Households' Decision to Participate in Cooperative Organizations: Evidence from Farmers in Akwa Ibom State, Southern Nigeria

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Article Info	Abstract
	Farmer organizations are effective mechanisms for increasing agricultural production, income and reducing poverty. Regrettably, farmers have not taken advantage of the lofty benefits accruable to those who voluntarily join these organizations. The study estimated the factors influencing household's decision to participate in cooperative organizations and also tested the level of agreement among identified constraints linked with participation. Multistage sampling procedure was employed to select 120 farmers for the study. Primary data were obtained using questionnaires. Data were analyzed using Probit model and Kendall's coefficient of concordance. Results of analyses revealed that the mean age, years of educational attainment household size and years of farming experience were 32, 15, 5 and 7 respectively. Result of probit analysis further indicate that age of the farmer, farm income, household size, participation in meeting, major decision maker, distance of farm to the nearest road and farmers social status were the most critical factors influencing household's decision to participate in cooperative organizations. Result of Kendall's coefficient of concordance revealed that there was 0.42 (moderate agreement) between the ranking of constraints associated with farmers' participation in cooperative organizations. Furthermore, findings showed that the top five factors limiting households' decision to participate in cooperative organizations were inadequate capital accumulation, high embezzlement of funds, poor leadership, recurring internal crises and lack of initiative. Policies to provide good and accessible roads, increase farmers incomes and encourage youths are rational options that will enhance effective participation in cooperative organizations.

Introduction

Although, the budgetary allocation to the agricultural sector in Nigeria has been increasing over the years, the country is unable to achieve food sufficiency and security as food import and prices are continuously on the rise while poverty and hunger are deepening (Etim and Edet, 2013a). With an estimated population of 206,139,589 people (United Nations,2019), food demand is likely to outpace its supply in the near future and agriculture will remain the major source of food and livelihood for most populace (Edet & Etim, 2014a; Etim et al.,2020a). To attain food security and reduce poverty, efforts should be geared towards stimulating local food production through effective agricultural production (Etim & Nkeme, 2015). Population and institutional innovations are also vital in reducing poverty, increasing food production and boosting economy (Awotide et al.,2015; Etim et al.,2021). The coming together of farmers through cooperative organizations as an effective means of increasing food production and reducing poverty have also been reported by (Bernard & Taffesse,2012; Fisher,2012a; 2012b). The benefits that cooperative organizations bring to farmers are plenteous and have been

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documented by Francesconi & Ruben (2007), Bijman (2007), Hermida (2008) , Zheng et al., (2011), Awotide et al., (2015) to include increasing food security, facilitating market access, strengthening farmers' household economy, reducing poverty and transaction costs of accessing input inter alia.

Inspite of the numerous benefits accruable to farmers who belong to cooperative organizations, there is still hesitancy in joining these social groups thus resulting in low participation. Therefore, it becomes imperative to identify key factors that affect households' decision to join cooperative organizations as well as the constraints associated with participation. Information on the factors and constraints limiting farmers' decision to join cooperative organizations particularly in the study area is limited. This study is predicated on the need to fill this lacuna and make recommendations that will serve as a guide for policy intervention. The study also contributes significantly to the paucity of literature on social organization in the study area. The study was conducted to empirically identify critical factors likely to influence farmers' decision to participate in social organizations as well as the constraints associated with their participation

Methods

Study Area

The study was conducted in Akwa Ibom State, southern Nigeria. The state lies between latitude 4° 33 and 5° 53' and longitude 7° 25' and 8° 25' East. The state is located in the South-South geopolitical zone, and is bordered on the east by Cross River State, on the west by Rivers State and Abia State, and on the south by the Atlantic Ocean and the southernmost tip of Cross River State It has six (6) Agricultural Development Project (ADP) zones namely; Abak, Eket, Etinan, Ikot Ekpene, Oron and Uyo. The state is located in the rainforest belt and has 2 distinct seasons namely – the long rainy and short dry season. The annual precipitation ranges between 2000 – 3000 mm per annum. This rainfall regime received in most parts of the state support farming all year round (Etim and Ofem, 2005; Etim and Udoh, 2014; Etim et al.,2020b).

