

Full Length Research Paper

Economic analysis of loan repayment capacity of smallholder cooperative farmers in Yewa North Local Government Area of Ogun State, Nigeria

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Farm credits played vital roles in the socio-economic transformation of the rural economies. However, their acquisition and repayment were characterized by numerous challenges including high levels of default among beneficiaries. This study analyzed the smallholder farmers' loan repayment capacity using household data from 110 cooperative farmers from selected villages in Ogun State, Nigeria. Specifically, the socio-economic and demographic characteristics of respondents, loan repayment rate and factors influencing repayment capacity were examined. Aside from purposive selection of Yewa North, multistage random sampling technique was used to select the study sample. Data were analyzed using descriptive statistics, correlation and regression techniques. Results revealed that the average age of respondents was 45 years with 36% within 20 to 40 years active working population. Average repayment rate was 69% with 42% repaying above nine-tenths, and 20% less than one-half of potential amounts during the period. Loan size ($p < 0.01$) and farm size ($p < 0.05$) had significant positive influences on loan repayment capacity while household size ($p < 0.05$) had a negative influence. From the elasticity analysis, while a 10% increase in loan and farm sizes resulted to 7 and 2.8% increases respectively, similar 10% increase in household size caused 4.2% decrease in repayment capacity. All significant variables produced a priori signs. The implication is that to enhance loan repayment capacity of smallholder cooperative farmers, policies and programmes capable of increasing sizes of loan and farm holdings, or reducing household size should be promoted. However, higher proportional increases were required for each variable to attain a desired level of increase in loan repayment capacity.

Key words: Nigeria, cooperatives, farm size, household size, loan size, repayment capacity, repayment rate, smallholder farmers.

INTRODUCTION

Credits play a vital role in economic transformation and rural development. Agricultural or farm credit is a crucial input required by the smallholder farmers to establish and expand their farms with the aim of increasing agricultural production, enhancing food sufficiency, promoting household and national income, and augmenting the

individual borrower's ability to repay borrowed fund. It enables the poor farmers to tap the financial resources and take advantage of the potentially profitable investment opportunities in their immediate environment (Zeller and Sharma, 1998). The need for credit facilities is necessitated by the limitations of self-financing, uncertainty pertaining to the levels of output, and the time lag between inputs and output (Kohansal and Mansoori, 2009). However, its accessibility is imperative for improvement in the quality and quantity of farm products, so as to increase farmer's income and reduce rural-urban drift (Kohansal and Mansoori, 2009). It is believed that

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farm credit is an indispensable tool for achieving socio-economic transformation of the rural communities. If well applied, it would stimulate capital formation and diversified agriculture, increase resource productivity and size of farm operations, promote innovations in farming, marketing efficiency and value addition while enhancing net farm incomes (Nwagbo et al., 1989). In Nigeria, the acclaimed importance of credits in agribusiness promotion and development, notwithstanding, their acquisition, management and repayment have been burdened with numerous challenges (Oboh and Ekpebu, 2011; Afolabi, 2010), especially for the smallholder farmer (Awoke, 2004). In the case of credit acquisition and management, Rhaji (2000) observed that lack of adequate, accessible and affordable credit is among the major factors responsible for the systemic decline in the contribution of agriculture to the Nigerian economy. With respect to repayment high levels of loan default among borrowers remain a major impediment.

Awoke (2004) reported that the high rate of default arising from poor management procedures, loan diversion 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 and Adeyemo, 2007) in dire need of the facility. Towards curtailing loan defaults and enhancing loan repayment performance among Nigeria farmers, formation and memberships of farmers' groups have been advocated. A group is a collection of individuals among whom a set of interdependent relationship exist (Ofuoku and Urang, 2009). Groups are characterized by interaction, shared values and beliefs, common goal, structure and ideology (Ofuoku and Urang, 2009). Cooperatives are forms of groups that have been encouraged among farmers as instruments of social and economic transformation (Ijere, 1992). Under the cooperatives membership model, farmers were encouraged to become members of cooperative associations, which would be registered, have elected officials and be holding regular meetings with documented minutes (Ofuoku and Urang, 2009).

The belief was that working under associations and groups, farmers would be empowered to speak and act with one voice and consequently it became easier

for them to process credit through financial institutions. As long as the members of cooperative societies desire to remain in the group, it is expected that they will live up to expectations, norms and values of the group (Ofuoku and Urang, 2009). However, despite the expected appreciable role of cooperative groups in promoting loan repayment of its members, limited studies have tried to investigate the loan repayment competence of cooperative farmers in Nigeria. This study attempts to bridge this research gap. The general objective is to analyze the loan repayment capacity of smallholder cooperative farmers selected from Yewa North Local Government Area (LGA) of Ogun State, Nigeria. Some pertinent questions that are linked to the specific objectives of this study are: What are the socio-economic and demographic characteristics of the respondents? What is the loan repayment or default rate of the smallholder cooperative farmers? What are the socio-economic and demographic factors that influence smallholder cooperative farmers' loan repayment capacity in the study area. Consequently, the specific objectives are to: a) examine the socio-economic and demographic characteristics of respondents; b) determine the loan repayment and default rate; and c) identify the factors that influence loan repayment capacity of the smallholder cooperative farmers in the study area. The result of the study is expected to serve as guide to policy makers, ministry of agriculture and rural development, financial institutions, extension services staff, nongovernmental organizations, donor agencies and development workers, and members of the academia in their future design, formulation and implementation of agriculture and rural development programmes in Nigeria.

