

## Effectiveness of Credit Delivery Among Agro-Based Cooperative Member Enterprises in Abia State, Nigeria

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### ABSTRACT

This study is significant as it examines the effectiveness of cooperative societies in providing credit and its potential impact on agro-based enterprises in Abia State, Nigeria. The specific objectives of the study were to determine the socio-economic characteristics of cooperative societies within the study area, determine the types of agro-based cooperative enterprises that received funding, determine the selection criteria used for cooperative society members, determine the loan application and approval process, determine the effectiveness of credit delivery to both agricultural and non-agricultural enterprises, and determine the impact of cooperative society credit on agro-based enterprise growth. The research selected eight cooperative societies and 32 cooperators. Both primary and secondary data were analyzed using various statistical tools, including frequency distribution, means, percentages, queue model, Chi-square, Analysis of Variance (ANOVA), and paired T-test. The findings showed that the cooperatives in Umuahia South had been operational for around seven years and supported agro-based and non-agro-based enterprises. The cooperators agreed that cooperatives must adhere to the necessary criteria when selecting members. The credit approval rate was 51.55%, while cooperative was found to be ineffective and inefficient in credit delivery. In addition, credit had a positive impact on agro-based enterprise production growth. We recommend that cooperatives be guided by their credit outreach objectives, approve more loan requests to enhance their traffic intensity and comply with admission conditions. This will improve their credit access and delivery, potentially leading to significant improvements in the agro-based enterprise sector.

**KEYWORDS:** Cooperators, Queue model, Idle time, traffic intensity, Agriculture

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### INTRODUCTION

Agriculture is an essential sector in the Nigerian economy and is pivotal in foreign exchange earnings; hence, most Nigerians are involved in agricultural and food production activities (Akinola et al., 2020). These activities are mainly carried out through small agro-enterprises, which provide the necessary nutrition requirements for the population. However, the agricultural sector's past performance has not been impressive, and this situation needs to be addressed to feed the nation, reduce poverty, and achieve a viable level of economic growth.

Cooperatives are self-governing associations established by individuals who unite voluntarily to pursue mutually beneficial economic interests through a democratically owned and organized enterprise. Agricultural cooperative societies play a vital role in providing various services to their members, such as farm inputs, financial assistance, farm extension services, education and training, marketing of members'

farm produce, and other economic activities and services. Non-agricultural cooperative societies are designed to protect their members' interests and offer credit facilities, education, and other services (EOS Data Analytics, 2022; USDA, 2022; CE, 2022). Well-organized and helpful cooperatives are essential for the development of agriculture in Nigeria. They cater to all agro-entrepreneurs and can be a reliable support system for the agricultural sector (Ijere, 1981; Izekor & Alufohai, 2010).

Credit can come in various forms, such as deferred payment extended by a creditor or lender to a debtor. Agricultural loans are mainly extended to agro-enterprise operators to enhance the value addition/food chain. Agro-enterprise and non-agricultural financial assistance can be obtained through different avenues, such as institutional avenues like banks, microfinance banks, government parastatals, or non-institutional paths such as money lenders, self-help groups, relations, and social entrepreneurs. However, Africa's unorganized rural credit market, including Nigeria, is more effective than the organized system due to the formal lending structure's inability to achieve the desired goal (Egboro, 2015). High interest rates and other transaction costs, including tedious paperwork and bureaucratic loan processes associated with formal loans, make it difficult for enterprise owners to access funds (Foltz, 2004)

To address these challenges, donor agencies and governments have re-emphasized the need for cooperatives as a strategy to promote collective action to strengthen smallholder livelihoods by linking them to available markets. Cooperative societies have proved to be a good channel of credit delivery to agro-enterprise owners due to their capability to withstand loan delivery (Alufohai, 2006). This study's primary focus is to evaluate cooperative societies' effectiveness in providing credit to both agro-enterprises and non-agro-enterprises in Abia State, Nigeria. This becomes necessary due to the growing challenge of creditworthiness among farmers on an individual basis. Mitigating this challenge has continued to demand potential strategy. In addressing this, the study will identify different types of agro-based enterprises that received funding, the selection criteria used for cooperative society members, the loan application and approval process, the effectiveness of credit delivery to both agricultural and non-agricultural enterprises, and the impact of cooperative society credit on agro-based enterprise growth. Understanding these will assist policymakers in formulating effective policy that suits local cooperatives in Nigeria and aligns with global best practices.

