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Assessment of the role of farmers associations in enhancing access to agricultural credit for smallholder crop farmers in Bayelsa State, Nigeria

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Abstract

This study assesses the crucial role played by farmers associations in facilitating access to agricultural credit for smallholder crop farmers in Bayelsa State, Nigeria. Collection of primary data from 150 members of MAAN- Maize Association of Nigeria and 150 non-members both randomly selected from 3 intentionally selected Local Government Areas (Yenagoa, Sagbama and Ogbia), Utilizing a combination of Z-test and Logistic regression for the analysis. The investigation revealed the mean credit access for members of (MAAN) to be N 65,480 and non-members as N 32,333.33 with a difference of N 33,146, standard deviation of4,690.59 for members and non-members 6,538.25. The logistic regression results noted that age, gender, farming experience, Membership of Association and access through association all have significant effect on credit access while education, farm size, household size, farm size and total income does not have significant effect on credit access. The study recommends the promotion of the formation of farmers associations, special attention should be given to gender credit issues, the need for collaborative efforts between farmers associations, financial institutions and policymakers to further enhance credit access.

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Introduction

The crucial role of credit in agricultural development cannot be overstated, particularly in the framework of smallholder crop farming. Lowder *et al.* (2021) reported that of the 608 farmlands in the world 480 (79%) are on less than two (2) hectares of land and this is what provides the food and dietary requirements (70%) of the dwellers in sub Saharan African and Asia. Any farm holding that is less than 2 hectares and managed for subsistence purpose is classified as a smallholder farm (Rapsomanikis, 2017; FAO, 2012). According to Andrade (2016) these farm categorisations are also based on the living standard of the farmers, the sophistication of the resources used and the contribution of available family labour.

Apata *et al.* (2018); Sabo *et al.* (2017) and Anderson *et al.* (2017) revealed that agriculture provides the resources needed for the development of the rural areas, health and education. Economically, about 60% (1.5 billion) of the 2.5 billion rural dwellers in the less developed countries rely on agriculture for sustenance (IFAD, 2012; FAO, 2012). Taiwo (2020) in his scorecard noted that Agriculture's GDP contribution to the economy of Nigerian in 2019 is 22.8%, 22.35% in 2020 (FAO, 2021), trade deficit stood at N 689bn in 2019 and N 549.3 in the previous year of 2018. It accounts for 36% of the workforce of Nigeria. Dorward (2007) revealed the vulnerability and unfavorable position of abject poverty these farmers find themselves.

A blend of limitations are responsible for the deplorable state of the Smallholder Farmer (SHF), these include low fertility land (Kanyenji *et al.*, 2014), poor accessibility of market (Osmani and Hossain, 2016). Infrastructural insufficiency, unsteady prices for input and output (Anyasi *et al.*, 2020), labour, land, tractor cost and chemical, and credit related issues (Igwemeka and Ekwunife, 2020; Evbuomwan and Okoye, 2017). Land use, occupancy and allied matters (Adesida *et al.* , 2021; Alawode and Oladeji, 2020; Obayelu *et al.*, 2019; Okoronkwo *et al.*, 2019; Soneye, 2014; Camillone *et al.,* 2020; Oyegbami, 2018) all noted the pivotal role of extension (education) (Akano *et al.,* 2022); insufficient research rudimentary usage of machinery and equipment, culminating in poor exports and resultant high imports. Akano *et al.,* 2018 and Yamba *et al.,* 2017 noted the impact of climate on the overall condition of the SHFs in Nigeria.

The small holder well-being is the pulse of the nation, hence, necessitating efforts from the government, non-governmental organisations, donors and international community to enhance productivity in agriculture (Anigbogu *et al.,* 2017; Iwuchukwu and Igbokwe, 2012; Daneji, 2011). Farmers' associations are important and play essential roles in helping their members improve their access to credit. Vu *et al.* (2020) employing the use of OLS – ordinary least squares model in the effects of farmers' associations on household income: attestation from tea farms in Vietnam. Findings revealed that members of associations had better access to credit and ultimately better income than farmers that are not members.