Theoretical framework

The use of financial support to promote agriculture had been a principal intervention strategy for poverty reduction and rural development. Two main paradigms could explain this approach: the first is the perception of poverty as a rural phenomenon while the second is the increasing emphasis on the concept of integrated rural development. During the late 1960s and early 1970s, prior to the emergence of this interventionist line of thought, the 'econocratic' perspective of development was used as a model to bring about better life for citizens of the poor nations. The model, which placed premium on growth in macroeconomic indicators (like national income, savings, investment, industrialization rate, etc.), had been grossly criticized because there were evidences that far-fetched performances in the key macroeconomic indicators were not reflecting on the standard of living of the poor citizenry. Due to the emerging conflicting and discouraging results, the growth-led development approach was considered a

pseudo tool that was not capable of bringing about the needed rural transformation. Therefore, there was need for direct intervention through provision of credit and financial services to small-holders farmers. The common understanding among development agencies was that the rural dwellers (especially the peasant farmers) were poor because they lacked access to basic infrastructures and institutional credit and that if provided with financial empowerment their productivity would be enhanced and rural poverty consequently reduced. In Nigeria, governments at different levels had at different times been involved directly or indirectly into provision of small to large-scale financial assistance to farmers as a major policy strategy for increased agricultural productivity (Udoh, 2008). Various schemes, programmes and institutions had been put in place to enable smallholder farmers have access to financial services. According to Udoh (2008), the practices of micro credit schemes had been celebrated in many government circles as poverty reduction-focused programme. Among the measures introduced since 1970 in recognition of the unhealthy condition of the Nigerian agricultural sector were the large-scale mechanized farming by state and federal governments, the River Basin Development Authority, National Accelerated Food Production (NAFP), Operation Feed the Nation (OFN), Green Revolution Programme (GRP), and the Directorate for Food, Roads and Rural Infrastructure or DFRRI for short (Enoma, 2010).

Also included were establishment of the Mandatory Credit Guidelines in respect of SMEs in 1970, Small Scale Industries Credit Guarantee Scheme in 1971, Agricultural Credit Guarantee Scheme Fund (ACGSF) in 1973, Nigeria Agriculture and Co-operative Bank (NACB) also in 1973, Rural Banking Scheme (RBS) in 1977, Peoples Bank of Nigeria (PBN) in 1989 and Family Economic Advancement Programme (FEAP) in 1989. There were also the Small- and Medium-Scale Enterprises Loan Scheme in 1992, Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) which was a merger of NACB, PBN and FEAP in 2002, and Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) in 2004, and other agricultural credit schemes operated at various state governments' levels. Essentially, there were two main sources of funds for the Nigerian smallholder farmers: equity and debt (called external sources). Equity (funds from internal sources) includes owners' savings and ploughed back profits. Debt (funds from external sources) could be obtained through formal and informal sources. The formal sources of debt include the banks and governmental agencies. The informal sources of debt include friends/relatives or credit associations like co-operative societies. The Nigeria's financial system was dualistic, consisting of the formal and informal subsystems (Obamuyi, 2007). The formal financial system (FFS) is an organized, registered, and regulated subsector, made up of the banking sector, non-banking sector and the

financial markets (Obamuyi, 2007). As at December 2005, the Central Bank of Nigeria (CBN, 2005) gave a breakdown of the structural composition of the Nigeria's formal financial system to include the Central Bank of Nigeria (CBN), Nigeria Deposit Insurance Corporation (NDIC), the Security and Exchange Commission (SEC), the National Insurance Commission (NAICOM), 25 deposit money banks, 6 development banks, 757 community (now known as the Microfinance) banks, one stock exchange, one commodity exchange, 5 discount houses, 9 primary mortgage banks, 112 finance companies, 126 bureaux de change, 103 insurance companies and 581 stock brokers. On the other hand, the informal financial system (IFS) consists of all the other institutions that are virtually outside the control of the established legal framework, including the money-lenders and the rotating savings and credit associations (Obamuyi, 2007) and of course, cooperative groups.