## METHODOLOGY

The study was conducted in Umuahia South, Abia, a region with a significant agricultural presence. Umuahia South, with an area of 140km<sup>2</sup> and a population estimate of 202,500, has a tropical climate with substantial rainfall and an average annual temperature and precipitation of 26.0 °C and 2153 mm, respectively, making it conducive for farming. This location was chosen due to its representative nature of the agricultural landscape in Abia State, Nigeria.

The study's population comprises 64 cooperatives registered in Umuahia South, a subset of the 4,500 registered Cooperative Societies in Abia State, Nigeria. A purposive sampling technique was used in selecting 8 cooperative societies. The Cooperatives Office at Umuahia South Local Government Area Headquarters provided the list of all registered Cooperative Societies. The 8 cooperative societies were selected based on their activities and participation in agricultural projects/programs such as FADAMA III and Abia State Agricultural Development Program-ADP. Primary data was used in the study. Data collection involved a structured questionnaire administered to 8 officials representing the 8 selected cooperatives and 32 cooperators (four cooperators each from the eight cooperatives). The data were analyzed using descriptive statistics such as means, frequency distribution, percentages, and pooled T-test statistics to determine the cooperative credit effect on the selected growth parameters. The T-test model is stated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \quad (1)$$

Where,

$\bar{X}_1$  = Mean value of production and assets before in Naira

$\bar{X}_2$  = Mean value of production and assets after in Naira

$s_1^2$  = Variance of production and assets before

$s_2^2$  = Variance of production and assets after

$N_1$ = Number of cooperatives before

$N_2$ = Number of cooperatives after

The Queue Model was utilized to determine the arrival rate of loans, service rate, idle time, and traffic intensity of cooperative societies. This model involves a waiting line or queue of individuals waiting to receive attention. Ogbe and Asanya (2019) drew upon previous research to adopt this model and establish the parameters for cooperative societies.

$$\text{Arrival rate} = \frac{\text{Number of arrival}}{\text{time}} \tag{2}$$

$$\text{Service rate} = \frac{\text{Number of serve}}{\text{r time}} \tag{3}$$

$$\text{Traffic intensity} = \frac{\text{Arrival rate}}{\text{service rate}} \tag{4}$$

$$\text{Idle time} = 1 - \text{Traffic intensity} \tag{5}$$

The service rate denotes the annual count of applications that have been accepted, considered, and approved for loans. Idle time, however, refers to the period during which no application is attended to despite being submitted. A queue management system can be deemed efficient when the traffic intensity is at unity, meaning that the arrival rate equals the service rate, and the idle time is brought to a minimum of zero.

## RESULTS AND DISCUSSION

### Dominance factors for some cooperative society characteristics in Umuahia South

Dominance factors for some cooperative society characteristics in Umuahia South are presented in Table 1

Table 1 shows that the mean age of the cooperative societies in Umuahia South was about 7 years, and 40% were more than 10 years. The average membership at inception was 6, indicating that 40% of the cooperative societies had more than 6 members. Interestingly, the average membership presently has risen to 13. This indicates that about 67% of cooperative societies had 13 or more members. The finding reveals that most cooperatives could have motivational packages that can entice more members to join them.

**Table 1: Features cooperatives according to age and membership**

Features	Mean	Min.	Max.	%	Dominance factor
Age of cooperative	6.9	4	10	40	40% of the cooperative societies had existed for at least 7 years.
Membership at inception	6.4	4	10	40	40% of the cooperative societies had at least 6 members at inception
Membership now	13.1	10	15	66.7	66.7% of the cooperatives had 13 or more members presently
Availability of motivational packages	-	-	1	100	The entire cooperative societies had packages that could induce new entrants.

