CREDIT ACCESS BY COOPERATIVE WOMEN VEGETABLE FARMERS AND POVERTY REDUCTION IN AKINYELE LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT:

Cooperatives can help solve the problem of non-access to credit among women farmers, which limits their production and income levels with consequence of poverty. Therefore, the effect of cooperative women vegetable farmers' credit access on poverty status in Akinyele Local Government Area of Oyo state, Nigeria was assessed in this study. Primary data were collected with the aid of a semi-structured questionnaire through a two-stage sampling technique. Three women cooperatives were chosen in the first stage and 150 cooperative vegetable farmers were randomly selected from the list of the three cooperatives. Data were analysed using descriptive statistics, FGT poverty measures and probit regression model. Average age of the women farmers was 44 years, household size was 6 persons, years of formal education was 7 years and farm size was 0.4 ha. Most (64%) women farmers accessed credit from their cooperatives. The poverty line was ₦2,271.57, while only 14% of the women farmers were poor. Credit access, education, farm income and savings reduced the probability of poverty among women cooperative farmers, while having primary occupation of farming increased it. The study concluded that access to credit among women vegetable farmers in cooperatives reduces poverty. Therefore, government policy on poverty reduction for women cooperative farmers should focus on increasing credit access, farm income, years of education and informal savings.

Keywords*:* Agricultural credit access, Poverty reduction, Women cooperatives, Women vegetable farmers.

JEL classification: I32, Q12, Q13.

1. INTRODUCTION

Global vegetable production in 196 countries of the world stands at 175.69 million metric tonnes, including onions, shallots, green beans, cabbage, broccoli, chilies, tomatoes and other vegetables (FAOSTAT, 2023). The top vegetable producers are China and its mainland producing a total of 68.4% of total vegetables in the world. India and the United States of America follow with production shares of 7.9% and 1.6%, respectively. Around the world, most vegetable growers are women, especially in African countries where most food crops are grown by women while cash crops are mostly grown by men (Olowa and Olowa, 2015). Nigeria ranks seventh in the world and top in Africa for vegetable production with an annual production of 1.58 million metric tonnes. Other top African vegetable producers include Egypt and Algeria having annual production of 1.56 and 0.77 million metric tonnes, respectively (FAOSTAT, 2023). Nigeria's annual vegetable production fell from 1.62 million tonnes in 2015 to 1.58 million metric tonnes in 2021 representing a decline of 2.53%. The decline in vegetable production may be a reflection of the general decline in the Nigerian economy due to the COVID-19 pandemic, conflicts, food insecurity, other security challenges and widespread poverty. Since 2015, poverty reduction has stagnated and over two-fifth of the

population are living in poverty (World Bank, 2022), hence, for every 10 Nigerians, four are poor. Furthermore, the phenomenon of poverty is more pervasive in the rural areas where agricultural production is the main occupation of people. The neglect of the sector due to oil revenue, among other factors, may explain the widespread poverty of actors in agriculture (Chijioke and Olisah, 2023). Consequently, low level of savings, capital, investment, productivity and income typify the rural areas leading to a general low standard of living. Absent or inadequate physical, social and economic infrastructure have also described the rural areas overtime (Lawal et al., 2022). For every two Nigerians found in the rural area, one is poor. Moreover, for every two households primarily engaged in agriculture, one is poor (World Bank, 2022).

Poverty also has a gender dimension in Nigeria, although the headcount of poverty among individual males and females in the country shows no difference, more women are poorer as they grow older than 45 years of age (World Bank, 2022). Women who are married, divorced, separated or widowed are poorer than their male counterparts. The proximate causes of poverty include low income and low assets whether physical or human capital; lack of opportunities and social exclusion (Aigbokhan, 2012) leading to creation of inequality situations in the country. The Global Gender Gap Report (GGGR, 2022) revealed the lowest proportion for gender parity in labour force, while unemployment rates for women have continued to be higher than men. Despite the United Nations fifth Sustainable Development Goals (SDG5) that advocates for equal rights and opportunities for both women and men, gender inequality in Nigeria is still rife in Nigeria; the largest economy in Africa. Women represent between 60 and 79 percent of Nigeria's rural labor force but are five times less likely to own their own land than men. Women are also less likely to have had a decent education (Blackwood and Hilton, 2018). Over three-quarters of the poorest women in Nigeria have never been to school and 94% of them are illiterate (Blackwood and Hilton, 2018)**.** Women farmers form the majority in the rural areas, and are involved at all stages of agricultural enterprises, responsible for about 80% of all food items produced and 50 percent of the domestic food storage in the country (Aderibigbe, 2018), though they rarely own the means of productions (Ojekale, 2018). This has implications for the scale, investment, decision-making and even accessing credit from financial institutions for agricultural production.

