

EFFECT OF COOPERATIVE SOCIETY ON EFFICIENCY OF RURAL FARMERS IN ENUGU STATE, NIGERIA

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ABSTRACT

The study assessed the effect of cooperative society on efficiency of rural farmers in Enugu State, Nigeria. The study was carried out in Enugu State, Nigeria. Multi-stage sampling technique was used in the selection of 120 respondents for the study. Primary data were used in the study. Different econometric and statistical tools were applied as deemed suitable for the study and variables in consonance with empirical research. Objectives one (i) and five (v) were realized using descriptive statistics such as frequency tables and means. Objective two (ii) was realized using cost and return. Objectives three (iii) was analyzed using the stochastic production frontier while objective four (iv) was realized using Z-test. The average net return realized was ₦56,667.66 and ₦40,978.83 for cooperative and non-cooperative farmers respectively. There was significant difference in efficiency of cooperative and non-cooperative farmers in the study area. Seed/seedling, labour, farm size and capital had significant effects on production output of cooperative farmers while fertilizer, capital and labour did not have significant effect on the output of non-cooperative farmers. The study therefore recommended that non-cooperative farmers should be encouraged to join cooperatives through massive enlightenment and awareness programmes, in order to have access to cooperative society's benefits like education, improved planting materials, fertilizer, labour, capital among others..

Keywords: Cooperative Society, efficiency, rural farmers, Profitability, production cost

INTRODUCTION

Agriculture is an important livelihood activity of most rural households in Sub-Saharan African countries. This is because agriculture has supported rural households in the region in terms of income generation, job creation, food security among others (Olagunju, *et al.*, 2021). In Nigeria, agriculture has contributed tremendously to rural development in terms of jobs creation, poverty alleviation and food security. According to Food and Agricultural Organization (FAO) (2019), agriculture has generated approximately 70% of total rural jobs, accounts for more than 85% of rural income streams, and contributes about 25% of the country's total GDP.

Agriculture in the rural areas of Nigeria is mainly dominated by small holder's farmers who face multiple production and marketing challenges ranging from limited access to productive inputs, output markets, extension services, credit facilities to unavailability of improved agricultural technologies (Olagunju *et al.*, 2021). These challenges might be a

contributory factor to inefficiency as well as threats to the food security of rural households. In a bid to enhance the efficiency of rural farmers, government, non-governmental organizations and international agencies in recent years have advocated and encouraged rural farmers to form agricultural cooperatives in order to address production and marketing challenges confronting them in Nigeria (Olagunju *et al.*, 2021). Agricultural cooperatives are autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise (The International Co-operative Alliance, 1995) as cited in (Ezeokafor *et al.*, 2019). Agricultural cooperatives have helped rural farmers in gaining access to certain benefits that otherwise would have been difficult to obtain by the members if they were non-members (Anigbogu *et al.*, 2017).

Previous researches have pointed out that successful agricultural cooperatives had

been effective in satisfying economic and technical needs of rural farmers in terms of access to land, agricultural inputs among others. For example Agbo (2016), identified specific benefits accruable to cassava farmers if they are members of cooperative societies to include: strong bargaining power for loans and other services; a favourable atmosphere for a more effective government aid scheme; improved marketing opportunities for members; provision of services for members at highly reduced costs; mobilization of funds for farm business; improved dissemination of extension services through the group approach; self-reliance and motivation for members; increased access to improved skills, exchange of ideas and educational opportunities through adult education and literacy programmes; and creation of avenues for members democracy and assumed collective responsibility.

Olagunju *et al.*, (2020) reported that agricultural cooperatives enhance the technical efficiency of farmers through the provision of improved agricultural technologies, land management practices, finance among others to their members. Wossen *et al.*, (2017) established a positive impact of cooperatives membership on improved agricultural technology adoption, productivity and household welfare of cassava farmers in Nigeria. Similarly, Michalek *et al.*, (2017) showed that farmers that belong to producer organisations have higher value-added, profitability, labour productivity, and employment than non-members. Renwick (2018) reported that membership of cooperatives is not only viable in increasing productive inputs use but also enhances technical efficiency. Therefore, the efficiency of farmers particularly among smallholder producers depends critically on cooperative membership.