Most of the government's credit schemes were implemented through the banking sector, which is an integral component of the nation's formal financial system. Smallholders' accessibility to formal financial system was very limited for reasons determined by both the supply (lenders') and demand (borrowers') sides of the credit scheme. On the lenders' side existed banks that were reluctant to expand loans to smallholders due to inadequate capital, imperfect information, high transaction cost of dealing with small loans, geographical dispersion and large numbers of borrowers of smallholders, and low returns from investment (Obamuyi, 2007). Also on the borrower's side, we have the smallholders that were equally reluctant to accessing loans for reasons, which included lack of collateral security, high interest rate and untimely delivery of credits by banks (Obamuyi, 2007). Still with respect to the borrowers, there were empirical evidences that when they failed to make repayment of borrowed money; it might be as a result of their inability or outright unwillingness to repay (Nawai and Shariff, 2010). This had underscored the distinction between two identified possible reasons for loan default, namely, strategic default, associated with a borrower's willful decision to default, even when the benefiting business enterprise had yielded enough revenue to effect repayment (Udoh, 2008), and default due to a negative economic shock, which was often unavoidable (Tedeschi, 2008).

Literature review of factors influencing loan repayment capacity of smallholder farmers

Loan repayment capacity of smallholder farmers has been variously investigated and reported in literature. Different analytical techniques had been employed in the analysts' bid to explain the effects of certain explanatory variables on repayment capacity of borrowers/farmers. Included among the techniques was the ordinary least square (OLS) regression technique (Afolabi, 2010;

Oladeebo and Oladeebo, 2008; Oke et al., 2007), the logit/probit analysis (Kohansal and Mansoori, 2009; Roslan and Karim, 2009; Oni et al., 2005) and the Tobit analysis (Mashatola and Darroch, 2003; Gebeyehu, 2002). Also used was the discriminant analysis (Afolabi, 2008; Dia, 1986). Depending on the choice of model, authors had attempted to measure the dependent variable, repayment capacity, in different ways. First, the actual amount of unpaid loan (principal plus accrued interest) repaid by the borrower or in some cases the actual amount not repaid had been used [Oladeebo and Oladeebo (2008)'s ordinary least squares (OLS) regression analysis of determinants of loan repayment among smallholder farmers in Ogbomoso agricultural zone of Oyo State, Nigeria]. Secondly, the proportion or percentage of loan due for repayment at a given point in time that was actually repaid or not repaid as the case may be was also used as dependent variable (Afolabi, 2010; Oke et al., 2007; Gebeyehu, 2002). While Afolabi (2010) and Gebeyehu (2002) investigations used OLS models; Oke et al. (2007) used the Tobit model in their investigation. Thirdly, dummies measured as 1, if borrower repaid in full and 0, if otherwise, had been used as dependent variables for logit/probit analysis (Kohansal and Mansoori, 2009; Roslan and Karim, 2009, Oni et al., 2005, Mashatola and Darroch, 2003). Fourthly, there were efforts to use the discriminant analysis to identify variables which classify the farmers into non-defaulters and defaulters and in the case of defaulters into willful and non-willful defaulters (Afolabi, 2008; Pradhan and Sharma, 1981).

Regarding to the choice of the explanatory variables to be included in the loan repayment model, Nawai and Shariff (2010) classified the underlying variables under four distinct headings: individual/borrower, firm, institutional/lender and loan characteristics affecting loan repayment. However, Derban et al. (2005) preferred grouping the factors into three main categories: the inherent characteristics of borrowers and their businesses; characteristics of the lending institution and suitability of the loan product to the borrower; and the systematic risk from the external factors, like the economic, political and business environment in which the borrower operates. They argued that each of these could make it unlikely that the loan would be repaid. Although, the classification in this study drew from the aforementioned two paradigms, it also considered the fact that there were some other factors that had been reported in loan repayment literature that could not necessarily and strictly be accommodated into any of the foregoing classifications. Consequently, for this study, the factors influencing loan repayment capacity were classified into five: individual/borrower-specific socio-economic and demographic factors; farm/firm/business-specific characteristics; lender/lending institution specific attributes; loan characteristics; and markets-related, institutional and environmental factors. Empirical studies

had showed that non-repayment of loan might be as a result of a borrower's inability or outright unwillingness to repay (Nawai and Shariff, 2010; Ozdemir and Boran, 2004). This had underscored the distinction between two identified possible reasons for loan default, namely, strategic default or default due to a negative economic shock (Tedeschi, 2008).

Strategic defaulting is associated with a borrower's willful decision to default, even when the benefiting business enterprise yielded enough revenue to effect repayment (Udoh, 2008) while default due to negative economic shock was often unavoidable (Tedeschi, 2008). Among the commonly reported individual/borrower-specific socio-economic and demographic factors is the borrowers' age (Kohansal and Mansoori, 2009; Papias and Ganesan, 2009; Afolabi, 2008; Oladeebo and Oladeebo, 2008; Oni et al., 2005), level of education (Oladeebo and Oladeebo, 2008; Eze and Ibekwe, 2007), gender (Papias and Ganesan, 2009; Roslan and Karim, 2009; Eze and Ibekwe, 2007; Arene, 1992), experiences – including experiences in farming, credit use, cooperative membership (Njoku, 1997; Arene, 1992) and other related economic activity (Gebeyehu, 2002), income – annual gross or net farm/non-farm income. Others include farm/non-farm expenses (Afolabi, 2010, 2008), family/household size – in some cases adult equivalent household size (Papias and Ganesan, 2009; Oke et al., 2007), number of spouse of respondent (Oke et al., 2007), marital status (Oni et al., 2005) and occupation (Oladeebo and Oladeebo, 2008). Also included were repayment of loan from transfer income, that is whether loan was repaid with transfer income or otherwise (Papias and Ganesan, 2009; Oke et al., 2007), distance between dwelling place and location of the credit institution (Oke et al., 2007), amount of business investment (Oke et al., 2007), socio-cultural expenses (Oke et al., 2007), engaging on economic activities other than agriculture (Gebeyehu, 2002), family commitment (Afolabi, 2008), borrower's membership of cooperative association and borrower's punctuality at cooperative/group meetings. Oke et al. (2007) used multivariate OLS regression analysis in their investigation of microcredit repayment in southwestern Nigeria and found that income, amount of business investment, socio-cultural expenses, access to business information, and membership of cooperative society had significant positive influences on microcredit repayment while poverty level and distance between borrower's dwelling place and bank had significant negative influences.

