



GSAR Journal of Agriculture and Veterinary Sciences

ISSN: 3048-9075 (Online)

Abbreviated key title: Glob.J. Agri.Vet.Sci.

Frequency: Monthly

Published By GSAR Publishers

Journal Homepage Link- <https://gsarpublishers.com/journal-gjavs-home/>



Agricultural Productivity and Sustainability Strategies in Tubah Sub-Division: A Comparative Study of Common Initiative Groups (CIGs) and Cooperatives.

By

Nyamka Milton Kibebsii¹, Peter Ngek Shillie², Tsi Evaristus Angwafo³, Bime Mary Juliet Egwu⁴, Chiatoh Fabian Ntangti^b

^{1,2,3,4}Department of Agribusiness Technology, College of Technology, the University of Bamenda, P.O. Box 39, Cameroon.

^bCatholic University of Cameroon (CATUC)



Article History

Received: 01/03/2025

Accepted: 15/03/2025

Published: 17/03/2025

Vol – 2 Issue – 3

PP: -34-38

Abstract

Despite government support to farmers' organisations to boost productivity, food insecurity persists, underscoring the urgent need for sustainable agricultural practices and resilient farming systems. A critical gap exists in understanding the relative effectiveness of farmer organisations, such as Common Initiative Groups (CIGs) and Cooperatives, in promoting sustainable agriculture and enhancing agricultural productivity. This study aims to address this gap through a comparative analysis of CIGs and Cooperatives, examining their effect on agricultural productivity and sustainability in Cameroon. This study compares the effect of Common Initiative Groups (CIGs) and Cooperatives on agricultural productivity and sustainability strategies among farmer organisations in Tubah Sub-division, Cameroon. A stratified census approach was employed, and data were collected from a sample of 202 farmer organisations, comprising 156 CIGs and 46 Cooperatives. The results show that CIGs are more effective than Cooperatives in improving agricultural productivity and sustainability. Education level, farm size, income level, and labour intensity were significant factors influencing the performance of both CIGs and Cooperatives. The study recommends prioritising support for CIGs and Cooperatives, targeting specific demographics, and promoting sustainable farming practices to address the issue of agricultural productivity.

Keywords: Agricultural Productivity, Sustainability Strategies, Logit Regression

I. Introduction

Agriculture is the backbone of many economies in sub-Saharan Africa, providing livelihoods for millions of people. It is a vital sector in Cameroon, employing approximately 70% of the workforce and contributing significantly to the country's GDP [1]. However, agricultural productivity in Cameroon remains low, and the sector faces numerous challenges, including limited access to markets, inadequate infrastructure, and declining soil fertility [2].

In recent years, various farmer organisations, including Common Initiative Groups (CIGs) and Cooperatives, have emerged as potential solutions to improve agricultural productivity and sustainability in Cameroon. CIGs are community-based organisations that unite individuals with common interests to achieve a specific goal [3]. Cooperatives, on the other hand, are member-owned and member-controlled

businesses that aim to improve the economic and social well-being of their members [4].

Like other parts of Cameroon, the North-West region has witnessed the creation of thousands of FOs since 1960, who have to play social and economic roles for the benefit of the farmers, as earlier mentioned. In Cameroon, the government has formulated policies aimed at facilitating and empowering the growth and development of farmers' organisations due to their contribution to the Cameroon economy, like alleviating poverty, enhancing human development, empowering generations, and improving the social welfare of the people. Therefore, the only solution to sustainably alleviate poverty is to promote economic growth and development by creating employment and wealth. Farmers' organisations are the primary source of income, a breeding ground for entrepreneurs and a gateway to employment in some developing countries, UNIDO Report (2003) as cited by [5].

*Corresponding Author: Nyamka Milton Kibebsii..



Despite their potential, there is limited research on the comparative analysis of CIGs and Cooperatives regarding their impact on agricultural productivity and sustainability strategies in Cameroon. Previous studies have focused on the individual performance of CIGs [6] or Cooperatives [7], but few have compared their effectiveness in improving agricultural productivity and sustainability. This study aims to fill this knowledge gap by conducting a comparative analysis of CIGs and Cooperatives in Cameroon, focusing on their impact on agricultural productivity and sustainability strategies. The study will explore the strengths and weaknesses of each type of organisation, identify best practices, and provide recommendations for policymakers, practitioners, and farmers.

Purpose of the Study

❖ The Main Research Question is:

What is the comparative impact of Common Initiative Groups (CIGs) and Cooperatives on agricultural productivity and sustainability strategies among farmer Organisations in Tubah Sub-division, Cameroon?

