

Congruency, agreement and accuracy among researchers, extension workers and farmers on the role of ICTs in Nigeria's agricultural development

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Abstract

The study determined the congruency, accuracy and agreement among researchers, extension workers and farmers on the role of information communication technologies (ICTs) in Nigeria's agricultural development. A structured interview schedule was used to collect data from a randomly selected sample of 110 respondents, made up of researchers, public extension professionals and farmers. Statistical analysis was accomplished by mean scores, percentages, Spearman's correlation and T-test. The study reveals that the researchers, extension workers and farmers had favourable perceptions of the role of ICTs in agricultural development. The result of the analysis indicate that the researchers were more congruent ($r=0.839$, $p=0.0007$) and accurate (0.429 , $p=0.05$), than extension workers in assessing farmers' perception of the role of ICTs in agriculture. Also the mean responses of the researchers and farmers as regards the role of ICTs in agriculture were significantly different for 3 out of 17 roles while the extension workers perceptions were significantly different for 6 out of 17 roles. These findings suggest a low level of agreement between extension workers and farmers than between researchers and farmers, indicating that researchers and farmers had a higher co-orientation in their perceptions regarding the role of ICTs in Nigeria's agricultural development. The study recommends an integrated interactive involvement of researchers, extension workers and farmers on ICT related issues in order to improve their knowledge and co-orientation of the role of ICTs in agriculture.

Introduction

A major challenge to agricultural development in Nigeria and other African countries have been the low level of agricultural information exchange among the different stakeholders in the agricultural sector (Agwu, 2004) as a result of limited access to current and relevant information in the form of primary documents and machine-readable databases. Uguru (2001) noted that research results from developing countries are available in industrialized countries but hardly in the country of origin due to poor documentation, storage and retrieval techniques. What is clear from many studies, however, is the continued need for information by farmers and farm communities, thus necessitating continued improvement in ways and means of providing the extension support that farmers and communities require and demand.

Empirical research suggests that ICTs have a positive impact on the development of any nation (FARA, 2004). The application of ICT offers excellent possibilities, for strengthening research-extension systems beyond the urban focus (Asian Productivity Organization, 2002). Thus for effectiveness and efficiency, extension service needs to be appropriately supported with the use of ICTs. A number of initiatives including the (CGNET), the USAID Leland initiative (1995 – 2000) and African highland initiative (1995 – 2000) have supported establishment of communication networks in several countries of Africa.

However, connectivity is still very much less than desired, and it could be argued that even for researchers in Nigeria, it is still less than the level at which significant impact can be expected.

The national extension service in Nigeria is based on the T&V delivery system which is traditionally supported by mobile cinema, video, television, radio and telephone. Under this system, research findings are transmitted to farmers through extension personnel after periodic trainings, while administrative directives and agricultural information are passed and received among agricultural administrators and practitioners through memos, letters and notices. These are no longer enough to handle the complex and time-bound information that is supposed to circulate within agricultural systems and farming population. However, even with the launch and explosion of the global system of mobile communication (GSM), only few officials have personal handsets (Agwu and Chah, 2007). These serious limitations of access to reliable telephone line makes even ordinary intra and inter-organization networking for information exchange a harrowing and frustrating experience.

One possible reason hypothesized for the low use of ICTs especially among extension workers and farmers is the differing levels of consensus among researchers, extension workers and farmers. Therefore, this study focused on assessing the views of researchers, extension workers and farmers regarding the use and role of ICTs in disseminating agricultural information. Understanding the congruency, accuracy and agreement of the role of ICTs among these groups can shape both the content and outcome of the way the innovation of ICTs are used by them. Productive communication is severely hampered if one or another's perception are inaccurate, that is, when an individual fails to accurately recognize differences in the other persons definition of a problem or to understand the constraints he faces in acting to solve it.

Conceptual Framework

Co-orientation model was developed by Chafee and McLeod in 1973, as an extension of Newcomb's ABX or psychological model of 1953, which discusses the social relations between two people and their orientation to some object. According to Gruning and Hunt (1984) the co-orientation model identifies three critical relationships between participants in a communication process. The relationships are agreement, congruency and accuracy.

Broom and Dozier (1990) defined agreement or cognitive overlap as the degree of similarity of two persons' cognitions about a common object. Without a sufficient degree of agreement as to what the situation is all about, it is not possible to begin to formulate a perception of how the other party sees the issue. Congruency or perceived agreement compares a person's own orientation with his or her perceptions of another's orientation. According to Walton (2000) congruency "measures the perception of what a group thinks compared to what another group thinks the first group thinks". Accuracy refers to the similarity between one person's estimate of another's cognitions about an object and that other person's actual cognitions about the object. Accuracy measures what one group thinks the other's perceptions will be compared to the others actual perceptions (Walton, 2000).