Source: author’s computation

### Type of enterprises funded by the respondents.

The type of enterprises funded by the respondents is presented in Table 4.2

**Table 2: Type of enterprises funded by the cooperative**

Umuahia South		Enterprise Funded
S/N	Name of Cooperative	
1	Easy FMC	+
2	Ndi Ome	+
3	Unik	+ -
4	Ezinedu	+ -
5	Ugaa Women	+ -
6	Afodinkpa	+ -
7	Onwuchekwa	+ -
8	Obinwanne	+

Source: author’s computation. Note: + represent agro-based enterprise, - represent non-agro based enterprise, +- represent agro-based non-agro based enterprise.

Table 2 shows that in Umuahia South, Easy FMC, NdiOme, and Obinwanne cooperatives society were engaged in funding agro-based enterprises. Meanwhile, Unik, Ezinedu, Ugaa Women, Afodinkpa, and Onwuchekwa cooperatives funded agro and non-agro-based enterprises. The reason for the funding of these enterprises by the cooperatives could be due to their mandate.

Table 3 shows that all cooperative members must reside within the cooperative's area of operation, and their businesses must also be located within that same area. Additionally, members must be willing to purchase at least the mandatory share capital, attend meetings, and be financially committed to the cooperative. Failure to adhere to these conditions could result in the derailment of the cooperative's aims and objectives.

**Conditions for selecting members among the cooperative societies**

The conditions for selecting members among the cooperative societies are presented in Table 3

**Table 3: Conditions for selecting members among the cooperative societies**

S/n	Conditions	Freq.	Percent
1.	Residence within the area of the operation of the cooperative	8	100
2.	The location of the members' business must be within the area of operation of the cooperative	8	100
3.	Readiness to purchase at least the mandatory share capital	8	100
4.	Readiness to attend meetings	8	100
5.	Readiness to be financially committed	8	100
6.	Readiness to be a member	8	100

Source: author's computation

**Average numbers of loan applications and approvals across the cooperatives in Umuahia South**

The average Number of loan requests and endorsements across the respondents in Umuahia South is presented in Table 4.

**Table 4: Average numbers of loan applications and approvals across the cooperatives in Umuahia South**

Name of cooperative	Loan Request						Loan Approved						App Rate (%)
	1 <sup>st</sup> Q	2 <sup>nd</sup> Q	3 <sup>rd</sup> Q	4 <sup>th</sup> Q	Total	$\bar{X}$	1 <sup>st</sup> Q	2 <sup>nd</sup> Q	3 <sup>rd</sup> Q	4 <sup>th</sup> Q	Total	$\bar{X}$	
Easy	15	-	6	-	21	5.3	1	-	2	-	3	0.8	14.3
NdiOme	15	7	8	-	30	7.5	8	5	5	-	18	4.5	60
Unik	-	-	-	-	-	-	-	-	-	-	-	-	-
Ezinedu	3	-	1	1	5	1.3	2	-	1	1	4	1	80
Ugaa Women	1	-	-	2	3	0.8	1	-	-	1	2	0.5	66.7
Afodinkpa	1	-	-	2	3	0.8	1	-	-	1	2	0.5	66.7
Onwuchekwa	5	-	10	-	15	3.8	3	-	4	-	7	1.8	46.7
Obinwanne	10	-	10	-	20	5.0	4	-	5	-	9	2.3	45
<b>Total</b>	<b>50</b>	<b>7</b>	<b>35</b>	<b>5</b>	<b>97</b>	<b>24.5</b>	<b>20</b>	<b>5</b>	<b>17</b>	<b>3</b>	<b>45</b>	<b>11.4</b>	
<b>Average</b>	<b>6.3</b>	<b>0.9</b>	<b>4.4</b>	<b>0.6</b>	<b>12.1</b>	<b>3.1</b>	<b>2.5</b>	<b>0.6</b>	<b>2.1</b>	<b>0.4</b>	<b>5.6</b>	<b>1.4</b>	<b>47.4</b>

Source: author's computation

Table 4 reveals that Ndi Ome had the highest loan application and approval rate for each quarter in 2016, with an average of 7.5 and 4.5, respectively. On the other hand, Ugaa Women and Afodinkpa had the smallest difference in the average Number of loan applications and approvals. The report also shows that Unik had no loan requests or approvals in 2017, indicating that no requests were made or approved.

