



ASSESSMENT OF THE EFFECTIVENESS OF SOURCES OF INFORMATION FOR ADOPTION OF IMPROVED COWPEA TECHNOLOGIES IN GOMBE STATE, NIGERIA

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ABSTRACT

The research analysed the efficacy of information sources used by cowpea farmers in adopting improved cowpea technologies in Gombe State, Nigeria. The study applied a multistage sampling procedure in selecting 606 respondents. Data were elicited via structured questionnaires analysed using descriptive statistics, and means score. The result shows that, educated married males dominated the cowpea production enterprise, with a mean farming experience of 13 years, without belonging to cooperative society, nevertheless, they had access to informal sources on credit, with extension contact. Cowpea farmers agreed that positive attitudes such as perceiving the technologies as beneficial, reliable, and compatible with their farming systems, increases their adoption rate. Fellow farmers and friends, and radio 3.49 and 3.25 weighted mean respectively were the effective sources of information, while print media weighted mean of 2.04 was the least source of information to the cowpea farmers. Therefore, information on cowpea production should be made readily available to the farmers via dependable and reliable sources such as (extension agents, radio, friends and other farmers, inputs suppliers, community leaders, and NGOs) to facilitate adoption of the technologies. It is recommended that; farmers should be encouraged to belong to cooperative organizations to pool their productive resources, increase their access to agricultural loans and inputs; Farmers should be encouraged to utilize multiple sources of information to find out more about improved cowpea technologies. They will be able to access varieties of information as a result of this, which will help them boost their cowpea production and profits.

Keywords: Adoption, Cowpea, Information, Technologies

INTRODUCTION

Cowpea is cultivated across the world every year on an estimated land area of 14.5 million ha with a total annual production of 6.2 million metric tons. Over the last three decades, global cowpea production grew at an average rate of 5%, with 3.5% annual growth in area and

1.5% growth in yield, and the area expansion accounting for 70% of the total growth during this period (Boukar *et al.*, 2018). About 84% of the world's production area and 83.4% of the world's overall production of cowpea is from Africa, with over 80% of African production in West Africa (Kebede, 2020).

Adoption is defined by widespread usage of the idea and most significantly its continuous use (Sennuga and Fadiji, 2020). The term "improved agricultural technologies" (IATs) refers to a set of guidelines for on-farm production and post-production procedures that are intended to produce safe and wholesome agricultural products, including non-food items, while also taking economic, social, and environmental sustainability into account (Sennuga, *et al.*, 2020). It enables farmers to learn the existence as well as the effective use of technology and this facilitates its adoption. Farmers will only adopt the technology they are aware of or have heard about it. Access to information reduces the uncertainty about a technology's performance hence may change individual's assessment from purely subjective to objective over time (Ajayi *et al.*, 2017). It is therefore important to ensure the information is reliable, consistent and accurate. Access to extension services helps to spread information about new agricultural technology leading to adoption (Adio *et al.*, 2016). Farmers are usually informed about the existence as well as the effective use and benefit of new technology through extension agents. Extension agent acts as a link between the innovators (Researchers) of the technology and users of that technology. Consequently, rural farmers play prominent role in dissemination of and utilization of extension information on new technology to a large heterogeneous population of farmers (Ataei *et al.*, 2019). Zhai *et al.* (2020) opined that farmers' sources of information fundamentally shape the kind of decision they make. Access to adequate information is very vital to increased agricultural productivity.

In order to improve agricultural development in Nigeria, farmers' adoption of agricultural technologies is essential. This can be accomplished effectively through adequate information delivery, via diverse channels. Cowpea yield, however, has decreased as a result of issues like absolute farming methods, high biotic pressures particularly from insects and other pests that frequently affect plants throughout their life cycles as well as stored seeds, inadequate planting dates, subpart weed control, mixed cropping, and low soil fertility (Harrison and Oguntunde, 2021). The research to increase production focused on improved methods for producing cowpea; However, the successful adoption and implementation of these technologies heavily rely on effective information dissemination to the target farmers. There remains uncertainty about which information channels or sources are most influential in encouraging farmers to adopt these improved cowpea production technologies. Therefore, evaluation of the sources of information for the expedient adoption of new technology is essential to ascertain the dwindling productivity of cowpea in Gombe State (GSADP, 2021), which is one of the major producers of Cowpea in the country. Therefore, the study assessed the effectiveness of sources of information used by cowpea farmers in attaining adoption levels of improved technologies for increased productivity with the specific objectives;

