

Awareness and Perception of Farmers to the Use of Information and Communication Technologies (ICTs) in Agricultural Extension Service Delivery: A Case Study of Imo State, Nigeria

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Abstract – The study assessed farmers' awareness and perception of the use of ICTs in agricultural extension service delivery in Imo State Nigeria. A purposive and simple random sampling technique was used to select 300 farmers from the three agricultural zones of the state- Owerri, Orlu and Okigwe. Data generated were analyzed using descriptive statistics – means, frequencies and percentages. Mean score and correlation analyses were also used. Results showed that farmers in the area had gone awareness of ICTs. The radio, the Television, the Mobile (GSM) phone and the Newspaper are highly accessible to the farmers but only the Mobile (GSM) (Phone and the radio were extensively used. Farmers in the area have a clear and favourable perception of the relevance of ICTs in extension service delivery. Education and income had a positive significant relationship at 5% level of significance with the number of ICTs farmers in the area had access to. ICT education should be built into the extension delivery package of extension agents to farmers particularly the use of the mobile phone since this is capable of eliminating series of wasteful trips made by farmers to get at extension workers and vice versa. Extension service delivery needs to be beefed up to bring about improved income that will enable farmers to increase their purchasing power.

Keywords – Farmers' Awareness, Perception And Use, ICTs, Agricultural Extension Service Delivery.

I. INTRODUCTION

The important task of agricultural extension service is to facilitate exchange and sharing of agricultural information, knowledge and skills. The transfer of agricultural information from research centers to farmers is very important as it helps farmers learn innovations which improve agricultural productivity [1]. Therefore, the need of farmers for relevant and current information on new agricultural practices is a vital issue that needs to be considered by every nation especially developing countries like Nigeria.

However, most African countries have not devoted adequate attention to providing their citizens, including farmers, with information which can improve access to finance, land and extension advisory services and the benefits that come along with these services, especially in rural areas where 70 - 80% of the population lives [2].

According to [3] several studies carried out in the past decades to identify the major sources of Agricultural information to farmers in rural Nigeria revealed that farmers obtained such information mainly from Agricultural Extension Agents, fellow farmers, friends and relatives which usually involved face to face, inter-personal communication contacts. This, though effective had its limitations especially in terms of coverage and unit cost of reaching the clientele. Another study, [4] showed that farmers accessed agricultural information from agricultural programs aired in the Radio and Television. [5] in fact opined that the radio is the most important source of Agricultural information to farmers in Nigeria. However, poor media coverage and pseudo-legislative backing of agricultural reform programs have not helped agricultural extension service delivery [4]. The result is that innovation changes brought into the field of agriculture, though critically vital could hardly reach the beneficiaries –farmers. This state of affair is in line with the view expressed by [6] that agricultural development in Nigeria and other developing countries has been hampered by low level of exchange of agricultural information.

With the current global ICT revolution, however, it has been found that ICTs portend great potentials for effective agricultural extension information transfer and information sharing [7]. [8] identified such potentials of ICT application in Agricultural Extension service delivery as in needs assessment, exploring production alternatives, exchanging and sharing of information by peers, training and demonstration, and community learning among others. [9] added in agreement that the promise of ICTs in agricultural extension is that they can energize the collection, processing and transmission of data, thus making it possible to extend quality information faster in a bottom up and interactive channel of communication. According to him ICTs have been found to be the only way in which farmers can access a variety of information sources that are accessible, affordable, relevant and reliable. The increasing use of ICTs in agricultural extension service delivery would narrow the gender disparities in terms of access to agricultural information. Information technology use refers to the extent to which technologies are utilized for communication purposes. It also explains the level to which the potentialities of the

technologies are harnessed for the information generation and transfer. The study therefore sets out to:

- 1) describe selected socio-economic variables of farmers in Imo State Nigeria;
- 2) ascertain farmers awareness and use of ICTs in the study area;
- 3) examine farmers perception of the use of ICTs in extension service delivery and in information sharing; and
- 4) determine relationship between selected socio-economic characteristics of the farmers and the number of ICTs they have access to.

