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Assessment of the Role of Mass Media in the Dissemination of Agricultural Technologies among Farmers in Kaduna North Local Government Area of Kaduna State, Nigeria

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Abstract
This study was carried out to assess the Role of Mass Media in the Dissemination of Agricultural Technologies among Farmers in Kaduna North Local Government Area of Kaduna State. A random sampling technique was used for selecting samples. The total sample size was 108 respondents. Data were collected through a well structure interview schedule and analyzed with descriptive statistics and Chi- square. The study showed that the respondents have different degree of accessibility to radio, television, telephone, Internet, and newspaper/ bulletin. Radio was found to be more accessible (46.3%) and also the major source (60.19%) of agricultural technologies to the farmers. The study further revealed that 90.7% of the respondents affirms that mass media is effective in the dissemination of agricultural technologies while 9.3% saw mass media as not effective. The Chi- square analysis at 0.01% level of probability showed that the use of mass media was effective in the dissemination of agricultural technologies in the study area. The factors militating against the effective utilization of mass media as source of agricultural technologies to the farmers in the study area were also identified to be illiteracy, low income level, lack of credit facilities, and inadequate/ erratic power supply. To enhance the effectiveness of mass media in the dissemination of agricultural technologies for agricultural development in the study area there is need to strengthen the use of radio and television in information dissemination to farmers, more competent presenters who are knowledgeable in agriculture to handle agricultural programs. Also such programs should be broadcasted in local languages as much as possible and efforts must be taken to guarantee that the airing times are suitable.
Key words: Agricultural technologies, Dissemination, Mass media, Analysis

1. Introduction

Information and communication are essential ingredients needed for effective transfer of technologies that are designed to boost agricultural production. For farmers to benefit from such technologies, they must first have access to them and learn how to effectively utilize them in their farming systems and practices. This should be the function of agricultural extension agencies all over the world. These extension agencies make use of different approaches, means and media in transferring improved agricultural technologies to the end users (farmers). Mass media methods in agricultural information dissemination generally, are useful in reaching a wide audience at a very fast rate. They are useful as sources of agricultural information to farmers and as well constitute methods of notifying farmers of new developments and emergencies. They could equally be important in stimulating farmers' interest in new ideas and practices (Ani *et. al*. 1997). Mass media are important in providing information for enabling the rural community to make informed decision regarding their farming activities, especially in the rural areas of developing countries (Lwoga, 2010). Information, as we know is the key for success in the operation and management process of the agriculture activities. To a large extent, mass media serve as a veritable instrument for information dissemination in agriculture.

In developing countries, latest mass media have made their place for backing up agricultural sector through extension activities (Qamar, 2006). Mass media have the capacity to uplift the knowledge and having impact on behaviour (Nazari and Hassan, 2011).The potency of modern electronic technology can be exploited for infotainment of farming community (Guenthner and Swan, 2011). The cost of extension advice through mass media comes to be considerably low as compared to individual and group methods (Oakley & Garforth, 1985). However, the mass media involve one-way communication from information source to the receivers. They permit limited and delayed feedback, which of course is essential for effective communication (Muhammad, 2005). Mahmood and Sheikh (2005) stated that creation of awareness is the first step towards the adoption

process (Suman, 2003; Yawson *et. al*., 2010). Mass media (electronic & print media) are playing very important role in creating awareness about new agricultural technologies among farmers. Mass media are spreading agricultural technologies to the farmers at a faster rate than personal contacts. Khushk and Memon (2004) stated that production and distribution of printed material helps farmers in the transfer of new information and technologies. Printing helps in preserving the technologies in the shape of books/booklets, magazines, newspapers and brochures. According to a study conducted in the central Punjab, majority of the farmers consulted pamphlets, magazines, and newspapers for getting the information regarding sugarcane production technologies. These were regarded as the most suitable forms of print media for adoption of sugarcane production technologies (Abbas *et. al*., 2003). Farm publications have proved to be effective means for dissemination of information, especially to introduce new technologies. Farm publications are also useful for disseminating information among literate farmers (Singh, 2001).