- i. describe the socio-economic characteristics of the respondents in the study area;
- ii. describe the effectiveness of various sources of information on cowpea production technologies; and
- iii assess farmers' attitudes toward the adoption of cowpea technologies.

METHODOLOGY

The study was conducted in Gombe State. A multi-stage sampling procedure was used in selecting the respondents for this study. Multi-stage sampling procedure was used in selecting the respondents for this study. In the first stage, eight of the eleven (11) Local Government Areas (LGAs), were purposively selected and used due to the high concentration of cowpea farmers and high production of cowpea. In the second stage, four farming

communities were purposively selected from eight Local Government Areas to give a total of 32 communities as presented in Table 1. In the third stage, a list of 12,282 (sample frame) cowpea farmers was obtained from the extension officers in the selected LGAs. Some studies (Yohanna *et al.*, (2021) and Madugu, 2023) used different percentages based on convenience to arrive at sample size. This study, therefore, used 5% to arrive at a sample size of 606 cowpea farmers. This is because the sample frame size is large, thus a selection of a percentage below or above 5% will not give the required sample size.

Data for the study were collected from primary sources (Structured questionnaire). Descriptive statistics such as simple percentage, frequency distribution and means score were used to analyze the data. On effective sources of information data was collected using a likert scale with 5 points categorizations (Very effective = 5, effective = 4, moderately effective = 3, fairly effective = 2, not effective =1). In calculating the means score, the sum of the points was obtained to be 15, the sum was further divided to obtain 3 which served as the mean score. Any source of information whose weighted average index fall below the mean score is considered not effective while all weighted average index above the mean score is considered effective source of information used by the farmers. Attitudes of farmers on the adoption of cowpea technologies, data was collected using a 5-point Likert scale of Strongly agree = 5, agree = 4, disagree = 3, strongly disagree = 2, and undecided = 1. To calculate a mean score, the values of the scale (1+2+3+4+5) were summed up to obtain 15. The sum was further divided by 5 to get 3.0 which is the mean. Any perception with a mean score of 3.0 and above depicts the agreement with the attitude and any indicator with a mean less than 3.0 was regarded as being in disagreement with the farmers' attitude.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The result in Table 1 revealed that male respondents made up 81.8 % of the sample. This indicates that men dominated the State's cowpea farming, this could be as a result of cultural characteristic which permits the male counterpart to participate in the majority of activities, while the female is mostly responsible for maintaining the family. Furthermore, the lack of land availability may have disenfranchised most females who could have been ready to grow cowpea owing to the land tenure system, which forbids females from inheriting land. The presence of more men in the enterprise has suggests that men can easily sought information concerning their farming than their female counterparts. Males had greater mobility and the freedom to attend various avenues of sourcing for information such as seminars, meetings, and training sessions without any hindrances unlike the female who are mostly bound by cultural and religious whips. This result is consistent with the findings of Harrison and Oguntunde (2021), who observed that there were more male farmers than female farmers in their study area. These similarities could be attributed to the cultural attributes and land tenure system practiced in the area.

According to the result, 66.5 % of respondents were married. Marriage results in additional responsibility, which accounts for their intense participation in farming, this indicates that the respondents were responsible enough to engage in any activity of their choice. This result was similar with that of Ogunmefun and Achike (2015) in their study socio-economic characteristics of rural farmers and problems associated with the use of informal insurance measures in Odogbolu local government area, Ogun State Nigeria, revealed that majority of the respondents were married. The result in table 1 further showed that farming is the primary occupation of the majority (64.8%) of respondents. This could be because rural areas have far more land than urban areas. Since they make their living from farming, they will always go for information that will help them increase more. Also 22% of the respondents were public servants, indicating that they perform a second job in agriculture to support their families

because, the respondents were able to combine public services and farming in order to augment their income. This result was similar to Nwaiwu (2015) assertion that majority of arable crop farmers had farming as their major profession. Ogunmefun and Achike (2015) in their study socio-economic characteristics of rural farmers and problems associated with the use of informal insurance measures in Odogbolu local government area, Ogun State Nigeria, revealed that majority of rural farmers depend on farming only, and a few with other occupations.