The term efficiency economic theory that shows ability to produce the largest possible quantity output from a given set of input (Olagunju *et al.*, 2021). The modern theory of efficiency dates back to the pioneering work of Farrel (1987) who proposed that the efficiency of a firm has two components namely: technical and allocative efficiency and the combination of these two components provide a measure of total economic efficiency (overall efficiency). Technical efficiency which is ability to produce a given level of output with a minimum

quantity of input can be measured either by input-observation oriented technical efficiency or output-expanding oriented technical efficiency (Abdul, 2017). Technical efficiency is related to the physical amount of all factors used in the process of producing some product. A particular method of producing a given level of output is technically efficient if there are no other ways of producing the output that use less of at least one input while not using more of any others (FAO, 2017). For example, consider a firm that is currently using 100 units of seeds and 50 units of labour to produce a certain level of output. If the firm could maintain its current output level by using only 90 units of seeds without using more capital, then it is being technically inefficient in its current methods because it is “wasting” 10 unit seeds.

However, measurement of efficiency via frontier approach has been widely utilized and studied. The term frontier involves the concept of maximality in which the function sets a limit to the range of possible observations. The observation of points below the production frontier for firms producing below the minimum possible output can occur, but there cannot be any point above the production frontier given the available technology. Deviations from the frontier are attributed to inefficiency (Ume *et al.*, 2017).

Rural farmers have contributed substantially to GDP of Nigeria, regrettably, rural farmers are constrained with various problems such as high cost of input, inadequate finance, low technical know-how, high storage, processing and transportation cost coupled with the primitive state of rural infrastructures among others. Inefficiency among rural farmers in Enugu state may be consequent upon improper resource management, inadequate knowledge of improved production practices, inadequate financial resources, low fertilizer application, inadequate irrigation infrastructure and equipment, conflict, absence of strong agricultural institutions, ineffective agricultural policies, prevalence of pest and diseases among others (Iheke and Nwaru, 2013).

Agricultural cooperative remains a practical tool for enhancing the efficiency of rural farmers in the country; regrettably, the efficiency of most cooperative farmers are very low owing to low membership strength which reduces financial strength of agricultural cooperative societies, impede access to credit and other production resources. More so,

agricultural cooperatives in most rural areas in Nigeria are dominated by farmers who have limited access to production equipment and facilities, labour, capital and management. The preponderance of marginal farmers in most agricultural cooperatives in Nigeria could influence the performance of agricultural cooperatives in terms of size of operation and ability to use part of their assets as collateral to seek and obtain funds from external sources to expand their financial resources.

Most agricultural cooperatives in the rural areas of Nigeria are operated in the face of unfavorable government policies, poor management practices, under-developed infrastructure, low level of cooperative education, low income and lack of access to credit facilities as well as corrupt practices among cooperative members and management. These could result in inefficiency among rural farmers in the study area. Therefore, there was need to conduct a study on effect of cooperative society on efficiency of rural farmers in Enugu State, Nigeria.

Objectives of Study

The broad objective of this study was to assess the effect of cooperative society on efficiency of rural farmers in Enugu State, Nigeria. The specific objectives were to:

- i. describe the socioeconomic characteristics of cooperative farmers in the study area;
- ii. estimate the cost and return of the rural cooperative farmers in the area;
- iii. estimate the efficiency levels of cooperative farmers in the study area;
- iv. determine the effect of cooperative society on level of efficiency of farmers the study area.
- v. identify the problems of participating in cooperative society in the area.

