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CONTRIBUTIONS OF AGRICULTURAL COOPERATIVE SOCIETIES TO SUSTAINABLE FARM PERFORMANCE OF SMALLHOLDER FARMERS IN AYAMELUM LOCAL GOVERNMENT AREA, ANAMBRA STATE

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ABSTRACT

Agricultural cooperatives play a critical role in improving the productivity and livelihoods of smallholder farmers through improved access to farm inputs, collective marketing, extension support, and economies of scale. Despite these potentials, empirical evidence on the extent to which agricultural cooperatives contribute to sustainable farm performance among smallholder farmers in Ayamelum Local Government Area of Anambra State remains limited. This study therefore examined the contributions of agricultural cooperative societies to sustainable farm performance of smallholder farmers in Ayamelum local government area**,** Anambra State, Nigeria. The population of this study comprises of all active farmers' cooperative societies in Ayamelum local government area of Anambra State. There are 37 registered farmers cooperatives in the study area with a membership strength of 482. The sample size used was 219 cooperative members using Taro Yamane formular. Objectives were processed using descriptive statistics (like percentage, mean and standard deviation) and the regression model of the Ordinary Least Square (OLS). T-test and F-test statistics were used to test the hypotheses of the study and the overall fitness of the model. All the analyses were done using SPSS version 23. Linear regression model of the Ordinary Least Square (OLS) approach was used to analyze the objectives. The regression model is significant at .000 which is less than 0.05 thus confirming that cooperative member's farm performance in the area was dependent on farm inputs obtained and value of agricultural products marketed through cooperative. It was concluded from the findings of the study, that cooperative significantly affects the performance of smallholder farmers in Agricultural zone of Anambra State. Based on the findings of the study the researcher recommends among others that cooperative society should endeavor to meet the farm input needs of the farmers so as to increase their yield, their profit and also improve their performance and Anambra State government should encourage research, development and extension of adequate extension services to smallholder farmers through the Ministry in charge of cooperative in the state.

Keywords: Agricultural Cooperatives, Smallholder Farmers, Farm Performance

INTRODUCTION

Background to study

A cooperative is a business organization owned by the members who use the services of the cooperative. Control rests equally with all members and surplus earnings are shared by members in proportion to the degree they use the services. It is further defined as a business owned and controlled by the people who use its services. They finance and operate the business or service for their mutual benefit. By working together, they can reach an objective that would be unattainable if acting alone. The purpose of the cooperative is to provide greater benefits to the members such as increasing individual income or enhancing a member's way of living by providing important needed services. The cooperative, for instance, may be the vehicle to obtaining improved markets or providing sources of supplies or other services otherwise unavailable if members acted alone (Okwara and Uhuegbulem, 2017).

There is no conventionally or universally accepted definition of smallholder farming systems and often the term smallholder is used interchangeably with family-farmer, small-scale farmer, resource-poor, subsistence, and low-income. Most of the existing definitions are centred on some of the common characteristics of smallholder farmers such as access to land, land size, labour, resource endowment or capital, technology and market orientation. (Kamara, Conteh, Rhodes and Cooke, 2019).

According to (Mgbenka and Mba, 2016), smallholder farmers are farmers whose production capacity falls between 0.1 and 4.99 hectares holding. Smallholder farmers supply about 70 per cent of Africa's total food requirements and provide around 80 per cent of the food consumed in both Asia and sub-Saharan Africa. (World Bank, 2015).

Smallholder farmers are the suppliers of food to the tables of Nigerians. They are the backbone of the Nigerian agricultural sector and deserve every support to produce more food, grow more raw materials for the agro-industrial sector and contribute in ending a food supply deficit that costs the country US$10 million in food import annually. A characteristic feature of the agricultural production system in Nigeria is that a disproportionately large fraction of the agricultural output is in the hands of these smallholder farmers whose average holding is about 1.0-3.0 hectares. According to Federal Office of Statistics (1999), smallholder farmers are farmers whose production capacity falls between 0.1 and 4.99 hectares holding. (Mgbenka and Mbah, 2016). Farm performance typically refers to the efficiency and effectiveness of agricultural operations in terms of productivity, profitability, sustainability, and other relevant metrics. Several factors contribute to farm performance, including crop yields, livestock productivity, input usage, technology adoption, environmental impact, and economic viability (FAO, 2017). Cooperatives can enhance farm performance by pooling resources, sharing knowledge, accessing markets, and improving bargaining power. Small-scale farmers often face challenges related to limited access to land, water, credit, and inputs such as seeds and fertilizers. These resource constraints can affect farm performance. Cooperatives can enhance farm performance by pooling resources, sharing knowledge, accessing markets, and improving bargaining power.

