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Assessment of Farmers' Knowledge Acquisition from Agricultural Technologies Broadcasted on Nasarawa Broadcasting Radio in Nasarawa State, Nigeria

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ABSTRACT

The study was to assess farmers' knowledge acquisition from agricultural technologies broadcasted on Nasarawa Broadcasting Radio in Nasarawa State. A multi stage sampling procedure was applied to select 209 farmers. The data were collected through structured questionnaire which were analysed using simple descriptive statistics. The result of the analysis revealed that majority (29.2%) were between the ages of 31- 40 years, male (86.1%), married (50.71%), having tertiary education (58.0%), with mean household size of 11 person, having an annual farm income of between ₦100,001- ₦200,000 with mean farming experience of 14.5 years, having a farm size of between 0- 5 hectares. Majority (70. 8%) were members of a cooperative groups and almost all (95,7) had radio set. The study identified two agricultural programmes presented by NBS radio weekly. The result of the study further shows technologies such as timely planting of crops ($\bar{x}$ =4, 80), best practices in yam production ($\bar{x}$ =4.75) and reputable sources of farm input ($\bar{x}$ =4.55) were considered highly relevant to farmers' needs. The result further revealed that farmers had gained new knowledge on use of improved seeds (81.2%), proper storage methods of farm produce (77.2%) and best practices in rice production (73.3%). The study also showed that the technologies mostly adopted by the respondents includes; use of improved seeds (95.7%), proper storage of farm produce (94.7%) and best practices in rice production (93.3%). It is recommended that, the programmes should be sustained as it giving out the needed information to farmers.

INTRODUCTION

Globally, mass media are essential means of communication, playing a crucial role in keeping people informed about events and developments around the world (Peterson & Johnson, 2020). Conventional media outlets such as radio, television, and newspapers continue to maintain their importance, especially in developing nations where the uptake of modern communication technologies has been relatively gradual.

In Africa, the lack of effective agricultural information delivery systems has remained a key obstacle to agricultural progress (Rugege & Murenzi, 2023). As a result, radio agricultural programmes have become an important channel for disseminating and promoting improved agricultural technologies. This is largely due to radio's affordability, accessibility, and ease of use, making it a highly efficient means of communication among rural communities (Rugege & Murenzi, 2023).

Radio have been found to be very useful in the process of empowerment through dissemination and unveiling to rural farmers, various production information, which can directly advance the social and economic lives of the farmers and development of agriculture in general (Khan, *et al*., 2017; Danjuma et. al., 2021). Among the mass media, radio has been depicted as the most effective in reaching rural areas (Adejo, *et al*. 2016, Tijani, *et al*. 2019). According to Food and Agriculture Organization (2023), radio serves as one of the most suitable media for agricultural communication as it overcomes distance barriers and delivers information promptly., It has been identified as the only medium of mass communication the rural population are very familiar with, (Danjuma *et al*. 2021; FAO, 2023).

The rise in rural radio stations and radio agricultural programmes highlights advancements in information technologies well as a transition towards a more inclusive and participatory approach to sharing information and knowledge (Nyirenda and Mphande, 2023). Nasarawa Broadcasting Service since its establishment have been airing different agricultural programmes with the aimed of improving the livelihood of farmers in the state. However, the impact of these programmes was not visibly seen on the farmers as there are no much changes in their attitude, knowledge, and output which translate to low income and poverty (FAO,2023). This is likely due to the problems of wrong timing of agricultural programmes, poor presentation of programmes by unqualified presenters, interpretation of scientific jargon to local languages

Despite the fact that many studies were carried out on the utilisation of radio as a source of and mean of disseminating agricultural information (Adejo *et al*. 2016, Mtega, 2018, Adikwu,2022), adoption of agricultural technologies from agricultural programmes on the radio (Njoku and Ugboaje, 2019;Maurice *et al*. 2019; Abdulaziz and Ibrahim 2024) not much has been done to assess farmers' knowledge acquisition from listening to agricultural technologies broadcasted on the Nasarawa Broadcasting Service radio in Nasarawa State recently. It is against this backdrop, that this study was undertaken to fill in the gap.