Figure 1 shows the conceptual framework for analyzing researchers, extension workers and farmers perceptions of the role of ICT in agricultural development in Nigeria. The figure includes three dependent or co-orientation variables of interest which include agreement or cognitive overlap, congruency or perceived agreement and accuracy. They provide the conceptual foundation of the co-orientation model in which communication research is based. The arrows connecting the boxes determine relationship between the co-orientation measures. However the arrows also indicated the boxes that were compared after the data were collected.

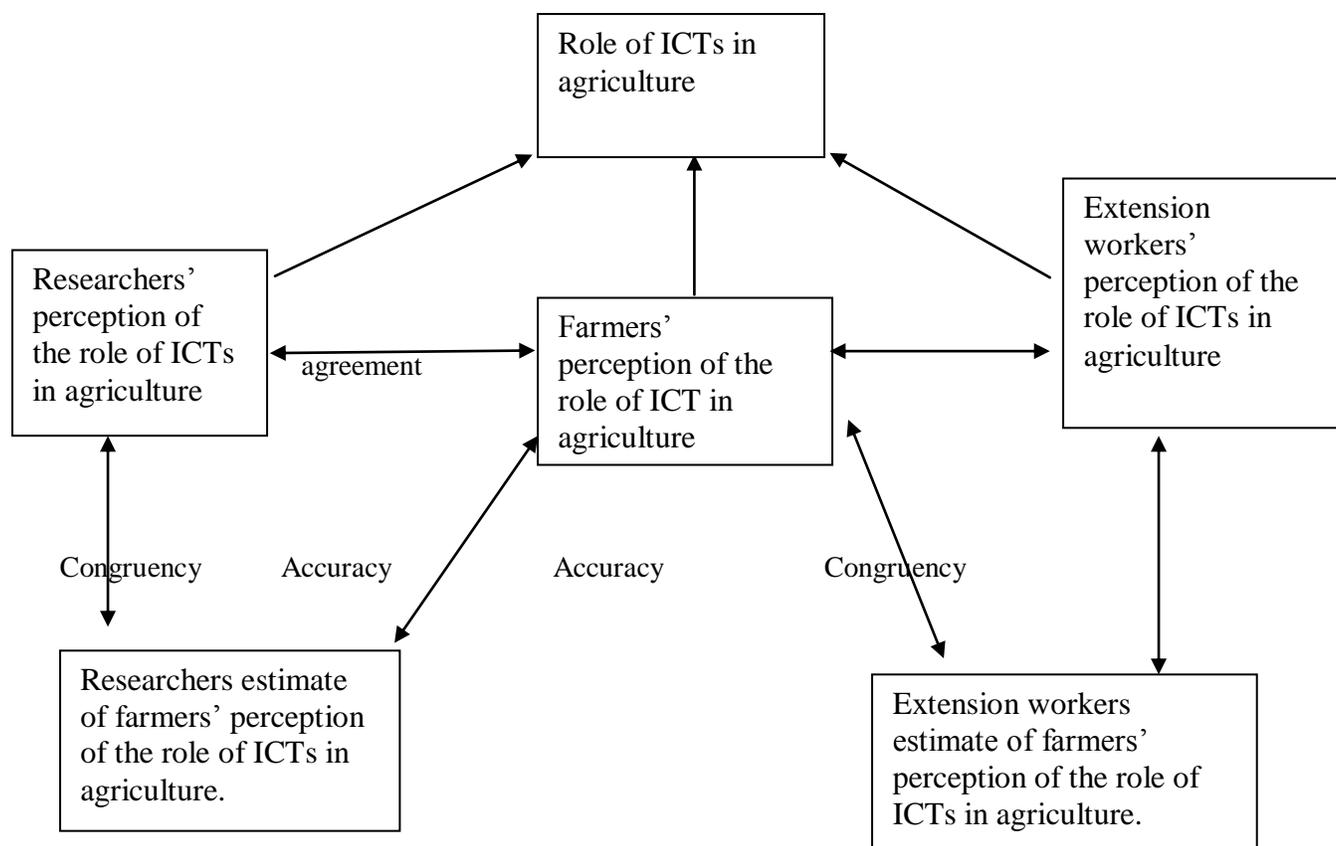


FIG 1: Conceptual framework for analyzing researchers, extension workers and farmers perceptions of the role of ICT in agricultural development.