In Nigeria, various communication media are being used to transmit agricultural information to farmers in line with national policy on agriculture. The communication media include farm magazine, leaflets, newsletters, newspapers, pamphlets, radio and television, among others (Dare, 1990). Among them, radio is the most preferred tool of mass communication in Nigeria (Zaria and Omenesa, 1992; Omenesa, 1997; Ekumankama, 2000). Omenesa (1997) observed that radio programmes are usually timely and capable of extending messages to the audience no matter where they may be as long as they have a receiver with adequate supply of power. The absence of such facilities as road, light and water are no hindrance to radio. Similarly, such obstacles as difficult topography, distance, time and socio-political exigencies do not hinder the performance of radio. He further observed, that illiteracy is no barrier to radio messages since such messages can be passed in the audience own language. Another advantage of radio programme is that it can be done almost anywhere through the use of a tape recorder (Nwuzor, 2000). It is probably because of these advantages of radio that many governments accord high priority to it as a means of reaching farmers.

Among other sources of information, radio and TV also depicted value for information dissemination (Okwu and Daudu, 2011). Radio is a popular medium for infotainment as well as attitude change (Ray, 2003). It plays a peculiar role in technology dissemination (Ejembi *et. al.*, 2006; Prathap and Ponnusamy, 2006). Similarly, Television (TV) is also a vital electronic medium in this dimension (Bhattacharjee, 2005). The potential of TV for dissemination of information should be harnessed for the benefits of farmers (Nazari and Hassan, 2011). Radio and TV also provide means for dissemination of interesting and appealing messages (Ramchandani, 2004). Audio and video cassettes display their importance not only as entertainment source but also for information delivery. These are also used as educational media (Hartley and Hayman, 1992). Moreover, these media reflect utility for extension activities by dint of playback facility and convenience in listening/watching of recorded messages whenever desired (Muhammad, 2005).

Computer has become a robust tool of this era of technological advancement and internet facility boomed the scope of “edutainment” (Williamson and Smoak, 2005). Internet has transformed this world into global village by reducing the distances of information exchange. Kelsey *et. al.* (2002) indicated that the development in information technology like internet has enhanced the opportunities of access and training pertinent to critical issues.
It also contributes towards information dissemination. E-mail facility and websites have increased the scope of media by expanding the sphere of access (Tawari, 2006). Kenny (2002) pointed out that despite possessing crucial importance, internet technology has been facing various obstacles like networking (infrastructure), language problem, and illiteracy. Khan (2010) also affirmed that lack of computer literacy and lack of interest appeared as major hurdles in using the internet (Khan, 2010). There is also a need to exploit interactive role of internet (Leeuwis, 2004) and internet facility can pave the way for extension activities (Bamka, 2000; Kallioranta *et. al.*, 2006). Moreover, websites should be developed that can cover the appealing sides of a variety of people (High and Jacobson, 2005).

Telephone facility has increased the opportunity of getting access to the people living even in remote areas (Gupta, 2005). It contributes towards developing farmers’ linkages with other people including extension experts. Help lines facilitate the mechanism for getting information/assistance regarding people’s problems by using toll free numbers. A sophisticated form of communication also on the scene in the form of mobile phone for the swift exchange of information among the farming community (Malhan and Rao, 2007). Mobile phone technology has provided multidimensional benefits to the rural people and it helps in interaction, accessibility, and quick/timely

information exchange. In addition, its importance is clear in sense of urgency and emergency (Sife *et. al.*, 2010).

Agricultural extension/information delivery is precisely a process of communication of improved skills, practices, innovations, technologies and knowledge to farmers. Thus, agricultural extension is a service which helps or assists people, particularly farm families through educational procedures in promoting their farming practices and techniques, increasing their production efficiency and income, bettering their levels of living and lifting their social, economic and educational standards of rural life (Ogunbameru, 2001). Food and Agricultural Organisation (FAO 2001) reported that in many developing countries, wide adoption of research results by majority of farmers remains quite limited. This therefore, calls for a system which allows adequate information flow from researchers to farmers and vice-versa. Hence, Agricultural extension agencies have central role in facilitating the flow of a variety of information to offer the needed exposure of farmer to innovation for overall development. The present study was conducted with a major objective of assessing the role of mass media in the dissemination of agricultural technologies among farmers so that the outcome of the study will help the extension agents and various stakeholders to strengthen and having better use of mass media for agricultural information dissemination and for the development of farmers. Thus the specific objectives of the study were to:

i. describe the socio-economic characteristics of the farmers in the study area.
ii. identify the different mass media available in the study area and their accessibility to farmers.
iii. identify the major source of agricultural information to farmers through mass media in the study area.
iv. analyze the effectiveness of mass media in the dissemination of agricultural technologies among the respondents.
v. identify factors militating against effective utilization of mass media as sources of agricultural technologies in the study area.

1.1 Hypothesis of the study

The hypothesis of the study stated in the null form is as follows:

H_o: The use of mass media is not effective in the dissemination of agricultural technology among the respondents in the study area.