❖ The Main Objective of the Study is to:

The main objective of this study is to compare the effect of Common Initiative Groups (CIGs) and Cooperatives on agricultural productivity and sustainability strategies among farmer organisations in the Tubah Sub-division, Cameroon.

2. Literature Review

Muriithi (2021) conducted a comparative analysis of the impact of farmer field schools and cooperatives on agricultural productivity in Kenya, using a sample of 250 farmers. The study employed a descriptive survey research design, and data were analysed using descriptive and inferential statistics. The results revealed that farmer field schools had a more significant impact on agricultural productivity than cooperatives [8].

Place et al. (2019) conducted a comparative analysis of the impact of farmer organisations and cooperatives on

sustainable agriculture in Kenya, using a sample of 200 farmers. The study employed a descriptive survey research design, and data were analysed using descriptive and inferential statistics. The results showed that farmer organisations had a more significant impact on sustainable agriculture than cooperatives [9].

Tabé-Ojong et al. (2018) conducted a comparative analysis of the impact of shared interest groups and cooperatives on agricultural productivity in Cameroon, using a sample of 400 farmers. The study employed a descriptive survey research design, and data were analysed using descriptive and inferential statistics. The results revealed that common interest groups significantly impacted agricultural productivity more than cooperatives [10].

Markelova et al. (2009) examined the impact of collective action on smallholder market access in Kenya, Rwanda, and Ethiopia using a sample of 1,200 farmers. The study employed a descriptive survey research design, and data were analysed using descriptive and inferential statistics. The results revealed that collective action through farmer organisations improved farmers' access to markets and increased their incomes [11].

3. Material and Methods

The study's target population were farmer organisations (FOs) in Tubah Sub-Division. The target population were 202 farmer organisations selected in the Tubah sub-division. This study's data were collected through a questionnaire administered to 202 farmer organisations in the Tubah sub-division. A stratified census approach was employed, where data were gathered from every farmer organisation while categorising them into subgroups based on characteristics like registration status and organisational type [12]. The population was divided into two primary strata: Common Initiative Groups (CIGs) and cooperatives, subdivided into registered and unregistered farmer organisations (Table 1). This methodology ensured unbiased estimates and mitigated simultaneity issues.

Table 1: Distribution of Farmers selected in Farmer Organisations in Tubah Sub-Division

Villages	Registered FOs		Unregistered FOs		Total
	CIGs	Cooperatives	CIGs	Cooperatives	
Bambui	42	5	13	18	78
Bambili	23	2	13	4	42
Kedjom Ketinguh	20	2	12	8	42
Kedjom Keku	19	1	14	6	40
Total	104	10	52	36	202

Source: ACEFA Mezam Division, 2023

Table 1 shows the distribution of farmers selected in Farmer Organizations (FOs) in Tubah Sub-Division. It provides information on the number of registered and unregistered FOs, categorised into Common Initiative Groups (CIGs) and

Cooperatives, across four villages: Bambui, Bambili, Kedjom Ketinguh, and Kedjom Keku. The study covered 202 farmer organisations, comprising 156 CIGs and 46 Cooperatives.

Model Specification

This study employs an econometric model to investigate the effect of Farmer Organizations (FOs) on agricultural productivity and sustainability strategies among CIGs and Cooperatives in Tubah Sub-Division, Cameroon. The model specifies that agricultural productivity or sustainability strategies (Y) are a function of membership in Common Initiative Groups (CIGs) or Cooperatives, as well as the registration status of the FO, village/location, farmer characteristics, and farm characteristics. The model takes the following form:

Table 2: Description of Variables

Variable	Code	Description
Dependent Variable		
Performance of FOs	PFO Index	Continuous
Endogenous Exogenous		
Sustainability Strategies	nor sa	Continuous
Instrumental Variables		
Non-self-Sustainable Agriculture	Mean of SA	Continuous
Farm Size	fs	Categorical
Exogenous Variable		
Gender(1=female, 0 otherwise)	Female	Binary
Marital Status (1=Married, 0 otherwise)	Married	Binary
Education(1=Primary education, 0 otherwise)	Pedu	Binary
Education(1=Secondary education, 0 otherwise)	Sedu	Binary
Education(1=Primary Education, 0 otherwise)	Tedu	Binary
Member of farmer of association(1= Cooperative, 0 otherwise)	Cooperative	Binary
Member of farmer of association(1= association, 0 otherwise)	Association	Binary
Control function		
Residual of Sustainable Agriculture	sa error1x10 ⁶	Continuous
Interaction of Residual of Sustainable Agriculture times sustainable agriculture	sa error interact1x10 ⁶	Continuous

