Journal of Agriculture, Environmental Resources and Management
ISSN2245-1800(paper) ISSN 2245-2943(online)
7(8)1-800**Mav.**.2025: pp50-58

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Smallholder Crop Farmers in Bayelsa State: Challenges and Implications for Food Security

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Abstract

This study examines food security and the constraints experienced by members and non-members of the Maize Association of Nigeria (MAAN) and the implications for Food security in Bayelsa State. Using a two-stage sampling technique, data were collected from 300 respondents (150 MAAN members and 150 non-members). Constraints were ranked via a five-point Likert scale. Findings show that non-members face critical challenges such as interfacing (mean = 4.41), grant access (mean = 4.26), and improving primary income (mean = 4.18), while members struggle more with financial decision-making (mean = 4.43), limited training and extension services (mean = 4.33), and output increase (mean = 4.29). Common constraints across both groups include inadequate post-disaster support and limited access to credit facilities. Income analysis using Z-test revealed that although MAAN members had a higher mean income (₦375,280) than non-members (₦362,160), the difference (₦13,120) was not statistically significant (z = 0.2093, p = 0.4172), suggesting MAAN membership does not directly influence total income. However, credit access differed significantly as members reported a mean score of ₦65,480 compared to ₦32,333 for non-members, a statistically significant difference (z = 4.1193, p = 0.000). To strengthen smallholder resilience and food security, the study recommends enhancing financial literacy, expanding extension services with climate-smart training, broadening grant and loan access, promoting cooperative membership, improving market linkage for better price negotiations, and establishing robust post-disaster insurance systems. Long-term monitoring is advised to track how credit improvements can eventually drive income and food security gains.

Keywords: Constraints, Maize Association of Nigeria, Bayelsa State, Likert scale, Agricultural productivity

Introduction

Smallholder crop farmers are central to Nigeria's agriculture, especially in Bayelsa State, where they support food production despite the dominance of the oil sector. However, they face numerous challenges that limit productivity and income. These include poor access to quality inputs, credit, land, extension services, and market linkages (FAO, 2022; Nwankwo, Oguoma and Ibe, 2020). Access to credit is especially problematic due to high-interest rates, stringent collateral demands, and the perception of agriculture as high-risk (Olomola, 2017). Consequently, farmers struggle to invest in improved seeds, fertilizers, and equipment. Market access is another hurdle, poor rural infrastructure leads to high transport costs and post-harvest losses. Middlemen often exploit farmers, who lack access to urban markets and timely market information (Nwaobiala, 2018). Low education levels and limited extension services further constrain their ability to adopt modern farming methods (Okorodudu, 2018). Bayelsa's ecological and environmental challenges: swampy terrain, heavy rainfall, flooding, and climate change severely hinder agricultural productivity and food security (Efe, 2019; Nlerum & Umoren, 2017). Unpredictable weather, coupled with unsustainable practices like slash-and-burn, leads to soil erosion, nutrient loss, and declining yields (Nwankwo & Onyeka, 2019). These factors collectively undermine the capacity of smallholder farmers to contribute meaningfully to rural development and sustained food production. Customary land tenure systems create insecurity and discourage long-term investment (Ebeku, 2017). Weak government support, poor infrastructure, and ineffective policy implementation further marginalize smallholder farmers (Nwaobiala, 2018; World Bank, 2021). These issues reduce productivity, increase post-harvest losses, and limit market access and income, thereby threatening food security. Addressing these interconnected problems is essential for improving agricultural outcomes and achieving Sustainable Development Goal 2—zero hunger—in Bayelsa State.

Smallholder farmers in Bayelsa State play a crucial role in ensuring food security and bolstering the economic stability of the region. Despite their importance, these farmers face numerous persistent challenges that significantly undermine their contributions. Among the most pressing issues are restricted access to financial resources, inadequate infrastructure, environmental degradation, and insufficient

extension services. These obstacles collectively impair the productivity and sustainability of smallholder farming operations, endangering the livelihoods of the farmers and the overall food security of the region. This study aims to thoroughly investigate these challenges and assess whether membership in a farmers' association can significantly mitigate their impact (Bachke 2009)

Materials and Methods: This study was conducted in Bayelsa State, Nigeria, with a population of 2,394,725 as of 2020 (NPC, 2020). It covered all three Senatorial Districts: Central (Yenagoa, Southern Ijaw, Kolokuma-Opokuma), East (Brass, Ogbia, Nembe), and West (Sagbama, Ekeremor). Bayelsa is bordered by Rivers State (east), Delta State (west), and the Atlantic Ocean (south) (Brisibe & Pepple, 2018). Key study areas included Yenagoa - population: 352,285; area: 706 km², Sagbama - 188,000; 945 km² and Ogbia - 180,000; 695 km² (NPC, 2020).

