

Impact of Farmers Associations on Income Diversification among Smallholder Crop Farmers in Bayelsa State, Nigeria

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ABSTRACT

This study investigates the influence of farmers associations on income diversification among smallholder crop farmers in Bayelsa State, Nigeria. Through a comprehensive survey and analysis of primary data collected from smallholder crop farmers consisting of 150 randomly selected members of Maize Association of Nigeria (MAAN) and 150 non-members taken from 3 purposively selected Local Government Areas (Ogbia, Sagbama and Yenagoa), Z-test and ordinary least squares (OLS) was used for the analysis. The study revealed mean total income for members as N 375,280, with a standard error of N 51,491.62 and a standard deviation of N 6,304.41. The mean total income for non-members is N 362,160, with a standard error of N 35,725.1 and a standard deviation of N 437,541.4. The regression results indicated age, farm size and education as positively impacting income, while farming experience, gender, association membership, credit access and credit through association all adversely affected income. The recommendations ensuing from the study includes; non members should be encouraged to join association and that policymakers and stakeholders should prioritize the strengthening of farmers associations and the provision of necessary support to maximize their impact on income diversification initiatives.

Keywords: Farmers Associations, Smallholder Crop Farmers, Income Diversification, Bayelsa State, Nigeria

INTRODUCTION

In the context of agrarian economies, smallholder crop farmers often face challenges related to income stability and vulnerability to external shocks. This therefore necessitates the exploration of strategies that promote income diversification as a means to enhance livelihood resilience. Rapsomanikis (2015) described a smallholder farmer as one whose farm holding is less than 2 hectares, while Andrade (2016) qualifies small holder farmers based on the types of resources the farmers' use, their standard of living and the available portion of family unit labour. About 70% of the people living in Asia and sub Saharan Africa are dependent on these SHFs for their nutritional and food sustenance (Lowder, Sánchez and Bertini, 2021 and FAO, 2012).

Agriculture provides resources for the development of the rural areas, as well as jobs for the rural dwellers who account for over 60% (1.5 billion) of the over 2.5 billion people (Apata, N'Guessan, Ayantoye, Badmus, Adewoyin, Anugwo, and Nwaogu, 2018; Sabo, Isah, Chamo, and Rabi, 2017). Agriculture's contribution in 2019 to the Nigerian economy is about 23% (Taiwo, 2019). FAO (2020) puts it at 22.35% and 36% of the populace are involved in agriculture and allied industries, this set of people are characterised by extreme vulnerability and are very poor (Anderson, 2017; Apata *et al.*, 2018; Onuche, Opaluwa and

Adejo, 2010 and ; Omonona, 2009).

A medley of limitations such as low quality and degraded land (Kanyenji, Oluoch-Kosura, Onyango and Ng'ang'a, 2014), poor infrastructure (Anyasi, Ajah and Idu, 2020), poor market access (Osmani and Hossain, 2016), Igwemeka and Ekwunife (2020) and Evbuomwan and Okoye (2017), credit and funding constraints, tenure and related issues (Adesida, Nkomokin, Bavorova and Madaki 2021 and Alawode and Oladeji, 2020) and a host of other challenges such training and extension (Camillone, Duiker, Bruns, Onyibe and Omotayo, 2020 and Oyegbami (2018) and Akano, Modirwa, Yusuf (2018) climate change are responsible for appalling condition of these farmers. According to Oshewolo (2010) he noted that in spite of the huge resource base (natural and human) of the country, the income of these small holder farmers is still abysmal, hence the labeling of Nigeria as an undeveloped country. Sokoto (91%) and Bayelsa State (88.5%) have the highest poverty rates in the country (**Elebeke, 2022 and Izuaka, 2022**),

Farmers' Organisations have proven to be a reliable means of are a veritable means to propagate and encourage the improvement and growth of agriculture through farmers with related situation and limitations (credit access, technical knowhow/information dissemination, inputs and marketing) coming together to offer solution at their level. SHFs having access to the ample amount of credit has the potential to better their livelihood and stimulates agricultural productivity (Ajah, Igiri and Ekpeyong, 2017). Cooperative membership was adjudged as one of the main socio-economic factor that improves the income of women in rural areas; however their age was recognised as a factor encumbering their annual income growth (Mukaila, Falola and Akanbi, 2021). Sikwela and Mushunje (2013) employing Tobit and Propensity Matching Score procedure, revealed household, education level, nearness to the market as significantly and positively affecting the farmers wellbeing. Farmers' associations have in the past created monopolies by their sheer organisation and have caused the reduction of price to the detriment of the famers, they are also known to have detracted from the farmers income and general wellbeing by introducing charges in different guises (Vu, Ho, and Le, 2020; Omonona and Agoi, 2017 and Oladele, 2017).