In his study of small-scale farmers of Oyo State, Nigeria, Afolabi (2010) also using the OLS regression technique found that borrower's farming experiences, and gross farm income had positive influence on loan repayment while family size and non-farm expenses had negative influence. Another study in Ogbomoso zone of Oyo State identified loan size, farming experience with credit and level of education to have significant positive

influence on loan repayment as against age of farmers that had significant negative influence (Oladeebo and Oladeebo, 2008). In their analysis of loan default among poultry farmers in Ogun State, Nigeria, Oni et al. (2005) found that farmer's age and income had positive and significant influences on loan default while their level of education had a significant negative influence. Based on this finding, the study recommended targeting of the young and better educated farmers during loan disbursements. In all, it can be concluded that the results of the empirical analysis had led to mixed conclusion on the effect of the individual/borrower-specific socio-economic and demographic characteristics of borrowers on their loan repayment capacity. The widely reported farm/firm/business-specific characteristics that affect loan repayment include the farm size, amount of business investment (Oke et al., 2007), use of improved technology, profitability level (Oke et al., 2007), degree of loan diversification (number of inputs bought with loan) (Oke et al., 2007), purpose of credit (Papias and Ganesan 2009), business enterprise combination, for example, if firm engages on economic activities other than agriculture (Oke et al., 2007; Gebeyehu, 2002), and quality of business information (Oke et al., 2007). Afolabi (2010) found that farm size had positive influence on loan repayment of small-scale farmers in Oyo State while Udo (2008) found a negative relationship between farm size and probability of loan default among farmers that benefitted from the agricultural loan state in Akwa-Ibom State, Nigeria.

The lender/lending institution specific characteristics that affect loan repayment had been reported to include number of visits by loan officials (Oke et al., 2007), threat imposed by the lending institution (Nawai and Shariff, 2010; Bhatt and Tang, 2002) regular monitoring and performance assessment (Nawai and Shariff, 2010), loan disbursement lag or number of days between loan application and disbursement, provision of non-financial services such as training, basic literacy and health services by lending institutions. Godquin (2004) emphasized that the provision of non-financial services such as training, basic literacy and health services has a positive impact on repayment performance whereas Roslan and Karim (2009) succinctly argued that borrowers without any training in relation to their business have a higher probability to default. According to Nawai and Shariff (2010), access methods generally ensure that poorer and not the richer people access the loans, the features define the maximum loan ceilings and interest rate while screening methods are used to screen out bad borrowers. Oke et al. (2007) found that loan disbursement lag had a negative influence on repayment, which corroborated similar findings by Olomola (2001) that delays in credit disbursement increase delinquency in borrowers. The most commonly reported among the loan characteristics that influence loan repayment include amount of loan granted or loan size (Afolabi, 2010, 2008; Roslan and Karim, 2009; Oladeebo and Oladeebo, 2008;

Eze and Ibekwe, 2007; Oke et al., 2007; Njoku, 1997; Arene, 1992), interest rate charged on loan by loan providers (Kohansal and Mansoori, 2009), design features of the loan [including access methods, screening methods, and incentive to repay (Hulme and Mosley, 1996), loan repayment method (Derban et al., 2005), loan repayment period (Derban et al., 2005), loan transaction cost (Nawai and Shariff, 2010; Papias and Ganesan, 2009; Oke et al., 2007), time laps between loan application and disbursement (Kohansal and Mansoori, 2009), collateral value (Kohansal and Mansoori, 2009), and number of installments for which the loan is due for repayment (Kohansal and Mansoori, 2009).

