

(RESEARCH ARTICLE)



Willingness and capacity of borrowers for loan repayment among farmers in Delta State Nigeria

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Abstract

Willingness of borrowers to repay loan and their capacity to repay borrowed fund has been an enigmatic challenge in the financing of agricultural enterprises in the tropics. As it stands, there is lack of empirical information on willingness of borrowers to repay loan and their capacity to repay credit. Investigating this challenge will improve agriculture in Delta state, Nigeria. This study derives its significance from its implications and usability among credit institutions. This study investigates willingness and capacity of borrowers for credit repayment among farmers in Delta State, Nigeria. A multistage sampling approach was used to select 216 farmers, Descriptive statistics, multiple regression, and binary logistic regression were employed in the analysis of collected data. The findings of the study show a mean amount of ₦460,972.22 was borrowed and ₦253,268.52 was repaid with a loan repayment performance of 54.94% and loan default rate of 45.1%. Further result indicates that 56.5% of farmers express willingness to repay loans, while 43.5% show unwillingness to repay borrowed fund. Further finding reveals that 40% of the farmers possess capacity to repay loan.. The study revealed that there is a significant difference in loan repayment capacity of poultry < fish, < arable crop farmers, with an F-value of 5.669 and ($P \leq 0.05$). Regression analysis identifies significant predictors of loan repayment capacity to include stock size, off-farm income, and farm income. Diversified income sources and effective farm management practices play crucial roles. Logistic regression indicates that longer repayment periods, larger stock sizes, and greater farming experience positively influence farmers' willingness to repay loans ($P \leq 0.05$). It was recommended among others that financial institutions should offering flexible loan terms and sizes according to borrowers capacity. Encouraging farmers to diversify their income sources can improve loan repayment capacity of farmers.

Keywords: Willingness to repay loan; Capacity of borrowers; credit, Correlates of loan repayment; Farmers

1. Introduction

Considerable interest have been shown globally by agricultural economists, planners, policy makers, agribusiness managers, agriculturists and financial institutions on the need to give listening ears to farmers in Nigeria with respect to loan. With these renewed interests in improving the status of the rural resource poor farmers through credit extension, a key issue that has cropped up is the question of loan repayment.

In other words, repayment of borrowed agricultural funds has been one of the numerous challenges of agricultural developments in the developing world (Enimu, Eyo and Ofeni 2017). Credit repayment performance could be influenced by a number of factors like interest rate, unstable prices of agricultural commodities, and the social relations and responsibilities of the borrower (Ugbomeh et al, 2008). Hence, the performance of aquaculture farmers is also dependent on their willingness and capacity to repay loan as some could be willing but do not have the capacity and vice versa.

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According to Ugbomeh, Achoja, Ideh and Ofuoku (2008), credit repayment performance could be influenced by a myriad of factors such as interest rate, unstable prices of agricultural commodities, and the social relations and responsibilities of the borrower.

Access to credit has multiplier effect on the agribusiness owners (Achoja 2013). Access to agricultural credits and importance of credits to agricultural development has been reviewed by various authors (Achoja 2011, Gbigbi 2017, Ideh 2008, Ugbomeh 2008, Ofuoku 2008,) however access to credits by smallholder farmers has constituted a critical challenge in developing countries (Echebiri and Nwaogu 2016). Notable reasons for this challenge among others is the lack of collateral to borrow loans. It is important to investigate the volume of loan access by the farmers in Delta state, Nigeria. The essence is to ascertain whether the volume of loan accessed by farmers is enough for optimum agricultural performance.

Various government and donors agencies have developed agricultural credit scheme, some NGO's, self-help group like cooperative societies, have also developed loan recovery scheme. Loan recovery scheme entails the acquisition and refund of borrowed fund into ever flowing financial system. Repayment of borrowed fund drives the sustainability of a credit system (Achoja, 2010). The previous record of loan repayment attitude of a borrower has been used to predict loan repayment behavior, tendency or willingness to repay loan (Achoja, 2020).

Lending to small and medium enterprise including farmers is a risky activity as repayment of these loans are less guaranteed, according to (Nandini and Shubha 2022). Even as the willingness to repay loan has been investigated as an extension of loan repayment behavior of smallholder farmers, it is therefore important to examine the willingness for smallholder farmers to repay loan. Furthermore loan repayment behavior of smallholder farmers may correlate with their personal characteristics hence it is important to determine the relationship between willingness to repay loan and some selected or identified socio-economic characteristics

Self-help groups possessed good capacity to repay loans to financial institutions, sustained profile of revenue growth, capacity to generate annual surplus (income), high investment in capacity assets and good credit report from creditors or borrowers (Achoja 2020).