In a related study undertaken in the Mezam region in Cameroon on the charge of Farmer Organisations in the increasing of the Economic Capacities of Farmer, descriptive statistics and t–test were used. Results noted that farmers who are members were better off in terms of income and access to credit (Fonteh and Fouepe, 2020). Accessibility to the right amount of credit has the potential of improving the livelihood of the farmers and stimulates agricultural productivity (Ajah *et al.*, 2017).

A number of studies have been done on the role farmers' association play in helping SHFs access credit. Farmers associations have been recognized as important facilitators of credit access for smallholder farmers, Msuta and Urassa (2015) used the analytical tool of t-test, Tolno, Kobayashi, Ichizen, Esham and Balde (2015) employed probit regression, Mbangari, Fonteh and Fouepe (2020) used gross margin (profitability) and Adekunle (2018) utilised probit model. The studies so mentioned were carried outside of this region. This study aims to evaluate the specific role of farmers associations in enhancing access to agricultural credit for smallholder crop farmers in Bayelsa State, Nigeria.

Materials and methods

This study was carried out in Bayelsa State which has a population of 2,394,725 according to (NPC, 2020) and the study covers the three (3) Senatorial Districts of the State encompassing; the Central Senatorial District-Yenagoa, Southern Ijaw and Kolokuma-Opokuma local government areas, East Senatorial District-Brass, Ogbia and Nembe local government areas and West Senatorial District – Sagbama and Ekeremor local government areas. Bayelsa shares a boundary with Rivers state to the East and Delta state to the West, with the waters of the Atlantic Ocean dominating its Southern borders. Fig. 1 shows the map of Bayelsa state with the eight (8) local Government Areas (Brisibe and Pepple, 2018). Yenagoa is a Local Government Area and capital city of Bayelsa State, Southern Nigeria; it is located at the southern part of the country at coordinates 4°55′29″N, 6°15′51″E. The Local Government Area covers an area mass of 706km² with a population of 524, 400 NPC (2020).

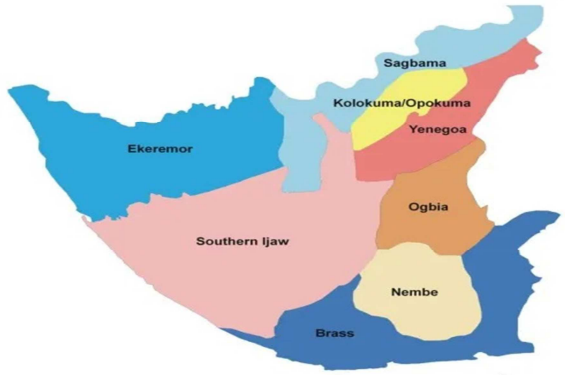

Fig. 1. Map of Bayelsa State Showing the Eight (8) Local Government Areas. Adapted from (Brisibe and Pepple, 2018)

Sagbama is a Local Government Area in the West Senatorial District of the State, Sagbama town is the headquarters, on coordinates (5°9'8.06"N, 6°11'32.92"E). The population is about 278,200 and covering an area of 951km² according to 2020 census. Finally Ogbia Local Government Area (East Senatorial District) and lies on the coordinates 4°39′00″N 6°16′00″E, with a population of about 267, 400 and an area of 695km². Fig. 1 shows the map of Bayelsa State

The Maize Association of Nigeria Farmers and the non-members in Bayelsa State were the interest in this study. A two stage sampling approach was employed, at first purposely selecting Ogbia, Yenagoa and Sagbama from the original eight (8) LGAs based on their involvement in maize activities. The next stage was sampling randomly fifty (50) members each of Maize Association of Nigeria and non-members making the total a hundred for each Local Government and a cumulative of three hundred for the study. The primary data from the study was analysed using Z test and ordinary least square.

Z-test

Z-tests are means for comparing sample means to see if there is satisfactory evidence to conclude that the means of the corresponding population distribution also differ (Toi, 2016).

