

Farmers Participation in Community-Based Extension Organizations: A Paradigm Shift to Rural Poverty Alleviation in Kaduna State, Nigeria

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DOI: <https://doi.org/10.62154/qhhq1e88>

Abstract

This study investigated the involvement of farmers in community-based extension organizations as a new approach to alleviating rural poverty in Kaduna State, Nigeria. The research included 437 respondents from 18 communities across 6 local government areas, randomly selected from two agricultural zones. Descriptive statistics were utilized to address the study's objectives, while inferential statistics, including multiple regression, t-tests, and binomial statistics, were employed for data analysis. Findings indicated that the respondents had an average residence duration of 14 years, an average age of 45 years, an average household size of 7 persons, average farm size of 3 hectares, and 11.7 average years of farming experience. A majority (81.5%) of the respondents exhibited a moderate level of participation in their community-based extension organizations, which led to a significant increase in farm income, averaging N92,907.18 after becoming members of CBEs. Respondents showed a favourable attitude (82%) to participation in the groups they belong with particular interest in the areas of: participation in the group has enhanced my farm output and participation in the group has improved my income, amongst other issues of consideration. Socio-economic characteristics that significantly affect farmers income are; participation score ($b = 0.029$; $t = 1.992$), length of community residence ($b = 0.078$; $t = 1.964$), age ($b = -0.029$; $t = -2.584$), educational status ($b = 0.125$; $t = 2.610$), household size ($b = 0.054$; $t = 1.979$), farm size ($b = 0.068$; $t = 3.184$) and farming experience ($b = 0.068$; $t = 1.999$). It was recommended that respondents' interest should be jacked up to reflect more interest in the groups they belong by improving on their level of participation.

Keywords: Farmers Participation, Community-Based Extension Organizations, Farmers Income, Poverty Alleviation, Agricultural Production, Farmers Attitude.

Introduction

Nigeria as a country, has done well and witnessed a steady increase in agricultural productivity. CBN (2012) emphasized that the Gross Domestic Product of the country to which agriculture contributed much, rose from 20.6% in 1980 to 41.5% in 2012. Despite the increase in production, demand of the citizenry is still higher due to steady population growth which rose from 68.45 million in 1980 to 145.03 million in 2010 and by estimation is now far approaching 200 million (Africlopedia, 2010). There exists a gap between domestic

supply and demand and the gap is not only wide but also in favour of demand. Confirming this, in recent time was the report of Umar et al. (2011) which expressed the imbalance in growth rate of the Nigeria population and food production growth rate which he said stood at 3.2% and 1.2% respectively.

In an attempt to create a balance between the population and food growth rate, Anyaoga and Anyaoga (2009) stated that the Federal government launched different agricultural programmes and policies that would help to boost agricultural production. Some of them are: Green Revolution Programme of 1980, Community-Based Agricultural and Rural Development Project (established 1995), Root and Tuber Expansion Programme (established 1997), Special Rice Programme (1998), etc. As lofty as these programmes and policies were, they have not been able to revamp the situation of ensuring food sufficiency, food security not to talk of alleviating the poverty status of the farmers (Idachaba, 2000). In further pursuing food availability and security led to the recent use of local or Community-Based Extension Organizations (CBEOs), otherwise also known as: Extension Farmers, Model Farmers, Agricultural Workers, Lead Farmers, Community Development Agents and Community Trainers. In this research, the generic term Community-Based Extension Organization (CBEOs) is used. Toyibo and Muili (2008) confirmed that the push for community-based extension organizations (CBEOs) is likely due to the government's failure to meet the needs of the people and solve their problems. They also noted that CBEOs tend to be more sustainable and "permanent" compared to groups formed under the influence of external forces.