Adebayo and Adeola (2008) reported that farmers relied on loans from financial institutions to increase their productivity. In spite of government effort towards establishing the Bank of Agriculture for the provision of cheap and affordable financial assistance to the agricultural sector, access to loans by rural farmers is affected by different factors. Most paramount among these variables are high interest rate, filling of many forms, number of guarantors, distance from bank and high transport cost. Also, Adejobi and Atobatele (2008) and Agnet (2004) reported that farmers' access to credit is hindered by high loan default and cumbersome loan acquisition procedures operated by commercial banks. Adegbite (2009) stated that some banks were reluctant to extend loans to farmers because of high administrative costs and their perception that default rate might be high among farmers.

This study was hinged on the theory of planned behavior. Ajzen (1991) proposed the Theory of Planned Behavior (TPB) wherein the individual's behavior is best predicted by one's intentions and intentions are in turn, predicted by attitudes about the behavior, the subjective norms encasing the execution of the behavior, the theory is found to be well supported by empirical evidence. Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior. Much has been made of the fact that general dispositions tend to be poor predictors of behavior in specific situations. General attitudes have been assessed with respect to organizations and institutions (the church, public housing, student government, one's job or employer), minority groups (Blacks, Jews, Catholics), and particular individuals with whom a person might interact (a Black person, a fellow student) (Ajzen & Fishbein, 1977) The failure of such general attitudes to predict specific behaviors directed at the target of the attitude has produced calls for abandoning the attitude concept (Wicker, 1969). The theory of planned behavior is an extension of the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) made necessary by the original models limitations in dealing with behaviors over which people have incomplete volitional control theory of reasoned action, a central factor in the theory of planned behavior is the individual's intention to perform a given behavior.

Werema and Opanga (2003) carried a study on the factors affecting clients on loan repayment for pride microfinance institutions in Arusha, Tanzania. According to their findings clients' characteristics (age, gender and level of education), nature of business (business type) and loan characteristics (repayment period, repayment mode and repayment amount) were among the factors that influenced borrowers in repaying their loans. Olagunju and Adeyemo (2007)

studied factors that determine loan repayment decision among farmers in Southwestern Nigeria during 2005, poverty was found to hamper repayment.

Rose, (2007) Define successful loan repayment as the ability to repay the loan as per the loan agreement and loan defaulting as the inability to repay the loan by either failing to complete the loan as per the loan agreement or neglect to service the loan. On her study on the causes of default in government micro credit programs in Kenya, she found a strong relationship between major sources of income, diversion of funds, domestic problems and loan defaulting.

Awoke (2004) reported that the high rate of default arising from poor management procedures, loan diversion.(Achoja 2020), and unwillingness to repay loans has been threatening the sustainability of most public agricultural credit schemes in Nigeria. In the same vein, Olagunju and Adeyemo (2007) argued succinctly that the problem of default in the repayment of agricultural loans is one of the factors that have militated against the development of the agricultural sector in Nigeria, because it dampens the willingness of the financial institutions to increase lending to the sector. Whatever the cause, one direct consequence of loan default is that it has caused considerable reduction in the loanable funds to greater majority of loan seekers and also requires substantial amount of administrative cost and time to recover the amount in default (Udoh, 2008). Partly because of the high default rate, most credit institutions are becoming more reluctant to extend loan to smallholder farmers (Afolabi, 2010; Olagunju & Adeyemo, 2007) in their need of the facility loan diversion is a possible reason for loan default and unwillingness and lack of capacity to repay loan kills a financial credit system (Achoja, 2011). The inability of the farmer borrower to repay borrowed funds in accordance with the loan terms constitutes a major issue to lending bodies. This non-payment in both principal and interest to Cooperatives can result in loan shrinkage, liquidation and ineffectiveness (Onyenucheya & Ukoha, 2007). Lending institutions formal and informal thus, need to consider the characteristics of potential borrowers before loan of any kind is granted

A lot of works have been carried out on the determinant of loan repayment by farmers but not much have been said on the willingness and capacity to repay loan by farmers in Delta State.

The thrust of this study was to analyze the willingness and capacity towards loan repayment among farmers in Delta State while the specific objectives were to;

- Evaluate farmers' willingness to repay loan in Delta State.
- Assess the capacity to repay loan by the farmers in Delta State.
- Determine factors that influence loan repayment among farmers in Delta State.
- Assess the difference in loan repayment capacity among poultry, fish and arable crop farmers in Delta State

Based on the study objectives, the following null hypotheses will be tested.