**Evaluation of loan applications and approvals for Umuahia South**

Analyses of loan application and loan approval for Umuahia South are presented in Table 5

**Table 5: Evaluation of Loan Applications and Approvals**

Quarterly	Average Number of applications	Average Number of approvals	Approval Rate (%)
Quarter 1	50	20	40
Quarter 2	7	5	71.4
Quarter 3	35	17	48.6
Quarter 4	5	3	60
<b>Total</b>	<b>97</b>	<b>45</b>	<b>55</b>

Source: author's computation

Table 5 reveals that cooperative societies in Umuahia South 2016 received an average of 50 loan applications in the first quarter. Out of those, only 25 were approved, resulting in a 50% approval rate. In the following quarters, 7, 35, and 5 loan applications were received, with 5, 17, and 3 applications approved, respectively. This gave approval rates of 71.4%, 48.57%, and 60%. Overall, the cooperative societies in Umuahia South received 97 loan applications in 2016, with 50 approved. This resulted in an overall approval rate of 51.55%. This shows that agro-enterprise owners had moderate access to cooperative loans.

### Effectiveness of the Cooperative Societies

The effectiveness of the cooperative societies is presented in Table 6.

**Table 6: arrival rate, service rate, idle time, and traffic intensity**

Quarterly	Arrival Rate (No.)	Service Rate (No.)	% Served	Traffic. Intensity	Idle Time
Quarter 1	17	8	47.1	2.13	-1.13
Quarter 2	2	2	100	1	0
Quarter 3	12	6	50	2.00	-1.00
Quarter 4	2	1	50	2.00	-1.00
<b>Total</b>	<b>33</b>	<b>17</b>	<b>247.1</b>	<b>7.13</b>	<b>-3.13</b>
<b>Average</b>	<b>8.09</b>	<b>4.25</b>	<b>57.55</b>	<b>1.78</b>	<b>-0.78</b>

Source: author's computation. Note: No. represent Number while Quarter represents four months. Decision rule: % served rate of 50 or its equivalent in % is regarded as creditworthy or a high level of creditworthy status otherwise not creditworthy status

Table 6 shows that the cooperative societies in Umuahia South in the four quarters of 2016 had average arrival rates of 17, 2, 12, and 2, with their corresponding service rates as 8, 2, 6, and 1, respectively. The Table shows that the highest arrival and service rates were recorded in the first quarter as 17 and 8 respectively. This could be because it is linked to the planting season, as respondents may seek cooperative finance and non-financial facilities. The result also revealed that the traffic intensities in Umuahia South for the first, second, third, and fourth quarters were 2.13, 1.00, and 2.00, with their corresponding idle time as -1.13, 0, -1.00, and 1.00 correspondingly. It shows that there is a need for improvement in credit delivery.

Furthermore, the analysis revealed that the percentage rate served in Umuahia South for the first, second, third, and fourth quarters of 2017 was 47.1%, 100%, 50%, and 50%. The shortfall in the percentage rate served in the third quarter could be because the respondents did not meet the conditions for cooperative financial and non-financial facilities. The overall result showed that the cooperative societies in Umuahia South were ineffective and inefficient in queue management because the overall traffic intensities were more than one (1.78). The overall idle time was not zero (-0.78), respectively. Therefore, they were ineffective in credit delivery because the overall percentage rate served was less than 100%. This result aligns with the study of Awotide *et al.* (2011). Awotide *et al.* (2011) showed that cooperatives had an overall approval rate of 88.4% with an average traffic intensity of 1.05 and an idle time of -0.05. This opined that cooperative societies were ineffective in their credit delivery function. In addition, the result is a variant of the study of Izekor and Alufohai (2010). The result of Izekor and Alufohai (2010) showed that cooperatives had an overall approval rate of 99.16%, an arrival rate of 43, and a service rate of 43 per month, which resulted in a traffic intensity of 1.01 and an idle time of -0.01, which opine that cooperative societies were effective in their credit delivery function.

### Effects of cooperative society's credit on beneficiaries' agro-based enterprise growth

To ascertain the outcome of cooperative society's credit on agro-based enterprises' growth, production and asset values before and after credit models were used, and the outcome is presented in Table 7.