Meanwhile, Sinkaiye (2005) pointed out that if quality of group impact is to be assured, members must do well to participate effectively in group's projects, attendance to meetings, and be committed to group's activities, among others factors. Chamala and Shingi (2006) emphasized that participation in community-based extension organizations (CBEOs) can enhance farm productivity and income, thereby reducing both absolute and relative poverty among members specifically, and the community at large. Mundi (2017) viewed poverty as a situation, which arises when a family output and income cannot secure some minimum standard of living. Mundi (2017) stated further that poverty can be categorized as either relative or absolute. Most of our farmers are poor and the scenario is not unconnected to farm production challenges faced by them which ordinarily can be solved through their participation in CBEOs (Faruk and Maharjan, 2022). Believing that farmers level of participation in CBEOs has a direct impact on farmers output and income level. It is against this background that the main concern of CBEOs in this regard, should be how to pull, remove or drive people (programme participants) away from poverty and that is where poverty alleviation comes in. Studies on farmers participation in various groups may have been carried out, but none seemed to have addressed their participation in relation to attitude of the farmers in the groups they belong and how it affects their poverty level. This study hopes to bridge this gap. The focus of this study on attitude of farmers participation in rural organizations like CBEOs have in one way or the other helped to alleviating the poverty status of the rural people. On a broad consideration, the study hopes

to assess farmers attitude on participation in rural organizations: A paradigm shift to rural poverty alleviation in Kaduna State, Nigeria.

Objectives of the study

On a specific note, the study aimed to:

- i. Examine the socio-economic characteristics of the respondents in Kaduna State, Nigeria
- ii. Determine the level of participation of farmers in CBEO activities
- iii. Compare the farm income levels of farmers before and after participating in CBEO activities and;
- iv. Assess the attitudes of farmers towards their participation in CBEOs.

Study hypotheses

The study's hypotheses, stated in their null forms, were as follows:

- i. There is no significant influence of respondents' socio-economic characteristics and participation in CBEO activities on farmers' income.
- ii. There is no significant difference in the farm income of farmers before and after joining CBEOs.
- iii. There is no significant difference in attitudes towards CBEO activities between participants and non-participants.

Methodology

Area of study

The study was conducted in Kaduna State, which was established on May 27, 1967. On geographical consideration, Kaduna State lies on Latitude 10.609319 and Longitude 7.429504 (Kaduna State Wikipedia, 2016). Kaduna State Wikipedia (2016) noted that the State occupies an area of 46,053Km², with 23 Local Government Areas (LGAs) and its capital seat being Kaduna City. with its capital city at Kaduna. Kaduna State has a land area of 46,053km² and respectively ranked 4th (amongst the other States of the Federation) and 9th position based on land area and number of LGAs. The National Population Commission projection of Kaduna State as at 2018 was 8,252,400 and this number made the State to attain 3rd rank in population size in Nigeria (NPC, 2018). The main stay of the people of Kaduna State is agriculture where about 80% of the people actively engaged in farming (crops and animals inclusive) (Kaduna State Wikipedia, 2016). The State has three agricultural zones and they include Kaduna North, Kaduna Central and Kaduna South (Report on Kaduna Climate Data, 2016). The Kaduna Climate Data Report (2016) indicated that the state is located in the tropical region, with an average annual temperature of 25.2°C and annual precipitation of 1211 mm. These climatic conditions enable the state to cultivate a wide variety of crops.

Sampling and sampling techniques

The study's population consisted of farmers participating in Community-Based Extension Organizations (CBEOs). The sample was selected using a multi-stage random sampling method. The process began with the purposive selection of Kaduna State for the study (stage one). In the second stage, two out of the three agricultural zones in the state (Kaduna Central and Kaduna South) were randomly chosen. In stage three, three Local Government Areas (LGAs) were randomly selected from each of these agricultural zones, resulting in a total of six LGAs used for the study. Stage four involved the random selection of three towns, thus making it a total of eighteen towns that were used. The zones, LGAs and randomly sampled towns in parentheses revealed that from Kaduna Central: it was Kaduna South LGA (Badiko, Barnawa and Makera towns were randomly selected), Kaduna North LGA (Dako, Gabasawa and Unguwan Dosa were towns randomly selected) and Chikun LGA that were randomly selected (where Sabon-Tasha, Chikun and Kuriga were randomly selected). In Kaduna South, randomly selected LGAs were Kachia (where Kachia, Awan and Katari towns were randomly selected), Kaura (Kuura, Garaji and Biniki were randomly selected) and Sanga (Gwatu, Aboro and Ayu represented the sampled towns). Finally, in stage five, twenty-five farmers were randomly selected from each town, yielding a sample of 450 CBEO participant farmers. For comparison, an equivalent number (450) of non-CBEO participant farmers were also randomly selected. Thus, a total of 900 farmers, comprising equal numbers of participants and non-participants of CBEOs, were included in the study. The researchers ensured that the selected CBEOs were active and functioning.