According to Nawai and Shariff (2010), access methods generally ensure that the poorer and not the richer people access the loans, the features define the maximum loan ceilings and interest rate while screening methods are used to screen out bad borrowers. Also, most available empirical studies on loan repayment established existence of significant positive effect of loan size (Afolabi, 2010; Kohansal and Mansoori, 2009; Oladeebo and Oladeebo, 2008; Eze and Ibekwe, 2007; Oke et al., 2007). Specifically, Kohansal and Mansoori (2009) in their investigation of the loan repayment of farmers in Khorasan-Razavi Province of Iran using the logit regression approach found that loan size and collateral value had significant positive influences while interest rate charged on loan and number of installments for which loan is due for repayment had significant negative influences on repayment. The most reported markets-related, institutional and environmental factors include availability and accessibility of improved innovations and management practices, availability and accessibility of tractor for mechanization, number of days per month group members meet (Oke et al., 2007), size of the borrower's cooperative/farmers' group (Oke et al., 2007), penalties for lateness to group meetings (Oke et al., 2007), crop failure (Afolabi, 2010) and poverty level (Oke et al., 2007). According to Oke et al. (2007), both penalties on lateness to group meetings and poverty were among the several factors that had significant negative influences on repayment capacity of borrowers.

METHODOLOGY

The study area

The study was conducted in Yewa North Local Government Area (LGA) of Ogun State, Nigeria. The headquarters of the LGA is in Ayetoro. Yewa North LGA has the largest expanse of land measuring 2043.60² ha. It is bounded in the west by the Republic of Benin, in the south by Yewa South LGA, in the north by Oyo State and in the east by Abeokuta North and Ewekoro LGAs of Ogun State. The headquarters, Ayetoro, is located on latitude 7° 15' N and longitude 3° 3' E (YNLG, 2005) in the deciduous derived savannah zone of Ogun State. Other important settlements in the local government include Joga-Orile, Saala-Orile, Owode-Ketu, Igbogila, Igan-Okoto and Imasayi. The inhabitants are mainly Yoruba speaking people comprising of the Yewas and Ketus. Farming is the main occupation of the people.

Among the major crops grown are yam, tomato, beans, pepper, maize, vegetables, cassava, potatoes and oranges. One peculiar feature of most farmers in the study area is their level of enlightenment and exposure to cooperative activities. This was necessitated by the fact that the College of Agricultural Sciences of the Olabisi Onabanjo University, Ogun State, Nigeria had been domiciled in Ayetore, the headquarters of the Yewa North LGA. The college's Faculty of Agricultural Management and Rural Development runs degree courses in Agribusiness and Farm Management (AFM) as well as its affiliated Cooperative and Business Management (CBM) studies. As part of its community development functions, the faculty had over the years promoted cooperative activities in the area.

It was also required that students enrolled for CBM programme should show evidence of industrial training and internship work with cooperative associations during their third year.

Data collection

The study used primary data collected using structured questionnaire. Data on the socio-economic and demographic characteristics of respondents, as well as their loan access, use and repayment behaviours during the 2008 cropping season were collected from January to March 2009. Yewa North Local Government Area was purposively selected for the study due to cost and time constraints and the prevalence of resource poor farmers that belonged to cooperative societies in the area. Multistage sampling technique was used to select the study sample. In the first stage, four wards were randomly selected from the eleven wards that make up the LGA. In the second stage, three cooperative societies were selected from list of societies obtained for each ward to give twelve cooperative societies. In the third stage, ten respondents were selected from each cooperative society, to give a total of 120 respondents. Questionnaire was administered on all 120 respondents. However, ten questionnaires could not be used for the analysis because they were either badly filled or had noticeable inconsistencies in information supplied in them by respondents. This left us with 110 respondents based on which analyses were eventually conducted for the study.

Data analysis

Data for this study were analyzed using descriptive statistics and regression techniques. Descriptive statistics including charts, frequency table, mean, standard deviation, coefficient of variation, and percentages were used to summarize the socio-economic and demographic variables of the respondents. Also, a multiple regression technique was used to examine the nature of the relationship between the endogenous variable and two or more exogenous variables. Since the objective of this study was to establish a causal relationship between the loan repayment capacity and the identified explanatory variables in the model, the linear form of the regression was run. The ordinary least square technique was used to estimate the parameters of the model. This was because with the normality assumption in the error term, ξ_t , the OLS estimators are normally distributed and are called the best linear unbiased estimators or BLUE (Koutsoyiannis, 1977). The technique usually produces estimators of the standard error and a coefficient of multiple determinations.

Empirical loan repayment model

Our choice of the explanatory variables considered for inclusion in the empirical loan repayment model was guided by theory,

evidence from past studies on loan repayment behaviours, and hypothesized relationships with the dependent variable. The variables considered for inclusion were of five categories: borrower-specific characteristics, farm-specific attributes, tender-specific attributes, loan-specific characteristics and institutionally-determined variables. The variables were then screened to ensure that only the plausible ones were retained for inclusion in the empirical model. Following, Manyong et al. (1996), analysis of bivariate correlation matrix was used to verify the explanatory variables pair-wise to ensure that only the plausible ones were retained. As Udoh (2000) succinctly argued reduction in the number of explanatory variables or interactions help to ease computation, reducing the risk of multicollinearity, and ensure that only the economically meaningful and theoretically plausible variables are retained for analysis. Only variables that were not highly correlated with $|r| < 0.5$ were retained for inclusion (Table 1) in the empirical loan repayment model (Manyong et al., 1996). Consequently, we specified the empirical model for analysis of loan repayment capacity of small-holder cooperative farmers (borrowers) in Yewa North LGA of Ogun State, Nigeria as:

$$y_t = \beta_0 + \beta_1 x_1 + \dots + \beta_{13} x_{13} + \xi_t \quad (1)$$

Where, y_t (REP) = the dependent variable defined as the respondents' loan repayment capacity given as the actual amount of loan repaid in the year 2008, measured in Nigerian Naira (NGN ₦); β_0 = constant and intercept of the equation; x_1 (AGE) = age of the respondent, in years ($\beta_1 > 0$ or $\beta_1 < 0$); x_2 (GDR) = gender of the respondent, given as 1 = female, 0 = male ($\beta_2 > 0$); x_3 (EDL) = level of education attained by respondent, 0 = no formal education; 1 = primary level of education attempted; 2 = primary level of education completed; 3 = secondary level of education attempted; 4 = secondary level of education completed, and 5 = tertiary level of education either attempted or completed ($\beta_3 > 0$); x_4 (EXP) = respondents' loan use experience, in years ($\beta_4 > 0$); x_5 (HHS) = household size, number of persons resident in the household ($\beta_5 < 0$ or $\beta_5 > 0$);

x_6 (MST) = marital status of respondents, 1 = married, 0 = otherwise ($\beta_6 > 0$); x_7 (OJB) = respondents' engagement or otherwise on other jobs, 1 = engaged in other jobs, 0 = otherwise ($\beta_7 > 0$); x_8 (NFY) = net farm income earned by respondent during the year 2008 under investigation, measured in Nigerian naira ($\beta_8 > 0$); x_9 (FMS) = farm size, land area cultivated by respondent during the period, in hectares ($\beta_9 > 0$); x_{10} (TRT) = amount of money respondents expended in tractor hiring during the period, in Nigerian naira ($\beta_{10} > 0$); x_{11} (LSZ) = loan size or amount of money actually collected as loan by respondent, in Nigerian naira ($\beta_{11} > 0$); x_{12} (INT) = rate of interest on borrowed money in percentage ($\beta_{12} < 0$). x_{13} (IMP) = a dummy depicting whether or not respondent used the borrowed fund to support growing of improved crop variety, 1 = borrowed fund was used to support an improved crop variety, 0 = borrowed fund was used to support a local or quasi-improved crop variety ($\beta_{13} > 0$); ξ_t = stochastic error term.

Table 1. Descriptive statistics and coefficients of association of included variables.

Var.	Descriptive statistics (n = 110)			Correlation coefficients (n = 110)												
	Mean	Std. Dev.		AGE	GDR	EDU	EXP	HHS	MST	OJB	NFY	FMS	TRT	LSZ	INT	IMP
REP	8.55E+04	5.24E+04	-0.002	-	-	-	-0.097	-0.116	-	-	0.088	0.248	-	0.478	-	-
AGE	44.75	9.18	-	-0.057	-0.011	0.496***	0.321***	0.220*	-0.222***	0.106	0.055	-0.157	-0.074	0.183*	-0.013	
GDR	0.08	0.28	-	-	0.226*	-0.031	-0.180*	0.041	0.039	0.248***	0.133	-0.028	-0.081	0.048	0.124	
EDU	1.80	1.15	-	-	-	-0.177*	-0.025	0.036	0.185*	0.099	-0.053	0.103	0.001	-0.027	0.058	
EXP	9.13	6.51	-	-	-	-	-	0.280***	0.076	-0.172*	-0.004	0.210**	-0.106	0.041	0.133	
HHS	6.97	1.80	-	-	-	-	-	-	0.263*	-0.274***	0.008	0.041	-0.055	-0.132	0.152	
MST	0.98	0.13	-	-	-	-	-	-	-	-0.298***	0.001	0.111	0.012	-0.102	0.042	
OJB	0.17	0.38	-	-	-	-	-	-	-	-	-0.071	-0.273***	-0.039	-0.128	-0.113	
NFY	1.07E+05	1.04E+05	-	-	-	-	-	-	-	-	-	0.014	-0.083	-0.052	-0.053	
FMS	2.08	1.33	-	-	-	-	-	-	-	-	-	-	0.211*	0.107	0.172*	
TRT	5.08E+04	4.76E+05	-	-	-	-	-	-	-	-	-	-	-	-0.019	-0.032	
LSZ	1.20E+05	8.68E+04	-	-	-	-	-	-	-	-	-	-	-	-	-0.1	
INT	3.22	5.59	-	-	-	-	-	-	-	-	-	-	-	-	-	
IMP	0.57	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	

*** = Significant at 1%; ** = significant at 5%; * = significant at 10%.

Included among the aforementioned retained variables are eight variables depicting characteristics of the borrower, namely, age of respondent, gender, level of education, experience with credit use, household size (Cogill, 2003), marital status, engagement in other jobs, and annual net farm income; two variables depicting the farm-specific attributes, namely, farm size, and use of improved variety; two variables depicting loan-specific characteristics, namely, loan size, and interest rate charged on loan by loan providers, and one market-related/institutionally-determined variable, which is availability and accessibility of tractor. The Standard EvIEWS software was used to estimate the parameters. All the functional forms were tested but only the linear-log model was chosen and analyzed because it produced the best fit based on the estimated values of the coefficient of multiple determinations (R^2) and F-statistics.