Sampling and Data Collection Procedure

Multistage sampling technique was used to select the representative farmers used for the study. First, 3 out of the 6 ADP zones were randomly selected to prevent biases. Secondly, 10 blocks per ADP zone were selected to make 30 villages. Thirdly, 4 farmers were selected per block to make a total of 120 farmers. Data for the study were primary and obtained from 120 farmers with the aid of questionnaire.

Model Specification

The dichotomous nature of the dependent variable necessitated the use of probit regression model to quantitatively estimate the factors that influence the decision of farmers to participate in cooperative organizations. The probit model is suitable for analyzing decision that have dichotomous values (Etim et al.,2017; Etim et al.,2020c; Etim and Ndaeyo, 2020; Etim and Udoh,2020). Its ability to resolve the problem of heteroscedasticity and also limit the utility value of the decision to join variable to lie between 0 and 1, makes it preferable to the logit model (Asante et al., 2011; Martey et al.,2014). The decision to participate in farmer organizations was captured as a dummy variable with the value of 1 assigned to farmers who were willing to participate and 0 for otherwise.

The empirical model for decision to participate in cooperative organization is specified as;

$Yi* = P(Yi= i) = \beta Xi + \varepsilon i$

Where Yi is the "Decision to participate" (DTP) in cooperative organization Yi*, the estimated value of Yi, (Yi*=i) if Yi>0, and εi is the error term which follows a normal distribution (mean μ=0, variance =1). P is the probability function. β is the vector of parameters to be estimated. Xi is the matrix of explanatory variables that affects the ith farmer's decision to participate in cooperative organization. The dependent variable Yi or DTP takes a value of 1 for farmers who decide to participate in cooperative organization and 0 otherwise. This model was used to determine the factors affecting farmers decision to participate in cooperative organization.

Table 1. Variables used in the Probit model and their expected signs

Variables	Description	Expected Sign
Age	Age of household head in years	+/-
Sex	Sex of household head (Dummy =1 if household head is male, 0 if female)	+ / -
Education	Number of years of schooling of the household head	+
Farming Experience	Number of years in farming	+
Household Income	Salary and wages earned by household in naira	+
Households size	Number of family members who have lived together for at least six months under the same roof	+ / -
Farm size	Size of cultivable land in hectares	+
Frequency in meetings	Involvement in meetings (Dummy = 1 if household head participate in meetings, 0 if otherwise)	+ / -
Decision making	Participation in Decision making(Dummy = 1 if household head takes part in decision making, 0 if otherwise)	+ / -
Distance to the nearest paved road	Average distance to the nearest paved road in kilometres	+ / -

The Kendall's coefficient of concordance

The Kendall's concordance analysis was employed to test for the agreement between the ranked constraints of decision to participate in cooperative organizations. The analysis shows the degree of disagreements and agreements among responses. The Kendall's coefficient of concordance (W) is the measure of the degree of agreement among m set of n ranks. W is an index that measures the ratio of the observed variance of the sum of ranks to the maximum possible variance of sum of ranks. According to Martey (2014), if the rankings are in perfect agreement, then the variability among sums will be a maximum. Following the computation of the total rank score for each constraint, the least score is ranked as the most pressing constraint whereas the one with the highest score is ranked as the least pressing constraint. To measure the degree of agreement in the rankings, the total rank score computed is then used to calculate for the coefficient of concordance (W) (Edwards 1964; Martey, 2014). The formula for the coefficient of concordance W is then given by:

Kendall's coefficient of concordance (aka Kendall's W) is a measure of agreement among respondents defined as follows:

$$W = \frac{12\sum D^2}{M^2(N)(N^2-1)}$$

Where

W = The Coefficient of Concordance

D = The difference between the respondents' sum

∑D2 = The Sum of the Square of the Differences

M = Number of Respondents

N = Number of statement/objects been rated by the farmers

This hypothesis was tested for potential constraints

H0: There is no agreement among the constraints faced by households' decision to participate in cooperative organization

Results and Discussion

The table revealed that mean age of farmers was 32. The lowest income earned by farmers was ₦10,000 whereas the highest income earned was ₦75,000. The mean years of farming experience was 7 years. Finding revealed that farm holdings were small as the average farm size was 1.5 hectares. The highest level of educational attainment was first degree implying that farmers were considerably literate.

Table 2. Summary Statistics of Socio economic Characteristics

Variables	Unit	Mean	Minimum	Maximum
Age	Years	32	22	50
Years in Farming	Year	7	2	30
Monthly Income	Naira(₦)	24,000	10,000	75,000
Household Size	Numbers	5	0	9
Farm Size	Hectares	1.5	0.7	2.6
Educational level	Years	15	12	18

Naira (₦) is Nigeria's currency. 1₦ is equivalent to 0.0024 US Dollar as at September, 2021

Factors Influencing households' Decision to Participate in cooperative organizations

As expected, the variable age was negative and significantly influenced the willingness of farmers to participate in cooperative organizations. Age of the household head was significantly associated with a lower probability of farmers to participate in cooperative organization. The probability of farmers to participate in cooperative organization decreased by 0.7 percent for every extra year added to the age of the household head. Result indicate that younger household heads were more willing to participate in cooperative organizations than older household heads. This may be attributable to the fact that older household heads are more experienced in farming and may have already belonged to social networks which enhance their agricultural activities hence will be hesitant to join other groups. This result is synonymous with earlier empirical findings by Etim and Edet (2013b); Etwire et al., (2013); Etim (2015); Etim et al., (2017); Etim et al., (2020a) younger farmers are risk takers, receptive and will be more likely to adopt innovations faster than the older farmers. Ayamga (2006) and Etim and Edet (2014) also corroborated that agricultural activities involves lots of drudgery, the ability to work tends to decrease with age thus discourages the participation in cooperative organizations. Result contrasts with Asante et al.,2011) who reported that age of household head was positive and significantly influenced farmers' willingness to join cooperative organizations.

The variable, household size was also significantly associated with a higher probability of farmers to participate cooperative organization. Result indicate that the probability of farmers to participate in cooperative organization increased by 0.1 percent for every additional member added to the household. Result implies that household heads with large members will be more willing to participate in cooperative organization. Etim et al., (2011); Edet and Etim (2014b; Martey et al.,2014) posited that agricultural production is highly labour intensive and dependent on household members for the supply of labour. Finding is synonymous with Martey et al., (2014) who reported a positive effect of household size on farmers willingness to participate in cooperative organization.

Household income was positive in conformity with a priori expectation. Result revealed that the likelihood of farmers to participate in farmer organization increased by 0.1 percent for every additional increase in household income. Result is suggestive that household heads with higher income will be financially capable of supporting the farmer organizations. Similar empirical findings by Asante et al., (2011) and Martey et al., (2014) established a positive relationship between farmers' income and willingness to belong to farmer organizations.

Frequency in meetings was positive and significantly influenced household heads decision to participate in cooperative organizations. Findings revealed that the probability of farmers to participate in cooperative organizations increased by 0.6 for every meeting attended. This implies that more household heads participate in meetings, the higher the likelihood of getting information and being involved in contributions that will positively affect their livelihoods. Similar empirical studies were reported by Othman et al., (2012), Aini et al., (2012) and Huang et al., (2015) that members who were regular attendees in cooperative meetings were more likely to contribute to share increments.