Many women farmers are small holders, asset-poor and often unable to meet conditions for loans of financial institutions, especially high interest rates and collateral requirements (Mukaila et al, 2022). Farmer cooperative societies have acted to bridge the financial gap for many women farmers. Cooperative societies provide an alternate source of credit, while improving the quality of life of the women farmers. Participation in cooperatives affords many beyond merely increasing income. Cooperatives are regarded as institutional machineries for empowering the economically weak members of the society. Cooperatives help to increase the productivity and incomes of small scale farmers (Obi-Egbedi and Ojo, 2020). Moreover, cooperatives provide support and cohesion for women farmers to enhance association, confidence and independence levels, thereby improving their decision making power and standard of living. Hence, farmers cooperatives can play a crucial role in the eradication of hunger and poverty, although the assessment of the effect of cooperatives on women farmers' poverty reduction has not been widespread in literature. Studies such as Osabohien et al (2021) and Jatto et al (2021) assessed effects of youth participation and farmers, respectively on poverty but did not focus on women farmers. Similarly, several studies exist on women farmers such as Mukaila et al (2022), Bulus and Madueme (2022), which assessed the level of poverty among women farmers or farmers of both gender but did not focus on vegetable farmers. Although, Olowa and Olowa (2015), Yekini and Oguntade (2014) and Meludu and Okanlawon (2014) studied women vegetable farmers, neither cooperative membership nor credit access

were considered. Women are more disadvantaged in resources, production and credit access though they make up the larger proportion of vegetable producers. Marginalization in productive assets could limit women's ability to access credit due to lack of collateral arising from non-ownership of assets, with probable result of poverty. It is therefore imperative to investigate cooperatives' members' poverty reduction among women vegetable farmers. Moreover, farmers have been encouraged to join cooperatives in order to be able to participate in government welfare (Faye and Obah-Akpowoghagha, 2023) and other farmer programs aimed at inclusive access to inputs, especially credit. Targeting women vegetable farmers in cooperatives for poverty reduction programs of Government and Non-Governmental Organizations requires knowledge of the influence of cooperative credit on their welfare. Therefore, this study raises the following questions: Do women vegetable farmers in cooperatives have access to agricultural credit? What is the level of poverty among the women vegetable farmers? How does cooperative credit access by women vegetable farmers influence their poverty status? Hence, the study seeks to investigate the effect of women cooperative vegetable farmers' credit access on poverty reduction in Akinyele Local Government Area of Oyo state.

2. LITERATURE REVIEW

2.1 Theoretical literature

Several theories have been used to analyze cooperative behavior including: game theory, transaction cost analysis, agency theory and the neoclassical theory of the firm. The neoclassical theory usually assumes that profit maximization as the major goal of the firm, though most cooperatives have other non-profit objectives as their major goal, such as maximizing the welfare of their members. Every economic objective has its unique economic implications. Hence, with the assumption of an input supply cooperative behavior where members' receive the input of credit for their agricultural activities, the cooperative maximizes profit at the point where its marginal cost equals price. The cooperative provides the farm input of credit only to its members hence, the cooperative's demand curve represents the demand of its members for credit. However, the members could also obtain credit from other sources. To maximize members' welfare it could seek to maximize per unit patronage refund hence it would procure and give out credit at the point where its total cost curve equals demand and average revenue (Royer, 2011). Hence, members have the critical input of credit and patronage refund in addition. Both lead to increased incomes which should result in reduced poverty level for the members.

