UNDERSTANDING MOST PREFERRED EXTENSION TEACHING METHOD IN THE ADOPTION OF AGRICULTURAL TECHNOLOGIES: EMPIRICAL EVIDENCE FROM COWPEA FARMERS IN KOGI STATE, CENTRAL NIGERIA

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ABSTRACT

This study assessed most preferred extension teaching method in the adoption of agricultural technologies among cowpea farmers in Kogi State, Central Nigeria. The survey research design was adopted in this study. Multi-stage sampling technique was used to select two hundred (200) cowpea farmers from the four common agricultural zones in the State. Primary data obtained through the use of Kobocollect toolbox was analysed using descriptive statistics. The findings revealed that the combination of individual and group extension teaching method was the most common (86.5 %) extension teaching method. However, cowpea farmers in the study area mostly preferred; the individual extension teaching method (mean score = 2.79; 93 %), the mass extension teaching method (mean score = 2.49; 83 %), the group extension method of disseminating information (mean score = 2.37; 79 %), and the combination of both the individual and group extension teaching method (mean score = 2.30; 76.7 %). The study concluded that cowpea farmers mostly preferred the individual extension teaching method while extension agents usually adopted a combination of both individual and group extension teaching methods. The study recommended that; extension agents should consider focusing more on the individual extension teaching method in disseminating information on agricultural production technologies. .

Key words**:** *adoption, cowpea, farmers, individual, group, mass*

INTRODUCTION

Cowpea is an important food and fodder legume and essential component of cropping systems in Nigeria. It covers the largest area of any grain legume in Africa and is especially important in West Africa where Nigeria and Niger alone account for over 75 percent of the total cowpea production in the world (International Institute for Tropical Agriculture, IITA, 2020).

Despite cowpea widespread cultivation, cowpea yield is low, with an average of 750 kg/ha, against a potential yield of 2500 kg/ha. Generally, low cowpea productivity could be associated with several factors such as low adoption of improved or recommended production practices, low yield potential, biotic stresses (insect pests, diseases, striga and alectra infestations), abiotic stresses (drought, heat and low soil fertility), and poor access to seeds of improved varieties (IITA, 2020; Mwale *et al*. 2017 and Olasupo *et al*., 2016).

Information and communication are essential ingredients needed for effective transfer of technologies that are designed to boost agricultural production. Agricultural extension education is given to the farmers using different methods by the extension agents. These include: interpersonal media, using individual methods through home visits, correspondence and lectures; group methods such as video, workshops, group discussion, demonstration, field or farm visits; and mass media such as Radio, television and printed publications such as posters, instruction leaflet, calendar and hand bills. The objective of these methods is to make the farmer learn some facts and acquire some skills, which can be put into use (adoption) for his socio-economic development.

The extension agents have been mandated to reach out to the farmers in order to help them make informed decisions. The method used in reaching out to the farmers is as important as the technologies to be disseminated to the farmers. Hence, this study empirically established cowpea farmers' preference for extension teaching methods in Kogi State, Central Nigeria.

LITERATURE REVIEW

Extension methods are effective means of communication meant to transmit knowledge and skills, that target farmers may easily see, hear, and learn the things conveyed by extension workers (Khan *et al*., 2009). There are various extension teaching methods used as tools by the extension workers to effect desirable changes in the behaviour of farmers, arrange the best learning situations and provide opportunities in which useful communication and interaction takes place between extension workers and farmers. Such teaching methods or pathways are basically individual, group, or mass (Nwaekpe *et al*., 2014).