- H_01 : The selected socio-economic characteristics do not have significant effect on farmers' willingness to repay loan.
- H_02 : The identified socio- economic characteristic have no significant effect on loan repayment capacity of farmers.
- H_03 : There is no significant difference in loan repayment capacity among poultry, fish and arable crop farmers in Delta State

2. Material and methods

2.1. Study Area

The study was conducted in Delta State, Nigeria. The state lies between latitude 50 00' and 60⁰ 30' North and longitudes 50 00' and 60 45' East. The State is bounded by Edo State to the North, Anambra State to the East, Rivers State to the Southeast, Bayelsa State to the South, the Bight of Benin of the Atlantic Ocean to the West and Ondo State to the Northwest. On the East and South, the State is bounded by the lower course and delta of the Niger River. The state is generally low-lying without hills but with a wide coastal belt interlaced with rivulets streams and rivers which form part of the Niger Delta. The distribution of vegetation varies from mangrove swamp along the coast to fresh water swamp forests and a derived savannah in the north.

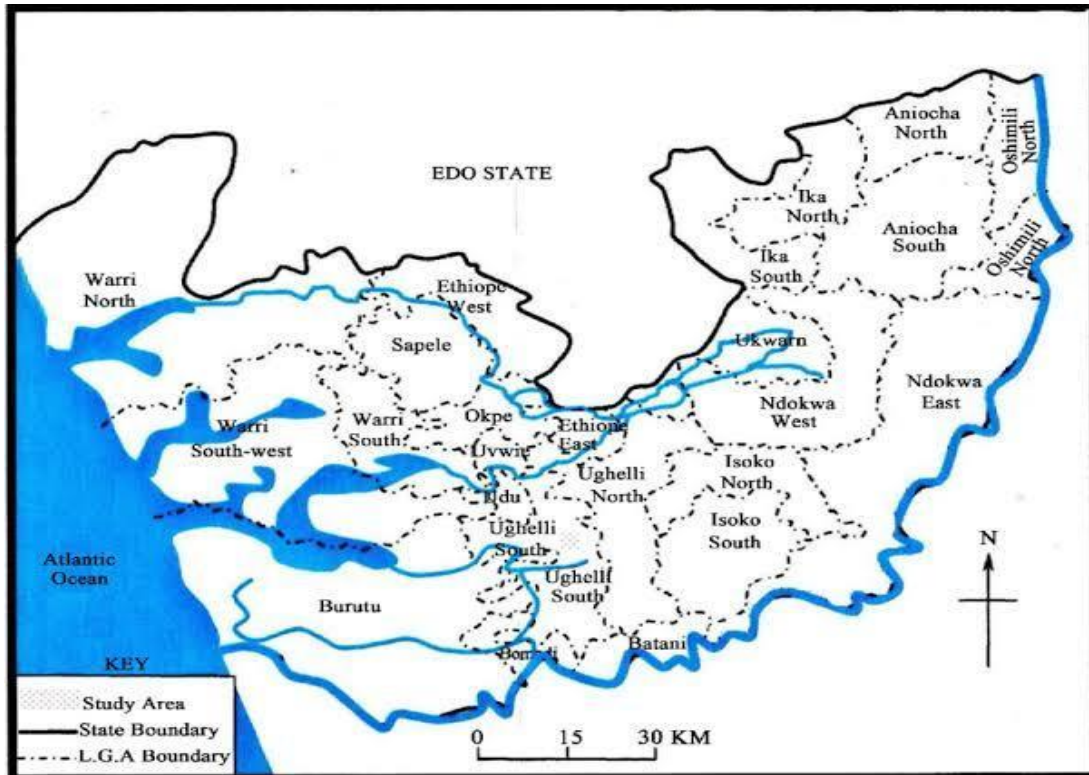


Figure 1 Sampling Technique

A multistage sampling procedure was used to sample 72 farmers. First stage was the purposive selection of 2 Local Government from Delta central agricultural zone, The second stage was random selection of 2 communities from each of the Local Government Areas while the last stage was random selection of 72 farmers from each of the villages.

2.2. Methods of Data Collection

The data for this study were primary data. The primary data were obtained using well-structured questionnaire that was administered to the farmers as well as interview

2.3. Method of Data Analysis

Objective one and three was achieved using debt to income ratio

Objective two and four was achieved using logit binary regression.

Objection five was analyzed using Likert scale .

2.4. Sampling Technique

Table 1 Distribution of respondents according to enterprise

S/N	Farm enterprise	Total no of Respondents
1	Poultry	72
2	Fish farm	72
3	Arable crop	72
Total		216

Source: Field survey data, 2023

2.5. Data Analysis Techniques

2.5.1. Descriptive Statistics

Descriptive statistics such as cross tabulations, frequencies, means and percentage was used to give insight into the magnitude of some variables such as socioeconomic variables of the Farmer sand their wiliness to pay.