METHODOLOGY

Study Area

The study was carried out in Enugu State, Nigeria. Enugu State was created in 1991. The State comprises seventeen (17) local government areas. The state lies between latitudes 50 56'1 and 70 05'1N of equator and longitudes 60 53'1 E and 70 55'1E of Greenwich meridian. The State shares borders with Abia state to the south, Ebonyi State to the East, Benue State to the North east, Kogi State to the Northwest and Anambra State to the west (ENADEP, 2009). According to Enugu ADP,

Enugu State is divided into six (6) agricultural zones namely:

- i. Agbani comprising: Enugu South, Nkanu West and Nkanu East L.G.As.
- ii. Enugu comprising: Enugu North, Enugu East and Isi Uzo L.G.As
- iii. Agwu comprising: Agwu, Oji-River and Aninri L.G.As
- iv. Udi comprising: Udi and Ezeagu L.G.As.
- v. Nsukka comprising: Nsukka, Igbo Etiti and Uzo-Uwani L.G.As.
- vi. Enugu-Ezike comprising: Igboeze-North, Igboeze-South and Udenu L.G.As

According to National population census (NPC, 2006), the population of Enugu State is about 3,257, 298 people with population growth rate of (+3.05%/year), Enugu population is 4 826 582. Enugu State has a population density of about three hundred and sixty persons per square kilometer (360). Its land area is approximately 8,022 95km² (ENADEP 2009). According to (ENADEP, 2009), Enugu State has good soil and climate, its physical features change gradually from tropical rain forest to open wood-land. The two main seasons are rainy season and dry season. The State is about 223 meters above the sea level, and the temperature in the hottest month of February is about 36.200c (97.16F), while the lowest occurs in months of November reaching about 20.30oc (68.54oF). The lowest rainfall exists around 67 cm³ February and is about 0.16cm³ while the highest is about 35.7cm³ in July. Economically, the state is predominantly rural and agrarian, although trading (18.8%) and services (12.9%) are also emerging.

Sampling Techniques

Multi-stage sampling technique used in the selection of 120 respondents for the study. At the first stage, four agricultural zones were randomly selected from the six agricultural zones in Enugu State. In the second stage, one local government area (LGA) was selected from each of the selected agricultural zones. In the third stage, three communities were randomly selected from each of the LGAs giving a sample of 6 communities. In the fourth stage 1 village was randomly selected from each community; giving a total of 12 villages. In the last stage a list of cooperative farmers and non-cooperative farmers in the selected 12 villages was compiled with the help of

enumerators who were natives of the villages. From the list, 10 farmers (comprising 5 cooperatives and five non-cooperatives) were selected randomly from the list, giving a sample size of 120 respondents for the study

Data Collection

Data for this study were collected from primary sources. Structured questionnaire and focus group discussion were used in collecting primary data. Enumerators were trained and employed in questionnaire administration and data collection to make the process seamless. The selected enumerators spoke the local language fluently, which helped to maintain the reliability of the data. Focus group discussion accorded the researcher more information for analysis of the objectives.

Data Analysis

Different econometric and statistical tools were applied as deemed suitable for the study and variables in consonance with empirical research. Objectives one (i) and five (v) of the study were realized using descriptive statistics such as frequency tables and means. Objective two (ii) was realized using cost and return. Objectives three (iii) was analyzed using the stochastic production frontier while objective four (iv) was realized using Z-test.

Model Specification

Cost and return

$$NR = TR - TC \quad - \quad (1.1)$$

Total cost is the addition of the entire variable cost (VC) and fixed cost (FC) items;

$$TC = TVC + TFC \quad - \quad (1.2)$$

Total revenue is the total amount of money that a farmer received from the sale;

$$TR = \sum P \times Q \quad - \quad (1.3)$$

$$GP = TR - TVC \quad - \quad (1.4)$$

$$\text{Net farm income (NFI)} = GM - TFC \quad - \quad (1.5)$$

Where

NR = Net Return,

TC = Total fixed cost

TVC = Total Variable Cost,

TFC = Total Fixed Cost,

P = price

Q = quantity sold

GP = Gross efficiency

TC – Total cost

Stochastic efficiency frontier production function

The stochastic production frontier was used to determine the efficiency level of the farmers in the study area. this was estimated for both cooperative and non-cooperative farmers

The stochastic efficiency frontier production function is defined by:

$$Y_i = f(X_i, \beta) \exp(V_i - U_i) \quad - \quad (1.6)$$

Y_i = Output for i th farmers

X_i = corresponding vector of inputs

$$Y_i = f(X_1, \dots, X_n) \quad - \quad (1.7)$$

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + e_i \quad - \quad (1.8)$$

Where $e_i = V_i - U_i$,

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + V_i - U_i \quad (1.9)$$

V_i = is independently and identically distributed random errors, having $N(0, \sigma^2)$ distribution.