2. Materials and Methods

2.1 Study area

The study was conducted in Kaduna North Local Government Area of Kaduna State. Kaduna North is located between latitude 9^0 N and 12" N and longitude 6^0 E 9" E of the prime meridian. It has a population of 402,390 (NPC, 2006). It has an annual rainfall of about 1000mm – 1500mm per annum. The local government shares common boundaries with Abuja in the South-East and six other States including: Kano, plateau, Katsina, Niger and Nassarawa. The major vegetation in the study area is guinea savannah. Crops like Yam, Millet, Sorghum, Potatoes. etc. are produced in the study area. The local government has twelve (12) wards including: Shaba, Gaji, Ungan Liman, Marburji, Kabala, Gabasawa, Ungan Sarki, Badarawa, Ungan Dosa, Kawo, Hayin Banki and Ungan Shanu wards. The major occupation in the study area is farming. Other occupation in the study area include: Trading, Tailoring, Transportation, Carpentry, Bricklaying etc.

2.2 Sampling Technique and Sample Size

Ten farmers were selected randomly from each of the 12 wards in the study area to make up a total number of 120 farmers as sample size.

2.3 Data Collection

The primary data used for this study were collected from the respondents through the administration of 120 well structured questionnaires. The questionnaire was well structured in line with the objectives of the study such that it contained open ended and closed ended questions. However, one hundred and eight (108) sets of questionnaires were returned and used for the analysis.

2.4 Analytical Tools

Descriptive statistics such as frequency, tables, percentage, mean, rating of effectiveness (effectiveness index) and Chi-square were employed for the analysis. Rating was done by means of ranking of the mass media by the respondents on a scale of 1-4 with 1= most effective, 2= effective, 3= less effective and 4= not effective. Effectiveness is the extent to which the respondents have benefitted immensely from mass media in terms of

agricultural technology. Effectiveness in this context of study is the ability of mass media in relating the agricultural innovations to farmers. Chi-square analysis was used to test the hypothesis.

2.4.1 Chi-Square Mathematical model:

$$X^2 = \frac{\Sigma (F_0 - F_E)^2}{E}$$

$Where \ X^2 = Chi - square \ \ calculated$

$\Sigma = Summation \ \ \ sign$

$F_O = Observed \ \ \ frequencie \ \ s$

$F_e = Expected \ \ \ frequencie \ \ s$

3.0 Results and Discussions

3.1 Socio-economic characteristics of the respondents

The variables considered under the socio economics characteristics of the respondent as presented on table 1 are sex, age, marital status, household size, level of education, farming experience and religion. The result showed that 59.3% of the respondents are male while 40.7% are female. This implies that men were more into farming business than female in the study area. This could be due to the fact that majority of the respondents are Muslims (71.3%) where the religion restrict women only to house hold jobs. The practice of ‘‘purdah’’ (women seclusion) is a common practice in the study area. The table further revealed that most of the respondents (83.33%) fall between 20 and 60 years of age. The mean age was 38 years. This indicates that most of the respondents were adults and fall within economically active age group. Besides, most of the respondents were within the age defined by FAO (1992) as economically productive in population (16-64 years). Such group is most likely active in farming and tends to develop more interest in sourcing for agricultural technology through the mass media. 62.03% of the respondents are married while 38% are single. Adamu (2005) had reported that about 90% of Nigerian populations are engaged in agricultural production processes of various types regardless of their marital status. However, it could be deduced that since majority of the respondents were married, it is expected that they will source for agricultural technologies through the mass media to increase their productivity and enhance their income. In term of educational level, 41.67% and 32.41% had secondary and tertiary education while equal number of respondents (12.96%) had primary and Arabic education. Farmers' education generally has been found to enhance production among food crop farmers, apparently resulting from their efficiency in using new production technologies (Ani, 2006). Methods of using these new production technologies are demonstrated through the use of mass media. More educated farmers are typically assumed to be better able to process information and search for appropriate technologies to alleviate their production constraints. The belief is that education gives farmers the ability to perceive, interpret and respond to new information much faster than their counterparts without education. The farming experience showed most of the respondents had farmed for a reasonable number of years as would enable them to be abreast with the use of mass media as sources of agricultural information. The farming experience of farmers to a large extent affects their managerial know-how as well as the use of various extension methods including mass media methods (Ani, 2006).