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where:

X_1 = mean of Maize association of Nigeria Farmers

X_2 = mean of non-members of farmers association

S_1^2 = variance of Maize association of Nigeria Farmers

S_2^2 = variance of non-members of farmers association

n_1 = number of Maize associations of Nigeria Farmers.

n_2 = number of non-members of farmers association.

Decision Rule:

Reject the null hypothesis, Ho, if tcal > ttab at ($P \leq 0.05$) and accept the alternative hypothesis.

This was used to test if there is significant difference between the means (Income and credit amount) of members and non-members of FOs.

Logistic regression

Logistic regression model: In this model (analysis), the response variable is typically binary, it assumes two values: 1 if the respondent is better off as a member of Maize association of Nigeria and 0 if otherwise (Onuche and Oladipo, 2021; Gujarati and Porter, 2010).

The logistic analysis model is implicitly stated as follows:

Y = Membership of Maize association of Nigeria begets benefit (better access to credit)

yi = {1 if the ith farmer better off, 0 otherwise}

$Ln = yi/(1-yi) = \beta o + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + e$

Where; yi = probability that a member will be better off joining Maize association of Nigeria

1-yi = probability that a member will not be better off joining Maize association of Nigeria

Bo = intercept

B (1,2, 3,...10) = estimated coefficients

X (1,2,3,...10) = set of independent variables

X1 = age (years)

X2 = gender (male = 1, female 0)

X3 = education (in years)

X4 = farming experience (in years)

X5 = farm size household size (Ha)

X6 = household size (number)

X7 = membership of association (yes = 1, No = 0)

X8 = credit through association (yes = 1, No = 0)

X9 = total income (N)

e = error term

Results and discussion

The sample size for both groups (members and non-members) is 150 each (Table 1). The mean credit access for members of the Farmers Association (MAAN) is N 65,480 while for non-members, it is N 32,333.33. This is suggestive that, on the average, members have significantly higher credit access compared to non-members. The standard deviation measures the variation in credit access within each group. Members have a smaller standard deviation (4,690.59) compared to non-members (6,538.25). This could be indicative that credit access among members is more consistent. The z-test estimate is 4.1193, this which measures the standard deviations difference between the two group means is from the null hypothesis. In this case, the null hypothesis (Ho) that there is no significant difference in credit access between members and non-members. With a z-test estimate of 4.1193, it's highly significant, indicating that there is a substantial difference between the two groups. The P-Value and Significance Level: The "α" level stated as 0.000,. Since it is less than 0.05, it means that the result is statistically significant at the 0.05 level, indicating that the difference in credit access between members and non-members is highly unlikely to be due to random chance.

The Table (2) represents the estimated logistic regression results for the factors influencing the access to agricultural credit for smallholder crop farmers in Bayelsa State, Nigeria. Each row corresponds to a different variable, and the columns provide information on the coefficient, standard error, odds ratio, t-value, and p-value for each variable.

The Age (coefficient: 0.0830433, odds ratio 1.086589 and p-value: 0.029): implies that Age has a statistically significant positive effect on credit access, indicating that as the age of the farmers increases, the likelihood of accessing credit also increases. It is generally believed that experience comes with age, especially in agriculture. The result of this study clearly aligns with that finding of (Chivandire, 2019).

Gender (coefficient: -1.197681, odds ratio 0.302 and p-value: 0.025): Gender has a significant negative impact on credit access, suggesting that being male is associated with higher chances of accessing credit compared to being female. The result of this study agrees with that of Chaiya *et al.* (2023) which revealed gender as an important determinant of credit. Mulume *et al.* (2022) enumerated gender and the membership status of an association as crucial factors in explaining the likelihood of agricultural credit access.

Education (coefficient: 0.0036488, odds ratio 1.004 and p-value: 0.953): Education does not appear to have a significant effect on credit access. The coefficient is close to zero, and the p-value is higher than the standard significance level, indicating that education level may not be a significant factor in accessing agricultural credit.