Sources of data and Data collection instruments

The study utilized both primary and secondary data. Primary data were collected directly from the randomly selected farmers, while secondary data were obtained from documented sources such as journals, textbooks, conference proceedings, and relevant internet materials. A questionnaire and an interview schedule were designed to gather information from the respondents. The questionnaire was administered to literate farmers, and the interview schedule was used for illiterate farmers.

Validation of question instruments

Validity and reliability of the question was carried out. The validity involved the use of face content method. Test-re-test technique was used to ascertain the instrument's reliability. This process involved conducting a pilot study to administer the instruments to the respondents. The instruments were administered at two different times to the respondents in two different consecutive months. The two different results obtained were further subjected to analysis. A Correlation Coefficient ('r') value of 0.69 was obtained, indicating that the instrument was reliable for the study. The reliability of the instrument increases as the value of 'r' approaches one (1). (Erie, 2009).

Data administration and collection techniques

The question instruments were administered by the researchers themselves together with enumerators trained for this purpose. The trained enumerators were ensured to be residents of the study area. The enumerators were also engaged in the retrieval of the instruments and this was done under the guide of the researchers. To facilitate reaching both male and female respondents in the community-based extension organizations, given the cultural context of Northern Nigeria, both male and female enumerators were employed. To ensure cooperation from the farmers during the distribution of the questionnaires, the study involved agricultural extension staff from the sampled LGAs and staff from the agricultural development program (ADP) in the respective LGAs and sampled communities.

Data analytical techniques

Descriptive and inferential statistics were employed to analyze the study's data. Descriptive statistics, including percentages, means, and standard deviations, were used to analyze the study's objectives. Inferential statistics were utilized to test the study's hypotheses. Hypothesis one was analyzed using multiple regression to determine the impact of the socio-economic characteristics of CBEO farmers and their participation in CBEO activities on farm income.

The regression equation is specified as:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_n X_n + e$$

Where Y	=	dependent variable
a	=	the coefficient of the constant term
b_i	=	the coefficient of the independent variables
X_i	=	the independent variables
e	=	error term

The variables in the equation are defined below as:

Y	=	Farm income (N)
X_1	=	Length of community residence (years)
X_2	=	Gender (dummy; male = 1; female = 0)
X_3	=	Age (years)
X_4	=	Marital status (Single = 1; Married = 2; Divorced = 3 and Widow(er) = 4)
X_5	=	Educational status (no formal educ. = 1; primary educ. = 2; secondary educ. = 3; post-secondary educ. = 4)
X_6	=	Household size (number of people living and feeding together)
X_7	=	Religious affiliation (dummy; Christian = 1; Muslim = 2; Traditionalist = 3)
X_8	=	Farm size (measured in hectares)
X_9	=	Farming experience (years)

X_{10} = Participation Score (percent)

Hypothesis 2 was analyzed using t-test statistics. The t-test was employed to determine the difference in farm income of CBEO farmers before and after their membership in the group. The formula for the t-test is shown below:

$$T = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{(s_1^2/n_1 + s_2^2/n_2)}}; \quad df = n_1 + n_2 - 2$$

Where:

$\bar{x}_1$ = the mean of group 1

$\bar{x}_2$ = the mean of group 2

S_1 = standard deviation for group 1; S_2 = standard deviation for group 2

S_1^2 = variance of the first group; S_2^2 = variance of the second group

n_1 = size of the first group; n_2 = size of the second group

$\sqrt{}$ = square root

Decision rule for t – statistics

If the t-calculated is greater than the t-tabulated, we conclude that the estimate of the variable is statistically significant. This means we reject the null hypothesis and accept the alternative hypothesis. Conversely, if t-calculated is less than or equal to t-tabulated, we fail to reject the null hypothesis.

A binomial test was used to determine if there is a significant difference in attitudes towards participation in CBEO activities between CBEO participants and non-participant farmers (hypothesis 3). The formula for binomial distribution is given as follows:

$$b(x; n, p) = {}_n C_x \cdot p^x \cdot (1-p)^{n-x}$$

Where b = binomial probability

x = total number of successes (satisfied or not satisfied)

p = probability of success on an individual trial

n = number of trials

When making a decision, the potential values of the test statistics are segmented into two ranges. The critical region of the sample distribution represents the area or areas where the values of the statistic lead to rejecting the hypothesis being tested when that hypothesis is true.

