



Assessment of Information and Communication Technologies (ICTs) Used By Extension Agents in Dissemination of Agricultural Innovation in Owerri Agricultural Zone of Imo State, Nigeria

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ABSTRACT

The importance of the use of Information and Communication Technologies (ICTs) in agricultural extension delivery cannot be overemphasized. However, particularly in the study area, the level of utilization of various ICTs devices by extension agents in agricultural extension delivery is relatively unknown. It is on this backdrop that the study was undertaken. Specifically, the study identified various ICTs devices extension agents use in agricultural extension delivery in the area; examined the level of utilization of ICTs devices by extension agents in the area; ascertained the extension agents method of communication of agricultural innovation in the area and identified the constraints extension agents encounters in the use of ICTs in agricultural extension delivery in the area. A total of 72 extension agents were selected using simple random sampling techniques. Well-structured questionnaire was used for data collection. Data collected were analyzed using descriptive statistical tools Radios, bulk text message, telephones (GSM), internet, television, audio and video cassettes were the major ICTs devices extension agents used in the dissemination of agricultural information in the area. ICTs devices have been beneficial for extension agents in agricultural extension delivery in the area. However, extension agents complained of poor electricity supply. It was therefore recommended that rural electrification policies and programmes should focus on providing adequate power supply in the area. It is also necessary that other source of power supply such as solar building should be provided as these would enhance effective and efficient agricultural delivery in the area and beyond.

Keywords: Information and Communication Technology (ICT), Extension agents, Agricultural innovation

INTRODUCTION

Communication channels are pathways through which information or messages are transmitted to an audience or receiver (Ekwujuru, 2006). Traditionally, it is assumed that good innovations sell themselves, but experience has shown that they do not (Elijah, 2010). Therefore, existing technologies or recommendations need to be disseminated to the farming audience. Extension agents carefully adapt communication strategies and channels to each local situation. Effective communication between change agents and researchers is essential for increasing agricultural production through the use of improved technologies.

The linear definition of communication conceptualized it as a process by which an idea is transferred from a source to one or more receivers with the intent of bringing about desirable changes in their behaviour (Agwu and Chah, 2007). Communication involves exchange of ideas between two or more individuals in an attempt to arrive at a convergence in meaning (Asenso-Okyere, 2012). Communication therefore in this study, is seen as the joint exchange of ideas, opinions and information through symbols commonly understood by the individuals involved in the communication act (Isiaka *et al.*, 2009).

Information and Communications Technologies (ICTs) is the most transformative technology of our present generation and its development, even from the earliest days, has benefited from close

partnership between government and various private sector companies which has continued to accelerate national development in Nigeria (Nwabueze and Ozioko, 2011). Effective agricultural extension delivery is partly determined by the ability to establish a synergetic interaction between technological innovations and farmers (Oladele, 2011).

According to Nwachukwu (2010) information and communication technologies (ICTs) were technologies used in collecting, processing storing, retrieving, disseminating and implementing data and information using microelectronics, optics and telecommunication and computers. Broadly, Nyirenda-jere (2010) defined information and communication Technologies as those technologies that facilitate communication and the processing and transmission of information by electronic means; Omotesho *et al.*, (2012) stated that ICTS covered a wide range of equipment and services. In agricultural extension, the ICTS included radio, television fixed and mobile phones, short message services, World Wide Web, search engines, packet digital assistants, cameras, video, e-mail, computer, contact data bases and systems, CD-Rom, DVD, current awareness, rural radio and web publishing.

On the other hand, Ani (2007) summarized ICTs roles in extension as follows: faster access to expert knowledge and information, faster and more efficient delivery of information, more relevant and adapted content and dissemination of information to people hitherto unreached or underserved and a deeper geographic penetration, especially to rural areas. However, technical development and use of the ICT devices is increasing much faster than research into their optimal use. This has implications for extension delivery, in that farmers need for information utilization on agricultural improvement is determined for them (Nkwocha *et al.*, 2009).

The type of ICTs tools extension agents use in dissemination of information is relatively not known in the area. It is on this background that the study will be carried out.

METHODOLOGY

The study was carried out in Owerri Agricultural Zone of Imo State, Nigeria. The zone is located between Latitude 4°45' and 7°25' north of the equator and Longitude 6°5' and 7°25' east of the Meridian (Microsoft Corporation, 2014).