3.2 Available mass media and their accessibility to the respondents in the study area

The availability of mass media and their accessibility to the respondents determine the extent to which the farmers obtained agricultural technology through the mass media. Table two showed that five mass media such as radio, television, telephone, print media and internet are available in the study area. Radio and Television with 46.3% and 29.6% were found to be more available and accessible to the respondents, followed by telephone (11.1%). Internet and print media were found to be less available and accessible to the respondents with 7.4% and 5.6% respectively. This can be explained by the fact that Kaduna North Local Government been a metropolitan Local Government has a high level of literacy as can be found in table 1 and awareness of innovation through the mass media.

3.3 Sources of agricultural information through mass media

The major source of agricultural innovation to the respondents through the mass media was radio (Table 3). This accounted for 60.19% of the respondents. This result agree with the findings of Ani (2004); Buba (2003); Fadama (2005), Ogunbameru (2001), Ani and Baba (2009) who expressed that radio cuts across the literacy

barriers required in books, newspapers, journals, bulletins, pamphlets etc. Radio in essence often does not require higher educational qualification or back-ground to be effective. Even the pastoralists who are often physically inaccessible (to many other mass media, including electronic media) and who live in low population densities can be mobilized at the same time with radio anywhere without necessarily interfering with their daily activities at homes or in fields. Hanif (1992) and Ali (1994) also found that radio was the major source of information in educating farmers regarding recommended agricultural practices. Also, Munyua (2000); and Craig (2001) found that rural radio was successful in delivering agricultural information to a target groups.

The table also showed that 27.78% of the respondents got their agricultural innovation through Television. This also agrees with Muhammad and Garforth (2001) findings that interpersonal communication among farmers was extremely lacking and radio was the major source of agricultural information followed by television. Nwachukwu and Odoemelam (2004) had found in their study that television viewing in developing countries is growing rapidly and has great scope for timely research and action.

Telephone and Internet served as source of agricultural information to about 6.48% and 5.57% of the respondents respectively. Abu Hassan *et. al*., (2009) found that people in the rural areas still hesitant to use the advance technology that are available to them. For example, in term of agriculture website surfing, Shaffril *et. al*. (2009) have concluded that the agro-based websites surfing among the rural community is at a low level. Rural community seems reluctant to use the advance technology such as internet to receive agriculture information. Results of this study is not surprising as it is in tandem with what have been done by Abu Hassan *et. al*. (2009); and Samah *et. al*. (2011). Abu Hassan *et al*. (2009) for example have demonstrated a few reasons why people are reluctant to use advance technology such as internet and among the reasons are do not know the benefits of the advance technology, do not have skills or expertise in using the advance technology, lack of time spent on ICT and difficulties in using ICT.

3.4 Effectiveness of mass media to the respondents

Effectiveness is the extent to which the respondents have benefitted immensely from mass media in terms of agricultural technology. Effectiveness in this context of study is the ability of mass media in relating the agricultural innovations to farmers. Table 4 showed that 90.7% of the respondents claimed that mass media was effective in the dissemination of agricultural information while only 9.3% affirmed that mass media was not effective. The findings agreed with that of Ani *et. al*. (1997) which stated that mass media methods in agricultural information dissemination generally, are useful in reaching a wide audience at a very fast rate. They are useful as sources of agricultural information to farmers and as well constitute methods of notifying farmers of new developments and emergencies. They could equally be important in stimulating farmers' interest in new ideas and practices (Ani *et. al*. 1997). Mass media are important in providing information for enabling the rural community to make informed decision regarding their farming activities, especially in the rural areas of developing countries (Lwoga, 2010). The Chi square test of significance of the effectiveness of mass media on table 5 showed that the calculated chi square value of 48 (X^2 statistics) was greater than the tabulated value of 16.27 (X^2 critical) at 0.01 percent level of probability. Thus, the null hypothesis (H_o) which says the use of mass media is not effective in the dissemination of agricultural technology among the respondents is hereby rejected and the alternative hypothesis (H_A) accepted. This showed that mass media is effective in the dissemination of agricultural technologies to farmers in the study area.

3.5 Factors militating against effective utilization of mass media

Information contained in table 6 present data on factors that militate against effective utilization of mass media as sources of agricultural technologies in the study area. The factors are illiteracy, low income level, lack of credit facilities, and inadequate/ erratic power supply. Erratic power supply formed the core constraint in the study area with 50.93%. However, the erratic power supply to some of the electronic mass media outfits in the study area could be a big handicap to their effective utilization by farmers. Lack of credit facilities accounted for 25.92%. Shelly and Costa (2000) also indicated lack of credit facility and lack of resource availability as the main constraints which are being faced by rural peoples involved in the agricultural development programme in Bangladesh. More or less similar results were also observed by Raju *et. al.* (2001), Sadaf *et. al.* (2005) and FAO (2001). Low level of income constituted 15.74% of the factors. This could be largely attributed to high cost of television sets which may beyond the reach of the farmers. The percentage of illiterate farmers was very low 7.41%. This category of farmers may not understand most agricultural information through the mass media.