Applying the co-orientation model, three basic questions directed the study, and they include the followings:

- 1) How do researchers, extension workers and farmers perceive the role of ICTs in agricultural development?
- 2) How do researchers think farmer perceive the role of ICTs in agricultural development? and
- 3) How do extension workers think farmers perceive the ICTs in agricultural development?

This study was therefore designed as an attempt to answer the above questions using the co-orientation model because of its usefulness in measuring process, which contribute to a consensus of views among individuals and groups.

Methodology

This study was carried out in Enugu and Abia states of Nigeria. The two states are in the South East agro ecological Zone of the country. The Zone lies between latitudes 4° - 7° N and spreads over a total of 78,612km² representing 8.5% of the country's total land area (Shaib *et. al.*, 1997). The target population for this study includes researchers (from the National Root Crops Research Institute (NRCRI), Umudike and University of Nigeria, Nsukka) as well as the public extension workers and farmers. Simple random sampling procedure was used to select 20 researchers each, from the two institutions. Also, 20 extension workers were randomly selected from each of the public extension organization (Agricultural

Development Programme (ADP)) in each of the state. Again, 20 randomly selected farmers from each of the state also participated in the study. In all a total of 120 respondents participated in the study

To obtain a quantitative measure of respondents' perceptions of the role of ICTs in agricultural development, rating scales with a pool of positive and negative statements were framed through review of literature and interview with experts. A four-point Likert-type scale with values of strongly agree =3, agree = 2 disagree = 1 and strongly disagree = 0 was used to determine the respondents' level of agreement and disagreement to the statements. For a positive statement, a mean score ≥ 1.5 depicts a favourable perception with regard to the role of ICTs in agricultural development. Also, for all negative statements (the scoring of all negative statements used to ascertain the perceptions of the respondents on the roles of ICT in agricultural development were reversed) a score of ≥ 1.5 showed a favourable response with regards to the role of ICTs.

To ascertain congruence and accuracy of respondents' perceptions, researchers, extension workers and farmers were asked to predict (estimate) each others perceptions with respect to the role of ICTs in agricultural development. Researchers and extension workers were then requested to predict the perceptions of farmers using a 4 - point Likert-type scale of strongly disagree (SD), disagree (DA), agree (A) and strongly agree (SA) to measure their responses.

Data relating to the perception of the roles of ICTs in agricultural development were analyzed by the use of mean scores and standard deviations. The agreement between the perceptions of researchers and farmers, and extension workers and farmers was determined by using T- test. Spearman's rank order correlation co-efficient was used to determine the accuracy of researchers' predictions of farmers perceptions; the accuracy of extension workers' predictions of farmers perceptions; congruency of researchers' perceptions and researchers' predictions of farmers perceptions; and congruency of extension workers perceptions and their prediction of farmers perceptions.

Results and Discussions

Perceptions of Researchers, Extension Workers and Farmers on the role of ICTs in Agricultural Development

Data in Table 1 show the mean scores and the standard deviations of the perceptions of researchers, extension workers and farmers on the role of ICTs in agricultural development. Results show that out of the 20 statements investigated, researchers had favourable perceptions on 19 statements (1 – 5 and 7 – 20) and had unfavourable perception on one (item 6). The standard deviations from the mean for all the statements were less than 1.00 indicating that researchers' individual scores as regards their perceptions of the role of ICTs did not differ much from the mean score. The implication of the above findings is that researchers in Nigeria are well aware of the role of ICTs in agricultural development and believes that ICTs should be inculcated in every aspect of agriculture including extension work.

The data further show that out of the 20 statements bordering on the role of ICTs in agricultural development that were investigated, extension workers perceived 16 statements in favour of the roles ICTs in agriculture. These include statements 1 – 5, 8, and 11 – 20. Among these favourably perceived statements, 13 were positive statements while 3 were negative statements. Again, the standard deviations from the mean were all less than 1.00.

Results in Table 1 also show that farmers perceived 14 statements in favour of the roles of ICTs in agriculture. Among the statements perceived favourably, 12 were positive statements while 2 were negative statements. This result indicates that these farmers are aware of the importance of ICTs in

agricultural development process and will be favourably disposed to using these technologies. In general, these findings show that researchers, extension workers and farmers in Nigeria are aware of the importance of knowledge and information as factors for accelerating agricultural production and improving marketing and distribution. Bertolini (2004) had earlier noted that ICTs can enhance the integration and efficiency of agricultural systems by opening new communication pathways and reducing transaction costs.

