosen for this study namely; Kaduna, Kano and Kebbi States. They were chosen purposively to give a reasonable coverage of the North-West geopolitical zone of Nigeria.

As part of preliminary preparation for the instrument to be used, a questionnaire was prepared and pre-tested with a validity result ($r=0.79$) of response from selected 32 VEAs. Thereafter, from each of the 3 State ADPs chosen, through simple random sampling technique, 204 VEAs were selected in the following proportions; 48, 81 and 45 from Kaduna, Kano and Kebbi States ADPs respectively. Thus, a total 204 of respondents, which represented 20% of the total number of the VEAs (1,018) in the selected 3 State ADPs, were selected for the study.

A social research, like this, requires a theoretical basis. Incidentally, it is to be noted that extension workers are agents of change and ICT is a tool of change too. The study was premised on social change theory. Development is a word that has been variously defined and understood by people. Rogers and Burdge (1972) stated that:

“Development is a type of Social Change in which new ideas are introduced into a social system in order to produce higher per-capita incomes and levels of living through more modern production methods and improved social organization. Development corresponds to modernization at the social system level. Thus we speak of the development of a nation and the modernization of an individual.”

The concept of rural development is not a new issue. In fact, from the “stone age”, through the medieval, to the modern time, mankind has been undergoing one type of development or the other. Successive governments, in many countries worldwide, have been faced with challenge of paying attention to the lives of the rural and urban poor. Contributions to rural sociology and securing improvement of socio-economic condition of the rural people have been given due emphasis by social researchers and appropriate theories have been applied (Igbokwe, 2005).

Descriptive statistics (i.e. frequency, percentages, and mean) was used to analyse results for objectives i. Of this study. This was used to explain the analysis carried out on Socio-economic characteristics of VEAs.

Pearson’s Product Moment Correlation (r) was used to measure the relationship between variables. In the correlation model, the classical coefficient of multiple determination is a measure of association between the dependent random variable Y and the random vector of independent variables X . In this study, it was used to measure the association between the independent variables (X) and dependent variable (Y). Thus, two variables are considered to be correlated when they tend to vary together. According to Araoye (2004:P237), “The aim of Pearson’s

Correlation Coefficient (r) is to measure the precision of the linear relationship between two variables”.

The formula is:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{[\sum ((x_i - \bar{x})^2) \sum ((y_i - \bar{y})^2)]}}$$

$$= \frac{S_{xy}}{\sum S_{xx} S_{yy}}$$

Where:

S_{xy} = Sum of product of x and y ; S_{xx} = Sum of squares of x ; S_{yy} = Sum of squares of y .

The following variables on VEAs’ characteristics and perceptions of VEAs were measured as follows:

1. Age (No of Years)
2. Educational level(Highest education attainment)
3. Extension visits(No of Visit per month)
4. Marital Status(Married=1, Single=0)
5. Sex (Male=0, Female=1)
6. Social participation (No of membership of Social groups)
7. Awareness of ICT (Not aware=0, aware=1)
8. Accessibility to ICT (Perception)
9. Availability of ICT in Organization (Perception)
10. Organization’s Policy support of ICT (Perception)
11. Organization’s Structure in support of ICT (Perception)
12. Government policy on ICT (Perception)
13. Cost of ICT (Perception)
14. Available infrastructural facilities (Perception)
15. Customs and tradition (Perception)
16. Accessibility of ICT facilities (Perception)
17. Geographical location (Perception)

These variables on perceptions of VEAs were measured, using Likert scale 1-3. On the other hand, the usage of ICT was measured by calculating the cumulative number of ICT components used by VEAs. In measurement of the Dependent variable (ICT usage), each of the fourteen (14) listed ICT components was assessed on the basis of extent of usage of each ICT components. The 14 ICT formats/devices listed for the study are: Radio, Television (TV), CD/DVD player, VHS Video player, GSM phone, Landline phone, Cassette tape recorder, Overhead projector, Cinema, Internet, Computer, Personal digital assistants (PDAs) and Fax.

The ICT Usage, in this context, was defined as the extent to which VEAs use of the selected ICT components in carrying out their work. This was measured with the aid of Likert scale (Very often =4, Often=3, Rarely=2 and Not at all=1). Consequently, from these scores, the maximum total extent of ICT Usage score obtainable per respondent is 56.

Hence, specifically for the study, the Extent of ICT Usage (EIU) was calculated as follows:

$$EIU = \frac{\text{Total Score of ICT Usage}}{\text{Maximum obtainable score of ICT Usage}} \times 100$$

The total score for all the 14 selected ICT components was calculated in order to determine the Extent of ICT Usage (Y). In this study, the 5% level of probability was used in evaluating the bivariate relationship among independent and dependent variables.