Objectives of the Study

The broad objective of this study was to assess the farmers' knowledge acquisition of agricultural technologies broadcast on Nasarawa Broadcasting Service radio in Nasarawa State., Nigeria. Specifically, the objectives were to:

i. describe the socio-economic characteristics of the target audience;
ii. identify agricultural programmes aired on Nasarawa Broadcasting Radio
iii. ascertain the relevance of radio agricultural programmes on agricultural information needs of the farmers;
iv. determine agricultural knowledge gained through the radio agricultural programmes of Nasarawa Broadcasting Service;
v. determine the level of adoption of recommended agricultural practices aired by Nasarawa Broadcasting Service;

METHODOLOGY

The study was conducted in Nasarawa State, which is situated in the North-Central region of Nigeria. Geographically, the state lies between latitudes 7° and 9°N and longitudes 7° and 9°E. It shares boundaries with Kaduna State to the north, the Federal Capital Territory (FCT) to the west, Benue and Kogi States to the south, and Plateau and Taraba States to the east. Nasarawa State is located within the Southern Guinea Savanna ecological zone and covers a total land area of approximately 28,682 square kilometres, with a population of 1,869,377 as reported by the National Population Commission (2006).

It consists of thirteen Local Government Areas (LGAs). The state has 23 major ethnic groups to incude; Kanuri, Alago, Eggon. Migili, Jukun, Agatu, Tivs, Rindre, Kantana, Mada, Gwandara, Afo, Hausa Fulani, Gbagyi, Gade, Egbira-kwato and Yeskwa. Others include Yorubas and Igbos.

Farming is the predominant occupation of the inhabitants of the state. Major Agricultural crops produced include; maize, rice, yam, cassava, millet, sorghum, beniseed, melon, ground nut and tree crops such as oranges, cashew and mangoes. Livestock reared includes cattle, sheep, goat, and poultry. (Nasarawa State Government, 2020). The State comprises three distinct agricultural zones: Southern, Central and Western zones.

For this study, the population encompassed all the crop farmers in Nasarawa State, Nigeria. A multi-stage sampling technique was employed in the selection of respondents from the population, which form the sample. Nasarawa State is divided into three agricultural zones; Southern, Central and Western zones. Southern zone has 5 local governments; Central zone is made up of 3 local governments and Western zone comprises of 5 local governments. The first stage involved a proportionate and simple random selection of five local government from the three agricultural zones; two selected from southern zone, one from central zone and two from Western zone. The local governments selected were; Awe and Lafia local governments from Southern zone, Akwanga local government from Central zone and Nasarawa and Toto Local Government Areas from Western zone.

The second stage involved the purposive selection of three communities from each local government previously selected to make up 15 communities. These communities were selected based on high receptivity of radio signal of Nasarawa Broadcasting Service and relatively high rate of agricultural activities. Wakwa, Akurba and Shabu-Kwandare were selected from Lafia; Azara, Kanje and Jangwa from Awe; Andaha, Gudi and Rinze from Akwanga; Laminga, Ara and Akum from Nasarawa; while Umaisha, Gadabuke and Karmo were selected from Toto Local Government.

The final stage involved the selection of the respondents from the communities. A simple random procedure was used, where the sampling frame was obtained from list of registered farmers from Nasarawa Agricultural Development Programme. Random selection of 6% from the frame was used to select a sample size for the study. Data were collected with aid of a questionnaire and were analysed using simple descriptive statistics.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of Respondents

The table 1 presents a detailed summary of the socio-economic characteristics of respondents in the study area. The table indicate that the majority of the respondents (43.57%) fell within the age range of 31-40 years. 23.97% were within 21-30 years, 21.53% above 50 years, while 11.96.% were 20 year or less. The average age of the farmers was 33.4 years. This shows that the farmers are young, active and strong enough to participate in agricultural activities. This may be due to favourable agro-climatic conditions of the area and the need to ensure there is enough food in their homes and income generation. Farmers at this age group tend to develop more interest in sourcing agricultural information and more responsive to new ideas and practices.

Distribution based on sex of the respondents shows that majority (86.10%) of them were male, while 13.90% were females. This show that there are more male in farming activities in the study area. This may be attributed to the 'purdah' seclusion of women from outdoor activities in Muslims dominated areas, gender division of labour or the hardship and stress associated with farming. Orifah, *et. al.* (2025) found that majority of farmers in Jigawa State who utilized radios as a source of information were male.

Result of analysis of marital status show that 50.71% of the respondents were married, 45.93% were single, 2.87% were widowed and less than 1% (0.48%) was divorced. This trend may be influenced by dominant religious and socio-cultural practices in the area, which place a high

value on marriage as a cornerstone of social and moral life. It also shows that majority of the farmers were settled farmers who would most likely be serious with their farm work. This corresponds with the findings of Tafida and Sabiu*,* (2021), who found a high percentage of farmers in Kano State, Nigeria, were married.