Table 1: Respondents' perceptions of the roles of ICTs in agricultural development in Nigeria

S/N	Perception Statements	Researchers		Extension workers		Farmers	
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
1*	ICT does not carry useful content that meets the information needs of researchers, extension workers and farmers.	2.33	0.526	2.00	0.904	1.85	0.679
2	ICT facilitates the interaction between researchers, extension workers and farmers in agriculture.	2.70	0.526	1.95	0.904	0.77	0.679
3	ICT enhances effective storage and retrieval of information in agriculture.	2.75	0.439	2.53	0.554	2.10	0.712
4	ICT makes information easily accessible to farmers.	1.95	0.846	2.47	0.640	2.30	0.794
5	ICT enables extension workers to acquire necessary information on research work without meeting the researchers	2.23	0.832	2.40	0.810	2.57	0.568
6*	ICT emphasizes understanding practical aspect of learning thereby discouraging the role of extension workers.	1.00	0.751	1.13	0.791	1.30	0.877
7*	ICT increases the cost of research and extension work.	2.50	0.757	1.40	0.709	1.23	0.971
8	ICT provides connected and distributed networks to researchers, extension workers and farmers.	2.10	0.883	2.07	0.656	2.17	0.791
9*	ICT makes learning monotonous and boring.	1.70	0.883	0.98	0.733	0.87	0.629
10*	ICT does not enhance retention of information.	1.50	0.751	0.82	0.931	1.07	0.923
11	ICT makes individualized agricultural instruction packages readily available.	1.90	0.928	2.17	0.747	1.97	0.615
12	ICT improve both efficiency and effectiveness of agricultural / research /extension work.	2.33	0.616	2.38	0.586	2.37	0.556
13	ICT aids in evaluation and appraisal of level of agricultural development.	2.17	0.675	2.20	0.687	2.23	0.626
14	With ICT information can be provided to a large group of audience at the same time.	2.50	0.555	2.68	0.474	2.37	0.490
15	ICT enables researchers and extension workers to obtain immediate feedback on their performance and thus enabling them to know their strength and weakness.	2.08	0.917	2.18	0.712	2.33	0.711
16	ICT assist researchers and extension workers to demonstrate experiments and concepts of agriculture.	2.05	0.714	2.07	0.572	2.17	0.747
17*	ICT does not facilitate information exchange amongst the agricultural communities and outside world	2.30	0.549	1.93	0.997	1.03	0.850
18	ICT makes farmers to learn faster about new technologies	1.67	0.859	2.08	0.797	2.07	0.907
19*	ICT does not facilitate lesson presentation and does not save the amount of time extension workers or researchers spend on teaching a topic.	2.00	0.823	1.72	0.874	1.51	0.986
20	ICT facilitates decision making process in agriculture.	2.08	0.694	1.85	0.770	1.87	0.900

*Negative Statements

Congruency of Researchers and Extension Workers estimates of Farmers Perceptions

The congruency of researchers' and extension workers' perceptions and their estimate of the perceptions of farmers using Spearman's rank order correlation technique indicates high level of congruency between researchers' perceptions and their estimate of farmers perception ($r = 0.839$, $P = 0.000$). However, the extension workers' perceptions and their estimate of farmers perception were not in congruence ($r = 0.544$, $P = 0.24$)

Accuracy of Researchers and Extension Workers estimates of Farmers Perceptions

The accuracy of researchers' and extension workers' estimate of farmers' perceptions on the role of ICT in Nigeria agriculture when compared with farmers' perceptions using Spearman's rank order technique shows that researchers predicted farmer's perceptions with a high level of accuracy. Spearman's rank order correlation coefficient for the seventeen roles was 0.429 ($P < 0.05$). On the other hand, the extension workers' estimate of farmers' perceptions compared with farmers' perceptions had Spearman's rank order correlation coefficient of $r = -0.285$, indicating a low level of accuracy of extension workers estimate that was not significant.

Agreement of Researchers and Extension Workers Perceptions with Farmers Perceptions of the roles of ICTs in Agricultural Development

The agreement between researchers' perceptions and farmers' perceptions of the role of ICTs in Nigeria agriculture shows that there were significant differences in the responses of the two categories of respondents in statements 1, 3, and 11. Results further showed that there were no significant differences between the perceptions of the two categories of respondents in the remaining 14 statements. This suggests a high level of agreement between these categories of respondents. However, the results further show that significant differences existed in the responses of extension workers and farmers in statements 3, 4, 8, 9, 12 and 14 suggesting low level of agreement between extension workers' perceptions and farmers' perceptions on the roles of ICTs in agriculture.