U_i = technical inefficiency

e_i = error term

Where:

Y_i = Output for i th farmer

X_1 = Seed/planting material (in kilogramme)

X_2 = Farm size (hectares)

X_3 = Fertilizer (in kilogramme)

X_4 = Labour in manday

X_5 = Capital (Depreciation, insurance, tax, interest and rent on land)

In the frontier model specified, to estimate β , which is the vector of the regression parameter, the stochastic production model is linearized thus:

$$\ln Y_i = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 \quad - \quad (1.10)$$

The model for technical inefficiency effects (U_i) is defined as:

$$U_i = \beta_0 + a_1 Z_1 + a_2 Z_2 + a_3 Z_3 + a_4 Z_4 + a_5 Z_5 \quad - \quad (1.11)$$

Where:

U_i = Technical inefficiency effect

Z_1 = Age of the farmer

Z_2 = Years of farming experience

Z_3 = Education status of the farmer

Z_4 = Extension contact

Z_5 = Household size

α_i = Parameters to be estimated

e_i = Error term

Objective Four (iv) which is to effect of cooperative society on level of efficiency of farmers the study was examined using Z-test.

$$Z = \frac{X_1 - X_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad - \quad 1.12$$

Where $n_1 + n_2$ = Degree of freedom

Z = Paired Z statistics

X_1 = Mean level of efficiency for cooperative farmers

X_2 = Mean level of efficiency for non-cooperative farmers

S_1^2 = Variance of efficiency for cooperative farmers

S_2^2 = Variance of efficiency for non-cooperative farmers

n_1 = Number of cooperative farmers

n_2 = Number of non-cooperative farmers

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Age

The result from table 1 indicates that the mean ages were 42 and 38 years for cooperative and Non-Cooperative farmers respectively; This implies that majority of the respondents were middle age, experienced and energetic. Age influences the ability to seek and obtain farm jobs, which could increase their production capacity. According to Bassey *et al.*, (2013) people within the age range 35-45 years would have acquired some good level of experience.

Sex

The result shows that majority of the respondent were males (Cooperative, 55.83%) and Non-Cooperative, 50.83%). This result implies the preponderance of male respondent which may be consequent upon land ownership and access to other production resources which their female counterparts usually unprivileged. Jagwe *et al.* (2010) found that, female headed households are negatively affected by the transaction costs of searching for buyers, contracting and enforcing a sale transaction as opposed to the male headed households.

Marital Status

Table 1 shows that majority of the respondents were married (Cooperative farmers, 74.17%) and (Non-Cooperative, 63.33%). The implication of marital status on productivity can be explained in terms of the supply of family labour. The supply of family labour would be higher for household heads that are married. This is in consonance with the findings of Zalkuwi *et al.*, (2014). Furthermore, Nwaru (2011) stated that the situation should create a conducive environment for good citizenship training, development of personal integrity and entrepreneurship which are very important for efficient use of farm resources. Furthermore, marital status can influence the role and responsibilities as well as occupational lives of members and their family.

Educational Attainment

Table 1 shows that majority of the respondents had formal education (cooperative

farmers, 90.00%) and (non-cooperative cooperative farmers, 81.56%). The result implies that the Cooperative farmer acquired more formal education than the Non-Cooperative farmers in the area. It could also be that majority of the respondent can be easily convinced to accept better practices and innovation. This findings is in conformity with Nnadi and Amaechi, (2004) that education influences farm decision making. High literacy level is an asset since it influences access to information, innovation adoption and analysis of farm situation. Undoubtedly, the high level of literacy predisposes some level of managerial ability in farm farming (Acquah and Addo, 2011). Furthermore, this study agreed with previous findings that education provides a favourable atmosphere for awareness, adoption of innovation and utilization of information (Siyanbola, 2012).