Farming Experience (coefficient: -0.1428607, odds ratio 0.867 and p-value: 0.000): Farming experience has a significant negative impact on credit access.

Table 1. Result of z-test for test of significance for the difference between the mean credit access of members of MAAN and non-members.

Variables	Obs.	Mean	Std. Error	Std. Dev.	z-test estimate
Credit access members	150	65480	4690.59	57447.81	
credit access non-members	150	32333.33	6538.25	80076.86	
Diff		33146	804676		4.1193 (α=0.000)

NB: *** = significant at P < 0.05

Table 2. Estimated Logistic regression results for credit access

Credit access	coeff.	std. Err.	Odds Ratio	t	P >| t |
Age	0.0830433***	0.038	1.087	2.2	0.029
Gender	-1.197681***	0.5334	0.302	-2.3	0.025
Education	0.0036488	0.0615	1.004	0.1	0.953
Farming experience	-0.1428607***	0.0393	-0.867	-3.64	0.000
Farm size	-0.2021139	1.691	0.817	-0.12	0.965
Household size	0.029935	0.1083	1.03	0.3	0.782
Membership of association	1.683127***	0.5942	5.382	2.8	0.005
Access through association	5.551632***	0.6243	257.7	8.9	0.000
Total income	2.15E-07	6.73e=07	1	0.3	0.749
_cons	-3.68454	2.0546	0.251	-1.8	0.073
Number of obs =300					
LR chi2 (9) = 296.22					
prob > chi2 = 0.0000					
Pseudo R2 = 0.7141					

Note: *** denote 5% significance level

As farming experience increases, the probability of accessing credit decreases. This finding resonates with that of Chaiya *et al.* (2023) where experience garnered in farming was found to have significant influence in the accessing of credit

Farm Size (coefficient: -0.2021139, odds ratio 0.817 p-value: 0.965): farm size does not seem to have a significant impact on credit access, as indicated by the non-significant coefficient and high p-value. This is in contrast with the study done by Chaiya *et al.* (2023) where increasing household size involvement as farm labour was reported as a significant determinant of credit

Household Size (coefficient: 0.029935, odds ratio 1.03 p-value: 0.782): Household size does not appear to have a significant effect on credit access, as the coefficient is close to zero and the p-value is higher than the standard significance level.

Membership of Association (coefficient: 1.683127, odds ratio 5.382 and p-value: 0.005): Membership of a farmers' association has a significant positive impact on credit access. Being a member of an association increases the likelihood of accessing agricultural credit. Sedem *et al.* (2016) noted that membership of association positively impacts credit access.

Access through Association (coefficient: 5.551632, p-value: 0.000): Accessing credit through the association has a highly significant positive impact on credit access. This suggests that utilizing the farmers' association as a channel for credit access greatly increases the chances of obtaining agricultural credit. Credit access is enhanced and maintained by membership of association (Sedem *et al.* , 2016).

Total Income (coefficient: 2.15E-07, odds ratio 1 and p-value: 0.749): Total income does not appear to significantly influence credit access, as the coefficient is very close to zero and the p-value is higher than the standard significance level.

Constant (_cons) (coefficient: -3.68454, odds ratio 0.251 and p-value: 0.073): The constant term represents the baseline probability of credit access

when all other variables are held constant. The p-value suggests that the constant is not statistically significant, although it is close to the conventional significance level.

Conclusion

The study concludes that farmers' associations' formation should be promoted and encouraged to function as it plays crucial role in enhancing access to agricultural credit for smallholder crop farmers in Bayelsa State, Nigeria. Their intermediary role significantly improves the creditworthiness of smallholder farmers, enabling them to access the necessary financial resources for sustainable agricultural practices. Additionally, special attention should be given to addressing the challenges faced by female farmers in accessing credit and providing support for farmers with less experience in the sector. The study emphasizes the need for collaborative efforts between farmers associations, financial institutions, and policymakers to further enhance credit access for smallholder farmers.

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