Constraints that hinder the use of ICT in agriculture

Data in Table 2 show that out of the twenty possible constraints listed in the study, eight were considered to be serious constraints to the role of ICTs in Nigeria agriculture by researchers. These include lack of communication infrastructure on which ICT depends ($\bar{x} = 2.00$), lack of sufficient trained computer personnel ($\bar{x} = 2.03$), erratic power supply ($\bar{x} = 2.55$), lack of internet access to the rural areas ($\bar{x} = 2.60$), high cost of ICT soft ware ($\bar{x} = 2.00$) and high cost of ICT hard ware ($\bar{x} = 2.08$), among others.

On the part of the extension workers, twelve out of the 20 statements were considered as serious constraints to the use of ICTs. These include lack of competence in handling ICT facilities ($\bar{x} = 2.30$), unavailability of hard ware required by modern ICT ($\bar{x} = 2.00$), poor finance ($\bar{x} = 2.48$), lack of adequate awareness about ICT ($\bar{x} = 2.28$), lack of internet access to the rural areas ($\bar{x} = 2.45$), poor communication network ($\bar{x} = 2.23$) and nature of information provided ($\bar{x} = 2.30$), among others.

The farmers also considered 12 factors as major constraints to the use of ICTs. They include lack of confidence in operating ICT facilities such as computers ($\bar{x} = 2.40$), lack of competence in handling ICT facilities ($\bar{x} = 2.33$), lack of adequate time for training on ICT facilities ($\bar{x} = 2.33$), unavailability of hardware required for modern ICT ($\bar{x} = 2.23$), lack of communication infrastructure on which ICT

depends ($\bar{x} = 2.20$), lack of computer trained personnel ($\bar{x} = 2.20$), erratic and fluctuating power supply ($\bar{x} = 2.70$), complexity in using ICT ($\bar{x} = 2.23$), lack of internet access to the rural areas ($\bar{x} = 2.00$), nature of information provided ($\bar{x} = 2.43$), high cost of ICT software ($\bar{x} = 2.43$), and high cost of ICT hard ware.

Table 2: Mean scores of constraints that hinder the use of ICT in agriculture

S/N	Constraints	Researchers (\bar{x})	Extension workers (\bar{x})	Farmers (\bar{x})
1	Lack of confidence in operating ICT facilities such as computers, CD Rom	1.50	1.78	2.40*
2	Lack of competence in handling ICT facilities	1.78	2.30*	2.33*
3	Lack of adequate time for training on ICT facilities	1.60	1.90	2.33*
4	Unavailability of hard required by modern ICT	1.90	2.00*	2.23*
5	Lack of communication infrastructure on which ICT depends on	2.00*	2.03*	2.20*
6	Fear that things will go wrong in using ICT	0.78	0.62	1.37
7	Inappropriate contents of ICT messages that do not meet the needs of clients	0.77	0.87	1.37
8	Poor benefits in using ICT	0.70	0.85	1.63
9	Lack sufficient trained computer personnel	2.03*	2.00*	2.20*
10	Erratic and fluctuating power supply	2.55*	2.38*	2.70*
11	Poor finance	2.32*	2.48*	1.77
12	Lack of adequate awareness about ICT	1.90	2.28*	1.93
13	Complexity in using ICT	1.80	1.85	2.23*
14	Lack of internet access to the rural areas	2.60*	2.45*	2.00*
15	Poor communication network	2.10*	2.23*	1.80
16	Nature of information provided	1.85	2.00*	2.43*
17	High cost of ICT soft ware	2.00*	2.72*	2.43*
18	High cost of ICT hard ware	2.08*	2.30*	2.43*
19	Negative attitude of people to change	1.88	1.55	1.30
20	General lack of awareness of the importance of ICT in agriculture	1.90	1.70	1.73

Summary and Conclusion

The results of the study show that researchers, extension workers and farmers had favourable perceptions on the role of ICTs in Nigeria agriculture. The result of the analysis also indicated that researchers were able to predict the farmers perceptions more accurately than the extension workers despite the higher interaction expected to exist between extension workers and farmers; this was contrary to the work done by Dolly (1997) in the Republic of Trinidad which proved that extension workers predicted farmers perceptions more than the researchers. This may be because of the high knowledge level of researchers on the role of ICTs in agriculture which made them know the likely problems the farmers will be going through and were able to predict them better than the extension workers. Another reason could be because the researchers used in this study have a direct contact with the farmers just like the extension workers because of their nature of research. However, major constraints to the use of ICTs in Nigeria agriculture included lack of sufficient trained computer personnel, erratic power supply, poor finance, lack of internet access in the rural areas and high cost of ICT soft and hard wares. Thus, strengthening the infrastructure base of ICTs in the country would help create an enabling environment for ICTs to thrive in Nigeria.

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SYNOPSIS

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