Statement of the Problem

Agricultural cooperatives play an important role in improving smallholder farmers' livelihoods and reducing poverty by enabling economic growth, skills development, partnership building and creating employment. Smallholders produce the bulk of food in developing countries, they produce

70 per cent of Africa's food supply (IFAD, 2003 cited in Sabo et al, 2017) and an estimated 80 per cent of the food consumed in Asia and sub-Saharan Africa together. In Latin America, smallholder farmers occupy almost 35 per cent of total cultivated land. The importance of smallholder farmers as food producers and the fact that they comprise such a large proportion of the world's poor indicate that their development significantly helps reduce poverty and hunger. These may be noticeable in terms of positive impact in sub-Saharan Africa and South Asia.

Agriculture remains a cornerstone of the Nigerian economy, especially in the rural areas of Southeast Nigeria, where the majority of the population relies on farming as their primary source of livelihood. Smallholder farmers in this region, who cultivate less than two hectares of land, face numerous challenges that impede their productivity and farm performance. These challenges include poor access to quality inputs, inadequate infrastructure, limited access to credit, lack of mechanization, poor market access, and weak agricultural extension services (Afolami et al., 2021). Despite the critical role that smallholder farmers play in ensuring food security, their productivity remains low, contributing to persistent rural poverty and food insecurity in the region. The formation of agricultural cooperatives has been suggested as a potential solution to these challenges. Cooperatives, by design, are collective organizations that allow farmers to pool their resources, improve access to inputs and markets, share knowledge, and strengthen their bargaining power (Okeke et al., 2020). Despite their importance in global and regional food production, smallholder farmers comprise the majority of the world's undernourished population and those living in absolute poverty. Increasing fragmentation of landholdings, coupled with reduced investment support and marginalization of small farms in economic and development policy, threaten this contribution, leaving many smallholders vulnerable to poverty. They operate in areas with incomplete or missing markets, incur high transaction costs, are unable to bargain for better terms and face difficulties accessing information (Amare et al., 2019).

Some of the empirical studies reviewed are that of Ahmed and Mesfin (2017), analyzed the impact of agricultural cooperatives on the wellbeing of small-holders famers in Ethopia using estimation methods and indicated that membership of agricultural cooperatives has a positive impact on the well-being of smallholder farmers. Ogunnaike, Osinowo and Idowu, (2023) examined effect of Cooperative Membership on Poverty Status of Smallholder Farmers in Yewa Division Ogun State, Nigeria. Multi-staged sampling technique was used and confirmed that having access to loans, and amounts of loans accessed could lead farmers out of poverty. Ndimbwa, Mwantimwa and Ndumbaro, (2022) studied Smallholder farmers' satisfaction with agricultural information accessed in rural Tanzania. The study employed a descriptive cross-sectional design alongside quantitative and qualitative approaches and confirmed that Smallholder farmers' satisfaction with agricultural information fosters uptake of innovative farming techniques which translates into sustainable agricultural production. Furthermore, the few Nigerian studies available have largely concentrated on southwestern and northern regions of the country, with limited empirical evidence from southeastern Nigeria, particularly Ayamelum Local Government Area of Anambra State. Ayamelum is one of the state's major food baskets, yet smallholder farmers continue to face persistent challenges such as inadequate access to quality farm inputs, weak marketing systems, fluctuating produce prices, poor rural infrastructure, and limited institutional support. Whether agricultural cooperatives have significantly mitigated these challenges and improved sustainable farm performance within this unique agricultural environment remains insufficiently documented.

This study therefore addresses this empirical gap by examining the contributions of agricultural cooperative societies to sustainable farm performance among smallholder farmers in Ayamelum Local Government Area by focusing on two key areas: farm inputs and cooperative marketed agricultural products.

Objectives of the Study

The broad objective of this study is to establish the contributions of agricultural cooperative societies to sustainable farm performance of smallholder farmers in Ayamelum local government area**,** Anambra State. The specific objectives are to:

1. examine the influence of farm inputs from the cooperatives on farm yields of smallholder farmers.
2. determine the effect of cooperative marketed agricultural products on farm revenue of small holder farmers.

Hypotheses

H_{01}: Farm inputs from cooperatives have no significant effect on farm yields of Small holder farmers.

H_{02}: Cooperative marketed agricultural products have no significant effect on farm revenue of small holder farmers.

CONCEPTUAL FRAMEWORK

Agricultural Cooperative

Predominantly, farming is the main occupation of Nigeria and in recent years, the business of farming has been relegated to those within the rural communities. Frederick, Elizabeth and Obimbua, 2021 maintained that over 80% of farmers in Nigeria are small scale farmers. These smallscale farmers mostly are rural dwellers with low incomes because they produce on subsistence basis with little surplus to sell and raise money to satisfy those things they cannot produce by themselves. This therefore ensure there is a continuous advocacy for achieving economic sustainability through agriculture within the rural communities by policy makers and scholars who at different times have ensured that efforts have been directed at finding appropriate structure for organizing millions of small-scale farmers towards achieving food security and increase rural dwellers standard of living. Agricultural cooperative society has been touted as the appropriate vehicle for harnessing and polling the resources of millions of small holder farmer producers together to enjoy the benefit of large-scale production (Ezekiel, 2023). Likewise, agricultural cooperatives improve the living standards of their members by identifying economic opportunities for the poor, empowering the disadvantaged to protect their interests, providing security to the poor by converting individual risks into collective risks, marketing farmers' produce and providing savings and credit facilities to farmers.