II. METHODOLOGY

2.1 Study Area

The study was carried out in Imo state, Nigeria. The state is made up of twenty-seven Local Government Areas clustered within three agricultural zones namely Okigwe, Orlu and Owerri zones. Imo State lies between latitudes 5°12' and 5°56' North of the Equator and between longitudes 6°38' and 7°25' East of the Greenwich meridian. The state is located in the South Eastern Zone of Nigeria (within the rainforest zone) and occupies a total land area of 5,100 square kilometers lying between lower River Niger and upper Imo River from where it drew its name. The state has a projected population of 3, 934, 899 persons with a population density of 711.6 per square kilometer [10]. The state is bordered by Abia state to the East, by the River Niger to the West, by Anambra state to the North and River state to the South. Farming is the major occupation of the rural communities, with mixed farming as the predominant type of farming system in the area.

2.2 Sampling Technique and Data Collection

Multi stage random sampling technique was used to select respondents for the study. First, two agricultural zones Orlu and Okigwe were randomly selected from the three zones in the State. In stage two, three extension blocks were randomly selected from each of the selected zones to give six extension blocks. In stage three two extension circles were randomly selected from each of the selected blocks to give twelve circles. A list of contact farmers in each of the twelve circles was obtained from extension agents in the area. From this list twenty five farmers were randomly selected from each circle bringing the sample size to three hundred. Structured questionnaire which was personally administered on respondents were used to collect primary data for the study. Nominal data were collected through questions drafted on likert-type scales.

2.3 Analytical Technique and Model Specification

Objectives (i), (ii) and (iii) were analyzed using descriptive statistics – means, frequencies and percentages. Multiple correlation analysis was used to realize objective (iv). The implicit model for the correlation analysis is given as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, e_i)$$

Where;

Y = Number of ICTs the farmers have access to

X_1 = Age (years)

X_2 = Gender (Male=1, female = 0)

X_3 = Educational attainment (Number of schooling years)

X_4 = Farming Experience (years)

X_5 = Monthly Income (₦)

e_i = error term

Objective iii was further captured by the use of a Likert scale. Following [11] a 5-point likert-scale was used to determine the perception of farmers on the relevance of ICTs for extension service delivery (captured with a scale thus: Strongly agree = 5; agree = 4; undecided = 3; disagree = 2 and strongly disagree = 1). The Likert scaling is a method of ascribing quantitative values to qualitative perception to make it amenable to statistical analysis. The values of the responses were added and further divided by 5 to obtain a mean score of 3.0, which was regarded as mean level of perception. Perception statements with mean score of 3.0 and above were regarded as being perceived by the farmers, while those with mean score of less than 3.0 were regarded as not being perceived by the farmers. The mean scores were calculated by multiplying the scores of the frequencies with the scale points for every rating and dividing by the total number of respondents. This is summarized with the equation below:

$$\bar{X} = \sum fn/N.$$

Where

\bar{X} = mean score;

\sum = summation sign;

F = frequency or number of respondents who responded positively;

n = Likert nominal value of each scale;

N = Number of respondents.

III. RESULTS AND DISCUSSION

3.1 Selected Socio-economic Characteristics of Farmers

The selected socio-economic characteristics of farmers in Imo State are presented in Table 1. Results in Table 1 shows that 40.00% of the farmers were within the age bracket of 51-60 years and 11.67% of them were of the age range of 61 years and above. The mean age of the farmers was 51 years. The prevalence of older farmers in the study area may be the result of rural-urban drift of younger people in search of white-collar jobs and greener pastures [12, 13]. This may have serious implications on the interest and ability of these farmers to adopt and use ICTs. According to [14] the ability of a farmer to bear risk, adopt new innovations and be able to do normal work decreases with age.

Table 1 again shows that the farmer respondents were more of males than females. This does not however, justify the generally held view and common practice in developing countries that extension should be directed to the males. According to [15] while women contribute between 60 and 70 percent of agricultural production in developing countries, women farmers are less likely to benefit from agricultural extension services and technologies that can improve their production.

Table 1 further shows that none of the farmer respondents in the area was an illiterate. More than 50 percent of them however, did not exceed the secondary level of education. The involvement of people who had tertiary education in farming in this area can be explained by the growing interest in farming of teachers, civil servants and self-employed graduates to augment family incomes and ensure family self-sufficiency. This situation is likely to foster favourable attitudes that will not only increase their farm activities but will also enhance their ability to understand, evaluate and utilize new production technologies such as ICTs to more productive advantage.