Individual extension teaching method

Individual teaching methods involve a one to one interaction between the farmer and the extension agent. It has to do with a face to face discussion under a relaxed and informal atmosphere by an extension worker with a farmer for a specific objective. The extension teaching method is usually time consuming but it has been found useful when relating with non-literate farmers with small units of proportion who are often educationally disadvantaged (Yahaya, 2003). This method has become imperative among cowpea farmers considering the fact that learning is an individual process and that the personal influence of extension worker is an important factor in securing cowpea farmers'` participation in extension activities. The use of this method provides the extension agent an opportunity to show his credibility and integrity (Nwaekpe *et al*., 2014). This method is widely used and have been found to be highly effective when dealing with illiterate farmers in particular (Agbamu, 2006). Some of the individual extension teaching approach are: farm and home visits, office calls and telephone inquiries, informal contacts, model farmer (farmer-to-farmer), and result demonstration.

The farm and home visits method involves meeting individually with farmer or farm worker at the farm or home. A farm and home visit serves a number of purposes: it establishes contact with men and women farmers and with others within the farm house hold; to learn what practices and problems exist on the farm; and to provide information and assistance. According to Avesha and Mohammed (2012), this technique is costly in terms of time spent and the number of clients contacted, which is usually few. Office calls and inquiries is concerned with personal visits made by the clientele to the extension office, to seek information and assistance. This is different from telephone calls – when a farmer put a call through to an extension worker for inquiries. Informal contacts are unstructured and planned meetings with clientele in an informal setting. Such meetings provide the extension worker with an opportunity to meet clientele in an informal situation, which facilitates the establishment of a personal bond, discussion of problems, and the recommendation of solutions. According to Rogers (1992), informal contacts can take place on the street, in the market place or at local celebrations. These meetings are often taken by chance and are casual in nature.

The model farmer (farmer-to-farmer) method involves the identification of a farmer whose farming methods and personal attitudes are so superior that his or her operation can serve as a model for others to follow. According to Franzel *et al.* (2015), the model farmer method of extension teaching involves the provision of training by farmers to farmers, often through the creation of a structure of farmer-trainers. Farmer-trainers train farmers on a wide range of practices covering livestock, crops, agroforestry, and fisheries.

This method have grown tremendously in Africa in recent years and are now quite common, with 78% of development organisations using the approach in Malawi and one-third using it across seven regions of Cameroon (Masangano and Mthinda, 2012; Tsafack *et al*., 2014). Mulwafu and Krishnankutty (2012) noted that the lead farmer approach had numerous benefits. They reported that the lead farmers provide a focal point in the community for introducing new technologies, for building farmer capacity, and as an entry point for service providers, such as input suppliers.

The result demonstration teaches why a practice or input should be adopted by physically showing how a new or different practice compares with a commonly – used in crop production. The purpose of using the result demonstration is to prove that the new practice is superior to the one currently being used, to persuade extension clientele to try the new practice, and to set up a long-term teaching situation (Evans, 1999). According to Laogun (2005), a successful demonstration can produce positive results for extension workers by creating confidence in their judgment and ability. However, the method is costly in terms of time, but if it is successful, it is an effective way to promote the new practice locally, and can open the way for further interaction with the clientele (Ekong, 2003 and Franzel *et al*., 2015).

Group extension teaching method

A group is made up of two or more persons interacting with each other in such a way that each person is interacted by the other. The interaction is intended to communicate ideas, feelings and actions of the subject matter under discussion. Group method assist moving people from the awareness stage through interest and eventual stages of adoption process. When an extension worker present an idea to a group, the participant may ask questions, exchange ideas with one another and may stimulate one another to action (Adebayo and Adedoyin, 2005). Group methods include method demonstration; field day/trips/excursion, group discussion, modified conference, role playing, general meeting and exhibits. This method proves important when time and staff are limited, especially in developing countries like Nigeria with low farmer – extension agent's ratio.

The method demonstration shows a group or class how something is done step-by-step for the purpose of teaching new techniques and practices to extension clientele (Evans, 1999). Ideally, each individual attending the demonstration would have an opportunity to practice the new skill during the lesson or session. According to Laogun (2005) and Agbamu (2006), the effectiveness of the demonstration depends on the amount of preparation and planning. This method is very effective in persuading clientele to try something new because the results of the demonstration can be observed and practiced. On a field trip, a group travels to another location to observe agricultural practices, projects or demonstrations not available locally. According to Laird (2007), a field trip's destination may be an agricultural experimental station, a farm, a home, or a community organization.