2.5.2. Debt – to – income ratio

This states a borrower’s debt as a percentage of his income. A high debt to income ratio is perceived by lenders as high risk, and it may lead to decline or altered terms of repayment that cost mover the duration of the loan

2.5.3. Binary logistic regression

Binary logistic regression was used to analyze the factors that influences loan repayment by farmers in Delta State. Following Gujarati (1995),the multiple regression model is implicitly specified as: $Y = f(X_1, X_2, X_3, X_4 \dots\dots\dots X_{11}, e)$

Model 1

Willingness to repay loan among farmers

Implicit form of the model

$$WTRL = f(X_1, X_2, X_3, X_4 \dots\dots\dots X_n)$$

Explicit form of the model

$$WTRL = \beta_0 + \beta_1 GND + \beta_2 MR + \beta_3 ATT + \beta_4 SL + \beta_5 INT + \beta_6 RP + \beta_7 EDU + \beta_8 FEXP + e_i$$

Where WTRL = Willingness to repay loan (dummy of 1 if yes or 0 otherwise)

GND = gender (dummy variable Male = 1; Female = 0)

MR = marital status (dummy variable Single = 1; Married = 0)

ATT = attitude

SL =source of loan

INT = interest rate (%)

RP = repayment period (annually)

EDU = educational level (years of schooling)

FEXP = farming experience (years)

e_1 = error tern

Model 11 capacity to repay loan

Implicit form of the model

$$CTPL = f(X_1, X_2, X_3, X_4 \dots\dots\dots X_n)$$

Explicit form of the model

$$CTPL = \beta_0 + \beta_1 AGE + \beta_2 HSZ + \beta_3 SSZ + \beta_4 OFI + \beta_5 FINC + e_i$$

Where CTPL = capacity to repay loan (dummy of 1 if yes or 0 otherwise)

AGE = age (years)

HSZ = household size (numbers)

SSZ = stock size

OFI = off- farm income (#)

FINC = farm income (#)

e_i = error term

2.6. Likert scale

The cut-off point was determine by finding

$$x = \Sigma x / n = 4 + 3 + 2 + 4 = 104 = 2.5$$

Thus, the mean value of the scale of 2.5 was used as cut-off to rank the responses. Response below 2.5 was considered as not significant while response above 2.5 was considered as significant.

3. Results and discussion

3.1. Volume of loan accessed by farmers in Delta State

The result in Table 2 presents the distribution of farmers based on the volume of loans they have assessed. The mean assessed loan amount, calculated as ₦460,972.22, represents the average loan value that farmers are seeking. The largest group, comprising 46.3% of the farmers, falls within the loan range of ₦500,000 to ₦749,999. The next most common range is ₦250,000 to ₦499,999, with 33.3% of farmers accessing loans in this range. Only a small percentage (5.6%) of farmers assessed loans below ₦250,000, and similarly, a limited portion (1.4%) accessed loans above ₦999,999. This distribution indicates that a significant portion of farmers require loans in the ₦250,000 to ₦749,999 range, which might suggest that this range aligns with their financial needs for farming operations. The predominance of farmers in the ₦500,000 to ₦749,999 category suggests that many farming operations require moderate funding for activities such as pond construction, stocking, feed procurement, and other operational costs. The presence of farmers in the higher loan categories signifies that some farming operations have substantial financial demands, potentially related to scaling up production or investing in advanced technology. According to a study conducted by Ndah et al. (2015), loan assessment volumes are indicative of the financial requirements and investment needs of farmers, with varying levels of financial engagement across different categories. This observation aligns with the findings presented in Table 4.2, where the majority of farmers assess loans in the mid-tier range of ₦250,000 to ₦749,999, implying a significant need for capital injection into their farming operations.

3.1.1. Interest rate on loan

The result in Table 4.2 showed that almost half (48.1%) of the farmers in the study area received loans with interest rates in the 0 – 5% range. This indicates that a significant proportion of farmers were able to access loans with low-interest rates, which could be beneficial for their businesses. A smaller percentage of farmers, around 9.7%, received loans in the 6 – 10% interest rate range. The mean interest rate in this range is 9.1%. This implies that some farmers had access to loans at a slightly higher interest rate compared to the lower range but still relatively favourable terms. Furthermore, around 10.6% of farmers received loans with interest rates in the 11 – 15% range, while approximately 20.4% of farmers had loans with interest rates in the 16 – 20% range. This shows that a significant portion of the borrowers faced higher interest rates. Finally, about 11.1% of the respondents received loans with interest rates above 20%. This indicates that a small but notable fraction of farmers in the study area had to pay high-interest rates on their loans. These findings highlight the diversity in interest rates applied to loans received by farmers in Delta State. While a significant number of farmers benefited from low-interest rate loans, a portion of the farmers faced higher interest rates. In a study by Kansanga (2017) it was noted that interest rates play a crucial role in shaping the affordability and feasibility of loans for agricultural enterprises. Variability in interest rates can significantly impact the financial feasibility of agricultural investments. This observation is consistent with the findings where farmers experience a diverse range of interest rates, which could potentially influence their borrowing decisions and financial sustainability.