Owerri Agricultural Zone is one of the three Agricultural Zones in Imo State. It is located at the southwestern part of Imo State. It is bounded on the East by Abia State, on the west by Anambra and Rivers State, on the North by Isu and Isiala Mbano Local Government Areas of Imo State and on the South by Abia and Rivers States (Imo ADP, 2013). It comprises eleven local Government Areas, namely; Aboh Mbaise, Ahiazu Mbaise, Ezinihitte Mbaise, Ikeduru, Mbaitoli, Ngor-Okpala, Ohaji/Egbema, Oguta, Owerri Municipal, Owerri North and Owerri West. There are two main seasons in the zone –dry and rainy seasons. The population is about 1,480, 853 persons which is about 38% of the total population of 3,934,879 of the state (NPC 2006 and NBS, 2007).

The sample for the study was drawn from Owerri zone Agricultural Development Programme (ADP) in Imo State. Simple random sampling technique was used in the selection of respondents for the study. Firstly, six local government areas were randomly selected from Owerri Agricultural Zone which includes Ikeduru, Mbaitoli, Ngor-Okpala, Ohaji/Egbema, Oguta, Owerri Municipal. Subsequently, in each of the selected LGAs, three wards were randomly selected. Ultimately, three extension agents were randomly selected from each of the ward giving a total sample size of seventy-two (72) extension agents for the study. Data were collected through the use of a set of structured questionnaire. Descriptive statistics namely; frequency distribution, flow-charts, percentages, mean score, range, 3-point likert scale rating and rank order was used to analyze the objectives. The mean scores were obtained by adding up the weighted values and divided by the number of scales. The values of the likert scale ratings were added together and then divided by the number of scales to obtain the discriminating index (e.g $4+3+2+1/4 = 2.5$). The maximum score is 4.0 while the minimum score is 1.0. The mean scores were also used for the ranking of the items. The significant mean will be 2.5 and above.

RESULT AND DISCUSSION

ICTs Devices Extension Agents use in Extension Delivery

The result of the Information and Communication Technologies (ICTs) devices distribution used by extension agents in agricultural extension delivery is compiled in Table 1. It shows that 100% of the extension agents make use of radio in agricultural extension delivery in the area. Evidence from prior studies show that most of the rural farmers have been reported to have huge access to radio than any other ICTs devices (Salau and Saingbe, 2008). Moreover, this may also be due to various advantages attached to radio facilities which others do not have. These are personal interaction in terms of contribution during live radio program, language understanding, literacy clarity, avoidance of time wasting and mass outreach (Olaniyi, 2013).

Table 1: Distribution of the ICTs Devices Extension Agents Use in Extension Delivery

ICTs Devices	Frequency	Percentage (%)
Radios	72	100.0
Newspapers	70	97.22
Bulk Text Message	67	93.06
Telephones (GSM)	65	90.28
Audio and Video Cassettes	60	83.33
Digital Photo Albums	59	81.94
Digital Theater	52	72.22
Digital cameras	48	66.67
Digital projector	40	55.56
Cinemas	33	45.83
Internet (e-mailing)	30	41.67
Television	28	38.89

***Multiple Responses are recorded;**

Source: Field Survey Data, 2018

Result also showed that approximately 97.22%, 93.06%, 90.28% and 83.33% identified newspaper, bulk text message, telephone (GSM), audio and video cassettes and digital Photo albums respectively as the part of the ICTs devices used in agricultural extension delivery in the area. The use of telephone and bulk text message might be attributed to the increasing growth in the proliferation and use of cell phones in Nigeria— with its attendant ease of access and at reasonable cost (Dire *et al.*, 2017). Furthermore, 81.94%, 72.22%, 66.67% and 55.56% of the extension agents reported that they use digital photo albums, digital theater, digital cameras, and digital projector respectively.

The ICTs devices such as the digital cinemas, internet (e-mailing) and televisions were identified by 45.83%, 41.67% and 38.89% of the extension agents respectively. The poor use of television and internet may be connected to poor electricity supply, poor connectivity and poor knowledge of internet use by farmers in the study area. As supported by the studies of Tanko *et al.*, (2013), who opined that the use of ICT facilities has continued to be hampered by the persistent problem of access, connectivity literacy and cost. In a similar vein, there may be probably no suitable ICTs devices to be used for agricultural extension delivery; it may only depend on the situation at the disposal of the extension agent (Isiaka *et al.*, 2009).