Results and Discussion

Socio-economic characteristics of the respondents

The findings regarding socio-economic characteristics are presented in Table 1. It reveals that the majority (39.59%) of participants in Community-Based Extension Organizations (CBEOs) have resided in their communities for 10 to 14 years. On average, they have spent 14 years in their communities. Having spent such a period is an indication that they have spent some good number of years in the communities of abode. Through personal communication with the respondents, it was asserted that participation in community groups like CBEOs have some level of influence in increasing their farm productivity and

income. This finding aligns with Manda et al.'s (2020) conclusion that farmers who have resided longer in a specific area are more inclined to participate in local community organizations, anticipating the benefits they may derive from such involvement. Regarding gender distribution, the majority (84.67%) of respondents were male, while a minority (15.33%) were female. This indicates a predominance of male farmers within CBEOs, possibly influenced by the prevalent practice of Islam in the study area and which does not permit women to socialize publicly. The dominance of male in farming groups concurs with findings of Abdullahi et al., (2015). This may be ascribed to the fact that most parcels of land are owned by males especially in the African context.

The majority (80.09%) of CBEO farmers were married, while proportions of single, divorced, and widowed individuals were 8.47%, 8.92%, and 2.52% respectively. This indicates a prevalence of married farmers within CBEOs, suggesting maturity and a sense of economic responsibility towards their families. Study of Vabi et al. (2020) which was conducted in almost same area, supported this result as it reported similar result regarding the dominance of married farmers among respondents and that it is assumed, the proceeds are basically for supporting their family economic needs. The average age of CBEO participant farmers was 45 years, with the majority (66.13%) falling within the age bracket of 40 to 49 years. In addition, about 17.84% and 16.01% of the participants category was respectively less than 40 years and above 49 years. The result is an implication that the respondents are strong and in their active age category. This result conforms with the age bracket of farmers (36 – 60 years) recorded by Vabi et al., (2020).

Educational qualification status of the CBEO farmers showed that a larger fraction (56.52%) had primary school education. Considering the respondents on a general note, as much as 89.7% of them had formal education. By implication, it could be deduced that a larger fraction of literate farmers is known to be participating in the CBEOs.

Table 1: Socio-economic characteristics of respondents. **N** = 437

Characteristics	Categories	Freq	%	Mean
Length of community residence (years)	< 5	11	2.52	14
	5 - 9	54	12.36	
	10 - 14	173	39.59	
	15 - 19	156	35.70	
	20+	43	9.84	
Sex	Female	67	15.33	
	Male	370	84.67	
	Total	437	100.00	
Marital status	Single	37	8.47	
	Married	350	80.09	
	Divorced	39	8.92	
	Widow(er)	11	2.52	

Age range (years)	< 30	13	2.97	
	30 - 39	65	14.87	
	40 - 49	289	66.13	
	50 - 59	56	12.81	
	60+	14	3.20	45
Educational status	No formal educ.	45	10.30	
	Primary educ.	247	56.52	
	Secondary educ.	130	29.75	
	Post-secondary educ.	15	3.43	
Religious affiliation	Christianity	126	28.83	
	Traditional	32	7.32	
	Muslim	278	63.62	
	Others	1	0.23	
Household size	1 - 3	29	6.64	
	4 - 6	194	44.39	
	7 - 9	180	41.19	
	10 - 12	32	7.32	
	13+	2	0.46	7
Farm size range (ha)	< 2ha	44	10.07	
	2 - 4	315	72.08	
	4 - 5.99	68	15.56	
	6.00+	10	2.29	3
Farming experience (years)	< 5	7	1.60	
	5 - 9	156	35.70	
	10 - 14	148	33.87	
	15-19	112	25.63	
	20+	14	3.20	11.7