3.2. Amount of loan paid back

The result in Table 4.2 shows that majority of farmers in study area paid back loans in the ₦250,000 – ₦499,999 range, representing 50.0% of the sample. The mean amount of loan paid back in this range is ₦253,268.52. This suggests that a significant proportion of farmers had loan obligations within this range and were able to relatively repay them. Furthermore, 43.1% of the farmers paid back loans below ₦250,000. This indicates that a substantial number of farmers had smaller loan obligations and were also able to meet their repayment obligations. In contrast, a smaller percentage of farmers paid back loans in the higher amount ranges. The percentage decreases as the loan amount increases, with only 6.0% of farmers paying back loans in the ₦500,000 – ₦749,999 range, and 0.5% in both the ₦750,000 – ₦999,999 and above ₦999,999 ranges. The high percentage of farmers (50.0%) who have paid back loans in the ₦250,000 to ₦499,999 range indicates a significant proportion of successful loan repayment among this group. This could suggest healthy financial management and profitability. A relatively large portion (43.0%) paying back loans below ₦250,000 could signify either smaller loan amounts or potential financial challenges among this subset of farmers. According to a study by Sebatta, Wamulume and Mwansakilwa (2014), loan repayment behaviour is a key indicator of financial discipline and the overall financial health of farmers. Understanding loan repayment patterns can provide insights into the viability of agricultural enterprises. This insight aligns with the findings presented in Table 2, where the majority of

farmers are successfully repaying loans in the ₦250,000 to ₦499,999 range, contributing to the financial stability of their operations.

Table 2 Volume of loan accessed by farmers in Delta State, Nigeria

Variable	Frequency	Percent	Mean
Volume of loan assessed			
<₦250,000	12	5.6	
₦250,000 – ₦499,999	72	33.3	₦460,972.22
₦500,000 – ₦749,999	100	46.3	
₦750,000 – ₦999,999	29	13.4	
Above ₦999,999	3	1.4	
Interest rate on loan			
0 – 5%	104	48.1	
6 – 10%	21	9.7	9.1%
11 – 15%	23	10.6	
16 – 20%	44	20.4	
Above 20%	24	11.1	
Amount of loan paid back			
<₦250,000	93	43.1	
₦250,000 – ₦499,999	108	50.0	₦253,268.52
₦500,000 – ₦749,999	13	6.0	
₦750,000 – ₦999,999	1	0.5	
Above ₦999,999	1	0.5	

Source: Field survey data, 2023

3.3. Farmers willingness to repay loan

The result in Table .3 shows that majority of farmers in the study area, accounting for 56.5% of the sample, expressed willingness to repay their loans. This indicates a positive attitude and intention among the farmers to fulfill their loan repayment obligations. However, it is important to note that a significant portion, approximately 43.3%, expressed unwillingness to repay their loans. This indicates that there is a subgroup of farmers who may face challenges or difficulties in meeting their loan repayment obligations. In a study by Olagunju and Ajiboye (2010) it was highlighted that willingness to repay loans is a crucial factor in the overall success of agricultural lending programs. Farmers' willingness reflects their commitment to financial responsibility and their perceived ability to generate income from agricultural activities. This observation resonates with the findings presented in Table 4.3, where a significant majority of farmers express their willingness to repay loans, indicating a positive outlook on their financial prospects and their acknowledgment of the importance of fulfilling their financial obligations.