3. Results and Discussion

3.1. Socio-Economic Characteristics of the Village Extension Agents (VEAs)

Majority (80%) of the respondents were between 40 - 49 years old (table 1). An overwhelming number (80%) of the extension agents were males, about 80% were married and 83% were from household size of 10 or less members. Most (44%) of them had HND, followed by those(34%) who had OND – indicating that they are literate and by virtue of their education, could appreciate ICT’s relevance and usefulness.

Specific to their working experience, 51% of them had 19 years and above, 12% had 15-18 years working experience – thus indicating they were well experienced in their jobs and this gave them advantage of appreciating ICT’s role; majority of VEAs (32%) had extension visits of 1-5 per month which shows that they were actively involved in carrying out their function of making contacts with farmers.

Table 1. Distribution of respondents based on their socio-economic characteristics (n=204).

Socio-economic characteristics of the respondents	Frequency	Percentage (%)	Mean
Age (years)			
20-29	21	10.3	
30-39	40	19.6	
40-49	120	58.8	40.83
50-59	23	11.3	
Gender (Sex)			
Male	182	80.2	1.11
Female	22	9.7	
Household size			
1-10	169	82.9	
11-20	32	15.7	6.76
21-40	3	1.5	
Marital status			
Single	25	11.0	
Married	179	78.9	1.88
Extension visits (No per mmonth)			
Extension visits (No per month)	65	32	
11 – 15	33	16.2	
16 – 20	45	22.1	
21- 30	46	22.6	5.42
31 – 45	12	5.9	
46 and above	3	1.5	
Level of education (highest attainment)			
Primary School	2	0.9	
Secondary School	19	8.4	
OND	78	34.4	
HND	100	44.4	
B. Sc.	5	2.2	

On social participation, 38% of the respondents belonged to only 1 group, and on their linguistic competence, majority (63%) spoke 2 languages frequently – thus indicating their high linguistic competence. On their income, most (48%) were in the income range (301,000.00 – 400,999.00). Their income level shows that they were low earners civil servants which may not make them comfortable at work. The awareness level on ICT components of the respondents show that the largest percentage (14%) were aware of all the selected 14 ICT components, thereby giving the impression that their awareness level was generally high. Specific to their Accessibility to ICT, results show that the largest percentage of them (45%) had access to 5-8 ICT components.

Table 2 continued. Distribution of respondents based on their socio-economic characteristics (n=204).

	Frequency	Percent age (%)	Mean
Working experience(years)			
<3	23	11.3	
3 – 6	15	7.4	
7 – 10	12	5.9	4.72
11 – 14	12	5.9	
15 – 18	26	12.7	
19 and above	116	56.8	
Social participation (No of groups)			
0	28	12.8	
1	86	42.2	
2	64	31.3	
3	21	10.3	1.47
4	4	1.9	
6	1	0.5	
Income (₦ per annum)			
1 - 120,999	21	10.3	
121,000 – 300, 999	42	20.6	
301, 000 – 400, 999	62	30.4	
401,000 – 500, 999	33	16.2	376,400
501,000 – 600, 999	19	9.3	
601,000 and above	27	13.2	
Linguistic competence (No of Languages)			
1	5	2.5	
2	144	70.5	
3	54	25.5	2.25
4	1	0.5	
Awareness of ICT (No of ICT)			
1-10	108	52.9	
11	14	6.9	
12	29	14.2	9.62
13	24	11.8	
14	29	14.2	
Accessibility to ICT (No of ICT)			
0 – 4	44	21.6	
5 – 8	92	45.1	
9 – 12	60	29.4	7.03
13-14	8	3.9	

3.2. Relationship between the Characteristics of the VEAs and Usage of ICT

The model used for this study posits the existence of a relationship between socio-economic characteristic of the VEAs and Usage of ICT. Pearson Product Moment Co-efficient (r) correlation and regression analysis were used to measure this relationship.

3.3. Test of Hypothesis

A null hypothesis was set for this study as follows:

H₁: There was no relationship between the VEAs' characteristics and ICT usage.

Results of Pearson correlation (r) as shown in Table 2, was used to explore the association between the VEA's characteristics (X) and ICT Usage (Y), indicate there is positive and significant association. For example, results of correlation co-efficients indicate that significant association exists between; Access to ICT and ICT usage (0.320**), Perceptions on Government Policy and ICT usage (0.157*) and Perception on Customs/ tradition and ICT usage (0.141*) - (at P=0.05 and P=0.001 levels) which indicate that they synchronized positively. The only exception was that there was a negative correlation between Sex and ICT usage (-.163*). Therefore, it was concluded that there exists positive and significant association between the variables and were significantly related to ICT Usage. Thus, the set hypothesis was rejected.

Table 2. Pearson Correlation Matrix showing the significant relationship between variables.