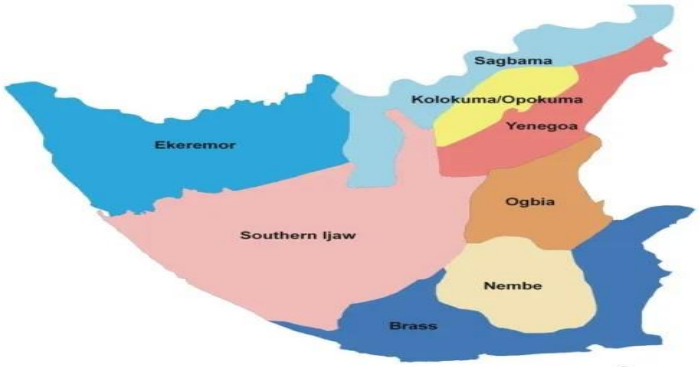

Figure 2: Map of Bayelsa State Showing the Eight (8) Local Government Areas. Source: https://reliefweb.int/organization/ocha

The study population comprised members and non-members of the Maize Association of Nigeria (MAAN). A two-stage sampling method was used, selecting these three LGAs - Ogbia, Sagbama, and Yenagoa for their maize activities. From each LGA, 50 MAAN members and 50 non-members were randomly chosen, totaling 300 respondents for the study. Data was analyzed using descriptive statistics (percentages) and Z-test. The Z-test formula is:

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

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.

The mean score on a Likert scale was used to determine the average scores of variables (Croasmun and Ostrom, 2011). The five-point Likert scale was structured as follows:

Opinion	Point
Strongly Agree (SA)	5
Agree (A)	4
Undecided (UD)	3
Disagree (D)	2
Strongly Disagree (SD)	1

To evaluate whether members of farmers' organizations benefit, a 5-point Likert scale was utilized. This scale was defined as follows: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. The benefits were assessed using a weighted mean (X). The average score was calculated as 5 + 4 + 3 + 2 + 1 = 15, divided by 5, giving a cutoff point of 3. Therefore, any item with an average score of 3 or higher was considered "a serious constraint to the SHF," while items with an average score of less than 3 are considered as not a serious constraint to the SHFs.

Results and Discussions: The results presented in Table 1 show that MAAN members had a mean total income of ₦375,280 compared to ₦362,160 for non-members, reflecting a difference of ₦13,120. However, the z-test statistic (0.2093) yielded a p-value of 0.4172, which is above the 0.05 significance level. This means the difference is not statistically significant, and the null hypothesis (H_{01}), stating no significant difference in income between members and non-members is accepted. While MAAN offers benefits like training and access to inputs, these do not appear to significantly increase total income, suggesting a need for the association to better align its services with members' financial outcomes. Table 2 presents results on credit access. MAAN members had a mean credit access score of ₦65,480, while non-members had ₦32,333, a substantial difference of ₦33,146. The z-test result (4.1193) and p-value (0.000) indicate a highly significant difference, leading to the rejection of the null hypothesis (H_{02}) at the 5% level. This suggests that MAAN membership substantially improves access to credit, likely through collective bargaining, group-based lending, or increased credibility with lenders. Strengthening such organizations may be vital for improving rural finance and boosting agricultural productivity.

Bachke (2009) noted that farmer groups can enhance the welfare of smallholders in developing countries by addressing shared challenges through collective action. Many constraints faced by non-members could be mitigated by joining associations that meet their needs. Table 3 ranks the top five constraints faced by MAAN members and non-members. For non-members, the most critical issues include interfacing (Mean: 4.41), grant access (4.26), improving income/accessing loans/post-disaster aid (4.18), accessing inputs (4.17), and disaster mitigation (4.12). These concerns highlight limited institutional support and vulnerability to external shocks. For MAAN members, top constraints include financial decision-making (4.43), training and improving secondary income (4.33), increasing output (4.29), and post-harvest management/disaster aid (4.25). These findings suggest that members focus more on enhancing technical capacity and financial management. Overall, while both groups face overlapping challenges, MAAN members tend to emphasize financial literacy and productivity, whereas non-members are more burdened by access-related issues and systemic vulnerabilities. This underscores the importance of strengthening farmer associations like MAAN to address both technical and institutional barriers in Nigeria's agricultural sector.