**Table 7: Effects of cooperative society's credit on beneficiaries' agro-based enterprise growth**

variables	Before (₦)	After (₦)	Growth Rate
Production	128500.00	2006623.33	56.1
Asset	110365.00	146466.67	32.7

Source: author's computation

Table 7 shows that in Umuahia South, the production before and after were ₦128,500.00 and ₦2006623.33, respectively, with a percentage % growth rate of 56.1%. The percentage growth rate of the production by 56.1% could mean that the enterprises had good access to cooperative financial and non-financial facilities. The Table also revealed that the value of assets increased by 32.7% with the value of assets before and after ₦110365.00 and ₦146466.67, respectively; the growth in the value of assets among the enterprises in

Umuahia South could be that a proportion of the cooperative credit was deployed in acquiring additional assets.

**Test of Hypotheses**

**Hypothesis 1**

**HO<sub>1</sub>: No significant difference exists among the growth parameters of selected agro-based enterprises' production before and after cooperative credit in Umuahia South.**

To determine whether there is a significant variation in the growth parameters of the chosen agro-based businesses, the paired t-test was utilized, and the results are presented in Table 9

**Table 8: Significant difference among the growth parameters of selected agro-based enterprises' production before and after cooperative credit in Umuahia South**

Growth Parameter	Individual mean	Std Deviation	Std Error Mean	Pooled Mean	df	T-cal	T-tab
Production before	128500.00	144662.107	26411.566	72123.33	29	2.731	1.699
Production after	200623.33						

Source: author's computation. Decision rule: if T calculated is >T tabulated, reject the Null hypothesis and accept the alternative; otherwise, accept the null hypothesis and reject the alternative hypothesis.

According to Table 9, the calculated T value for production before and after was 2.731 in Umuahia South, while the tabulated T value was 1.699, with a mean percentage of 56.1%. This suggests that the calculated T value is greater than the tabulated T value, so the alternate hypothesis is accepted, meaning there is a significant difference among the growth parameters in selected agro-based enterprises in Umuahia South. The high percentage growth rate indicates that the enterprises had good access to cooperative financial and non-financial facilities.

**Hypothesis 2**

**HO<sub>2</sub>: No significant difference exists among the growth parameters of selected agro-based enterprise assets before and after cooperative credit in Umuahia South.**

To establish whether there is any significant difference among the growth parameters of the selected agro-based enterprises, the paired t-test was used, and the result is presented in Table 10.

**Table 9: Significant difference among the growth parameters of selected agro-based enterprises assets before and after cooperative credit in Umuahia South**

Growth parameter	Individual mean	Std Deviation	Std Error Mean	Pooled Mean	Df	T-cal	T-tab
Asset before	110365.00	110918.849	20250.919	36101.67	29	1.783	1.699
Asset after	146466.67						

Source: author's computation Decision rule: if T calculated is >T tabulated, reject the Null hypothesis and accept the alternative; otherwise, accept the null hypothesis and reject the alternative hypothesis.

According to the data presented in Table 10, the calculated T-value for assets before and assets after in Umuahia South was 1.783, while the tabulated T-value was 1.699. The mean percentage was found to be 32.7%. This indicates that the calculated T-value is greater than the tabulated T-value, which means that the alternate hypothesis is accepted. In other words, there is a significant difference among the growth parameters of the selected agro-based enterprises in Umuahia South. The percentage growth in assets suggests that a portion of the cooperative credit was invested in acquiring additional assets.

**CONCLUSION**

The study results indicate that cooperative credit positively impacted the growth of agro-based enterprise production in Umuahia South, with a production growth rate of 56.1% and a positive asset growth rate of 32.7%. Most respondents agreed that cooperatives must adhere to necessary criteria for selecting members, as non-adherence could derail cooperative aims and objectives. Additionally, the results showed access to cooperative credit, with an average approval rate of 51.55%. However, the study revealed that cooperatives in Umuahia South were not very effective and efficient in credit delivery, as overall traffic intensities and idle time were 1.78 and -0.78, respectively. The study recommends that funding of business enterprises

among the cooperatives should be based on their mandates to ensure the sustainability of cooperative activities and the quick realization of goals and objectives. Cooperatives should approve more loan requests to improve their traffic intensity. Furthermore, they should ensure speedy treatment of loan requests to reduce idle time and facilitate greater outreach to clients.

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