Source: Field survey, 2022

Education plays a crucial role in enhancing farmers' practical performance, increasing their awareness of improved technologies, and improving their agronomic skills, ultimately leading to better farming outcomes. This finding aligns with the conclusions of Abdullahi et al. (2015), who noted that educated farmers tend to participate more in local groups such as CBEs compared to their illiterate counterparts. It therefore implies that they may be a little easier to train and quickly to understand and apply practical skills in farming. Additionally, the majority (63.62%) of farmers in this study identified as Muslims. The other farmers in the proportion of, 28.83%, 7.32% and 0.23% were of Christian, Traditional and other types of religion respectively. The predominance of farmers belonging to the Muslim religion in this study may be attributed to the area which is predominantly populated by Muslims. This observation aligns with the findings of Okwuokenye and Petu-Ibikunle (2021), who also noted the domination of Muslims among residents in the area. On average, the respondents had a household size of 7 persons, with the most common (44.39%) household size among participant farmers being 4 to 6 persons. This suggests that

respondents have family members whose responsibilities are undertaken by them. Etwire et al., (2013) opined that, large household size is of two folds. First, it can also be a source of family labour and so a contributor to household welfare. Secondly, it can also pose an economic burden on the household. The findings regarding household size are supported by Okwuokenye and Akintoye (2016), who reported a similar household size range of 4 to 6 persons among participants and non-participants of similar groups studied.

The average farm size of the respondents was 3 hectares, with the majority (72.08%) of them having a farm size ranging from 2 to 4 hectares. About 10.07% and 17.85% had less than 2 and more than 4 ha respectively. The farm size of the farmers implies that they are small-scale farmers since most of their farm sizes are either less than or equal to 4ha. The implication is that, the farmers are likely to be rated as subsistence farmers with small output and farm income. This discovery aligns with the findings of Zakari et al. (2021), who also observed a comparable farm size in their study. The average farming experience of the respondents was 11.7 years, with the majority (35.70%) having between 5 and 9 years of experience. This suggests that the farmers possess substantial experience in their agricultural activities, a conclusion consistent with that of Yahaya et al. (2013), who noted that group members typically have more farming experience than non-participants.

Classification of CBEO participants according to their level of participation

The participation level of CBEO participants was analyzed across two main categories: moderate and high scores, as detailed in Table 2. The results reveal that the majority (81.5%) of respondents demonstrated a moderate level of participation, while approximately 18.5% exhibited a high level of engagement in their groups and group activities. By implication, the respondents will be properly informed of the activities of their group. This finding is consistent with the results of Okwuokenye and Okoh (2018), who similarly observed a high level of participation among members of farm groups. They emphasized that active involvement of farmers in agricultural groups contributes to the enhancement of their farming knowledge, subsequently leading to increased productivity and income.

Table 2: Categorization of respondents based on Level of participation

Levels	Frequency	Percent
Moderate (score: 14-21)	356	81.5
High (score: 22-28)	81	18.5
Total	437	100.0

Source: Field survey, 2022

Assessment of farmers' income before and after participation in CBEOs.

The annual income levels of respondents before and after joining community-based extension organizations (CBEOs) were examined in Table 3. The results indicate that the

majority (58.81%) of farmers earned farm income ranging from N100,001 to N200,000. Conversely, after joining CBEOs, most (48.05%) of the same farmers earned annual farm income ranging from N200,001 to N300,000. The average annual income of farmers before joining CBEOs was N187,985.27, while after joining, it increased to N280,892.45. The difference in average income before and after joining CBEOs was N92,907.18, favouring farmers after their membership in the groups. The difference in CBEOs farmers income is an indication that certain benefits that have to do with enhancement of farmers knowledge and farming skills are being derived from their membership in the groups. Such benefits thus result in reaping higher farm output and income. This finding aligns with the conclusions drawn by Faruk and Maharjan (2022), who determined that the annual income of participant farmers in Community-Based Organizations (CBOs) significantly surpasses the income of non-participant farmers.