Smallholder Farmers

There is no conventionally or universally accepted definition of smallholder farming systems and often the term smallholder is used interchangeably with family-farmer, small-scale farmer, resource-poor, subsistence, and low-income. Land size is the criterion most commonly employed in the definition. Most of the existing definitions are centered on some of the common characteristics of smallholder farmers such as access to land, land size, labour, resource

endowment or capital, technology and market orientation. (Kamara, Conteh, Rhodes and Cooke, 2019). Smallholders are those with a low asset base operating less than two (2) hectares of cropland. (World Bank, 2015). Smallholders are farmers, pastoralists, forest keepers, fishers who manage areas ranging from less than one hectare to two hectares, they are characterized by family-focused motives such as favoring the stability of farm household system, using mainly family labour for production and using part of the produce for family consumption. (FAO, 2012). Overall, smallholder farmers are characterized by marginalization, in terms of accessibility, resources, information, technology, capital and assets, but there is great variation in the degree to which each of these applies. Small holder farming system characterizes Nigeria's food production system. The system is operated on small farms, family-owned, rented, or leased as a dominant form of agriculture.

Agricultural Farm Inputs

Farm inputs are the resources that are used in farm production, such as chemicals, equipment, feed, seed, and energy. The backbone of any agricultural revolution is farmers' access to modern agricultural inputs. Agricultural inputs are a great determinant of yields in any type of agricultural production. In the modern world today, agriculture has become extremely dynamic therefore, making the kind of inputs that are being used in the sector today upgraded. Farm inputs come in a wide array from the most common which include but not limited to; Manure, Farm chemicals, Machinery, Seeds, Water (Muchunu, 2017). These agricultural inputs range from improved seeds, fertilizers and crop protection chemicals to machinery, irrigation and knowledge (Sahel, 2019). The incidence and impact of rural investments on standard of living depends to a large degree on the farm structure and the distribution of land (Nwankwo and Akonu 2019). Farm inputs are very important to farmers to boost their productivity and as such should be made available to them by cooperatives. Agricultural inputs range from land, labour, improved seeds, fertilizers and crop protection chemicals to machinery and technical knowledge. Access to farm inputs especially land, labour, fertilizer, seeds, herbicides, pesticides, rodenticides, tractors is one of the major challenges confronting small scale farmers in Nigeria.

Cooperative Marketed Agricultural Products

Agricultural cooperatives pool the produce of the small farmers having a small surplus to market and improve their bargaining power. They have also helped government agencies in the execution of the policy decisions bearing on ensuring food availability by the procurement and distribution of food grains and other essential commodities. Market access is crucial in small-holders' development because it creates the necessary demand and offers remunerative prices, thereby increasing smallholder incomes. The proponents of this thought strongly argue that effective market access can lead to sustainable increases in household incomes and food security, increased rural employment, and sustained agricultural growth. Greater agricultural markets mean increased trade and ultimately increased income growth. Hence, there is an urgent need to improve market access of perishable crops, particularly, horti-cultural produce such as vegetable production to ensure sustainability. One such option of enhancing market access involves through the provision of market information to smallholder vegetable producers through the formation of farmer organizations. Mobilizing producers into groups and establishment of contractual arrangements between farmers and buyers can be an important entry point to link farmers with buyers hence a market assurance to farmers and sufficient supply to buyers (Aku, Mshenga, Afari-Sefa and Ochieng, 2018).

Performance Indicators

Sales (Revenue)

Any business, regardless of its size, is in business to make money through sales. A transaction between the buyer and the seller in which the seller sells intangible or tangible goods, assets, or services against money is known as a sale. Sale is done between two or more parties. In broader terms, a sale can be understood as a contract between two or more parties i.e. the buyer and the seller (Oputa and Ahmad, 2018). A transaction between the buyer and the seller in which the seller sells intangible or tangible goods, assets, or services against money is known as a sale. In broader terms, a sale can be is understood as a contract between two or more parties i.e. the buyer and the seller. A sale can also be defined as an agreement between the two parties in the financial market, where the buyer and seller agree upon a definite price of a security (Rachmawati and Sherlita, 2021). A transaction that includes an exchange of services or goods for a certain amount of money is known as a sale. In other words, any activity that involves transferring the ownership of a good or commodity to the buyer in exchange for a monetary price is known as a sale. Sales have a number of characteristics which includes: A sale takes place between two or more parties. Sales involve a seller and buyer. The goods and services are exchanged for assets and money.