Level of Utilization of ICTs Devices by Extension Agents

The result of the distribution based on level of utilization of ICTs devices by extension agents is displayed in Table 2. Using a discriminating index of ≥ 2.5 for acceptance and < 2.5 for rejection, extension agents reported a high level of utilization in ICTs devices which includes; radios, newspapers, bulk text message, telephones (GSM), audio and video cassettes, digital photo albums, digital theater, digital cameras, digital projector and cinemas. The high level of utilization recorded in the above ICTs device in the area may be connected to the relatively high level of education on part of the extension agents, language understanding, literacy clarity, avoidance of time wasting and mass outreach (Olaniyi, 2013).

In the same way, the use of Internet (e-mailing) and television for agricultural extension delivery in the area were rejected. The finding is expected as a result of poor electricity supply, poor internet

connectivity, high internet subscription charged by network providers as well as poor knowledge of internet by farmers in the study area.

Table 2: Distribution of level of utilization of ICTs Devices used by Extension Agents Extension Delivery

ICTs Devices	High (3)	Moderate (2)	Low (1)	GM	Remark
Radios	68 (94.44)	3 (4.17)	1 (1.39)	3.80	Accepted
Newspapers	54 (75.00)	12 (16.67)	6 (8.33)	3.31	Accepted
Bulk Text Message	65 (90.28)	5 (27.78)	2 (2.78)	3.42	Accepted
Telephones (GSM)	60 (83.33)	9 (12.50)	3 (4.17)	3.22	Accepted
Audio and Video Cassettes	51 (70.83)	11 (15.28)	10 (13.87)	3.00	Accepted
Digital Photo Albums	45 (62.50)	20 (27.78)	7 (9.72)	2.93	Accepted
Digital Theatre	48 (66.67)	15 (20.83)	9 (12.50)	2.60	Accepted
Digital cameras	40 (55.56)	18 (25.00)	14 (19.44)	2.53	Accepted
Digital projector	49 (68.06)	10 (13.87)	13 (18.06)	2.69	Accepted
Cinemas	30 (41.67)	31 (43.06)	11 (15.28)	2.50	Accepted
Internet (e-mailing)	22 (30.56)	40 (55.56)	10 (13.87)	2.44	Rejected
Television	32 (44.44)	29 (40.28)	11 (15.28)	2.30	Rejected

Keys; GM: Grand Mean: Cut off point 2.5 Accepted; *Figures in parenthesis are percentage; Field Survey Data, 2018

The findings is strengthened by the studies of Purnomo and Lee (2010) and Tanko *et al.*, (2013), who opined that the use of ICT facilities has continued to be hampered by the persistent problem of access, connectivity literacy, cost and epileptic power supply. In a similar way, there are probably no suitable ICTs devices to be used for agricultural extension delivery, it may only depend on the situation at the disposal of the extension agent (Isiaka *et al.*, 2009).

Channel of Communication of Agricultural Innovation

The result of the distribution based on channel of communication of agricultural innovation used by extension agents in agricultural extension delivery is presented in Table 3. The finding indicate that 100%, 97.22%, 95.83% and 77.78% of the extension agents identified radio, group meetings, bulk test message and telephone (GSM) call as the channel of communication of agricultural innovation in agricultural extension delivery in the area. The merging of technology, that is, telephone and radio has made it more accessible to many. Farmers are able to go everywhere with their radios, including to their farms. Every home had a radio while others had more than one radio. Ogola (2015) had established that radio leads in overall media consumption followed by the mobile phone, television, with the wake of many vernacular radios which are able to effectively communicate to the targeted groups; and the findings of this study on the use of radio confirms this.

Table 3: Distribution based on Channel of Communication of Agricultural Innovation used by extension agents

Channel of Communication	Frequency	Percentage (%)
Radios	72	100.0
Group meeting	70	97.22
Bulk Text messages	69	95.83
Telephone (GSM) call	56	77.78
Newspapers	40	55.56
Internet (e-mailing)	32	44.44
Television	25	34.72
Video/ audio conferencing	12	16.67
One-on-one approach	8	11.11

***Multiple Responses are recorded;**

Source: Field Survey Data, 2018

Moreover, the rapid growth of mobile telephone and the introduction of mobile-enabled information services provide ways to improve information dissemination to the knowledge intensive agriculture sector and also help to overcome information asymmetry existing among the group of farmers (Mittal and Mehar, 2012). Mobile phones have many advantages, which include their adaptability and the capability of transferring voice, text messages and data at gradually decreasing cost (Oto and Shimayohol, 2011). They are also portable, have wide range of coverage and instantaneous two-way communications. Studies have found that mobile telephone is regarded as the most successful ICT tool used in attempts to develop the global agricultural sector (Mangstl, 2008).