Informal or group discussion in a small group is another type of group extension teaching method. In this method, farmers who are neigbours get together in a certain house at a certain time period once a month, or perhaps once a week, to consider and communicate the common public problems. It is also a method to get acquainted with the neigbours, to exchange farming information and ideas, and to share common problems, in order to help each other and the community (Rogers, 1992). The informal discuss is carried out at the villages' monthly meeting and do not have professional leadership (Laogun, 2005). Modified conference method is a procedure in which a group of people, each of whom has had some experience in connection with the job or problem at hand, come together to discuss situations they are facing. This method provides those attending with an opportunity for constructive thinking under the stimulus of contributions offered by other participants (Agwu, 2006). In the case of role playing, an open-ended scenario is described, and participants are assigned role to act out the situation or problem. There is no script to follow, because participants play the roles as they see fit, drawing on their own experiences. The purpose of using this technique is to involve participants in real life situations, to stimulate thought and learning, and to encourage discussion about factors involved in the drama (Evans, 1999).

General meetings include all kinds of meetings held by the extension worker except demonstration meetings. These meetings may be lectures, discussions, showing of slides and motion pictures or any combination of these. During the meeting, provision is made for use of models, charts specimens, and pictures to illustrate points. Exhibits are systematic displays of specimen, models, charts, posters, among others. Their main purpose is to develop the interest of those who see them, influence their attitude, increase their knowledge and stimulate them to action. Exhibits are considered as some of the best methods of teaching illiterates because they have imaginative appeal, and can stimulate competitive spirit among participants (Ramirez and Quarry, 2004).

Mass media extension teaching method

Mass media extension teaching method involves the use of the mass media, (for example; radio, posters, drama, television, newspapers, films, slide shows, to inform the public. Mass media are mainly used to create awareness on agricultural technologies or recommended agricultural production practices. Mass media communication involves messages sent from mass sources in mass ways to mass audience to make mass meaning (Rogers, 2003). A report by the Food and Agriculture Organization, FAO (2017), positioned that mass media are those channels of communication which can expose large numbers of people to the same information at the same time. According to Saleh *et al*. (2018) and Okwu and Daudu [(2011), extension services use mass media, because of the high speed and low cost with which information can be communicated over a wide area.

They are generally useful as sources of initial information to farmers and constitute methods of notifying farmers of new developments and emergencies. They are equally important in stimulating farmers' interest in new ideas and practices (Ani, 2007). Saleh *et al*. (2018) broadly classified mass media extension teaching method to include: print media, electronic media, and new age media.

Print media encompasses mass communication through printed material. It include newspapers, magazines, booklets, periodicals or newsletters, handbills or flyers, billboards and press releases. A newspaper carries all kinds of communication related to a variety of topics like agriculture, politics, socialism, current affairs, entertainment, finance, stocks, among others (Baran, 2004). This captivates the imagination and interests of readers, from all age groups. Newspapers are an important platform of mass communication as they reach every nooks and corners of the world where electronic media fails to reach. Billboards or hoardings are huge advertisements that are put up at a height in strategic locations to fetch more attention. They usually attract the targeted audience by their bold colors, attention grabbing headlines, creativity, designs, and special effects.

Electronic or broadcast media is the kind of media which requires the user to utilize an electric connection to access it. It include television, radio, and new-age media like Internet, computers and telephone. Television offer farmers opportunity to employ the two major sense of seeing and hearing in the learning process thereby strengthening the likelihood of grasping and retaining the subject matter presented. Through television, the extension worker can give a method demonstration to a very large audience and can give a short talk or conduct a personal discussion on a topic of interest (Adejoh *et al.,* 2016). The authors further pointed out that the limitations of using television include the fact that owing to the high cost, many farm homes do not own television sets.