An analysis of educational qualifications of the respondents indicated that the majority (57.9%) had tertiary education, 27.8% had secondary education, and 5.70% had primary education, while 8.60% had no formal education. The findings observed that high proportion of the respondents were educated. This suggests a favourable condition that may facilitate the adoption of improved agricultural technologies. This is consistent with the findings of Adikwu (2022), who reported that most yam farmers in Benue State who accessed information through the *Tom Sule* agricultural programme possessed some level of formal education. Education plays a great role in understanding and comprehending messages from the radio.

The table 1 also shows that 40.20% of the respondents had household size of 11 -15 people, 21.10% had more than 20 people, 6-10 people constituted 14.80% of the respondents, 13.90% had no more than 5 people while 10.0% had between 16-20 people. This shows that majority of the farmers had considerable large family size. The tendency towards large household sizes may stem from both cultural norms favouring polygamy and the practical need for family labour in subsistence and small- scale farming. Household size in traditional agriculture determines the availability of labour and level of production. This finding agrees with Tafida and Sabiu*.,* (2021) who reported that farmers in Kano state have large family size.

Based on their income, majority (39.20%) earned between ₦100,001- ₦200,000, 36.80% earned not more than ₦100,000, 11% earned ₦200,001-300,000, 6.20% earned between ₦400,001-₦500,000, 4.3% earned above ₦500,000 while 2.40% earned between ₦300,001- ₦400,000 annually. This implies that majority of the farmers do not earn much. Such income can discourage the farmers from purchasing and using radio. With large family size to take care of, coupled with other responsibilities, farmers may not consider buying radio as a priority. This is in line with the findings of Anonguku *et al.* (2016) where he revealed that most of the farmers in rural Benue State are of the low-income group.

The farming experience of the respondents highlights that 50.70% had between 11-20 years of farming experience,34.40% had no more than 10 years farming experience, 14.8% had more than years. The mean years were 14.51, this shows that the respondents are experienced farmers. The farming experienced showed most of the farmers had farmed for a reasonable number of years as would enable them to be abreast with the use of radio as a source of agricultural information hence sustainability in agriculture. Farming experience of farmers to a large extent affects their managerial know-how, as well as the use of various technologies disseminated through the radio. Yakubu, *et al.* (2019) in their study of farmers perceived effectiveness of radio agricultural programmes in Jibia, Katsina State, Nigeria reported that farmers who utilises information from the radio are highly experienced.

The result further showed that majority (83.70%) had farm size of between 0-5 hectares while 5.3 % had between 5.1 - 10 hectares while 11. 0% had farm size of more than 10 hectares. This reflects a predominance of small- scale farming among the respondents. This finding corroborates that of Maurice *et al.* (2019) who found that majority of farmers in Gerei Local Government owned farm size of less than 5 hectares.

The result also revealed that 68.40% of the farmers belonged to one cooperative group or the other while 31.60% did not. Membership of social organizations serves as an avenue for mobilising farmers for collective action. It can also serve as an avenue for receiving new information, facilitates bulk purchases, leading to reduced production costs and improved access to innovation and opportunities provided by government agencies, input dealers and credit

institutions (Yahaya *et al*. 2019). Ahmed and Yusuf (2022)) reported the majority of farmers in Kaduna and Zamfara States, Nigeria who listens to agricultural programmes on the radio belong to one cooperative group or another.

The study further revealed that 95.70% of the farmer owned a radio set while 4.30% did not. This implies that the farmers have accessed to radio agricultural programmes. Ownership of radio set is an important factor in determining farmers' exposure to radio agricultural programmes. This aligned with the findings of Lamino, *et al.* (2016), who reported that 89% of the farmers in Lafia Local Government Area of Nasarawa state owned a radio set.