2.2 Methodological review

Poverty measurement could be money-based or non-money-based, unidirectional or multidimensional. Information on the incidence, intensity of poverty and the inequalities between the poor can be obtained from the Sen-index and Sen-Shorrocks-Thon (SST) index. The SST can further give information on the sources of change in poverty over time. The Foster–Greer–Thorbecke (FGT) measure of poverty puts higher weight on the poverty of the poorest individuals, making it a combined measure of poverty and income inequality. The individual indices within the family are derived by substituting different values of the parameter α into the following equation:

$$P\alpha(y, z) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-yi}{z}\right)^{\alpha} \qquad \text{Equation 1}$$

Where α is a non-negative parameter; z is the poverty threshold, n is the total number of households in the population, q is the number of poor households and y is household income, z - yi is the gap between the poverty line and the income for each poor individual. For $\alpha=0$, $P(y, z)$ reduces to head count ratio which indicates the proportion of the population below the poverty line. z is the poverty line (using 2/3 of monthly Mean per Capita Household Expenditure - MPCHE) The higher the index, the greater the proportion of the individuals or households who are poor. It is given as: $P_0= \frac{q}{n}$

Equation 2

Similarly for α = 1, it reduces to the poverty gap measure (depth of poverty) which shows the average gap between the expenditure or income of the poor individual or household and the poverty line. The higher the index the greater the poverty gap and it is given as:

$P_1= \frac{1}{n}\sum_{i=1}^{q}(\frac{z-\mathbf{yi}}{z})$ Equation 3

However, a complex measure reflecting differences in inequality among the poor is obtained by setting α>1; an example is the squared poverty gap index, SPG or P_2 (Ravallion, 1994). P_2, the severity of poverty index or the square of the gap of each poor individual from the poverty line is more sensitive to the poorest persons in the society by giving them a higher weight in calculating the depth of poverty. This means that the further a person is away from the poverty line, the higher the value of the P_2 index. The index will give those much below a smaller weight for persons just below the poverty line than those much below.

It is given as: $P_2= \frac{1}{n}\sum_{i=1}^{q}(\frac{z-\mathbf{yi}}{z})^2$ Equation 4

For a continuous case, FGT poverty measures are defined as:

$P_\alpha = \int_0^z \left(\frac{z-\alpha}{z}\right) \alpha f(x)dx, \alpha > 0$ Equation 5

Where x is the household consumption expenditure, f(x) is its density (roughly the proportion of the population consuming x), z denotes the poverty line and α is a non–negative parameter. FGT measure of poverty satisfies the monotonicity axiom for $\alpha=2$ and is justified by a relative deprivation concept of poverty.

2.3 Empirical review

The study of Mukaila et al. (2022) examined the drivers of poverty among rural women in Nigeria using the logit regression model. It was found that age, household size and cropping systems increased poverty while provision of credit, farm size, marital status and contact with extension agents reduced poverty. Jatto et al. (2021) assessed the poverty status of arable farm households in Akinyele Local Government Area of Oyo State, using logit regression model. It was found that being married and household size positively and significantly predicted the probability of being poor, while access to credit and per capita income were negative and significant predictors. In the assessment of youth participation in agriculture and poverty reduction in Nigeria using logit model by Osabohien et al. (2021), household size was also found to have significant positive effect on poverty, along with age, having inherited land and being a male, while having market access and household assets reduced poverty. As noted by Okereke et al. (2023), a variety of variables affect welfare in Nigeria. Despite the varied studies that assessed the determinants of poverty in agricultural enterprises, cooperative women

vegetable farmers were not assessed with respect to poverty reduction. Furthermore, Meludu and Okanlawon (2014) and Yekini and Oguntade (2014) assessed women vegetable farmers with regards to their training needs in organic agriculture and vegetable farming respectively. Olowa and Olowa (2015) also studied vegetable farmers with respect to labour participation and gender, though their membership in cooperatives and poverty reduction were not assessed. Hence, the aim of this study is to assess the influence of credit access by women vegetable farmers in cooperatives on poverty reduction of their households in Akinyele local government area of Oyo State.