Farmers level of dedication to agriculture is usually indicated by farming experience. Long experience according to Sani *et al.* (2014) is an advantage for increasing farm productivity. According to the findings, the majority of farmers (69.1%) have less than 16 years of experience in cowpea farming with a mean of 11 years. This was as a result of the respondents' youthful age, as experience often increases with age. Since the majority of the respondents had longer farming experience, this implies that cowpea farmers in the study area can easily identify improved technologies that can boost their yield and increase income. This was in conformity with the study by Bashir *et al.* (2018) where they reported that majority of the respondents had 6-15 years of farming experience in cowpea production in Taraba State Nigeria.

The majority (53%) of the sample respondents, did not belong to any cooperative society anywhere. This suggests that farmers would have benefited from participation in cooperatives, which would've significantly increase their sources of information and experience eventually, expand their knowledge on improved cowpea technologies. This result was in contrast to Nwaiwu (2015) that 80.7% of farmers in southeast Nigeria belonged to cooperative groups. The results further revealed that 54% of the respondents in the study area had received credit for growing cowpea; this credit was acquired through informal (families, friends, neighbours and colleagues) sources rather than through financial institutions. This was similar to with the findings of Onuwa *et al.* (2022), in a study technical efficiency in cowpea production in Kanke, Plateau State, revealed that majority of cowpea farmers had access to credit.

As a result of the favorable effects of extension contact on agricultural productivity, 89.6% of respondents had extension contact with extension personnel. Extension agents act as a bridge for information between farmers and research institutions to introduce innovation. This, however, was in contrast to that of Bashir *et al.* (2018), who found that all of their respondents had no contact with the extension agents but instead adopted the technologies on their own or with assistance from fellow farmers. According to (Takahashi *et al.*, 2020), lack of farmer interaction with extension agents undermines the theoretical function that these organizations are meant to play in the diffusion and adoption of technology.

Table 1: Socio-economic Characteristics of Cowpea Farmers (n=606)

Variables	Frequency (F)	Percentage (%)	Mean (\bar{x})
Sex			
Female	114	18.8	
Male	492	81.2	
Marital Status			
Single	185	30.5	
Married	396	66.3	
Widowed	16	2.6	
Divorced	9	1.5	
Main Occupation			
Farming	387	63.9	
Civil servant	132	21.8	
Trading	57	9.3	
Others	30	5.0	
Experience			
1-8	254	41.9	11
9-16	174	28.7	
17-24	95	15.7	
25-32	60	9.9	
33-40	19	3.1	
>40	3	.5	
Farm size			
<= 1Ha	113	18.6	
1-3ha	260	42.9	
4-6ha	146	24.1	
=>7ha	87	14.4	
Membership in Cooperative Society			
No	321	53.0	
Yes	285	47.0	
Credit			
No	276	45.5	
Yes	330	54.5	
Extension contacts			
No	77	12.7	
Yes	529	87.3	
Total	606	100	

Source: Field Survey, 2022

Effectiveness of Various Sources of Information on Improved Cowpea

The sources of information used by the respondents was presented on Table 2. Any source of information with a weighted mean above 3 is consider to be effective and reliable, while source of information with recorded weighted mean below 3, which is consider to be ineffective sources.

Table 2: Cowpea Farmers' Sources of Information.