A fair percentage (25.00%) of the farmers in the area have been farming for 16 to 20 years while more than 21% had been farming for 21 years and above. The mean years of farming experience for the farmers is 17 years. The longer the farming experience a farmer has the more practical experience he acquires and the more he is able to make rational choices and decision for improved profitability of enterprise. Farmers, in fact, attach more importance to experience than educational attainment. Experience enhances their ability to effectively use scarce resources. This is in consonance with the findings of [14].

Table 1 shows that only 3.67% of farmers in the study area earned ₦35, 000 and above monthly. Some of the farmers earned between ₦1, 000 and ₦5, 000 a month. The mean monthly income of the farmers was ₦19, 683. This income level though above the national minimum wage may not be adequate in the face of the prevailing economic crunch. The incomes farmers earn have serious implications on the number of improved technologies they will be able to access and adopt. The higher their income, the more likely they can invest in improved technologies. Their level of income will also affect their ability to access and use ICTs.

3.2 Awareness, Accessibility and Use of ICTs by Farmers

Table 2 shows farmers awareness, accessibility and use of ICTs in Imo State.

The table shows that farmers in this area were fully aware (100%) of the radio. They had high awareness of the Television (91.67%), GSM phones (90.00%) and Newspapers (88.33%) but the radio (91.67%) and the mobile telephone (GSM) (88.33%) were the most accessible to the farmers and the most widely used by them. It is possible for a farmer to have access to an ICT without personally using it. Low education, low knowledge of use and fear of trying may account for this. Table 2 further shows that the accessibility and use of telecommunication/computer based and the broadcast/audiovisual technologies are low in Imo State. This would hamper the level of information sharing and exchange in the area. This agrees with the view of [6] that agricultural development in Nigeria and other developing

countries have been hampered by low level of information exchange arising from inadequate facilities.

Table 1: Distribution of Respondents according to their selected Socio-economic Characteristics

| Variable | Frequency | Percentage |
|-------------------------------|-----------|------------|
| Age (years) | | |
| 21 – 30 | 10 | 3.33 |
| 31 – 40 | 30 | 10.00 |
| 41 – 50 | 105 | 35.00 |
| 51 – 60 | 120 | 40.00 |
| 61 and above | 35 | 11.67 |
| Mean = 51.23 | | |
| Gender | | |
| Male | 175 | 58.33 |
| Female | 125 | 41.67 |
| Educational Attainment | | |
| No formal education | 0 | 0.00 |
| Primary school | 95 | 31.67 |
| Secondary school | 65 | 21.67 |
| OND | 35 | 11.67 |
| NCE | 25 | 8.33 |
| HND | 50 | 16.66 |
| BA/BSc/B.ed | 25 | 8.33 |
| PGD | 0 | 0.00 |
| M.Sc | 5 | 1.67 |
| Ph.D | 0 | 0.00 |
| Farming experience | | |
| 1 – 5 | 30 | 10.00 |
| 6 – 10 | 80 | 26.67 |
| 11 – 15 | 50 | 16.67 |
| 16 – 20 | 75 | 25.00 |
| 21 – 25 | 30 | 10.00 |
| 26 – 30 | 10 | 3.33 |
| 31 and above | 25 | 8.33 |
| Mean = 17.25 | | |
| Monthly income (₦) | | |
| <5,000 | 40 | 13.33 |
| 6, 000 – 10,000 | 90 | 30.00 |
| 11,000 – 15,000 | 25 | 8.33 |
| 16,000 – 20,000 | 35 | 11.67 |
| 21,000 – 25, 000 | 30 | 10.00 |
| 26,000 – 30, 000 | 30 | 10.00 |
| 31, 000 – 35, 000 | 39 | 13.00 |
| 35, 000 and above | 11 | 3.67 |
| Mean = ₦19, 683 | | |
| Total | 300 | 100.00 |

Source: Field survey, 2014.