Farmers associations have been found to positively impact their members' livelihood (income) through training and their adoption of climate smart technology (Fischer and Qaim, 2012). Mgendi, Mao and Qiao (2021) in their study also reported how training (a tutoring programme) helped farmers to substantially increase their productivity (output). The government of Nigeria with the intention of galvanizing agricultural productivity has initiated diverse policies and plans (programmes) through the setting of targets and motoring them to ensure compliance and the creation of conducive environment and needed infrastructure (Anigbogu, Agbasi and Okoli, 2017 and Iwuchukwu and Igbokwe, 2012).

Farmers associations have long been identified as key players in supporting agricultural development (Agricultural Productivity and Income). Vu, Ho and Le (2020) employing the tool of ordinary least square reported that farmers organisation helped their members in improving their livelihood. Using descriptive statistics and t-test Mbangari, Fonteh and Fouepe (2020) and Msuta and Urassa (2015) the analytical tool of multiple regressions revealed that members owned better assets and their income outlay was better when compared to non-members. However, findings from the study conducted by Ofori *et al.*, (2019) revealed that membership of association did not automatically confer improvement on incomes. All the studies mentioned were done in other parts of the country and the world. The need for a thorough investigation into the influence of farmers associations on income diversification among smallholder crop farmers in Bayelsa State has thus become increasingly apparent. This study aims to investigate the specific impact of farmers associations on income diversification among smallholder crop farmers in Bayelsa State, Nigeria.

METHODOLOGY

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. Figure 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 $4^{\circ}55'29''\text{N}$, $6^{\circ}15'51''\text{E}$. The Local Government Area covers an area mass of 706km^2 with a population of 524, 400 NBS (2020)

Sagbama is a Local Government Area in the West Senatorial District of the State, Sagbama town is the headquarters, on coordinates ($5^{\circ}9'8.06''\text{N}$, $6^{\circ}11'32.92''\text{E}$). The population is about 278,200 and covering an area of 951km^2 according to 2020 census. Finally Ogbia Local Government Area (East Senatorial District) and lies on the coordinates $4^{\circ}39'00''\text{N}$ $6^{\circ}16'00''\text{E}$, with a population of about 267, 400 and an area of 695km^2



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

The members of Maize Association of Nigeria and the non members in the selected areas was 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, H_0 , if $t_{cal} > t_{tab}$ 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.

OLS – Ordinary Least Square'

Additionally, the tool of OLS regression model was also applied to ascertain the effects of some socio-economic characteristics of the small-scale farmers (members of MAAN and non-members) on their incomes level. (Eze and Nwibo, 2014 and Ademiluyi, 2014).

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e$$

Where; Y = Farmers' Incomes (N)

B_0 = intercept

$B (1,2,3, \dots, 10)$ = estimated coefficients

X_1 = age (years)

X_2 = farming experience (years)

X_3 = farm size (Ha)

X4 = household size (number)

X5 = gender (male = 1, female = 0)

X6 = education (in years)

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

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

X9 = credit access (yes= 1, No = 0)

e = error term

RESULTS AND DISCUSSION

Table 1.1: Result of z-test for test of significance for the difference between the total Incomes of members of MAAN and non-members.

Variables	Obs.	Mean	Std. Error	Std. Dev.	z-test estimate
total income members	150	375280	51491.62	6304.41	
total income non-members	150	362160	35725.1	437541.4	
					0.2093
diff		13120	62671.13		($\alpha=0.4172$)

NB: *** = Significant at $p < 0.05$

H_0 accepted at the 0.05 level

Data was collected from 150 observations for both members and non-members of the organisation; table 1.1 shows the mean total income for members is N 375,280, with a standard error of N 51,491.62 and a standard deviation of N 6,304.41. The mean total income for non-members is N 362,160, with a standard error of N 35,725.1 and a standard deviation of N 43,7541.4. The z-test estimate is 0.2093, suggesting that the difference between the means of the two groups is 0.2093 standard deviations. The absolute difference in total income between members and non-members is N 13,120 with a standard deviation of N 62671.13. The result of the z-test indicates that the difference between the total incomes of members and non-members is not statistically significant. With a p-value of 0.4172, it can be concluded that the null hypothesis, which assumes that there is no significant difference between the total incomes of members of the MAAN organisation and non-members, is accepted at the 0.05 significance level. This finding strongly resonates with that of Ofori *et al.*, (2019) that membership of association did not bestow improvement on incomes