Similarly, newspapers, internet (e-mailing), television, video/ audio conferencing, one-on-one approach had a percentage of 55.56%, 44.44%, 34.72%, 16.67% and 11.11% respectively as channel of communication of agricultural innovation used by extension agents in agricultural extension delivery. Television is a channel of the mass media, which transmit information about agricultural technology very fast among the farmers in community (Sule *et al.*, 2009). Another possible mechanism is that television may help to activate already existing mental skills in the viewer. For instance, the study of Ogola (2015) has argued that television combines multiple symbol systems, such as visual images, sounds, music, spoken and written language, and presents them simultaneously.

Constraints Extension agents face in use of ICTs in Agricultural Extension Delivery

The result of the distribution based on constraints extension agents face in use of ICTs in agricultural extension delivery is compiled in Table 4. It indicates that about 93.06%, 87.50%, 81.94% and 72.22% of the extension agents complained of poor electricity supply, poor government support, poor technical know-how, and poor network connectivity respectively as the constraints they encounter in the use of ICTs devices in agricultural extension delivery in the area. Poor electricity supply left most of the extension agents not to use ICTs device when necessary as well as search for other source of power in order to charge and power their ICTs devices such as the mobile phones and laptops.

Table 4: Distribution of Constraints Extension agents face in use of ICTs in Agricultural Extension Delivery

Constraints	Frequency	Percentage (%)
Poor electricity supply	67	93.06
Poor government support	63	87.50
Poor technical know-how	59	81.94
Poor network connectivity	52	72.22
Poor knowledge of ICTs device by farmers	50	69.44
Unavailability of ICTs Device	48	66.67
High charges for radio/television presentations	44	61.11
Poor ICTs infrastructures	41	56.94
Poor logistic supports	40	55.56
Distant Location of ICTs Facilities	35	48.61

***Multiple Responses are recorded;**

Source: Field Survey Data, 2018

However, electricity and power supplies are absolute prerequisites to using contemporary ICT systems. Agwu *et al.*, (2008) had earlier observed that several obstacles hinder ICTs usage in developing countries, especially in areas of access to telephone and electricity networks. According to the Academy for Educational Development and Win rock International (2013) over 1.5 billion people in developing countries lack relatively inexpensive grid or ‘mains’ electric service, and over a billion people will continue to lack grid electricity for the foreseeable future. For these people, other energy options such as small renewable energy-based power systems (solar photovoltaic (PV), small wind-electric turbines), are essential if they are to benefit from rural ICTs use.

Poor government supports make most of the extension agents to lack basic logistic support required in the use of ICTs devices in the area. Poor technical know-how left most of the advanced extension agents not to keep abreast on the use of modern and hi-tech ICTs devices. Poor network connectivity is associated with network providers whose networks are always unstable for easy and effective communication.

Similarly, 69.44%, 66.67%, 61.11%, 56.94%, 56.94%, 55.56% and 48.61% identified Poor knowledge of ICTs device by farmers, unavailability of ICTs device, high charges for radio/television presentations, poor ICTs infrastructures, poor logistic supports and distant location of ICTs facilities respectively.

CONCLUSIONS AND RECOMMENDATIONS

Radios, bulk text message, telephones (GSM), internet, television, audio and video cassettes were the major ICTs devices extension agents used in the dissemination of agricultural information in the area. ICTs devices have been beneficial for extension agents in agricultural extension delivery in the area. However, extension agents complained of poor electricity supply. It was therefore recommended that rural electrification policies and programmes should focus on providing adequate power supply in the area. It is also necessary that other source of power supply such as solar building should be provided as these would enhance effective and efficient agricultural delivery in the area and beyond. Government should make adequate provision for internet facilities for use by extension service providers particularly the SMSs in their various offices. In this regard, laptops equipped with modems are recommended for EAs given the field nature of their job.

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