Table 1: Socio-Economic Characteristics of Farmers

Socio-Economic Characteristics	Frequency	Percentage (%)	Mean
Age (Years)			
≤20	25	12.00	
21-30	48	22.90	
31-40	91	43.50	33.38
>50	45	21.50	
SEX			
Male	180	86.10	
Female	29	13.90	
Marital Status			
Single	96	45.93	
Married	106	50.71	
Divorced	01	0.48	
Widow/Widower	06	2.87	
Level of Education			
Tertiary Education	121	57.9	
Secondary Education	58	27.8	
Primary Education	12	5.70	
No Formal Education	18	8.60	
Household Size			
≤5	29	13.90	
6-10	31	14.80	
11-15	84	40.20	11.17
16-20	21	10.00	
>20	44	21.10	
Farm Income (₦)			
≤100,000	77	36.80	
100,001-200,000	82	39.20	
200,001-300,000	23	11.00	
300,001-400,000	05	2.40	251,994.86
400,001-500,000	13	6.20	
>500,000	09	4.30	
Farming Experience			
0-10	72	34.4	
11-20	106	50.70	14.51
>20	31	14.8	

Farm Size (ha)			
0-5	175	83.70	
5.1-10	11	5.30	
>10	23	11.0	2.96
Belonging to Cooperative			
Yes	143	68.4.	
No	66	31.6.	
Ownership of Radio			
Yes	200	95.70	
No	09	4.30	

Source: Field survey. 2024

Agricultural Programmes Broadcast on Nasarawa Broadcasting Radio

Table 2, below shows the agricultural progammes aired on Nasarawa Broadcasting Radio. The study identified two agricultural programmes; *Mu koma Gona (Let's go back to farming)* and *Noman Shinkafa Jari* (Rice farming: a profitable venture). All programmes were broadcast in Hausa language as it widely spoken among all the ethnic groups in the state. The progammes covered various aspects of agriculture including crop production, post-harvest, processing storage, pest and disease control weather forecast, climate change mitigation practices, value chains, among others. Both programmes are aired weekly and are designed to combine information sharing with practical guidance, ensuring that farmers receive relevant, easy-to-understand messages that support improved agricultural performance.

Table 2: Agricultural Programmes on NBS Radio

Programme	Language	Day	Air Time	Duration	Focus Area
Mu Koma Gona	Hausa	Tuesday Monday	2:00pm 1:30pm	30min	All aspect
Noma shinkafa Jari	Hausa	Saturday Thursday	5-6pm 11-12 pm	1 hour	Rice farming

Source: Programme Department, NBS,2024

Relevance of Radio Agricultural Programme to Information Needs of Farmers

Analysis on the relevance of agricultural technologies aired by Nasarawa Broadcasting Service is presented in table 3. The result indicate that the relevant agricultural technologies disseminated to farmers include: timely planting of crops ($\bar{x}$ =4.80), best practices in rice production ($\bar{x}$ =4.75), reputable source of farm inputs ($\bar{x}$ =4.55), proper storage of methods of farm produce (m=4.43), maize production and its value chain (4.40), climate change mitigation/adaptation ($\bar{x}$ =4.09), safe use of agrochemicals ($\bar{x}$ =4.05), urea second application ($\bar{x}$ =3.68), use of improved seed ($\bar{x}$ = 3.68), control/prevention of crop pests and diseases ($\bar{x}$ =3.49), organic manuring (m=3.34). However, technologies such as irrigation / dry season farming practices, ($\bar{x}$ =1.69), utilising and processing of orange - fleshed sweet potatoes ($\bar{x}$ = 1,06) were considered not relevant by the farmers. This could be attributed to non-awareness of the technologies, technicalities involved in the technologies among others.

This result is imperative, because it shows that the information aired on the radio is helpfull to the farmers, and impacts their agricultural production. This result is in agreement with that of Danjuma *et al.* (2021) and Omoghenee *et al.* (2018), in their studies found that improved agricultural practices broadcast on the radio were relevant to the audience information needs.

Table 3: Relevance of the agricultural technologies broadcast on Nasarawa Broadcasting Radio to farmers information needs/ farming activities.

Variable	Mean	Rank
Timely planting of crops	4.80*	1st
Best practices in rice production	4.75*	2nd
Reputable farm input sources	4.55*	3rd
Proper storage methods of farm produce	4.43*	4th
Maize production and its value chain	4.40*	5th
Climate change mitigation practices and adaptation	4.09*	6th
Safe use of agro-chemicals	4.05*	7th
Urea second application	3.68*	8th
Use of improved seeds	3.63*	9th
Control/prevention of crops disease and pest	3.49*	10h
Organic manuring	3.34*	11th
Post-harvest handling practice and processing of sesame	2.40	12th
Irrigation/dry season farming practices	1.69	13th
Utilising and processing orange-fleshed sweet potatoes	1.06	14th