Table 2: Awareness, Accessibility and use of Available ICTs by Farmers in Imo State

| Types of ICTs | Awareness | | Access | | Use | |
|-------------------------------|-------------------|--------|-------------------|-------|-------------------|-------|
| | Freq [*] | % | Freq [*] | % | Freq [*] | % |
| Computer/ Telecom | | | | | | |
| Mobile phone (GSM) | 270 | 90.00 | 265 | 88.33 | 265 | 88.33 |
| E-mails | 120 | 40.00 | 70 | 23.33 | 100 | 33.33 |
| Internet | 110 | 36.67 | 40 | 13.33 | 45 | 15.00 |
| Computer | 160 | 53.33 | 70 | 23.33 | 90 | 30.00 |
| Fax | 55 | 18.33 | 10 | 3.33 | 10 | 3.33 |
| Broadcast/Audiovisuals | | | | | | |
| TV | 275 | 91.67 | 180 | 60.00 | 36 | 60.00 |
| Radio | 300 | 100.00 | 275 | 91.67 | 275 | 91.67 |
| Mobile cinema | 110 | 36.67 | 20 | 6.67 | 0 | 0.00 |
| Media van | 80 | 26.67 | 30 | 10.00 | 0 | 0.00 |
| Overhead projector | 65 | 21.67 | 20 | 6.67 | 10 | 8.33 |
| Print Technology | | | | | | |
| Research bulletin | 110 | 36.67 | 60 | 20.00 | 30 | 1000 |
| Newspaper | 100 | 83.33 | 135 | 45.00 | 80 | 26.67 |
| Magazines | 160 | 53.33 | 90 | 30.00 | 70 | 23.33 |
| Posters | 190 | 63.33 | 130 | 43.33 | 40 | 13.33 |
| Journals | 125 | 41.67 | 70 | 23.33 | 20 | 6.67 |
| Annual reports | 125 | 41.67 | 65 | 21.67 | 10 | 2.33 |

Source: field survey, 2014

*Multiple responses recorded.

3.3 Relevance of ICTs in Extension Service Delivery – Farmers' Perception

The distribution of farmers according to their perception of the relevance of ICTs in extension service delivery is presented in Table 3. The perception statements expressed in this study are in consonance with those of [16] who stated that the internet tool allows network members to capture and develop local content, share, store, retrieve and disseminate information and connect geographically dispersed people from research and extension institutions, faculties of agricultural institutions, NGO workers and agricultural producers. Table 3 shows that farmers in Imo State have a clear and favourable perception of the relevance of ICTs in extension service delivery. This is evidenced by their agreement with the positive statements which highlight the importance of ICTs in extension

service delivery such as increase in contacts (Mean score 4.57); time-saving contacts (4.53); increase in collaboration between extension and input supply agencies (4.20); incorporation of feed-forward and improvement of feed-back (4.10); global cross fertilization of ideas (4.25); increase in the pace of rural development and enhancement of sustainable rural livelihoods (4.36) and cost-effective service delivery (3.67). The perception statements recorded mean scores above the cut off of 3. The farmers however, agreed with the statement that the cost of ICTs cannot justify the benefits (3.17). It is not surprising that farmers hold this view. It will take some time and increased commitment to the use of ICTs before they can fully appreciate the benefits of ICTs. The benefits of ICTs are capable of stimulating the interest of farmers to access and use ICTs.

Table 3: Distribution of Farmers According to their Perception of the Relevance of ICTs in Extension Service Delivery in Imo State, Nigeria

| S/ No | Perception statements | Strongly agree (5) | Agree (4) | Undecided (3) | Disagree (2) | Strongly Disagree (1) | Total | Mean rating Max = 5 |
|-------|---------------------------------------------------------------------|--------------------|---------------|---------------|--------------|-----------------------|-------|---------------------|
| 1. | Increased contacts between Extension workers | 900 (60.0) | 440 (36.7) | 30 (3.33) | 0 (0) | 0 (0) | 1370 | 4.57 |
| 2. | Increased time-saving contacts | 875 (58.3) | 440 (36.7) | 45 (5.0) | 0 (0) | 0 (0) | 1360 | 4.53 |
| 3. | Increased collaboration between extension and input supply agencies | 600 (40.0) | 500 (41.7) | 150 (16.7) | 10 (1.7) | 0 (0) | 1260 | 4.20 |
| 4. | Incorporate feed-forward and improve feedback | 500 (33.3) | 520 (43.3) | 210 (23.3) | 0 (0) | 0 (0) | 1230 | 4.10 |