RESULTS

Descriptive statistics and correlation analysis

The descriptive statistics alongside the

coefficients of association of the retained variables are presented in Table 1. Descriptive results revealed that the average age of the respondents was 44.8 years. This comprised of 36.4% that fell into the 20 to 40 years active working population, 59.1% that fell into the 41 to 60 years age bracket, and 4.5% that was aging (above 60 years old). The average household size was 7 persons while that of farm size was 2.1 ha. Also, the average agricultural credit use experience was 9.1 years even as the loan size and non-farm income averaged NGA ₦120,109.00 (an equivalent of US\$845.84)¹ and NGA ₦106,880.00 (an equivalent of US\$752.68) respectively. The average interest rate paid by respondents on loan received was 3.2%. The ratio of respondents who were women was 8.2% while the ratio that engaged in other jobs other than farming was 17.3%. Also, 57.3% of respondents used at least part of the borrowed fund to support

the growing of improved crop variety. The average sum of money spent by respondents in procuring tractor hiring services was NGA ₦50,886.36 (equivalent to US\$363.47). Further breakdown showed that only a few respondents (10.0%) dominated this expenditure category as 49.09% did not spend at all on tractor hiring while 40.91% spent less than NGA ₦20,000.00 (an equivalent of US\$142.57) on the activity. Correlation analysis revealed that there was a significant positive association ($p < 0.01$) between age of respondents and their credit use experience. Equally, positive and significant at $p < 0.01$ were associations between age of respondents and household size, household size and marital status, and marital status and engagement in other jobs.

Credit use experience and household size, credit use experience and farm size, and farm size and hiring of tractor were also positive and significant ($p < 0.01$). Gender and level of

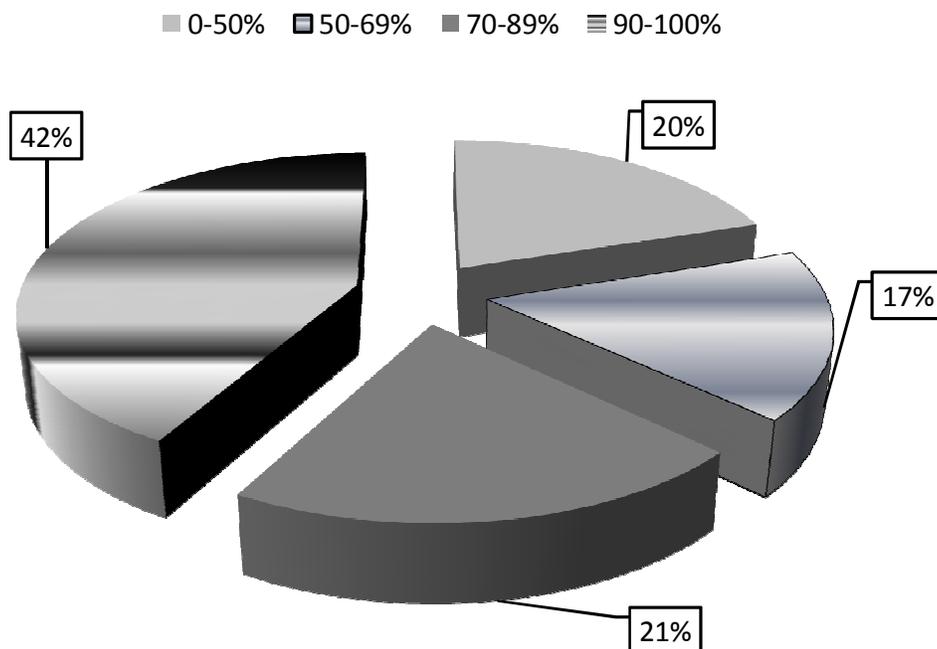


Figure 1. Respondents' repayment rate of borrowed loan. Source: Calculated and charted using data from field survey.

education, as well as, gender and non-farm income of respondents equally had significant positive correlations but at $p < 0.05$ level. However, the correlations between respondents' engagement in other jobs, on the one hand, and age, household size, farm size, and marital status of respondents, on the other, were negative and highly significant ($p < 0.01$).

Repayment rates

The average amount of loan repaid by respondents stood as NGA ₦85,480.41 (an equivalent of US\$601.97), representing 69.0% of the actual amount due for repayment during the period. Given the average amount borrowed by all respondents, which was ₦120,109.10 (equivalent of US\$857.92) exclusive of the accrued interest charges, it means that the repayment represented only 71.17% of the actual amount borrowed. Breakdown of the repayments is presented in Figure 1. It revealed that 20.0% of respondents repaid less than 50% of the actual amount that was due for repayment while 17 and 21% repaid 50 to 69% and 70 to 89% respectively of the repayable loan during the period of study. In all, majority of the respondents (42%) actually repaid above 90% of the potential amount.