*Source: Field survey,2024. Note: * = perceived as relevance*

Agricultural Knowledge Gained through Radio Agricultural Programmes

Result on knowledge gain through agricultural programme is shown in Table 4. It was found that respondents had gained new knowledge on the use of improved seed (81.2%), proper storage of farm inputs (77.2%), best practices in rice production (73.3%), safe use of agrochemical (72.8%), climate change mitigation/ adaptation practices (71.3%), timely planting of crops (69.3%), prevention /control of crop pests and diseases (69.35%), urea second application (67.3%), reputable source of inputs (58.1%),organic manuring (58.45%), irrigation/ dry season farming technologies (38.3%), post-harvest handling techniques of sesame (37.1%) and processing and utilisation of orange- fleshed sweet potatoes (27.8%). Only few respondents had gained new knowledge on processing and utilising of orange- fleshed sweet potatoes, post-harvest handling practices of sesame seeds and irrigation and dry season farming technologies. This could be attributed to the fact the technologies were not properly explained by the presenters, poor method of presentation or lack of interest by the respondents.

The finding indicates that large proportion of the farmers gain new knowledge from the radio agricultural programme. This finding is in line with the findings of Danjuma *et al.* (2021) who reported that farmers in Benue State, Nigeria gained knowledge on various agricultural practices aired on the radio agricultural programme *Tom sule.*

Table 4: Knowledge Gain by Respondents through Radio Agricultural Programmes

Variable	Frequency	Percentage
Timely planting of crops	140	69.3
Best practices in rice production	148	73.3
Reputable farm input sources	118	58.4
Proper storage methods of farm produce	156	77.2
Maize production and its value chain	106	52.5
Climate change mitigation practices and adaptation	144	71.3
Safe use of agro-chemicals	147	71.3
Urea second application	140	69.3
Use of improved seeds	160	81.2
Control/prevention of crops disease and pest	140	69.3
Organic manuring	118	58,4
Post-harvest handling practice and processing of sesame	75	37.1
Irrigation/dry season farming practices	80	38.3
Utilising and processing orange-fleshed sweet potatoes	58	27.8

Source: Field survey, 2024

Adoption of Agricultural Practices aired on the Nasarawa Broadcasting Radio station

The distribution of farmers by level of adoption of agricultural practices transmitted on Nasarawa Broadcasting Radio is shown in Table 5. The result revealed that 14 improved agricultural practices were disseminated to the farmer via radio agricultural programmes. The radio agricultural programmes had enhanced the adoption of all the practices by the farmers in varying degrees. Technologies such as use of improved seeds (95.7%) had the highest adoption while processing and utilising orange fleshed- sweet potatoes had lowest adoption (24.9%).

The reasons for their low adoption could be that the technologies were not properly explained difficulties in understanding and use of the technologies, farmers' unwillingness to take risk on some of the new practices among others. Njoku and Ugboaja (2019) reported that farmers in Imo State Nigeria had adopted all the fourteen agricultural practices disseminated on the 'Radio- Farmer' agricultural programme.

Table 5 Adoption of Agricultural Technologies Aired by Nasarawa Broadcasting Radio

Variable	Frequency	Percentage %
Climate change mitigation practices	187	89.5
Best practices in rice production	195	93.3
Safe use/handling of agro-chemicals	190	91.0
Use of improved seeds varieties	200	95.7
Urea second application	182	87.1
Control/prevention of crops disease and pests	174	83.3
Proper storage methods of farm produce	198	94.7
Organic manuring	166	79.4
Maize production and its value chain	184	88.0
Timely planting of crops	188	89.9
Reputable sources of seeds/inputs	133	48.0
Poastharvest handling practices of sesame	60	28.7
Irrigation/ dry season farming technologies	70	33.5
Processing and utilisation of orange fleshed- sweet potatoes	52	24.9

Source: Field survey, 2024. multiple responses were allowed

CONCLUSION

Based on the findings of this study, it was concluded that most of the farmers were male with an average age of 33 years, married, educated, having a household size of 11 people with mean farming experience of 14.5 years. Two agricultural programmes were identified, which are presented weekly on the radio. The technologies aired were highly relevant to the farmers' information needs / practices and had made impact as they gained new knowledge on the various technologies. More so, the farmers had adopted most of the technologies aired on the radio.

RECOMMENDATIONS

The findings of this study, inform the following recommendations:

Agricultural Programmes of Nasarawa Broadcasting Radio should be sustained and strengthened. The government, agencies, developing partners and the radio station should continue to support and fund the radio agricultural programmes recognising their importance in reaching a wide range of farmers with timely and relevant information.

Radio station should do more on technologies with low adoption. This could be through exploring other means of explaining the technologies better or changing the format of presenting them to the farmers among others.

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