4.0 Conclusions and Recommendations

Based on the results of the study, it can be concluded that majority of the respondents are male, married, age between 20-60 years, possessed secondary and tertiary education and are experienced in farming. The study also concluded that radio, television, telephone, print media and internet are available mass media in the study area, but radio and television were more available and accessible, hence serves as the major sources of agricultural innovation to the respondents. Generally, the use of mass media in the dissemination of agricultural technologies was found to be effective in the study area. Besides, mass media such as Telephone, Internet and print media were not fully utilized by the respondents in the area. However, to provide better access and improve the effectiveness of mass media in the dissemination of agricultural technologies for agricultural development in the study area, the following recommendations were made:

(i) Agricultural extension services particularly the Kaduna state Agricultural Development program and Ministry of Agriculture should strengthen the use of radio and television in information dissemination to farmers in the study area, there is a need for more competent presenters who are knowledgeable in agriculture to handle agricultural programs. Also such programs should be broadcasted in local languages as much as possible and efforts must be taken to guarantee that the airing times are suitable.

(ii) Adequate announcement of the agricultural programme on the radio and television before the kick off of the programme will keep the farmers abreast and enable them to plan their time to listen to and watch such programme.

(iii) Formation of radio rural farmers or listening group among the farmers should be encouraged.

(iv) The erratic power supply from Power Holding Company of Nigeria (PHCN) should be improved significantly if mass media especially electronic mass media is to perform its roles effectively.

(v) Similarly, there is also a dire need to create awareness on the use of computer to promote computer literacy for uplifting internet use. Governments at all levels and private sectors should provide computer centres where farmers can surf internet to obtain latest agricultural technologies at minimum cost.

(vi) Finally, the educational level of the study area should be increased and farmers should be encouraged so as to be able to get benefits from printed material.

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Table 1: Socioeconomic Characteristics of the Respondents

Socio economics characteristics	Frequency	Percentage
Sex		
Male	64	59.3
Female	44	40.7
Age		
20-40	54	50
41-60	36	33.33
61-80	18	16.67
Marital status		
Single	41	38
Married	67	62.03
Household size		
2-5	27	25
6-9	66	61.1
10-13	15	13.8
Level of education		
Primary	14	12.96
Secondary	45	41.67
Tertiary	35	32.41
Arabic	14	12.96
Religion		
Muslims	77	71.3
Christianity	31	28.7
Farming experience (years)		
5-10	51	47.2
11-15	34	31.5
16-20	16	14.8
21-25	7	6.5

Table 2: Distribution of respondents according to available mass media and their accessibility to the respondents

Mass Media	**Frequency**	**Percentage (%)**
Radio	50	46.3
Television	32	29.6
Telephone	12	11.1
Internet	8	7.4
Print media	6	5.6
Total	108	100

Table 3: Distribution of respondents based on major sources of Agricultural information through different mass media

Sources of Agric. Information	**Frequency**	**Percentage (%)**
Radio	65	60.19
Television	30	27.78
Telephone	7	6.48
Internet	6	5.57
Total	108	100

Table 4: Distribution according to the effectiveness of mass media by the respondents

Effectiveness of mass media	**Frequency**	**Percentage**
Most effective	28	25.9
Effective	36	33.3
Less effective	34	31.5
Not effective	10	9.3
Total	108	100

Table 5: Chi-square test of significance of the effectiveness of mass media

Rating	**Rank**	**f_o**	**R+f_o**	**Tot.$_o$**	**f_e**	**f_e-f_o**	**$(f_e-f_o)^2$**	**$(f_e-f_o)^2/f_e$**	**Tab. value @1%**
Most effective	1	28	29	57	52.2	24.2	585.64	11.0	
Effective	2	36	38	74	67.7	31.7	1004.89	15.0	
Less effective	3	34	37	71	65.0	31.0	961	15.0	
Not effective	4	10	14	24	22.0	12	144	7.0	
Total		108	118					48	16.64

Table 6: Distribution of respondents according to problems encountered in getting information through the mass media

Types of problems	Frequency	Percentage (%)
Illiterate	8	7.41
Low income level	17	15.74
Lack of credit facility	28	25.92
Inadequate/ erratic power supply	55	50.93
Total	108	100