Decision making is positive and significantly influenced farmers participation at p<0.01. Result implies that the probability of farmers to participate in cooperative organizations increased by 4.1 per cent for every decision taken in the association. Sibertin- Blanc & Zarate (2014) supports the hypothesis that decisions should be taken after due consultation with numerous people instead of an individual.

The coefficient of distance to the nearest road was negative and significantly associated with farmers participation in cooperative organizations at p<0.0 5. This means that the probability of farmers to participate in cooperative organizations is decreased by 2.2 per cent for every additional kilometer. The farer or more remote a farmer lives, the less the likelihood of participation in cooperative activities.

Table 3. Parameter estimation of univariate Probit Regression to determine the factors influencing the decision to participate in cooperative organizations

Variables	Coefficient	Standard Error	z- value	p-value	
Constant	−11.0744	3.40883	−3.249	0.0012	***
Sex	0.846084	0.748121	1.131	0.2581	
Age	−0.212442	0.0795996	−2.669	0.0076	***
Education	−0.0549674	0.270543	−0.2032	0.8390	
Farming Experience	−0.0653154	0.0693599	−0.9417	0.3464	
Household Income	1.45125	0.460776	3.150	0.0016	***
Household Size	0.665371	0.202691	3.283	0.0010	***
Farm Size	−0.0708936	0.364786	−0.1943	0.8459	
Frequency in meeting	2.85557	1.05689	2.702	0.0069	***
Decision making	1.70684	0.834103	2.046	0.0407	**
Distance to nearest paved road	-0.698215	0.304282	-2.295	0.0218	**

Likelihood ratio test: Chi-square	113.098				
Intercept	3.032				
R-Square r^2	0.716579				
Log-likelihood	−22.36618				

Note: ***significant at 1%, **significant at 5%, *significant at 10%

Constraints limiting Farmers Participation in Cooperative organizations

The constraints of farmers identified in this study are presented in Table 4 . Result indicate that the Kendall's 'W' was found to be 0.42 and significant at 1% level. From the result, the alternate hypothesis was accepted while the null was rejected. The Kendall's 'W' of 0.42 implies that there was 42 percent (moderate agreement) between the respondents in the ranking of the constraints faced by farmers with respect to participation in cooperative organizations.

Among the identified ranked constraints, inadequate capital accumulation, high embezzlement of funds, poor leadership, recurring internal crises and lack of initiative were the top five most constraining factors limiting farmers' willingness to participate in cooperative organizations.

Kendall's W Test

Table 4. Constraints to Benefit from Social Capital Groups by the Respondents

Constraints	Mean Score	Rank
Lack of Initiative	5.24	7th
Lack of personal initiative	6.42	1st
Low literacy level of members	5.42	5th
Disloyalty	5.33	6th
Inadequate capital accumulation	4.84	11th
Low financial base of members	6.30	2nd
High Embezzlement of Funds	5.02	10th
Unfavorable government policy	5.57	4th
Recurring internal crises	5.22	8th
Lack of skilled personnel	5.63	3rd
Poor leadership	5.05	9th
Test Statistics		
Number of observations	120	
Kendall's W[a]	0.42	
Chi-Square	43.771	
df	9	
Asymp. Sig.	.000	

Kendall's Coefficient of Concordance
Poor agreement = Less than 0.20
Fair agreement = 0.21 to 0.
Moderate agreement = 0.41 to 0.60
Good agreement = 0.61 to 0.80
Very good agreement = 0.81 to 1.00

Conclusion

The study analysed households' decision to participate in cooperative organizations. Factors affecting the decision to join social organizations were determined using probit regression analysis. Critical factors identified to influence farmers decision to join cooperative organizations included farmers age, household income and size, frequency in meetings,

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decision making and distance to the nearest paved road. The constraints limiting farmers participation in cooperative organizations included inadequate capital accumulation, high embezzlement of funds inter alia.Policies to increase farmers incomes and provide accessible roads to farmers will stimulate households participation in cooperative activities.

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