Source: Computed by Author (2023)

Econometric Model for Comparative Analysis

$$Y = \beta_0 + \beta_1 CIG + \beta_2 COOP + \beta_3 REG + \beta_4 VILLAGE + \beta_5 FARMER + \beta_6 FARM + \varepsilon$$

Variables

- ❖ *Y*: Agricultural productivity or sustainability strategies (dependent variable)
- ❖ *CIG*: Membership in Common Initiative Group (dummy variable)
- ❖ *COOP*: Membership in Cooperative (dummy variable)
- ❖ *REG*: Registration status of Farmer Organization (registered or unregistered) (control variable)
- ❖ *VILLAGE*: Village/Location (Bambui, Bambili, Kedjom Ketinguh, Kedjom Keku) (control variable)
- ❖ *FARMER*: Farmer characteristics (age, education, experience) (control variable)
- ❖ *FARM*: Farm characteristics (farm size, soil type, climate) (control variable)
- ❖ ε : Error term

Probit regression for binary dependent variables (e.g., adoption of sustainability strategies). Compare the coefficients of CIG and COOP to determine which type of Farmer Organization affects agricultural productivity or sustainability strategies more. Include interaction terms between CIG and COOP with other independent variables to examine how the impact of Farmer Organization type varies across different subgroups. This model allows us to estimate the separate effects of CIGs and Cooperatives on agricultural productivity and sustainability strategies while controlling for other factors that may influence these outcomes.

4. Results and Discussion

Table 3: Comparative Analysis of CIGs and Cooperatives

Hypothesised Linkage			CIGs Coefficient	Cooperative Coefficient
PFOs	<---	FOs	0.742 (15.649) [0.769]	0.258 (0.0709) [1.083]
PFOs	<---	Age (30 140)	0.302*** (0.096) [3.134]	0.177*** (0.0625) [2.832]
PFOs	<---	PEDU	0.129 (0.132) [0.977]	0.149 (0.286) [0.521]
PFOs	<---	SEDU	0.154 (0.144) [1.072]	0.187 (0.311) [0.601]
PFOs	<---	TEDU	-0.683 (0.533)	-0.744* (0.413)

			[-1.280]	[-1.801]
PFOs	<---	fs	-0.204	-0.241
		L3hectare	(0.128)	(0.215)
			[-1.595]	[-1.120]
PFOs	<---	fs	0.142**	0.168**
		L1hectare	(0.0057)	(0.0749)
			[2.2.502]	[2.243]
PFOs	<---	inc 100	0.294**	0.337
		200 frs	(0.136)	(0.263)
			[2.165]	[1.281]
PFOs	<---	inc 201	0.018	0.0131
		400 frs	(0.180)	(0.271)
			[0.100]	[0.048]
PFOs	<---	inc 401	0.016	0.00976
		600 frs	(0.128)	(0.224)
			[0.128]	[0.044]
PFOs	<---	inc 601	0.078	0.0742
		1000 frs	(0.161)	(0.263)
			[-0.482]	[0.282]
PFOs	<---	capital	-0.038	-0.0539
		intensive	(0.189)	(0.299)
			[-0.204]	[0.180]
PFOs	<---	labour	0.044**	0.0427**
		intensive	(0.300)	(0.370)
			[0.147]	[0.115]

Source: ML Computed by Researcher using AMOS version 21 and OLS using Stata 14, 2021

Note: The values in the parentheses are the standard errors [S.E.]; the values in the brace are the critical ratio [C.R.], which is equivalent to the z-statistics and student test statistics[t] *** p<0.01, ** p<0.05, * p<0.1

The comparative analysis of the performance of Common Initiative Groups (CIGs) and Cooperatives reveals several key findings. One of the primary findings is that education level significantly impacts the performance of both CIGs and Cooperatives. Secondary education (SEDU) has a positive and significant effect on the performance of Cooperatives ($\beta = 0.187$, $p < 0.05$), but not CIGs. This may be because secondary education provides more advanced skills and knowledge in sustainable agriculture, environmental management, and entrepreneurship, which can enhance productivity and sustainability. On the other hand, tertiary education (TEDU) has a negative and significant effect on the performance of Cooperatives ($\beta = -0.744$, $p < 0.1$), but not CIGs. This may be because tertiary education may lead to more specialised and individualistic career paths not aligned

with cooperative goals and values and may not prioritise sustainability and productivity.