Income (Yield)

Agricultural income refers to the income earned or revenue generated from sources essentially premised on agricultural activities. These sources of income include farming land, buildings on or identified with agricultural land as well as commercial produce from a horticultural land. The following are some of the examples of agricultural income: Income derived from sale of replanted trees. Income from sale of seeds. Rent received for agricultural land. Income from growing flowers and creepers. Profits received from a partner from a firm engaged in agricultural produce or activities. Interest on capital that a partner from a firm, engaged in agricultural operations, receives. The goal of any poverty reduction strategy is to increase income and other welfare indicators. Any policy which aims is to increase income must first understand the composition and determinants of rural income, so that target interventions can be applied appropriately (Babatunde, 2008). Income levels of rural communities may be attributed to certain crucial factors, and understanding these factors may hold the keys to effective rural development policy making. This in part led to the submission of Olatona (2007), that a closer look at the determinants of rural income provides an in-depth knowledge into the factors that explain low income, low yields and poverty in rural regions where these rural farmers constitute about 90% of the total population (Olayemi, 2001; Olatona, 2007). It is worthy of note that elimination of poverty, though always an aim of development assistance, has been brought more sharply into focus in the Nigeria's development policies. For such communities of farmers, there is now a fresh emphasis on delivering outputs which have verifiable impacts in their standard of living.

Theoretical Framework – Collective Action Theory

Collective active theory was propounded by Mancur Olson in (1965). It refers to action taken together by a group of people whose goal is to enhance their status and achieve a common objective (*Baronchelli, 2018).* The economic theory of collective action is concerned with the provision of public goods (and other collective consumption) through the collaboration of two or more individuals, and the impact of externalities on group behavior.

The theory states that individuals under certain institutional arrangements and shared norms are capable of organizing and sustaining co-operation that advances the common interest of the group

in which they belong. This line of thought recognizes that human beings can organize and govern themselves based on appropriate institutional arrangements and mutual agreements in a community of understanding. The theory of collective action is not restricted to a particular phenomenon and can be related to groups, organizations, agencies and even community action. For Olson, collective action is an action taken by a group (either directly or indirectly through an organization) in pursuit of members perceived share interest especially in reducing any economic problem affecting them as a community.

This study is anchored on Collective Action Theory because it examines the growing and extensive theoretical literature that posits a host of structural variables presumed to affect the likelihood of individuals achieving collective action to improve their standard of living. Collective Action Theory describes the situation in which multiple individuals would all benefit from a certain action, but has an associated cost making it implausible that any individual can or will undertake and solve it alone. The ideal solution is then to undertake this as a collective action, the cost of which is shared. Through Agricultural Cooperatives, individual farmers can come together to acquire productive resources such as land, loan facilities, cheaper farm input like fertilizers, seedlings and pesticides among others. as well as marketing services for the sale of their produce which they may not be able to acquire alone. This theory is relevant to this study because it shows how the joining of small-scale farmers to Cooperatives have to a great extent been able to positively affect their performance by creating sources of income for these rural farmers through easy access to cooperative loan and farm input which will to a large extent help to boost their agricultural activities.

Review of Empirical Literature

Nyawo and Olorunfemi, (2023) studied Perceived Effectiveness of Agricultural Cooperatives by Smallholder Farmers in North-Eastern South Africa. A multistage sampling procedure was employed to elicit data from a sample of 120 smallholder farmers drawn from 150 farmers—members who were currently active members of agricultural cooperatives. A structured questionnaire was used to collect data that were analyzed using descriptive statistics. Multiple linear regression was used to determine the socio-economic and institutional factors influencing the member farmers' perception of cooperative effectiveness. The findings revealed that although agricultural cooperatives in the area rendered some level of support services to their members, the majority of the respondents perceived their cooperative as ineffective in rendering some key support services to them that could potentially improve their livelihoods. The results of inferential analysis indicate that factors such as farm size, level of education, household size, farming experience, major crop grown/animal reared, number of cooperative members, support services received index, and satisfaction of leadership processes were significant socioeconomic and institutional factors that influence respondent's perception. The study recommended increased government public recognition and support for agricultural cooperatives development, increased resource base through more access to grant and donations, and improved linkages between cooperatives and extension agencies as a means of improving the effectiveness of agricultural cooperatives in the area.

Ogunnaike, Osinowo and Idowu, (2023) examined effect of Cooperative Membership on Poverty Status of Smallholder Farmers in Yewa Division Ogun State, Nigeria. Multi-staged sampling technique was used to select 120 farmers and primary data were collected using a questionnaire.