Table 3 Farmers willingness to repay loan

Willingness to repay loan	Frequency	Percent	Mode
Willing	122	56.5	Willing
Not willing	94	43.3	

Source: Field survey data, 2023

3.4. Farmers capacity to repay loan by the farmers

The result in Table.4 provides information on the capacity of farmers in study area to repay their loans. It was observed that a significant proportion of farmers (34.3%) have a low capacity to repay their loans, ranging between 0% and 20%. This suggests that these farmers may face significant financial challenges and may require additional support or alternative repayment options to meet their loan obligations. Additionally, 11.1% of the farmers have a capacity to repay between 21% and 39%, indicating a slightly higher but still limited ability to meet their loan repayment obligations. The largest group of farmers, comprising 41.7% of the sample, have a capacity to repay their loans between 40% and 59%, with a mean capacity of 40%. This suggests that a substantial number of farmers in Delta State have a moderate capacity to repay their loans but may still require support to improve their repayment ability. A smaller percentage of farmers (9.3%) have a capacity to repay between 60% and 79%, indicating a relatively stronger ability to meet their loan obligations. Lastly, the group with the highest capacity to repay their loans consists of only 3.7% of the sample, who have a capacity above 79%. Out of 100% of income, 40% is being used to service loan and 42.2% of their income covers loan repayment and the farmers have 57.6% income left. These farmers may be in a strong financial position and are more likely to meet their loan repayment obligations on time. It is crucial for financial institutions and policymakers to consider the varying capacity to repay loans among farmers in Delta State. By understanding these trends, targeted interventions and support can be provided to farmers with lower capacities to improve their financial stability and promote responsible loan repayment. A study by Allgood and Walstad (2016) emphasized that perceived repayment capacity is a subjective assessment that can be influenced by various factors, including financial literacy, market conditions, and previous borrowing experiences. This observation resonates with the findings presented in Table 4, where farmers in Delta State express varying levels of perceived capacity to repay loans, which could be indicative of their individual financial situations and experiences.

Table 4 Farmers capacity to repay loan by the farmers

Capacity to repay loan	Frequency	Percent	Mean
0 - 20%	74	34.3	
21 - 39%	24	11.1	
40% - 59%	90	41.7	40%
60% - 79%	20	9.3	
Above 79%	8	3.7	

Source: Field survey data, 2023

3.5. Difference in loan repayment capacity among poultry, fish and arable crop farmers in Delta State

Table 5 presents results of the differences in loan repayment capacity among poultry farmers, fish farmers, and arable crop farmers in Delta State. The ANOVA results show that there is a statistically significant difference in loan repayment capacity between the three groups, with an F-value of 5.669 and p-value of 0.004 which is less than 0.05. This means that the loan repayment capacity varies significantly between poultry, fish, and arable crop farmers. Therefore, the null hypothesis which stated that there is no significant difference in loan repayment capacity among poultry, fish and arable crop farmers in Delta State is hereby rejected.

The post-hoc Duncan test further analysed where the differences lie between the groups. It showed two distinct subsets. Poultry farmers have the lowest mean score of 33.119, indicating the lowest loan repayment capacity. Fish and arable crop farmers form the second subset with mean scores of 43.043 and 45.044 respectively, implying higher loan repayment capacity. The ANOVA and Duncan test results demonstrate that poultry farmers have significantly lower loan repayment capacity compared to fish and arable crop farmers in Delta State. This may be due to higher risks, investments, and operating costs associated with poultry farming compared to the other enterprises. The findings highlight the need for lenders to consider differentiated approaches in financing and supporting the three farm enterprises based on their distinct loan repayment capacities.

Table 5 ANOVA table showing the difference in loan repayment capacity among poultry, fish and arable crop farmers in Delta State

Farm enterprises	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6299.855	2	3149.927	5.669	0.004
Within Groups	118360.600	213	555.684		
Total	124660.455	215			

Source: Field survey data, 2023

Table 6 Distribution of capacity to repay loan

Farm enterprise	N	Capacity to repay	Rank
Arable crop	72	45.044	1
Fish	72	43.043	2
Poultry	72	33.119	3

Source: Field survey data, 2023

3.6. Factors influencing loan repayment capacity among Farmers

Table 7 presents the results of a regression analysis aimed at examining the factors influencing loan repayment capacity among farmers in Delta State. The semi-logarithmic regression model was the lead equation model and was used for further analysis of the results. The R-squared value is 0.6165, indicating that approximately 61.65% of the variability in loan repayment capacity among farmers can be explained by the independent variables included in the model. The adjusted R-squared value is 0.5970. This value suggests that around 59.70% of the variation in loan repayment capacity is explained by the variables that are truly contributing to the model's performance.

3.6.1. Stock Size

The coefficient of 2.1720 signifies that for each one-unit increase in stock size, loan repayment capacity is expected to increase by approximately 217%. This is a substantial positive impact. The high t-value of 3.3576 indicates that this coefficient is highly statistically significant at the 1% level, suggesting that stock size is a significant predictor of loan repayment capacity. Farmers with larger stocking capacities are able to generate greater revenues from harvests to repay loans. This aligns with findings by Olagunju and Adeyemo (2007) that scale of operations strongly predicts loan repayment.