Source of information	VE (5)	E(4)	ME (3)	FE (2)	NE(1)	WI	WAI	Perception
Friends / Fellow Farmers	152	182	129	95	48	2113	3.49	Effective
Radio	84	228	118	107	69	1969	3.25	Effective
Extension workers	59	209	191	93	54	1944	3.21	Effective
NGOs	96	199	132	92	87	1943	3.10	Effective
Universities/Research institutes	107	189	118	100	92	1937	3.20	Effective
Telephone (GSM)	111	177	118	101	99	1918	3.17	Effective
Input suppliers	121	159	127	101	98	1922	3.18	Effective
Community leaders	109	129	156	115	97	1856	3.06	Effective
Television	83	187	117	107	112	1840	3.04	Effective
Internet	105	48	21	41	391	1253	2.06	Not Effective
Print Media	21	54	74	240	217	1240	2.04	Not Effective

Very Effective = VE; Effective = E; Moderately Effective = MD, Fairly Effective = FE; Not Effective = NE

Source: Field Survey, 2022

It is essential to have effective communication channels for disseminating information on improved cowpea technologies. According to the research, friends and fellow farmers were the most effective source of information on improved cowpea technologies with a weighted mean of 3.49 (Table 2). The results concur with Abubakar and Magaji's result (2019), which examined the information sources utilized by small farmers in Katsina State, Nigeria, where they found that the majority of respondents agreed that friends and family are used as information sources. radio with the weighted mean of 3.25, was the least expensive means of reaching farmers and can reach a larger number of farmers at once, is another resource that is seen the most effective by farmers as a source of knowledge about improved cowpea production technology. This finding is consistent with that of Adetimehin *et al.* (2018), who found that information providers were the respondents' main information sources and that radio, friends, and family were the most efficient information sources. With a weighted mean of 3.21, extension staff were another useful resource for learning about improved cowpea production technologies. According to Yaseen *et al.* (2016) assessment of farmers' information sources in rural Pakistan, extension agents were not among their most effective sources of information. Farmers' main knowledge sources included their friends, family, and neighbors. With a mean score of 2.04, print media does not effectively teach farmers in the study area about cowpea production technology. Even though the majority of the farmers in the study area have completed some form of formal education, reading is not a culture in rural areas. The findings of Duhan and Singh (2017), who conducted research on the sources of agricultural information used by farmers in Haryana, India, are at odds with the findings of this study. The respondents' main source of information was the newspaper. According to the study, telephone (GSM) is also effective source of information on improved cowpea technologies with a weighted mean of 3.17 (Table 2). This result was similar to the survey conducted by Folitse *et al.* (2019) in Ghana's cocoa-growing areas (Western, Asanti, Brong Ahafo, and Eastern regions), it was discovered that majority of farmers owned mobile phones, which facilitated better communication between the farmers and extension workers. Inputs suppliers were also effective source of information on improved cowpea technologies with a weighted mean of 3.18. These sources are used by farmers and other agricultural stakeholders to learn about the

advantages, cultivation technologies, pest control methods, and other technical aspect of implementing improved cowpea technologies. The adoption of improved cowpea technologies depends critically on farmer-to-farmer knowledge sharing. Adoption rates are positively impacted when farmers who have adopted improved cowpea technologies tell their colleagues about their successes and results.

Farmers Attitude towards Adoption of Improved Cowpea technologies

These study findings give a broadened perspective of improved cowpea technologies adoption among the respondents. The result on Table 3 shows the attitudinal statements, the result revealed that cowpea farmers disagree with the statement experienced challenges in accessing improved inputs when needed with a weighted mean of 2.7. this implies that respondents had access to improved inputs such as improved seeds, fertilizer, pesticides and herbicides. Cowpea farmers agreed that extension contacts influence their adoption of Cowpea with a weighted mean of 3.0. Cowpea farmers in the study area relied on agricultural extension services for agricultural information, extension agents educate cowpea farmers on improved technologies, which in return increase cowpea production. Cowpea farmers agreed that the use of ICPTs makes them popular among their peers with a weighted mean of 3.8. the respondents also agreed that improved cowpea production technologies increase their cowpea output. This implies that the appropriate use of improved seeds, fertilizer application, planting date, planting space, pesticides and herbicides, increase their cowpea production. Furthermore, the respondents agreed with the statement that, the use of improved cowpea technologies improved their social status in the communities with a weighted mean of 3.0. They are always respected in the community because they adopt new technologies, and many farmers come and asked more questions on the improved cowpea technologies, at the end they also adopt. Respondents further revealed that farmer friends who adopted improved cowpea influenced their attitudes positively on adoption of improved cowpea technologies with a weighted mean of 3.0. The respondents agreed with the attitudinal statements that cost of improved cowpea production technologies is expensive with the mean of 3.06, this affect their adoption of improved technologies negatively as many perceived recommended inputs (fertilizer, improved varieties, herbicides and pesticides) expensive. Farmers' attitudes toward improved cowpea technologies directly influence their adoption rates.