Data were analyzed using descriptive analysis such as percentages, mean, frequency counts and Probit regression. Results showed that an average farmer was 49 years and they possessed adequate and relevant knowledge as to the dealings of the cooperatives because they were averagely educated and most of them were married. The majority of them lived in a rented block apartment. In addition, more than half of the respondents belonged to the non-poor class of the poverty line. It was found that the probability of being poor decreased with an increase in educational attainment, and cooperative experience. Furthermore, the presence of secondary occupation increased the probability of co-operators escaping poverty. The study also confirmed that having access to loans, and amounts of loans accessed could lead farmers out of poverty. The study concludes that farmers in the study area were not poor but needed higher loan amounts to expand their businesses. It is therefore recommended that Cooperative societies should be enlightened through sensitization on the proper utilization of loans accessed as this will help them generate more income that could lift them above the poverty line.

METHODOLOGY

Research Design

The research design used in this study is descriptive survey. Survey research is one in which a group of people or items is studied by collecting and analyzing data from only a few or items considered to be representative of the entire group.

Population of the Study

The population of this study comprises of all registered members of farmers' cooperative societies in Ayamelum LGA. There are 37 active farmers cooperatives as confirmed by the authority in the study area with a membership strength of 482. Ayamelum LGA was chosen because of its vast agricultural activities.
(Department of Cooperative, Ayamelum LGA Secretariat, Anaku 2026)

Sample Size

The sample size is the number of individuals to include in a sample. The formula developed by Taro Yamane in 1967 was adopted in determining the sample size for this study.

Below is the mathematical illustration for the Taro Yamane method:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n signifies the sample size

N signifies the population under study

e signifies the margin error (0.05)

$$n = \frac{482}{(1 + 482\ (0.0025)}$$

$$n = \frac{482}{}$$

$$n = \frac{482}{(1 + 1.205)}$$

$$n = \frac{482}{(2.205)}$$

$$n = 219$$

The sample size is 219

3.5 Method of Data Collection

The researcher explored both primary and secondary sources of data for the study. The primary data was obtained from members of the selected Agricultural' Cooperative Societies through the use of a structured questionnaire that was administered to them. The secondary data used were published journal articles, textbooks, conference materials etc.

3.6 Description of Data Collection Instrument

The researcher developed questionnaire in line with the objectives of the study. The questionnaire has three sections, section A, B and section C. Section A sought information on socio-economic background of respondents. Section B and Section C. were made up of items relating to the influence of cooperative on performance of small-scale farmers in Ayamelum local government area of Anambra State. Section C specifically, seeks to assess the farmers' responses on the appropriateness of cooperative services on farming operations of small-scale farmer, a four (4) point Likert summative scale questions of strongly agree (4), agree (3), disagree (2), and strongly disagree (1) was used.

Method of Data Analysis

Data collected was analyzed using descriptive statistics (frequencies, percentages, mean, and standard deviation) and the inferential statistics such as t-test statistics and the linear regression model. Objectives one to four was processed using the descriptive statistics and the regression model of the Ordinary Least Square (OLS). T-test and F-test statistics was used to test the hypotheses of the study and the overall fitness of the model. All the analyses were done using SPSS version 23. Linear regression model of the Ordinary Least Square (OLS) approach was used to analyze the objectives in order to ascertain the influence and also determine the relationship between the independent variables and dependent variable in the conceptualized model of the study. The use of Ordinary Least Square (OLS), is informed by the fact that under normality assumption for α_i, the Ordinary Least Square (OLS) estimator is normally distributed and is said to be best, unbiased linear estimator (Gujarati and Porter, 2008).

Thus, the model of this study is stated in the implicit form as follows:

$$FPM = f(FAI, ACM) \quad (1)$$

The explicit form of this model (1) is stated as hereunder:

$$FPM = \beta_0 + \beta_1 FAI + \beta_2 ACM + \alpha_i \quad (2)$$

Where; FPM = Farm performance of cooperative member (proxied by farm revenue and farm yield).

FAI = Farm Inputs from Coop (^of total farm inputs obtained from all sources)
ACM = Access to Market (Percent of Naira value of agricultural harvests marketed through coop)
β_0 = Intercept of the model
$\beta_1 - \beta_4$ = Parameters of the model
α_i = Stochastic error term

Performance Measurement.

Profitability analysis was used as the arrow head in the performance measurement of cooperatives. Certainly, profitability is an important measure of the economic activity and performance of a firm, including businesses of cooperative members. It also refers to the ability of a firm to earn a profit in the regular course of its operation. A business firm has high profitability when: its operations are efficient.

The profitability analysis that was employed in this study is given as:

GFI = TFR – TVC (3)
NFI = GFI – TVC (4)
GM = (GFI/TFR)*100 (5)
NM = (NFI/TFR)*100 (6)

Where
GFI = Gross farm income (Naira)
NFI = Net farm income (Naira)
GM = Gross margin (%)
NM = Gross margin (%)
TFR = Total farm revenue (Naira)
TVC = Total variable cost (Naira)
TFC = Total fixed cost (N)

RESULTS

The Socio-economic characteristics of the respondents.

Two hundred and nineteen (219) questionnaires were distributed and all were duly filled and returned which was used for the analysis.