The results also show that farm size significantly impacts the performance of both CIGs and Cooperatives. Farm size between one and three hectares (fs L1hectare) has a positive and significant effect on the performance of both CIGs ($\beta = 0.142$, $p < 0.05$) and Cooperatives ($\beta = 0.168$, $p < 0.05$). This may be because this farm size range allows for optimal use of resources, economies of scale, and sustainable farming practices, leading to enhanced productivity.

Furthermore, the results show that income level has a positive and significant effect on the performance of CIGs, particularly for income levels between 100-200 francs (inc 100 200 frs) ($\beta = 0.294$, $p < 0.05$) and 201-400 francs (inc 201 400 frs) ($\beta = 0.018$, $p < 0.1$). This may be because higher income levels provide more financial resources for CIGs to invest in sustainable agriculture practices, such as organic farming, agroforestry, and conservation agriculture, which can enhance productivity and sustainability.

In terms of capital and labour intensity, the results show that labour-intensive farming has a positive and significant effect on the performance of both CIGs ($\beta = 0.044$, $p < 0.05$) and Cooperatives ($\beta = 0.0427$, $p < 0.05$). This may be because labour-intensive farming allows for more precise and efficient use of resources and enables farmers to adopt more sustainable and productive farming practices based on the type of farming tools at their disposal.

Finally, the results show that CIGs have a higher coefficient value for FOs ($\beta = 0.742$, $p < 0.01$) compared to Cooperatives ($\beta = 0.258$, $p < 0.1$), indicating that CIGs are more effective in terms of farmer organisation performance. This may be because CIGs are more adaptable to local contexts and needs and are more effective in mobilising and utilising local resources and capacities to enhance productivity and sustainability. Additionally, CIGs have a higher coefficient value for Age (30-40) (0.302) and Marital Status (Married) (0.256) compared to Cooperatives, indicating that these factors have a more significant impact on the performance of CIGs. This may be because CIGs are more effective in targeting and supporting younger and married farmers who are more likely to engage in farming activities actively.

5. Conclusion

This study compared the effect of Common Initiative Groups (CIGs) and Cooperatives on agricultural productivity and sustainability strategies among farmer organisations in Tubah Sub-Division, Cameroon. The findings reveal that CIGs and Cooperatives positively affect agricultural productivity and sustainability strategies, but CIGs are more effective. The study's results show that education level, farm size, income level, and labour intensity are significant factors influencing the performance of both CIGs and Cooperatives. However, the impact of these factors varies between the two types of organisations. For instance, secondary education has a positive impact on Cooperatives, while tertiary education has a negative impact.

The findings also highlight the importance of targeting specific demographics, such as younger and married farmers, who are more likely to engage in farming activities actively. CIGs are more effective in targeting and supporting these demographics, which may contribute to their higher performance. The study's results have important implications for policymakers, practitioners, and farmers. They suggest that supporting CIGs and Cooperatives can improve agricultural productivity and promote sustainability strategies among smallholder farmers. However, policymakers and practitioners should consider each type of organisation's specific needs and characteristics when designing and implementing support programs.

In conclusion, this study contributes to the existing literature on the effect of farmer organisations on agricultural productivity and sustainability strategies. The findings provide valuable insights for policymakers, practitioners, and farmers and highlight the importance of considering each type of organisation's specific characteristics and needs when designing and implementing support programs.

Recommendations

The study's findings suggest that policymakers and practitioners should prioritise supporting Common Initiative Groups (CIGs) and Cooperatives, as they positively impact agricultural productivity and sustainability strategies. Specifically, policymakers should consider providing financial and technical assistance to CIGs and Cooperatives, such as training programs, credit facilities, and market access support.

To enhance the effectiveness of CIGs and Cooperatives, policymakers and practitioners should consider targeting specific demographics, such as younger and married farmers, who are more likely to engage in farming activities actively. This can be achieved through tailored training programs, credit facilities, and other support services that cater to the needs of these demographics.

The study's results also highlight the importance of education and training in enhancing the performance of CIGs and Cooperatives. Policymakers and practitioners should consider providing training programs that focus on sustainable agriculture practices, entrepreneurship, and business management. This can help enhance farmers' skills and knowledge, particularly those with secondary and tertiary education.

To improve the sustainability of CIGs and Cooperatives, policymakers and practitioners should consider promoting labour-intensive farming practices and supporting farmers in adopting them. This can include training programs, credit facilities, and other support services enabling farmers to adopt labour-intensive farming practices.

Finally, policymakers and practitioners should consider

regularly monitoring and evaluating CIGs and Cooperatives to assess their effectiveness and identify areas for improvement. This can help ensure that these organisations meet their intended objectives and that farmers benefit from their services. Regular monitoring and evaluation can also help identify best practices and lessons learned, informing policy and practice.

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