3.6.2. Off-farm Income

For each unit increase in off-farm income, loan repayment capacity is expected to increase by about 145%. The coefficient is statistically significant at the 5% level (t-value = 2.4872), implying that off-farm income has a meaningful impact on loan repayment capacity. Farm households with higher secondary wages from jobs, remittances from relatives, or non-farm enterprise earnings have supplementary income sources to cushion loan repayment, even during lean harvest periods or commodity price declines. Income diversification provides resilience against farming-specific risks like disease outbreaks affecting ability to repay from farm earnings alone. Facilitating skilled off-farm employment and rural microenterprises is therefore imperative to bolster the loan repayment capacities of smallholder farmers. According to Miller and Jones (2010), higher non-farm wages and remittances provide a secondary income source to cushion loan repayment. Diversified income enables resilience.

3.6.3. Farm Income

Similarly, a unit increase in farm income is associated with an expected increase of around 90% in loan repayment capacity. This coefficient is statistically significant at the 5% level (t-value = 2.4751), indicating that farm income is a relevant predictor of loan repayment capacity. Higher revenues from farming facilitate loan repayment, though the effect is weaker than off-farm income, indicating vulnerability to production uncertainties. This shows that while profits from farm harvests still provide the primary means for loan repayment, they are susceptible to numerous production uncertainties. Reliance solely on on-farm income leaves farmers vulnerable to defaults from factors like high feed costs, low market prices during gluts, or lost stock from pollution. Diversified income streams are therefore essential to insure loan repayment.

The F-ratio is 12.9545, and it is statistically significant at the 1% level. A significant F-ratio suggests that at least one of the independent variables in the model is contributing significantly to explaining the variation in the dependent variable. Therefore, the null hypothesis which stated that the identified socioeconomic characteristic have no significant effect on loan repayment capacity of farmers is hereby rejected.

Table 7 Factors influencing loan repayment capacity among Farmers

Variables	Linear	Semi log	Double log	Exponential
Constant	1.9195**	2.4913***	3.6398***	2.6155**
	(2.5956)	(6.3828)	(3.2272)	(2.0138)
Age	1.0150	0.4939	2.5146**	-4.6118
	(0.7022)	(1.4247)	(2.0018)	(-1.7065)
Household size	1.7719	0.9313	0.8593	0.6170
	(1.3818)	(1.0132)	(0.9199)	(0.1618)
Stock size	-1.1643**	2.1720***	-6.8652***	-0.7670***
	(-2.3026)	(3.3576)	(-3.7067)	(-3.4866)
Off-farm income	1.9469	1.4536**	-3.2822	-4.1844***
	(0.6149)	(2.4872)	(-1.2261)	(-3.2484)
Farm income	0.7136	0.8965**	3.9376	-0.0045
	(0.9704)	(2.4751)	(0.9396)	(-0.3648)
R ²	0.4723	0.6165	0.5492	0.4315
Adjusted R ²	0.4252	0.5970	0.5109	0.4283
F-ratio	8.9164***	12.9545***	7.6607***	2.6214***

Figures in parenthesis () are t-values Source: Field survey data, 2023

3.7. Effects of farmers' socioeconomic characteristics on willingness to repay loan

Table 8 presents results of a logistic regression analysing factors influencing willingness to repay loans among farmers in Delta State.

3.7.1. Loan Repayment Period

The loan repayment period has a statistically significant ($p < 0.05$) positive effect on willingness to repay. The odds ratio is 4.963, indicating that for each additional repayment term (month, year etc.), the likelihood of farmers' willingness to repay the loan increases nearly 5 times. More specifically, longer loan tenures make the periodic installments more affordable for farmers' cash flows, thereby boosting their confidence in being able to service the debt. This result is in line with that of Bakar and Senin (2016) who found that loan duration was critical in influencing borrower willingness and ability to repay. Longer terms increased affordability. Policy measures that provide grace periods before repayment starts and structure loan payback over longer durations can therefore greatly enhance smallholder borrower willingness to repay.

3.7.2. Farm size

The farm size has a statistically significant ($p < 0.05$) positive influence on willingness to repay, with an odds ratio of 6.166. This implies that when farm size rises by say 1,000 additional hectares, the likelihood of farmers' willingness to repay increases over 6 times. Farmers with larger farm sizes are able to get greater harvest to generate increased revenues that facilitate loan repayment. Olagunju and Adeyemo (2007) reported that scale of operations had a highly significant positive effect on loan repayment willingness among Nigerian smallholder crop farmers. Scaling up smallholder production through training in best practices and appropriately sized loans can thus significantly boost farmer confidence and morale to repay loans.