Household size

Table 1 shows that the mean household for Cooperative and Non-Cooperative farmers were 6 and 4 persons respectively. This implies that the respondent maintained a relatively large and sizeable household which could serve as readily available source of labor. The economic implication is that it will provide the Cooperative area and Non-Cooperative with family labour and reduce cost of production and increase their revenue. This is desirable and of great importance. Nwaru (2004) reported that farmers may rely more on their members than hired workers for labour on their farm. This corroborates with the findings of Ayuya *et al.*, (2011) who made an argument that large household size have the capacity to relax the labour constraints required during introduction of new technology. Adegbite and Oluwalana (2004) reported that a relatively large household size may likely enhance family labour supply on farm.

Access to Credit

From the result in Table 1, majority (60.0%) of cooperative farmers and non-cooperative farmers (68.33%) indicated access to credit. Access to credit is believed to have significant positive effects on aggregate and

household-level outcomes, such as technology adoption, agricultural productivity, food security, nutrition, health, and overall household welfare (Diagne and Zeller, 2011). Increased access to credit may have helped the respondents to engage in more productive income-generating activities that will raise their living standards. Access to credit have been reported to enhance efficiency of farmers through acquisition of productive capital, which improves their capacity to generate income, savings and investment for better welfare (Diagne and Zeller, 2011).

Experience

Table 1 shows that on the average the cooperative farmers and non-cooperative

Cost and Return of the Farmers in the Area

Table 1: Distributions of Respondents According to Socioeconomic Characteristics

Variables	Cooperative		Non-cooperative	
	Frequency	Percentage	Frequency	Percentage
Age				
20-29	6	10	13	21.67
30-39	22	36.67	21	35.00
40-49	13	21.67	17	28.33
50-59	11	18.33	7	11.67
62-71	8	13.33	2	3.33
Mean	42.93		38.21	
Sex				
Male	67	55.83	61	50.83
Female	53	44.17	59	49.17
Marital status				
Single	17	28.33	20	33.33
Married	37	61.67	31	51.67
Divorced	2	3.33	1	1.67
Separated	4	6.67	8	13.33
Education				
Never attended	6	10	11	18.34
Nursery	7	11.67	2	3.33
Primary	2	3.33	19	31.67
Secondary	25	41.67	3	5.00
Tertiary	5	8.33	23	38.33
Others Specify	15	24.94	2	3.33
Mean	4.05			
Household Size				
1-5	28	46.66	32	58.34
6-10	27	45	22	36.65
11-15	36	30.00	6	10
Mean	6.6		4.13	5.10
Access to credit				
No	48	40.00	29	24.17
Yes	72	60.00	82	68.33
Experience				
1-10	28	46.67	32	53.33
11-20	21	26.67	21	35.01
21-30	11	18.34	5	8.34
Mean	14.3		8	
Total	120	100.00	120	100.00

Source: field survey, 2021

The result in Table 2 shows that the average net return realized was ₦56,667.66 and ₦ 40,978.83 for cooperative and non-

farmers had spent about 14 and 8 years in farming for respectively. Nwaru (2004), noted that the number of years spent in farming may give an indication of the practical knowledge one has acquired on how to overcome certain inherent farm production problems. Non-Cooperative' and Cooperative farmers would count more on their experiences for improved output rather than educational attainment. Experience has a positive effect on market participation because it enhances the skill and ability to utilize better on market information, which may in turn reduces marketing costs and make it more efficiency able to participate in the market.

cooperative farmers respectively. This finding shows that the respondent was efficiency in their farming business. However the result also

shows that the cooperative farmers were more efficient than non-cooperative farmer in the study area, this could be attributed to access to cooperative education, credit and other

production input. This finding is in tandem with Olagunju *et al.*, (2021) who reported that most cooperative farmers are technically efficiency in Nigeria