3. METHODOLOGY

3.1 Study area

The study was conducted in Akinyele Local Government Area (LGA) of Oyo state. The LGA is one of eleven LGAs that make up Ibadan the capital city of Oyo State. It shares boundaries with Afijio Local Government to the north, Lagelu Local Government Area to the east, Ido Local Government Area to the west and Ibadan North Local Government Area to the south. It occupies a land area of 464.892 square kilometers with a population density of 516 persons per square kilometer. Using 3.2% growth rate from 2006 census figures, the 2010 estimated population for the Local Government is 239,745. The LGA is subdivided into 12 wards: Ikereku, Olanla/Oboda/Labode, Arulogun/Eniosa/Aroro, Olode/Amosun/Onidundu, Ojo-Emo/Moniya, Akinyele/Isabiyi/Irepodun, Iwokoto/Talonta/Idi-oro, Ojoo/Ajibode/Laniba, Ijaye/Ojedeji, Ajibade/Alabata/Elekuru, Olorisa-Oko/Okegbemi/Mele, and Iroko. The predominant economic activity is farming, especially cultivation of vegetables. Cereal and cassava cultivation are also common in the LGA.

3.2 Data and sources

The study employed primary sources of data using a semi-structured questionnaire to obtain information from women vegetable farmers registered with the women cooperatives in the study area. Data was collected on socio economic characteristics, food and non-food expenditure and asset ownership. The study employed a multistage sampling technique in the selection of women vegetable farmer cooperators. In the first stage, three women cooperative associations were purposively selected out of the list of women cooperative associations that are registered with the Women in Agriculture (WIA) section of the Agricultural Development Programme (ADP) of Oyo State, based on having lists of vegetable farmer members that could be located for interview and regular cooperative activities. The cooperative associations selected were: Codo Women Cooperative Association, Green Life Women Cooperative Association and Stop Hunger Women Cooperative Association. In the second stage, a total of 150 women farmers were randomly selected from the list of 214 women farmers.

3.3 Data analytical techniques

Descriptive statistics were used to describe the socio economic characteristics of women farmers, and their agricultural credit access. The FGT class of poverty measures were used to estimate the poverty level , while the probit model was used to assess the effect of credit access on poverty reduction. Poverty status is the response variable Y^* which is dichotomous (poor and non poor, respectively). We assume that (Y^*) can be specified as follows:

$$Y_i^* = \beta_o + \sum_{j=i}^{n} BjXj + \varepsilon i \qquad \text{Equation 6}$$

And that, $Y_i = 1$ if $Y_i^* > 0$ Equation 7

$Y_i = 0$ if $Y_i^* \leq 0$ Equation 8

Positive Values of Y^* are observed as Y = 1 while negative or zero values of Y* are observed as Y = 0, while B_i represents unknown parameters to be estimated. The description and measurements of these variables are summarized in Table 1.

Table 1: **Description, measurement and apriori expectation of determinants of poverty**

Variable	**Type**	**Measurement**	**A priori sign**
Age	Continuous	Years	-
Years of education	Continuous	Years	-
Access to credit	Dummy	1 = yes, 0 = otherwise	-
Farm income	Continuous	Naira	-
Primary occupation	Dummy	1 = farming, 0 = otherwise	+
Savings pattern	Dummy	1 = formal, 0 = informal	+

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 The description of socioeconomic characteristics