Table 1: shows the socio-economic characteristics of the respondents. (n= 219)

Table 1 Socio-Economic characteristics

	Item	Frequency	Percentage
1	**Sex**		
	Male	116	52.97
	Female	103	47.03
2	**Age distribution**		
	20-39	70	31.96

	40-59	95	43.38
	60 and above	54	24.65
3	**Marital status**		
	Single	42	19.18
	Married	102	46.57
	Widowed/divorced	75	34.24
4	**Household size**		
	0-5	38	17.35
	6-10	111	50.68
	11-15	52	23.74
	16-20	28	12.79
5	**Education level**		
	Not been to school	18	8.21
	Primary school	75	34.24
	Secondary	102	46.58
	Tertiary institution	24	10.95
6	**Sources of income**		
	Yam sales	40	18.26
	Livestock sales	24	10.96
	Vegetable and fruits	10	4.5
	Cassava sales	45	20.54
	Maize and rice sales	100	45.66
7	**Total farm income, '25 (N'000)**		
	100-200	100	45.66
	200-300	90	41.09
	300-400	20	9.13
	400-500	9	4.11
	500 and above	-	-
8	**Total farm expenses, '25 (N'000)**		
	100-200	70	31.96
	200-300	100	45.66
	300-400	30	13.97
	400-500	10	4.56
	500 and above	9	4.11
9	**Farm size in (Ha)**		
	1-2	120	54.79
	3-4	80	36.52
	5 and above	19	8.67

Source: Survey data, 2026.

Table 4.1 shows the socio-economic characteristics of respondents, 52.97% of the respondents were male while 47.03% were female, which shows that the cooperative have more males than females.

The distribution according to age of respondents revealed that majority of respondents were between the age group 40-59 (i.e. 43.38%) followed by 20-39 (i.e. 31.96%). This shows that

majority of the respondents were mixture of middle age and youths that are involved in the cooperatives.
The analysis of respondents in accordance to their marital status shows that 46.57%of the respondents were married, 34.24% are widowed/divorced while 19.18% are single which shows that majority of the respondents were married and disposed to joining the cooperative.
Distribution according to household size shows that majority of the respondents household size are 6-10 (23.74%) followed by 17.35%) and 0-5 (50.68%) which shows that majority of the household size are manageable.
Educational qualification revealed that about 92% of the respondents had acquired one level of education or the other ranging from primary 34.24%, secondary 46.58% and tertiary 10.95%, while 8.21% of the respondents had no formal education and this is good for the cooperative because it will make them to make informed decisions.
The analysis of respondents according to source of income shows that 45.66% of the respondents' source of income were maize & rice sale, 20.54% for cassava sale, 18.26% for yam sale which shows that majority of the respondents' source of income are from maize and rice, cassava and yam sales.
The distribution according to total farm income of the respondents in 2025. The majority the farmers 45.66% reported total farm income of between 100,000 and 200,000, they were closely followed by a group of 41.09% of the farmers reported 200,000 and 300,000. While other reported total farm income ranges included 300,000 and 400,000 (9.13%), 400,000 and 500,000 (4.11%). The total farm income reported was moderate considering what is prevalent in the country with the minimum wage of 30,000.
The analysis according total farm expenses of respondents in 2025. The farmers reported that majority of the total farm expenses are 200,000 and 300,000 (45.66%) followed by 100,000 and 200,000 (31.96%). Other reported total farm expenses were 300,000 and 400,000 (13.97%), 400,000 and 500,000 (4.56%) and above 500,000 (4.11%). This shows that the majority of the total farm expenses lies between 100,000 and 300,000 which is considerable in terms of the economic situation of the country.
The distribution according to farm size of the farmers shows that majority of the farm size in hectares were 1-2 hectares (54.79%), followed by 3-4 hectares (36.52%) and 5 and above hectares (8.67%). This shows that majority of the respondents farm size fall within the stipulated farm size that makes a farmer a small-scale farmer.

4.2 Profitability of Farm Operations.

Table 2: Gross and net margin analysis

Item	Mean	Std. Deviation	Std. Error
Total Farm Revenue (Naira)	**446,232.34**	**940027.53701**	**71059.40253**
Yam	113,568.29	357210.46406	27002.57296
Cassava	101,417.58	394811.56554	29844.94906
Livestock	100,382.44	188005.50740	1143215.881
Maize and Rice	110,505.27	398224.26335	24213.43678
Vegetable and fruits	102,270.81	336271.51240	14211.88051

Total variable cost (Naira)	**60,888.39**	**33329.94906**	**2519.50733**
Fertilizer	55,868.54	128544.60829	9717.05903
Seedlings	25,659.41	70878.20049	5357.88834
Labour cost	43,690.35	120684.50354	9122.89096
Pesticides	3,522.22	1914.08065	144.69090
Herbicides	3,202.01	1740.07332	131.53718
Miscellaneous	19,306.18	11820.32868	893.53286
Gross Farm Income (Naira)	**294,983.63**	**692986.71153**	**52384.87144**
Gross Margin (%)	64.31	0.15525	0.01174
Total Fixed Cost (Naira)	87,404.73	731594.87095	55303.37397
Net Farm Income (Naira)	**207,579.43**	421115.80030	15511.99987
Net Margin (%)	46.46	0.24051	0.01818

(n = 219)

Source: Field survey, 2026.