Table 3: Economic characteristics of respondents

Characteristic	Categories	After Participation			Before participation		
		Freq.	%	Mean	Freq.	%	Mean
Income level (annual) (N)	<100,000	4	0.92		31	7.09	
	100,001-200,000	51	11.67		257	58.81	
	200,001-300,000	210	48.05		106	24.26	
	300,001-400,000	151	34.55		38	8.70	
	400,001-500,000	20	4.58		5	1.14	
	500,001+	1	0.23		-	-	
	Total	437	100.00	280,892	437	100.00	187,985.27

Source: Field survey, 2022; Difference in income = N280,892.45 – N187,985.27 = N92,907.18

Community-Based Extension Organization members attitude towards participating in group

The attitudes of the farmer participants of CBEOs in the different groups they belong vary among themselves and among different issues of concern that generate attitude amongst the farmers (see Table 4). First amongst the issues is: participation in the group has enhanced my farm output (mean = 3.19), the second: participation in the group has improved my income (mean = 3.17) and the third is: participation in the group has improved my knowledge of farming practices (mean = 3.10). The Farmers strongly agreed to the above issues of concern and therefore showcased a favourable attitude to the issues. Participant farmers are likely to learn new skill and farming practices from the group they belong and such may translate to increased production and income. This finding is corroborated by the research conducted by Madukwe (2005), which highlighted that involvement in Community-Based Organizations (CBOs) helps to get across to the farmers

via training, the latest on agricultural information that guarantees an upgrade of farmers knowledge and skills that can help them improve their production abilities and farm income.

Other statements that give rise to farmers favourable attitude are: participation in the group has improved my living standard (mean = 3.10) and participation in the group has helped in improving my farming skills (mean = 2.72). These results corroborate the findings of Abegunde (2009) that farmers participation in farmers groups will inculcate in the members' the necessary farming skills that would help boost production level, increase income and ameliorate their poverty level, thereby increasing their living standard.

Table 4: Attitude of farmers towards participating in Community-Based Extension Organization (CBEOs)

Statements leading to attitudes	Strongly disagree		Disagree		Agree		Strongly agree			Total
	Freq	%	Freq	%	Freq	%	Freq	%	Mean*	
Participation in the group has enhanced my farm output	1	0.23	24	5.49	301	68.88	111	25.40	3.19	0.5
Participation in the group has improved my income	0	0.00	34	7.78	295	67.51	108	24.71	3.17	0.5
Participation in the group has improved my knowledge of farming practices	2	0.46	30	6.86	328	75.06	77	17.62	3.10	0.5
Participation in the group has improved my living standard	1	0.23	65	14.87	262	59.95	109	24.94	3.10	0.6
Participation in the group has helped in improving my farming skills	14	3.20	124	28.38	269	61.56	30	6.86	2.72	0.6
Participation in the group has helped in improving our linkage to input providers	83	18.99	318	72.77	28	6.41	8	1.83	1.91	0.6
Participation in the group has helped in improving people's good thinking about me	82	18.76	326	74.60	29	6.64	0	0.00	1.88	0.5

***Favourable / agreed (mean > 2.50)**

Relationship between socio-economic characteristics of farmers in Community-Based Extension Organizations (CBEOs) and their participation in CBEO activities in relation to their farm income

Hypothesis one explores the impact of farmers' socio-economic characteristics and participation in CBEO activities on farm income. This hypothesis was examined using multiple regression analysis, and the results are summarized in Table 5. The computed F-Statistic was 2.604, exceeding the F-Tabulated value of 1.75, indicating significance at 5% level. Thus, the alternative hypothesis suggesting a significant influence of respondents' socio-economic characteristics and participation in CBEO activities on farm income was supported. This implies that the regression model is significant, indicating the combined impact of the independent variables (socio-economic characteristics of farmers and participation in CBEO activities) on farmers income was significant. The R-squared value was 0.69, indicating that the independent variables and participation index collectively explain 69% of the variation in the dependent variable (participants' farm income). Out of the ten explanatory variables, seven were found to be significant. Specifically, participation score, length of community residence, household size, and farm experience were significant at 5% level, while respondents' age, educational status, and farm size were significant at 1% level. These results are elaborated upon in the subsequent discussion.