The description of women farmers socioeconomic characteristics is presented in Table 2. Most (67.33%) of the women farmers were within the age bracket of 41 and 50 years, while the average age of the women farmers was about 44 years. This implies that most women farmers were in their agile and productive stages of life. This follows closely with the findings of Olowa and Olowa (2015) which also showed that vegetable farmers were within the age bracket of 41 and 50 years. Further, almost three-quarters (72%) of the women farmers had between 6 and 10 years of formal education. The mean years of formal education was about 7 years, indicating that most of the women farmers were literate. Jatto et al. (2021) also found that most farmers were literate. Moreover, almost two-thirds (64.7%) of the women farmers had household size of between 4 and 6 persons with the average household size being 6 persons. This could be considered as a medium sized household. The household size has implications for family labour which reduces the cost of farm production. This supports the findings of Mukaila et al. (2022) and Bulus and Madueme (2022) whoo found household size to be 7 and 9 persons, respectively. Similarly, over half of the women farmers earned farm income of between ₦21,000 and ₦40,000 monthly. The average monthly farm income of the women farmers was ₦28,653.37 which concurs with the findings of Odetayo *et.al.* (2016) that found women farmers had an average monthly income of ₦24,000 and Mukaila et al. (2022) that found ₦22,561. This was above the World Bank poverty line of ₦690 ($1.90) per day and ₦21,000 per month. With respect to farm size, the results reveal that only 0.7% of the women farmers had farm sizes of over 1 hectare. The mean farm size was 0.4 hectare, in close agreement with Olowa and Olowa (2015) who found that, most vegetable farmers operate farm size of 1 hectare or less. Similarly, over 90% of the women farmers are primarily engaged in agriculture. This result is in agreement with the findings of Mukaila et al. (2022) that 86% of women farmers have

agriculture as their primary occupation. The savings pattern of the women farmers further revealed that over two-thirds engage informal financial institutions for savings. This may be because their savings give them access to loans without collateral which is required by formal financial institutions. This result is similar to the findings of Ololade and Olagunju (2013) which revealed that 60% of the rural farmers engage in informal savings. Finally, the results in Table 1 show that majority (64%) of the women farmers had access to credit. This implies that most of the women farmers did not have to rely on personal savings or wealth to invest in agriculture. This has positive implications for agricultural production and farmers' welfare, although Mukaila et al. (2022) found that most rural women farmers do not have access to credit and do not belong to cooperatives.

Table 2: Socioeconomic Characteristics of Women Cooperative Vegetable Farmers

Characteristics	Frequency	Percentage (%)
Age		
≤30	2	1.33
31-40	33	22
41-50	101	67.33
>50	14	9.33
Total	150	100
Mean	44.43	
SD	4.91	
Years of Formal Education		
1 – 5	31	20.7
6 – 10	108	72
>10	11	7.3
Total	150	100
Mean	6.95	
S.D.	2.16	
Household size		
1-3	2	1.3
4-6	97	64.7
7-9	49	32.7
≥10	2	1.3
Total	150	100
Mean	5.95	
SD	1.28	
Farm Income (₦'000)		
1 – 10	14	9.3
11 – 20	33	22
21 – 30	32	21.3
31 – 40	51	34
41 – 50	18	12
>50	2	1.4
Total	150	100
Mean	₦28653.37	
SD	₦12767.4	
Farm Size (ha)		
0.1 – 0.3	81	54
0.4 – 0.6	61	40.7

0.7 – 1	7	4.7
>1	1	0.7
Total	150	100
Mean	0.3661	
SD	0.165	
Primary occupation		
Farming	138	92
Trading	12	8
Savings pattern		
Formal	49	32.7
Informal	101	67.3
Credit Access		
Access to credit	96	64
No access to credit	54	36

Source: Field survey, 2018

The poverty line estimation is shown in Table 3. The moderate poverty line, which was two-third of MPCHE was calculated as ₦2,271.57. This higher than the National poverty line of ₦1,330 or $1.90/day and World Bank poverty line ₦1,400 or $2/day. This indicates that most of the cooperative women farmers have are relatively better off in terms of their welfare level.

Table 3: Poverty line estimation among cooperative women farmers

Variables	**Amount (₦)**
Food Expenditure	2262805
Non-food Expenditure	637815
Total Expenditure	2900620
Per capital expenditure	511102.82
Mean per capital expenditure (MPCE)	3407.35
Moderate poverty line (2/3 of MPCE)	2271.57
Core poverty line (1/3 of MPCE)	1135.78

Source: Authors' computations from field survey, 2018

The result of the poverty level estimation is shown in Table 4. Only 14% of the women farmers were below the poverty line, hence were moderately poor. Similarly, poverty depth (P_1) was 2.5%, while the poverty severity was 0.59% among the cooperative women farmers. None of the women farmers were below core poverty level. The low poverty incidence may be linked to the women's participation in the cooperative which avails them of several poverty alleviation benefits such as access to credit and economies of scale in production via products sale and inputs purchase. It is generally agreed in literature that participation in cooperative organizations reduces rural poverty and raises rural household living standards (Shen et al., 2022; ICA, 2022).