Table 2: Costs and Returns of the Farmers

Variables	Cooperative farmers (Amount ₦)	Non-Cooperative farmers (Amount ₦)
Cocoyam	2700	0
Cassava	58100	30420
Maize	49000	48420
Yam	41900	41320
Sweet potatoes	7050	6470
Total return/revenue	158750	126630
Variable cost		
Transportation cost	2533.33	2600
Storage cost	5091.67	2483.33
Labour	12316.7	11850
Cost of planting materials	64475	50583.33
Agrochemical	5180	6480.3
Total variable cost	89,596.7	73,996.96
Fixed cost		
Depreciated value	12485.64	11654.21
Total fixed cost	12,485.64	11,654.21
Total cost	102,082.34	85,651.17
Net return (efficiency)	56,667.66	40,978.83

Source: Field Survey Data, 2021

Efficiency Determinants of Cooperative Farmers in the Study Area

The estimated parameters for efficiency levels of cooperative farmers is presented in Table 3

Table 3: Efficiency determinants of cooperative farmers in the study area

Variables	Parameters	Coefficient	Z-values
Production factors			
Intercepts	β_0	5409.589	0.11
Seed/Seedling	β_1	68.64349	21.82***
Farm size	β_2	54.77003	3.42***
Fertilizer	β_3	18.77003	1.52
Labour	β_4	16401.61	2.06**
Capital	β_5	3653.309	2.47**
Inefficiency factors			
Constant	δ_0	-1711.230	-0.40
Age	δ_1	-1427.455	-0.73
Experience	δ_2	1583.219	0.93
Education	δ_3	10954.87	1.60
Extension contact	δ_4	-1897.441	0.14
Household size	δ_5	-7463.146	-1.53
Diagnostic statistics			
Log Likelihood	-693.8643		
Gamma (γ)	0.59		
Sigma-squared (σ^2)	0.021		

Source: Field Survey data, 2021 ***, *, Significant at 1% and 10%, respectively

The maximum likelihood estimates for parameters of the stochastic frontier production model for efficiency determinants of cooperative farmers in the study area are

presented in Table 4. The estimate of the sigma-squared (σ^2) parameter, 0.021 was statistically significant, indicating a good fit and correctness of the distribution assumption of composite

error term. The estimate of the gamma parameter (0.59) indicated that only 0.41 of the total variations in output of cooperative farmers was due to technical inefficiency. The log likelihood function was estimated to be -693.8643.

The result indicated that four (Seed/seedling, labour, farm size and capital) out of the five production variables had significant effects on production output, while fertilizer was not significant. This implies that a 1% increase in the quantities of seed/seedling, labour, farm size and capital used by

cooperative farmers would lead to 68.64349%, 54.77003%, 16401.61% and 3653.30% of output respectively. This finding is in agreement with Ebido *et al.*, (2020) who posited that fertilizer and capital inputs had a positive and significant relationship with output. With regards to the inefficiency factors (Table 4), none of the variables considered was significant. This may be attributed to the fact that most agricultural cooperatives provide their members with innovations, resources, improved management practices, education among others.

Table 4: Efficiency determinants of non-cooperative farmers in the study area

Variables	Parameters	Coefficient	Z-values
Production factors			
Intercepts	β_0	1765.041	0.03
Seed/Seedling	β_1	71.73436	21.49***
Farm size	β_2	54.59274	3.28***
Fertilizer	β_3	13601.76	1.01
Labour	β_4	15038.34	1.00
Capital	β_5	4597.175	0.05
Inefficiency factors			
Constant	δ_0	2298.134	-0.30
Age	δ_1	-2557.841	-1.45
Experience	δ_2	-3588.195	-1.79*
Education	δ_3	4252.392	0.59
Extension contact	δ_4	-431.8763	-0.03
Household size	δ_5	-6085.54	-1.63
Diagnostic statistics			
Log Likelihood	-581.97		
Gamma (γ)	0.62		
Sigma-squared (δ^2)	0.004		