The participation score of the respondents exhibited a beta coefficient of 0.029 and a t-value of 1.992. This positive relationship was found to be significant at 5% level concerning farm income. Impliedly, the higher the participation score, the more the income that could be generated from the participant farmers. It is true that when farmers participate in groups, they get more knowledgeable with the farm knowledge, skills and innovations that are prevalent in the groups. Getting acquitted will help to improve their farming practices, output and consequently farm income. The findings agree with observation of Telno et al. (2015) that farm revenue for participants and non-participants of farmers group are significantly different from each other. The authors observed that the participants realized a profit level that is almost two times to that of non-participants farmers groups. The length of community residence ($b = 0.078$; $t = 1.964$) showed a positive coefficient and was also significant at 5% level concerning farm income for the respondents. By implication, more participants live in their community of abode, the more income that would be realized from their farming activity. Living longer in a particular place exposes them to the intricates associated with farming practices, do's and don'ts of the community and then know how to manipulate his or her farming practices for increased productivity and income. This result is consistent with the findings of Ofuoku and Urang (2009), who observed that farmers who have resided in a community for a longer duration tend to participate more in farmers group's activities and this may likely educate them about agricultural practices and experience positive effects on their farm income. The beta coefficient (-0.029) and t-value (-2.584) of respondents' age were negatively signed and significant at 1% level concerning the respondents' farm income. Results implies that, the older farmers are in age, the less farm income that would be expected of them. Older farmer participants are less ready than their younger counterparts to participate in agricultural projects and groups because they

are less innovative and not ready to take risk, hence they are confronted with lower farm income. This assertion is synonymous with Kahn et al. (2012) who reported that increase in age physically weakens farmers and reduces their ability to participate in agricultural projects and groups and therefore expects lower income compared to much younger farmers.

The educational status of the respondents exhibited a positive correlation ($b = 0.125$; $t = 2.610$) and was significant at 1% level concerning farm income. The positive correlation is an indication that more educated farmers would earn higher farm income from their farming activities than their less educated counterparts. The implication is that education has a way of brightening a farmer's awareness and thus influence his/her ability to source for agricultural information and innovations and apply such to better his/her farming activity with an increased income as an end product. This finding contrasts with that of Kahn et al. (2012), who identified a negative relationship between the educational status of farmers and their participation in groups, subsequently impacting their income. However, the household size of the farmers demonstrated a beta coefficient of 0.054 and a t-value of 1.979, indicating a positive correlation that was significant at 5% level with farmers' farm income. The positive relationship implies that participants whose households are larger would earn higher income from their farming activities. Availability of family labour can be a source of information on agricultural innovation and can help to expand the information available to Heads of household, thereby generating more income for the family. This finding aligns with the conclusions drawn by Mohammad et al. (2011), who observed that larger household sizes motivate farmers to engage more actively in groups, aiming to utilize the resulting increase in income to mitigate the effects of poverty.

The farm size of the respondents exhibited a positive coefficient with participants' income. It was significant at 1% level and it has a beta coefficient of 0.156 and a t-value of 3.184. This implies that farmers with larger farm sizes tend to generate higher farm income. Larger-scale farmers are often inclined to seek out up-to-date information and innovations to enhance their farming practices, ultimately leading to increased income. This finding aligns with the conclusions drawn by Ovharhe et al. (2020), who observed that farmers with larger household sizes tend to earn higher farm income, consequently aiding in the alleviation of poverty. Moreover, respondents' farming experience exhibited a positive correlation with farmers' farm income. Its beta coefficient was 0.068, t-value of 1.999 and was significant at 5% level. This suggests that farmers with more experience in farming activities tend to earn higher farm income. Experience in farming will make the farmers know the intricacies around, and how to handle farming activities, thereby avoiding as much mistakes as possible which will translate to higher income to the farmer. This result is supported by the findings of Achoja and Ugege (2015), who similarly concluded that farmers' farming experience is positively associated with higher farm income.

Table 5: The relationship between respondents' socio-economic characteristics, participation in CBEO activities, and farmers' income (multiple regression)

Independent variables	Standardized Coefficients (Beta)	t-value	Sig.
(Constant)		4.538	0.000
Participation Score (percent)	0.029*	1.992	0.008
Length of community residence (yrs)	0.078*	1.964	0.002
Sex	-0.026	-0.548	1.014
Age (years)	-0.029**	-2.584	0.020
Educational status	0.125**	2.610	0.009
Household size (no.)	0.054*	1.979	0.001
Religious affiliation	-0.040	-0.840	0.401
Farm size (ha)	0.156**	3.184	0.002
Farming experience (years)	0.068*	1.999	0.013
Marital status	-0.004	-0.088	0.930

*Significant at the 5% level; **Significant at the 1% level;

$F = 2.604$ ($p < 0.050$); $R^2 = 0.69$; Critical $t = 1.960$; Significant at 5% (Critical $F = 1.75$)