Table 4: Poverty level estimation among cooperative women farmers

Poverty measure	**Poverty levels**
Poverty incidence (P_0)	0.14
Poverty depth (P_1)	0.025659
Poverty severity (P_2)	0.005943

The probit estimates for the effect of agricultural credit on the poverty status of women cooperative farmers are presented in Table 5. The log likelihood value of −17.44855 indicates that the explanatory variables used in the binary probit model are appropriate. The probability value of 0.00305455 for chi squared of 86.5919 shows that at least one of the parameters of the variables is different from zero. This means that the null hypothesis that all parameters equal to zero in the model is rejected. Agricultural credit access was negative and significant in explaining the poverty status of cooperative women vegetable farmers in the study area. This implies that credit access reduces the probability of being poor by 431%, an indication that credit access is critical for poverty reduction for women farmers. The result agrees with Shen et al. (2022) and Jatto et al. (2021). Similarly, years of formal education, primary occupation and farm income significantly reduced the probability of poverty among the women farmers at different levels of significance. Years of education was significant at 1% level in determining the probability of being non poor. Education is expected to build a woman's capacity of income generation, thereby reducing poverty. This aligns with Mukaila et al. (2022).

The result further revealed that primary occupation was negative and significant in influencing the poverty status of the women farmers in cooperative. Hence, having a non-farm primary occupation reduces poverty relative to being primarily engaged in agriculture. This conforms to the findings of Osabohien et al. (2021) who deduced that respondents who are primarily farmers have a lower total annual income compared to respondents having farming as a secondary occupation. Furthermore, farm income was negative and suggests that the higher the farm income the lesser the probability of being poor. This finding corroborates Saifullahi and Haruna (2016) who concluded that a consistent increase in farm income causes an exit shift from core poverty among rural farmers. Finally, the savings pattern has a positive effect on the probability of poverty. This implies that saving in other formal financial institutions increases poverty, relative to saving in informal financial organizations. This may be due to the bureaucracy involved in saving and retrieving savings associated with formal institutions. This result is supported by Aderibigbe (2018).

Table 7: Probit estimates for the effect of agricultural credit on the poverty status

Variables	**Coefficient**	**Std. Error**	***Z***	**p-value**
Constant	0.982139	3.79063	0.2591	0.7956
Education	−1.08721***	0.414635	−2.622	0.0087
Credit access	−4.31060***	1.37945	−3.125	0.0018
Prim. Occupation	−1.83635*	0.962714	−1.907	0.0565
Savings pattern	2.32852***	0.903979	2.576	0.0100
Farm income	−0.000525741***	0.000187405	−2.805	0.0050
Sources of credit	−0.155713	0.257617	−0.6044	0.5456
Age	−0.00984730	0.0727018	−0.1354	0.8923
McFadden R-squared	0.712755			
Adjusted R-squared	0.581056			
Akaike criterion	50.89710			
Log-likelihood	−17.44855			
Schwarz criterion	74.98218			
Hannan-Quinn	60.68210			
Likelihood ratio test: Chi square (7)	86.5919 [0.0000]			

5. CONCLUSION AND POLICY RECOMMENDATIONS

The effect of credit access by women vegetable farmers in cooperatives on poverty reduction was investigated in the study. It was established that most women farmers in cooperatives are not poor. It was further concluded that agricultural credit access reduces the chances of poverty among women cooperative farmers, along with years of formal education, non-farm primary occupation and farm income. Based on the findings of the study, it was recommended that poverty reduction policies among women farmers by governmental and non-governmental organizations should emphasize agricultural credit access. Furthermore, policies and programmes that favor increased years of formal education and farm income should be initiated for women farmers' poverty reduction. Finally, women farmers should be encouraged to patronize informal savings institutions for poverty reduction.

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