Table 4.2 shows the gross and net margin analysis of the small holder farmers. It could be seen from the table that the small holder farmers' farm operations in the area spent average Total Variable Cost (TVC) of ₦151,248.79, to realize mean and standard deviation (SD) of 33329.94906 as standard deviation. Total Revenue (TR) of ₦446,232.34 so as to earn mean gross farm income of ₦294,983.63 and a net farm income of ₦207,579.43. From the deductions it shows that the small holder farmers' farm operations was profitable.

Farm Support Services from Cooperatives

Farm support services received by the respondents from their cooperatives included supply of farm inputs and marketing of farm produce.

(a) Types and value of farm inputs obtained by members

Table 3: Types of Inputs Received by Members

Items	Frequency*	Percentage*
Fertilizers	219	100
Herbicides	580	78.70
Cassava cutting	390	99.05
Seedlings	219	100.00

*Multiple responses

Source: Field Survey 2026

Table 3 shows farm support services from cooperatives. According to the respondents it shows that the farmers received fertilizers, herbicides, cassava cutting and from their cooperative. It shows that the small-scale farmers received enough farm inputs from their cooperative.

Table 3: Value of farm inputs needed and obtained from cooperative

Item	Min	Max	Mean	Std. Deviation
Amount of farm inputs needed (N)	50850.00	405000.00	131,628.97	59166.76
Amount of farm inputs obtained from cooperative (N)	15307.38	405000.00	90,132.21	49354.85
Amount of inputs obtained as % of farm inputs needed			68.47	

(n=219)

*Note: Farm inputs obtained included fertilizer, herbicides, cassava cutting and seedling

Source: Survey Data 2026.

Table 3 shows the value in naira of farm inputs needed and obtained from cooperative. From the response of the farmers, it shows that the minimum total amount of farm inputs they needed were 50850 and the maximum were 405000 and the minimum total amount of farm inputs obtained were 15307.38 and the maximum amount is 405000. From the respondents it shows that the minimum amount of farm inputs received by the farmers (15307.38) were not even up to half of the needed farm inputs (50850) meaning that they did not receive enough farm inputs from their cooperative and more should be done for them to receive more in subsequent years.

Marketing

Table 4: Total Value and proportion of farm output marketed through cooperative

Item	**N**	**Total Value of Output in Naira**	**Mean Value of Output in Naira**	**Std. Deviation**
Total value of farm output (N)	219	177,600,471.00	446,232.34	505,952.78
Amount of farm output marketed through cooperative (N)	219	76,302,854.18	254,342.85	182,368.11
Proportion of output marketed through cooperative (%)		42.96%		

*Note: Crops marketed included maize, yam, cassava, cocoyam and vegetable.

Source: Survey Data 2026.

Table 4 analyzed total value and proportion of farm output marketed through cooperative. This shows that 177,600,471 was the total value of output marketed and the value of the one marketed through the cooperative was 76,302,854.18, which shows that their cooperative really helped them to market their farm output which includes maize, yam, cassava, cocoyam, vegetables etc.

Effect of Farm Support Services on Farm Performance (Test of Hypotheses.

The effect of cooperative support services to the farmer members was examined through the use of multiple regression analysis in tables 5.1, 5.2 and 5.3.

Table 5: Regression (Variables Entered/Removed)

Model	Variables Entered	Variables Removed	Method
1	Inputs, Marketed products	.	Enter

a. Dependent Variable: Member's performance
b. All requested variables entered.

Table 5.1: Regression (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504[a]	.254	.247	39782.91921

a. Predictors: (Constant), Input, Marketed, products

In the model summary table 5.1. it is revealed that the adjusted R square value of 0.247 shows a modest relationship between the dependent variable and the independent variables, farm inputs obtained and value of agricultural products marketed through cooperative. This means that 24.7% variation in performance of cooperative farmers in the area was as a result of variability in farm inputs obtained and value of agricultural products marketed through cooperative.

Table 5.2: **ANOVA of the Regression Analysis**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	212263720720.289	4	53065930180.072	33.529	.000[b]
	Residual	621993499831.637	215	1582680661.149		
	Total	834257220551.925	218			

a. Dependent Variable: FPM
b. Predictors: (Constant), input, marketing

The ANOVA table, 5.2 shows that the regression model is significant given that its F ratio of 33.529 was associated with a probability value that is less than 0.05. Thus, confirming that cooperative member's performance in the area was dependent on farm inputs obtained and value of agricultural products marketed through cooperative.