Assessment of the difference in farm income of farmers before and after their membership in Community-Based Extension Organizations (CBEOs)

Table 6 presents the disparity in income among farmers before and after their involvement in CBEOs, as analyzed in hypothesis two. The findings unveil that the average income of farmers before and after their membership in CBEOs was N187,985.27 and N280,892.98, respectively. Notably, the average income surged after joining CBEOs, with a substantial difference of Ng2,907.18. This difference was found to be significant at 1% level, as the calculated t-value (27.97) exceeded the tabulated t-value (2.576). Consequently, the alternative hypothesis, suggesting a significant difference in farm income before and after CBEO membership, was accepted over the null hypothesis. From these results, it can be inferred that farmers' engagement in CBEOs has played a pivotal role in enhancing their knowledge, skills, and agricultural practices, ultimately leading to heightened productivity and income. These findings resonate with those of Etwire et al. (2013), who asserted that farmers' participation in groups like CBEOs facilitates access to institutional or production credit, thereby augmenting production capacity and farm income. Additionally, Etwire et al. (2013) underscored that group participation enables farmers to access extension services, fostering the improvement of skills, practices, and consequently, productivity and income.

Table 6: The Effects of participation in Community Based Extension Organizations on income level of respondents

Participant Status	Income (N)		T test	Prob. level
	N	Mean	Difference	

Participants	437	280,892.45	78004.8	N92,907.18	27.97*	P < 0.05
Non-participants	437	187,985.2	43210.2			

*Significant at the 1% level (Critical t-value = 2.576);

Farmers' attitude towards participation in Community-Based Extension Organizations (CBEO) [Binomial test]

Farmers' attitude towards participation in activities within Community-Based Extension Organizations was analyzed using a binomial test, with the results presented in Table 7. In the analysis, the researcher employed the propensity score matching method (Logit). The outcome variable is participation in CBEOs. The result revealed that most (82%) of the farmers showed a favourable attitude towards participation in CBEOs activities. The other fraction (18%) expressed an unfavourable attitude towards participation in their group's activities. The respondents' attitude was skewed towards displaying favourable attitude towards participation in CBEOs. The result was found to be significant at 1% level. Consequently, the alternative hypothesis was accepted over the null hypothesis. The favourable attitude may not be unconnected to the positive effects in terms of increased productivity and income as well as other benefits that may be emanating from participating in group's activities. The result of the study aligns with the findings of Htay et al. (2022), who noted that farmers' attitudes are shaped by the net effect of benefits and costs experienced from their projects.

Table 7: Respondents attitude towards participation in CBEO [Binomial test]

Variables	Category	N	Observed Prop.	Test Prop	Chi-square	Prob. Level
Attitude towards participation in CBEOs	Favourable (score: >18)	358	0.82	0.50	358.0	.000
	Unfavourable (score: 18 & below)	79	0.18			
	Total	437	1.00			

Significant at the 1% level

Source: field survey, 2022

Conclusion

The study investigated farmers' participation in community-based extension organizations as a shift in paradigm towards rural poverty alleviation in Kaduna State, Nigeria. The findings revealed that farmers exhibited a moderate level of participation in CBEOs. Additionally, there was a notable difference in their farm income before and after their membership in CBEOs. Their income level was higher with mean of N280,892.45 after belonging to CBEO as against what it was (N187,985.2) before membership of CBEOs. This is an indication that being members of CBEOs has positive effects on the members. The farmers also showed some favourable attitude to participation in the group in the area of: participation has enhanced my farm output, participation in the group has improved my

income and participation in the group has improved my knowledge of farming practices, amongst other issues of consideration.

Recommendations

Based on findings, the following recommendations are thus made:

- i. This study recommended that the farmers need to be encouraged to show more interest in the groups they belong by improving on their level of participation. It is hoped doing this will improve their farming skill and knowledge which will translate to higher productivity and income, resulting to reduction in poverty level, and
- ii. There is a need for the old or elderly farmers be given more support and attention by way of encouraging more active participation in their groups. This will help to boost their output and income and therefore have their poverty level alleviated.

Acknowledgement

The research team of this very research is very grateful to the Vice Chancellor and Management of National Open University (NOUN) for logistic and sponsorship of this research and the publications that are going to come out of it.

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