| | | | | | | | |
|------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|-------------|------|-------|
| 5. Can lead to global cross fertilization of ideas | 625 (41.7) | 540 (45.0) | 90 (10.0) | 20 (3.3) | 0 (0) | 1275 | 4.25 |
| 6. Cost of ICTs cannot justify benefits | 200 (13.3) | 280 (23.3) | 330 (36.7) | 120 (20) | 20 (6.7) | 950 | 3.17 |
| 7. Will increase the pace of rural development and enhance sustainable rural livelihoods | 600 (40.0) | 620 (51.7) | 90 (10.0) | 0 (0) | 0 (0) | 1310 | 4.36 |
| 8. Will make extension service delivery more cost – effective | 400 (26.7) | 400 (33.3) | 195 (21.7) | 100 (16.7) | 5 (1.7) | 1100 | 3.67 |
| Total mean | | | | | | | 32.08 |
| Grand mean | | | | | | | 4.01 |

Source: Field survey, 2014.

Decision Rule 3.0 and above = Perceived; Decision Rule < 3.0 = Not perceived

Figures in parentheses are percentages.

3.4 Socio-economic Characteristics of Farmers and their Accessibility to ICTs

Table 4 presents a correlation matrix of selected socio-economic variables of farmers and the number of ICTs they have access to. The table shows that age, education and income have significant relationship with the number of ICTs farmers have access to at 5% alpha level of significance.

Specifically farmer's age had a significant negative relationship with access to ICTs. This implies that as farmers advance in age they become less ICTs compliant. According to [14] the ability of a farmer to bear risk, adopt new innovations and be able to do normal work decreases with age. Older people are likely to be more resistant to change and innovations. The result is in agreement with [17] who obtained a similar result.

The positive correlation between education level and access to ICTs is in line with *a priori* expectation because the more educated the farmer is, the more exposed and knowledgeable he is and the more his desire to be ICT-compliant in line with modern trend. This result agrees with [17] who obtained a positive correlation between education level of respondents and access to ICTs.

The table also revealed that farmers with higher incomes had more access to ICTs. All things being equal increase in income increases a farmer's purchasing power and will help actualize the farmers' desire of accessing more ICTs. The result compares favourably with [18] who obtained a positive correlation between income and access to ICTs in Tanzania.

Table 4: A Correlation Matrix of Selected Variables of Farmers Age, Gender, Education, Experience and Income and the Number of ICTs (Y) they had Access to

| | Y | X ₁ | X ₂ | X ₃ | X ₄ | X ₅ |
|----------------|-----------|----------------|----------------|----------------|----------------|----------------|
| Y | 1.0000 | | | | | |
| X ₁ | -0.6550** | 1.0000 | | | | |
| X ₂ | 0.667 | 0.4806* | 1.0000 | | | |
| X ₃ | 0.4500* | 0.0919 | 0.0454 | 1.0000 | | |
| X ₄ | -0.0580 | -0.1997 | -0.0651 | 0.0199 | 1.0000 | |
| X ₅ | 0.4789* | 0.2633* | 0.5319* | -0.0058 | 0.0199 | 1.0000 |

Source: field survey, 2014.

(X₁ = age, X₂ = gender, X₃ = education, X₄ = experience and X₅ = income)

* = Significant at 0.05 level, ** = Significant at 0.01 level

IV. CONCLUSION AND RECOMMENDATION

The farmers had a clear and favourable perception of the relevance of ICTs in extension service delivery. Farmers' education level and income had a positive significant relationship with the number of ICTs farmers in Imo State had access to. It is therefore recommended that ICT education should be built into the extension delivery package of extension agents to farmers particularly the use of the mobile phone since this is capable of eliminating the series of wasteful trips to get at the extension workers and vice versa.

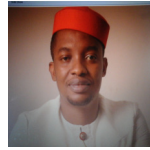
Farmers should be made to access ICT education through the agency of the farmers' school program. Extension service delivery should be stepped up in Imo State to ensure that farmers increase their productivity, improve upon their income generation and be able to access the ICTs.

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