The viewer too is not in a position to ask questions to clarify the points made in a television presentation and the short airtime allocated to extension broadcasts. Radio is a powerful instrument for communicating with people far away in about the fastest manner and has a significant reach. A considerable number of farmers tune into radio every time while on their way to farm or work (Saleh *et al*., 2018). Advertising on the radio with catchy jingles and phrases is a tried and tested means of communication. According to Adejoh *et al*. (2016), radio broadcast must be followed by other methods to bring people to adoption stage.

New age media are high technology mass media, which are used with a widespread range. Mobile phones, computers, and Internet are often referred to as the new-age media. Mobile phones are used for interaction, operating pumps from remote locations, among others. Extension agents can use mobile phones to share messages on cowpea production through the Short Messaging System (SMS). However, Adejoh *et al*. (2016) reported low usage of mobile phones as a mass media source among farmers in Kogi State. The authors attributed this low usage to low level of farmers' income, lack of electricity, poor network coverage, and lack of infrastructure. Also, with the invention of computers farmers can virtually get information about everything. It has added speed and multimedia to the information which was earlier available only in the print format (Saleh *et al*., 2018). According to Rodman Rodman (2006), computers have added a new breakthrough in the mass media by combining human intelligence with the cutting edge technology. The Internet has inspired interaction and connectivity through its social networking medium and has become one of the core means of mass communication in extension teaching (Obinne *et al*., 2000).

3.0 MATERIALS AND METHODS

This study was carried out on Kogi State, Nigeria. Kogi State was created on 27th August, 1991 out of Kwara and Benue States. The State is located in the North central region of Nigeria. The State is located between latitude $6^0$30'N and $8^0$5'N and longitude $5^0$51'E and $8^0$00'E. The major crops grown in the State are cowpea, maize, yam, cassava, sorghum, rice, millet, pigeon pea, groundnut, bambaranut, cocoyam, sweet potato, beniseed, melon, banana, plantain and cotton.

The multi – stage sampling technique was employed in the selection of two hundred cowpea farmers from the four commonly available agricultural zones in the State for the study. The primary data were obtained with the aid of a semi-structured questionnaire which was administered to the respondents using android enabled Kobocollect toolbox mobile application. The data were analysed using descriptive statistics and mean score from Likert type scale.

4.0 RESULTS AND DISCUSSION

The distribution of cowpea farmers according to the extension teaching methods normally used by extension agents in disseminating improved practices in the study area are presented in Table 1.

Table 1: Extension Teaching Methods Normally used in the Study Area

Extension Teaching Methods	*Freq.	Percent
Individual	116	58.0
Group	125	62.5
Mass	11	5.5
Individual + Group	173	86.5
Individual + Mass	08	4.0
Group + Mass	14	7.0
Individual + Group + Mass	10	5.0

Source: Field Survey, 2021 * = multiple responses n=200

The result in Table 1 shows that, extension agents in the study area mostly used the combination of individual and group extension teaching method in disseminating information on cowpea production recommended practices among cowpea farmers. This was followed by the group (62.5%) and individual (58%), as separate extension teaching method used by the extension agents in disseminating information.

The group extension teaching method of disseminating information involves excursion, general meeting, exhibition, method demonstration, field days, and farmers' field schools, among others. Such group usually involves two or persons coming together for interaction on recommended farming practices. A group of more than 1000 persons (which will involve the use of ICT) was considered as mass extension teaching method in this study. The adoption of group extension teaching method by extension agents could increase farmers' awareness stage through interest and eventual stages of adoption recommended cowpea production practices. This finding agrees with Umeh *et* al. (2018) when they reported that group methods (demonstration, field shows, among others) (53%) and combination of individual and group methods (23%) are the major teaching methods used by extension agents in dissemination of information among farmers in Akwa Ibom State, Nigeria.