Conclusion/Recommendations: The findings provide a clear picture of how MAAN (Maize Association of Nigeria) membership affects smallholder farmers in Bayelsa State. While MAAN members report a slightly higher average income (₦375,280) than non-members (₦362,160), the difference is not statistically significant (z = 0.2093, p = 0.4172), suggesting that membership does not directly raise income in the short term. However, a key advantage of MAAN membership is significantly improved access to credit, with members recording a mean score of ₦65,480 compared to ₦32,333 for non-members (z = 4.1193, p = 0.000), highlighting the association's role in promoting financial inclusion. Constraints differ across groups: non-members face barriers in accessing grants and agricultural networks, while members struggle with financial decision-making and limited training. Both groups experience challenges in securing loans and post-disaster assistance. Recommendations include promoting income growth through better market access and price negotiations, strengthening financial literacy via regular training, broadening grant access for non-members, encouraging more farmers to join MAAN, enhancing disaster resilience with insurance and early warning systems, boosting extension services by offering modern, climate-smart farming training, and conducting long-term studies to assess how improved credit access translates into greater income and resilience over time.

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Tables

Table .1: Summary of Results of z- test for test of significance for difference between the total income of MAAN members 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	
Diff		13120	62671.13		0.2093 ***(α=0.4172)

NB: *** = not Significant at p > 0.05
$H0_1$ accepted at the 0.05 level

Table 2: Summary of Results of z- test for test of significance for difference between the mean credit score of members of MAAN and non - members

Variables	Obs.	Mean	Std Error	Std Dev	z-test estimate
Credit access members	150	65,480	4690.59	5744.89	
Credit access non - Members	150	32,333	6538.25	80076.86	

Diff	33146	8046.76	4.1193 ***(α=0.000)

NB: *** = Significant at $p < 0.05$
$H0_2$ rejected at the 0.05 level

Table 3: Result of constraints faced by both members of Maize Association of Nigeria (MAAN) and Non-members

	Non- Members			150					Members			
	strongly agree	agree	undecided	strongly disagree	disagree	TSS	mean score	Rank		strongly agree	agree	undec
Interfacing	380	264	15	0	3	662	4.41	1	Making Financial decision	295	340	3
Accessing grants	295	324	15	0	5	639	4.26	2	Training & Extension	360	256	24
Improving primary income	205	404	9	8	1	627	4.18	3	Improving secondary income	355	268	18
Accessing loan	250	344	21	10	2	627	4.18	3	Increasing output	320	300	12
Post disaster assistance	315	252	45	12	3	627	4.18	3	Post-harvest management	310	292	24
Accessing inputs	245	356	15	4	5	625	4.17	6	Post disaster assistance	315	280	33
Disaster mitigation	240	336	30	8	4	618	4.12	7	Improving primary income	265	336	24
Increasing output	185	392	21	2	7	607	4.05	8	Accessing inputs	300	304	15
Improving secondary income	255	264	66	8	7	600	4.00	9	Acquiring assets	285	300	36
Housing & Health	135	400	33	10	7	585	3.90	10	Accessing grants	280	300	39
Consumption/spending	135	360	57	18	8	578	3.85	11	Interfacing	265	324	27
General management	150	376	33	8	11	578	3.85	11	Source for market	235	348	24
Acquiring assists	180	252	114	18	4	568	3.79	13	General management	245	316	42
Making Financial decision	215	312	9	4	23	563	3.75	14	Consumption/spending	230	336	30
Training & Extension	105	292	42	28	28	495	3.30	15	Savings	240	284	48
Gender equity	105	260	75	22	28	490	3.27	16	Disaster mitigation	330	228	24
Source for market	70	240	114	24	26	474	3.16	17	Housing & Health	195	344	39
Post-harvest management	70	240	114	24	26	474	3.16	17s	Accessing loan	230	288	30
Managing assets	150	172	90	26	34	472	3.15	19	Managing assets	195	296	45
Savings	50	216	72	66	29	433	2.89	20	Gender equity	160	324	63

Source: Computed from field survey, 2023