Table 3: Farmers Attitude towards Adoption of Improved Cowpea Technologies

Attitudinal Statements	S A	(%)	A	(%)	U	(%)	D	(%)	SD	(%)	WI	WAI	Attitude
Experienced challenge in accessing improved inputs	36	5.9	9	9	5	7.4	272	9	4	9	161	2.7	Disagreement
Extension contacts influence adoption	11	19.	11	19.	4			49.	2		182		Agreement
The use of ICPTs makes me popular among my peers	5	0	9	6	9	8.1	299	3	4	4.0	0	3.0	Agreement
ICPTs increase my outputs	11	19.	13	22.	6	10.		40.	3		186	3.0	Agreement
Received personal satisfaction from applying ICPTs	8	5	7	6	6	9	248	9	7	6.1	9	8	Agreement
The cost of ICPTs is expensive	10	17.	16	26.	5			31.	9	15.	181		Agreement
Use of ICPTs improved my social status	5	3	2	7	6	9.2	191	5	2	2	5	3.0	Agreement
My farmer friends who adopted ICPTs influenced me to do the same	13	21.	12	21.	5			32.	9	16.	182	3.0	Agreement
	1	6	9	3	7	9.4	194	0	5	7	5	1	Agreement
	12	20.	14	23.	7	12.		28.	8	14.	185	3.0	Agreement
	2	1	5	9	8	9	172	4	9	7	7	6	Agreement
	12	20.	14	23.	8	13.		27.	9	15.	185	3.0	Agreement
	2	1	1	3	4	9	165	2	4	5	0	5	Agreement
	98	16.	16	26.	9	15.		24.	9	16.	182	3.0	Agreement
		2	3	9	6	8	150	8	9	3	9	2	Agreement

Strongly agree (SA) = 5; Agree (A) = 4; Disagree (D) = 3; Strongly Disagree (SD) = 2; Undecided (U) = 1
 Weighted mean = WI, Weighted mean Index= WAI, Source: Field Survey, 2022

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This research assessed the information sources used by cowpea farmers in Gombe State of Nigeria. The respondents were mostly male, who are married, with average farming experience of 13 years who predominantly engage in farming activities as their main occupation. Furthermore, the study revealed majority of the respondents do not belong to any cooperative society, had access to informal sources of credit. Extension contact was high in the study area as 87.3% of the respondents experienced visitation by extension agents even though it was not as frequent as it should be. Fellow farmers and friends, and radio were the most effective sources of information (with the weighted mean of 3.49 and 3.25 respectively) while print media was the least source of information to the cowpea farmers on cowpea production technologies. The research therefore concluded that, information on cowpea production should be readily available to the farmers via dependable and reliable sources to facilitate adoption of the technologies. The study hereby recommended that; Extension agents should increase frequency of contacts with farmers so as to disseminate technical information and increase knowledge needed for adoption of technologies; the Government and other stakeholders should support extension agents in their efforts to regularly provide training for farmers on improved cowpea technologies that can help maintain the crop's high production; farmers should be encouraged to establish cooperative organizations to pool their productive resources, increase their access to agricultural loans, and increase their access to agricultural inputs; Farmers should be encourage to utilize a variety of information sources (extension agents, radio, friends and other farmers, inputs suppliers, community leaders, and NGOs) to find out more about improved cowpea technologies. They will be able to access varieties of information as a result of this, which will help them boost their cowpea production and profits.

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