Cowpea farmers in the study area also rated separately, the individual extension teaching method as one of the frequent methods used by extension agents in disseminating information on cowpea production practices. This did not come as a surprise since the extension agents do visit individual farmer's farm or site for some form of on-the-spot assessment and evaluation. This is done outside the usual fortnight extension visit.

The individual extension teaching method involves a one to one interaction between the cowpea farmer and the extension agent. It has to do with a face to face discussion under a relaxed and informal atmosphere by an extension worker with the cowpea farmer for a specific objective, such as the adoption of recommended cowpea production practices.

The study further assessed cowpea farmers' preferred extension teaching methods in the study area. This finding is presented in Table 2.

Table 2: Preferred Extension Teaching Method

Extension Teaching Methods	MS	Prop. (%)
Individual	2.79	93.0
Mass	2.49	83.0
Group	2.37	79.0
Individual + Group	2.30	76.7
Individual + Mass	1.88	62.7
Group + Mass	1.55	51.7
Individual + Group + Mass	1.72	57.3

Source: Field Survey, 2021 *n = 200; NOTE: MS = Mean Score; Prop. = Proportion*

Result presented in Table 2 shows that, cowpea farmers in the study area mostly preferred the individual extension teaching method (mean score = 2.79; 93 %) in disseminating information on cowpea production recommended practices. This is somewhat different from the method mostly adopted by extension agents in disseminating information. Extension agents mostly use a combination of both individual and group or the group extension teaching methods. Cowpea farmers' preference for the individual extension teaching method could be associated with its benefit. Under the individual extension teaching methods, cowpea farmers can be reached through; farm and home visit, office calls, and telephone calls. This finding agrees with Okwu and Dauda (2011), when they reported that, crop farmers in Benue State preferred interpersonal communication with fellow farmers and extension workers.

Cowpea farmers in the study area further preferred the mass extension teaching method (mean score = 2.49; 83 %) in disseminating recommended cowpea production practices. This method of information dissemination is used to reach quickly many people at the same time at different locations. The adoption of this method by extension agents could be a plus as it allows for a large number of farmers aware of new ideas and practices, stimulate farmers' interest, or alerting them to sudden emergencies.

This finding agrees with Okunade (2007) who reported that, farmers in Oyo State mostly preferred the mass extension methods because the method attracts attention, stimulate interest and the desire for further information. According to Obinne *et al*. (2000), the mass extension method plays an important role in creating awareness about new agricultural technologies among farming communities across the world.

Another preferred extension teaching method by the cowpea farmers was the group extension method of disseminating information (mean score = 2.37; 79 %). This was closely followed by a combination of both the individual and group extension teaching method (mean score = 2.30; 76.7 %). A group is made up of two or more persons interacting with each other. The interaction is intended to communicate ideas, feelings and actions of the subject matter under discussion (adoption of recommended cowpea production practices). Farmers' preference with regards to this method could be associated with FAO's position that; the group extension teaching method is suited to bringing specific information about practices, helping to move the individual through the desire for conviction and sometimes to taking action (FAO, 2016). This finding agrees with Bonye *et al*. (2012) who reported that crop farmers in Ghana selected the group extension method as one of the most preferred methods. Further, Khan *at el.* (2009) showed that, the group method was an effective means of communication to transmit knowledge and skills. A previous study by Temesgen and Tola (2015) found that farmers' propensity to seek new agricultural knowledge motivated them to attend field days (a group extension method) and in the overall, they favourably rated its effectiveness in information dissemination.

CONCLUSION AND RECOMMENDATION

Conclusively, cowpea farmers mostly preferred the individual extension teaching method while extension agents usually adopted a combination of both individual and group extension teaching methods. The study therefore recommends that; extension agents should consider focusing more on the individual extension teaching method in disseminating information on technologies.

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