Source: Field Survey data, 2021 ***, *, Significant at 1% and 10%, respectively

The maximum likelihood estimates for parameters of the stochastic frontier production model for efficiency determinants of non-cooperative farmers in the study area are presented in Table 4.3. The estimate of the sigma-squared (σ^2) parameter, 0.004 was statistically significant, indicating a good fit and correctness of the distribution assumption of composite error term. The estimate of the gamma parameter (0.64) indicated that only 0.36 of the total variations in output of non-cooperative farmers was due to technical inefficiency. The log likelihood function was estimated to be -581.97.

The result indicated that two (Seed/seedling and farm size) out of the five production variables had significant effects on

production output, while labour, fertilizer capital were not significant. This implies that a 1% increase in the quantities of seed/seedling and farm size used by cooperative farmers would lead to 71.73436% and 15038.34% increases in output respectively. With regards to the inefficiency factors (Table 4), the coefficients of farming experience was negatively signed and significant. This implies that the higher the farming experiences of non-cooperative farmers, the lower the level of technical inefficiency. This finding is not in line with Chikezie *et al.*, (2020) who reported a positive relationship between farming experience and technical inefficiency in Ebonyi state.

Effect of Cooperative Society On Level of Efficiency of Farmers the Study Area

The Z- test was used to estimate the effect of cooperative society on level of efficiency of farmers the study area.

Table 5: Results of the Test the Significant Difference in Efficiency of Cooperative and Non-Cooperative Farmers

Variable	Mean	Std. Deviation	Std. Error Mean	Z
Cooperative farmers	0.504	0.167	0.015	4.788***
Non-cooperative s farmers	0.283	0.145	0.018	
Differences	0.221	0.312	0.033	

Source: Field survey 2021

The result of the test for differences in efficiency between cooperative and non-cooperative farmers is shown in Table 5. The result shows that the mean differences in efficiency of cooperative and non-cooperative farmers were 0.221 and 0.312. The 'Z' (4.788***) result showed that there was significant difference in efficiency of cooperative and non-cooperative s farmers in the study area. The Z-ratio was positively signed indicating efficiency advantage for the cooperative. Also, the efficiency of cooperative farmers was significantly higher than that of non-cooperators. This could be attributed to

increased access to cooperative innovations and services.

Problems of Participating in Cooperative Society in the Area

Problems of participating in cooperative society in the study area is present in Table 4.6. The result shows that the major problems of participating in cooperative society were high levies (65%) and distance (55%). This is in agreement with the findings of Ololade and Olagunju (2013) where they reported high wages as major constraint in farmer's association.

Table 6: Problems of Participating in Cooperative Society

Constraint	Frequency *	Percentages	Ranking
High levies	39	65.00	1st
Long protocols	25	41.67	3rd
Bureaucracy in cooperative administration	24	40.00	4th
Insufficient funds	21	35.00	5th
Nature of farm work	11	18.33	7th
Distance	33	55.00	2nd

Source: Field survey (2021) *multiple responses recorded.

CONCLUSION

Based on the findings of the study, it was concluded that cooperative societies had significant effect on the level of efficiency of rural farmers in Enugu State, Nigeria. Seed/seedling, labour, farm size and capital had significant effects on production output of cooperative farmers while Seed/seedling and farm size exerted significant effect on the output of non-cooperative farmers. With regards to the inefficiency factors, farming experience had negative effect on the output of non-cooperative farmers. The major problem to participation in cooperative societies was high levies and distance.

RECOMMENDATIONS

The following recommendation were made in-line with major finding

- i. Non-cooperative farmers should be encouraged to join cooperatives through massive enlightenment

and awareness programmes, in order to have access to cooperative society's benefits like education, improved planting materials, fertilizer, labour, capital among others.

- ii. The major problem to participation in cooperative societies were high levies and distance, therefore, there is need for cooperative society policies to be restructured to address the above issues.

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