3.7.3. Farming Experience

Years of farming experience has a statistically significant ($p < 0.05$) positive effect on willingness to repay farm loans. Experienced farmers likely have superior technical expertise in farming, stronger financial management skills to plan loan use and repayment, and more earnings from established farms to service debts. Their familiarity with the sector's risks also makes them more prudent and cautious borrowers. This result is similar to that of Karim and Law (2016) who found that more experienced borrowers had lower default rates and greater loan repayment willingness based on acquiring financial management skills and business acumen. Mentorship initiatives that create opportunities for new entrants to learn from experienced farmers can help instil positive repayment attitudes among youth.

3.7.4. Cox & Snell R Square (0.638)

The Cox & Snell R Square is a measure of the proportion of variability in the dependent variable explained by the model. Here, it suggests that the model explains about 63.8% of the variability in willingness to repay.

3.7.5. Nagelkerke R Square (0.857)

Similar to the Cox & Snell R Square, the Nagelkerke R Square is an adjusted measure of the proportion of variability explained. This value (0.857) suggests a strong fit of the model.

3.7.6. Chi-square (219.276)

The Chi-square value assesses the overall goodness-of-fit of the model. The significant p-value (Sig. = 0.000) indicates that the model as a whole is statistically significant in predicting the willingness to repay.

Overall, the result in Table 4.7 suggests that factors such as repayment period, stock size, and farming experience significantly influence the willingness of farmers in Delta State to repay loans. Therefore, the null hypothesis which stated that the selected socioeconomic characteristics do not have significant effect on farmers' willingness to repay loan is hereby rejected.

Table 8 Effects of farmers' socioeconomic characteristics on willingness to repay loan

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Gender	-1.28	0.871	2.156	1	0.142	0.278
Marital status	0.087	0.062	1.951	1	0.162	1.091
Source of loan	-0.019	0.451	0.002	1	0.966	0.981
Interest rate	0.268	0.554	0.235	1	0.628	1.308
Repayment period	1.602**	0.739	4.696	1	0.030	4.963
Educational level	0.534	0.652	0.671	1	0.413	0.586
Farm size	1.819**	1.082	2.826	1	0.043	6.166
Farming experience	12.792**	5.301	5.824	1	0.016	0.000
Constant	1.121	0.821	1.866	1	0.172	3.069
Model Summary						
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	df	Sig.	
74.789	0.638	0.857	219.276	8	0.000	

Source: Field survey data, 2023; **, significant at 5% level of probability

4. Conclusion and Policy Recommendation

This study offers a comprehensive analysis of loan repayment attitudes, capacities, and challenges among farmers in Delta State, Nigeria. The sector's diverse demographics, including gender inclusivity and varying age groups, highlight its dynamic nature. While associations hold potential for collective action, limited formal credit access remains a challenge. Loan assessment patterns reveal diverse financial needs and responsible repayment behaviour. Although

most farmers express willingness to repay loans, a significant portion faces challenges. Furthermore, varying capacities to repay loans emphasize the need for targeted interventions to enhance financial stability. Regression analyses underline the significant influence of factors like stock size and income sources on repayment capacity. Constraints such as weather impact, marketing challenges, and infrastructure issues highlight the multifaceted challenges farmers encounter. These findings provide valuable insights for informed policy-making, interventions, and support mechanisms that foster financial resilience and sustainable growth within the farming sector.

Based on the findings provided in this study, the following are recommendations for addressing the challenges and enhancing the loan repayment capacity among farmers in Delta State, Nigeria:

- Given the reliance on informal sources of credit and limited access to loans, there is a need to improve financial literacy and facilitate formal financial inclusion.
- Since loan repayment capacity varies, financial institutions should consider offering flexible loan terms and sizes.
- Encouraging farmers to diversify their income sources can mitigate the impact of factors like weather and market fluctuations on loan repayment.
- Addressing poor marketing and lack of ready markets is essential. Supporting farmers in developing effective marketing strategies and linking them with reliable markets can improve income generation.
- Financial institutions should consider offering longer spread of loan repayment periods. This approach aligns with farmers' cash flows and harvest cycles, reducing the financial burden of loan repayment.
- Enhancing farmers' farming techniques, business skills, and financial literacy practices can boost their capacity to generate income from farming.
- Promoting collective action through agricultural associations can provide a platform for sharing experiences, knowledge, and resources. Farmers can collectively address challenges, pool resources, and access credit on more favourable terms.

The identification of diverse loan patterns emphasizes the need for tailored financial products that cater farmers' varying needs and behaviours. Financial institutions can design customized loan options, promoting better alignment between financial resources and farmers' requirements.

- By revealing varying repayment capacities (low to moderate), the study emphasizes the importance of targeted interventions to enhance farmers' financial capabilities

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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