Table 1.2: Estimated OLS regression results for income

total income	Coeff.	Std. Err.	t	P > t
age	8433.522	3820.726	2.21	0.028
farming experience	-3565.7	4313.667	-0.83	0.41
farm size	751439	167244.9	4.49	0.000
household size	15712.14	12026.26	1.31	0.192
gender	6870.382	59402.5	0.12	0.908

education	14842.23	6747.816	2.2	0.029
membership of association	32842.97	73030.49	0.45	0.653
credit rough association	-103769	110697.3	-0.97	0.349
credit access	51327.78	119721.3	0.43	0.668
_cons	-994725	228673.2	-4.35	0.000
Number of obs = 300	F (7, 292) = 6.35			
R- squared = 0.1646	prob > 0.0000		/	

Note: *** denote 5% Significance level

The coefficient for age is 8433.522, indicating that a one-unit increase in age is associated with an increase in income by 8433.522 units. The t-value of 2.21 suggests that the coefficient is statistically significant at the 5% level (p-value of 0.028), implying that age has a significant effect on income. However; this result is at odds end variance with that of Mukaila et al., (2021) where the age of women in cooperative association has hampered their income, but in agreement with Maliwichi *et al.*, (2014), where has a positive influence on the members’ gross margin.

The coefficient for farming experience is -3565.703, suggesting that more experience is associated with a decrease in income. The t-value of -0.83 indicates that the coefficient is not statistically significant at the 5% level (p-value of 0.410), implying that farming experience may not have a significant effect on income. The result of this study is contrary to that of (Maliwichi *et al.*, 2014).

The coefficient for farm size is 751439, indicating that an increase in farm size is associated with an increase in income. The high t-value of 4.49 suggests that the coefficient is highly statistically significant at the 5% level (p-value of 0.000), implying that farm size has a significant effect on income. The affirmation is in agreement with the result of Lowder *et al.*, (2021) and Maliwichi *et al.*, (2014), that farmers who manage/cultivate bigger farms are more likely to enlarge their income.

The coefficient for household size is 15712.14, suggesting that an increase in household size is associated with an increase in income. The t-value of 1.31 suggests that the coefficient 6870.382 is not statistically significant at the 5% level (p-value of 0.192), implying that household size may not have a significant effect on income. This assertion is clearly at variance with the result of (Sikwela and Mushunje, 2013) where household positively contributed to income-

The t-value of 0.12 and the high p-value of 0.908 indicate that gender does not seem to have a statistically significant effect on income at the 5% level.

The coefficient for education is 14842.23, suggesting that higher education is associated with an increase in income. The t-value of 2.2 suggests that the coefficient is statistically significant at the 5% level (p-value of 0.029), indicating that education has a significant effect on income This result is in tandem with that of Sikwela and Mushunje (2013) where education of the household contributed positively to income-

The coefficient for membership of the association is 32842.97, suggesting that being a member is associated with an increase in income. The t-value of 0.45 and the relatively high p-value of 0.653 indicate that membership of the association does not have a statistically significant effect on income at the 5% level. The coefficients for credit through association and credit access are -103769.1 and 51327.78, respectively. The t-values and p-values for both variables indicate that they do not have statistically significant effects on income at the 5% level. These signifies marked deviations with the findings of Ajah *et al.*, (2017) which reported a positively significant relationship between income, credit access and membership of association. However, the finding from this study replicates that of Vu, Ho and Le (2020); Omonona and Agoi (2017)

and Oladele (2017) who posited that farmers associations can sometimes be counter productive

The intercept term (constant term) is -994724.7. The t-value of -4.35 and the very low p-value of 0.000 indicate that the intercept term is statistically significant at the 5% level.

Overall, the regression results indicate that variables such as age, farm size, and education are statistically significant in explaining the variations in income. On the other hand, variables such as farming experience, household size, gender, membership of the association, credit through association, and credit access do not appear to have significant effects on income, based on the given significance level. The R-squared value of 0.1646 suggests that the model explains 16.46% of the variability in the income data, indicating that there may be other important factors not included in the model that influence income.

CONCLUSION

This study concludes that farmers should be encouraged to join associations as farmers associations play a crucial role in promoting income diversification among smallholder crop farmers in Bayelsa State, Nigeria. Their collective efforts contribute to increased resilience and improved livelihoods for smallholder farmers. The study suggests that policymakers and stakeholders should prioritize the strengthening of farmers associations and the provision of necessary support to maximize their impact on income diversification initiatives.

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