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	X ₁₆	X ₁₇	X ₁₈	X ₁₉	X ₂₀	X ₂₁	Y	
X ₁	1																						
X ₂	.428 **	1																					
X ₃	- .067	.053	1																				
X ₄	.033 .188 **	.188 **	.012	1																			
X ₅	.198 **	.719	.128	.159 *	1																		
X ₆	- .074	.170 *	.146 *	.048	.016	1																	
X ₇	.763 **	.379 **	- .002	.062	.313 **	.158 *	1																
X ₈	.135	.170 *	- .120	.027	.146 *	.013	.130	1															
X ₉	.585 **	.364 **	- .007	.101	.170 *	.630 *	.148 **		1														
X ₁₀	- .211 **	- .139 *	- .014	- .126	- .148 *	- .048	.229 **	.232 *	- .111	1													
X ₁₁	.141 *	.021	- .062	- .071	- .074	- .127	.103	- .030	.120	- .068	1												
X ₁₂	.037	- .018	- .096	- .069	- .106	- .011	.048	- .069	.098	- .004	- .329 *	1											
X ₁₃	.060	- .036	- .017	- .035	- .149 *	- .004	.039	.084	.118	- .009	.258 *	.372* *	1										
X ₁₄	.048	- .086	- .004	.078	-125 .078	- .078	.038	.028	.037	- .076	.329 *	.381 **	.372 *	1									
X ₁₅	.091	- .099	- .017	- .069	- .048	.015	.056	- .021	.032	- .063	.304 **	- .072	.168 *	.349 **	1								
X ₁₆	- .015	- .035	.015	.232 **	- .048	.032	- .065	- .044	.016	.086	.404 **	.329 **	.283 **	.307 **	.168 *	1							
X ₁₇	- .015	- .085	.005	.085	.085	- .019	.070	.084	* .184	.023	.171 *	.154 *	.190 *	.283 **	.139 *	1							
X ₁₈	- .033	- .066	- .024	.260 **	.260 **	- .092	.061	.059	- .006	.006	.678 *	.314 **	.225 **	.215 *	.065 **	.673 **	.105 *	1					
X ₁₉	- .048	- .028	- .021	.002	.002	- .116	- .084	- .015	- .005	.048	.075	.201 **	.132	- .025	.225 **	.105 **	.213 **	.162 *	1				

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	X ₁₆	X ₁₇	X ₁₈	X ₁₉	X ₂₀	X ₂₁	Y
X ₂₀	-	-	-	.032	.032	.169*	-	-	-	-	-	-	-	-	.132	-	.063	-	.081	1		
	.201**	.129	.052			*	.176*	.150*	.150*	.189*	.210**	.165*	.074	.055	.025	*	.167**					
X ₂₁	-	-	-	.041	0.006	.148*	-	.153*	.039	-	.026	.039	.150*	.039	.076	-	.069	.150*	.150*	.559**	1	
	.180*	.078	.081			*	.057	*		.115			*			.043		*	*	**		
Y	-	-	-	.008	.108	.013	-	-	-	-	-	-	-	.157*	.039	.093	.141*	.099	.121	.120	.320**	1
	.089	.054	.041				.033	.052	.041		.163*	.048	.039	*			*				**	

**= Correlation is significant at P=0.01 level (2-tailed); *= Correlation is significant at P=0.05 level (2 tailed).

X₁ = Age (in years); X₂ = Household size (in number); X₃ = Extension visits (in number per year); X₄ = Level of Education (Highest Qualification); X₅ = Income (in N/k); X₆ = Linguistic competence (No of languages); X₇ = Working experience (in years); X₈ = Social participation (in number of groups); X₉ = Marital status (Married, Single); X₁₀= Sex (Male or female); X₁₁ = Availability of ICT by Organization (perception); X₁₂= Organization's Policy support of ICT(perception); X₁₃= Organization's Structure in support of ICT(perception); X₁₄= Government Policy on ICT(perception); X₁₅= Cost of ICT(perception); X₁₆ = Available infrastructural facilities on ICT(perception); X₁₇= Customs and tradition(perception); X₁₈ = Accessibility of ICT facilities(perception); X₁₉ = Geographical location (Perception); X₂₀ = Awareness of ICT; X₂₁ = Access to ICT components

Recommendations

Based on the findings of this study, we recommend the following:

1. Emphasis should be placed by the VEAs employers in improving the awareness and literacy of VEAs on ICTs. If this is done, the VEAs orientation toward ICT usage would be enhanced considerably.
2. Efforts should be made toward sustaining the VEAs' socio-economic status, particularly on income, accessibility to ICT and their perception.
3. In view of the findings indication significant and positive relationship between the identified independent variables and dependent variable, it is safe to assert that VEAs' characteristics and perceptions be improved upon in order to increase their usage of ICT generally.

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