Table 5.3: Coefficients of Variables in the Model

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	17118.605	33300.190		.514	0.607
	Farm inputs	0.313	0.051	0.267	6.109	0.000
	Marketed products	0.259	0.025	0.453	10.147	0.000

a. **Dependent Variable:** Cooperative member's performance

The result from the table 5.3 revealed that the constant intercept of the function (17118.605) is large and positive. Certainly, a large positive constant in a model predicting performance might suggest a high baseline performance even without any of the explanatory factors considered in the model.

The predictors: Inputs, marketed products, all had a positive sign. This implies that an increase in offering of these support services will lead to better or increased farm performance on the part of cooperative members.

Farm inputs were statistically significant as determinants of member farm performance with a coefficient of 0.313 and t-statistics of 6.109 and probability of 0.000, which is below the 0.05 level of significance. The implication is that members should adhere to the types and quality farm inputs from cooperatives in other to maintain and improve on the level of performance: 1% increase in farm inputs from cooperatives will increase performance level by 0.313 holding other independent variables fixed.

Agricultural products marketed through cooperatives was also statistically significant as a determinant of member's farm performance with a probability of 0.000 which is less than the 0.05 level of significance, with a t-statistics of 10.147and a coefficient of 0.259. This implies that it increased cooperative marketing of member's agricultural products to almost 26% of farm performance of the cooperative member, holding other independent variables fixed.

Tests of Hypotheses

Test of hypothesis one.

H_0: Farm inputs from cooperatives have no significant effect on farm performance of members.

H_1: Farm inputs from cooperatives have significant effect on farm performance of members.

DECISION: From the regression results on table 5.3, it was seen that farm inputs obtained from cooperative with a coefficient of 0.313 and a t-statistics of 6.109 was significant at less than 1% level of significance. As a result, the null hypothesis is rejected and the alternate is accepted and

we therefore conclude that farm inputs obtained from cooperatives have significant effect on farm performance of members

Test of hypothesis two.

H_0: Cooperative marketed agricultural products have no significant effect on farm performance of members.

H_1: Cooperative marketed agricultural products have significant effect on farm performance of members.

DECISION: The regression results on table 5.3 showed that marketed agricultural products through **c**ooperatives with a coefficient of 0.259 and a t-statistics of 10.147 was significant at less than 1% level. As a result, the null hypothesis is rejected and the alternate is accepted and we therefore conclude that Cooperative marketed agricultural products have significant effect on farm performance of members.

Summary of Findings

The findings arising from the study includes:

1. Farm inputs from cooperative have significant effect on farm performance of members as proxied by farm yields and farm revenue (t=6.109; p=0.000). The cooperative farmers sourced 68.47% of their input needs from their cooperatives.
2. Cooperative marketed agricultural products have significant effect on farm performance of members, as proxied by farm yields and farm revenue (t=10.147; p=0.000). The cooperative farmers marketed 42.96% of their agricultural products through the cooperatives.

Conclusion

The study on the contributions of agricultural cooperative societies to sustainable farm performance of smallholder farmers in Ayamelum local government area**,** Anambra State, Nigeria, reveals significant insights into the vital role cooperatives play in enhancing agricultural productivity. The findings demonstrate that farm inputs obtained through cooperatives are a crucial determinant of farm performance, with a statistically significant relationship indicating that a 1% increase in quality inputs correlates with a 0.313 increase in performance levels. This underscores the importance of adhering to the types and quality of inputs provided by cooperatives, as they directly influence members' agricultural success. Moreover, the research highlights that cooperative marketing of agricultural products significantly enhances farm performance, contributing nearly 26% to overall productivity. This finding emphasizes the necessity for smallholder farmers to engage actively with cooperatives to leverage collective marketing strategies that can improve their market access and profitability.

In summary, farm inputs from cooperative and cooperative marketed agricultural products from cooperatives has positively and significantly affected the performance of the respondents in terms of boosting farm outputs and positive effects on farm operations in agricultural zones of Anambra

state, Nigeria by enhancing food production activities, increase farm yields and productivity, increase income etc.

Recommendations

1. Farm inputs such as seedlings, fertilizers, herbicides, cassava cuttings etc. supplied by cooperatives were significant in improving profits of small holder farmers, it is therefore suggested that the cooperative society, the local and state government should endeavor to meet the farm input needs of the farmers, that Input and Farm Information Service Centers should be established under a public private partnership to increase farmers' access to inputs, especially the most limiting inputs, like tractors, farmers should be linked with high quality inputs dealers for the purchase of agricultural inputs so as to increase their yield, their profit and also improve their performance.
2. Cooperative marketed agricultural products like maize, yam, cocoyam, cassava etc. were significant in improving the performance of the small holder farmers, it is therefore suggested that the cooperative, the local and state government should endeavor to provide market for the farmers to market their products, smallholder farmers should be trained on the use of social media channels in accessing agricultural markets, Government should support to improve infrastructures like roads to assist farmers in accessing market in order to increase their profit and income.

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