Determinants of repayment capacity

The regression output is presented in Table 2. The F-value (6.48) was highly significant ($p < 0.01$) revealing the

good fit if the model The R^2 (0.467) implied that the included variables explained 46.7% of the variations in loan repayment capacity of respondents. The resultant R^2 was high compared to 0.36 and 0.2 reported by Oke et al. (2007) and Oni (1999) respectively in different studies on repayment of microcredit by smallholder farmers. The loan size ($p < 0.01$) and farm size ($p < 0.05$) had significant positive influences on the respondents' loan repayment capacity while household size had a significant negative influence ($p < 0.05$). All significant variables had a priori expected signs. The positive signs of loan size and farm size implied that loan repayment capacity increased with increases in the variables. In the contrary, the negative sign of household size implied that repayment capacity decreased with an increase in the variable.

Elasticity estimates

The estimates of the degree of responsiveness of loan repayment capacity to changes in the included variables was calculated as coefficients of elasticity and presented in Table 3. The discussion will be limited to the significant variables. The elasticity coefficient is 0.70 for loan size. This implied that one percentage increase in loan size would result to a 0.7 percentage increase in amount repaid by respondent or that a 100% increase in loan size will result to a 70% increase in loan repayment capacity. Similarly, elasticity coefficients were calculated as 0.28 for farm size and 0.42 for household size. These implied that a 100% increase in farm size would result to a 28% increase in loan repayment capacity while a similar 100%

Table 2. Estimates of the loan repayment model.

Variable	Code	Expected sign	Regression figures		
			Coefficient	Std. error	t-Statistic
Constant	C		-667725.700	132042.100	-5.057
Age of farmer	(AGE)	+/-	14803.940	24831.140	0.596
Gender of farmer	(GDR)	+	-30088.640	37848.070	-0.795
Education level	(EDU)	+	-7193.872	9195.725	-0.782
Experience	(EXP)	+	3669.366	7638.988	0.480
Household size	(HHS)	+/-	-35505.950**	16718.470	-2.124
Marital status	(MST)	+	27471.700	48374.680	0.568
Other jobs	(OBJ)	+	14988.570	17513.300	0.856
Non-farm income	(NFY)	+	3456.062	3208.905	1.077
Farm size	(FMS)	+	23672.650**	11343.970	2.087
Use of tractor	(TRT)	+	-676.426	922.715	-0.733
Loan size	(LSZ)	+	60224.520***	7798.899	7.722
Interest on loan	(INT)	-	7184.506	6690.316	1.074
Improved variety	(IMP)	+	17531.080	12103.780	1.448
R-squared				0.467	
F-statistic				6.480	
Prob (F-statistic)				0.000	
Durbin-Watson stat				1.926	

*** = Significant at 1%; ** = significant at 5%; * = significant at 10%.

Table 3. Responsiveness of loan repayment capacity to changes in explanatory variables.

Variable	Code	Elasticity coefficient
Constant	C	--
Age of farmer	(AGE)	0.17
Gender of farmer	(GDR)	0.35
Education level	(EDU)	0.08
Experience	(EXP)	0.04
Household size	(HHS)**	0.42
Marital status	(MST)	0.32
Other jobs	(OBJ)	0.18
Non-farm income	(NFY)	0.04
Farm size	(FMS)**	0.28
Use of tractor	(TRT)	0.01
Loan size	(LSZ)***	0.70
Interest on loan	(INT)	0.08
Improved variety	(IMP)	0.21

*** = Significant at 1%; ** = significant at 5%; * = significant at 10%.

increase in household size would result to a 42% decrease in loan repayment capacity of smallholder cooperative farmers.

DISCUSSION

Among other things, the results revealed that the average age of respondents was 44.8% while greater proportion (59%) of them fell between 41 to 60 years age bracket.

The result supported the growing evidence of ageing farming population in most parts of rural Nigeria as reported elsewhere (Akpan, 2010). Also, Adekunle et al. (2009) had argued that the involvement of the youth in agricultural activities in Nigeria had steadily declined in recent years. Among the factors responsible for this was that most youths would prefer engaging themselves into quicker money-making and, perhaps, less tasking occupations than going into the rigorous tasks of farming. This was evident in the high incidence of rural-urban drift

often necessitated by search for high-paying white collar employments or opportunities to invest in less risky areas with higher rates of return, high resolve to motorcycle transport (Okada-riding) business, and more recently, the incessant cases of kidnapping for juicy ransoms. This study also found that the average amount of loan repaid by respondents was 69.0% of the amount due for payment, which was by far below the 90% repayment rate found elsewhere (Oke et al., 2007). In another study in the neighbouring Ondo State of Nigeria, it was found that the loan delinquency rate was also very low at 6.90% of total loan obligations among small- and medium-scale enterprises (SMEs) (Obamuyi, 2007). Among the reasons given was the sound-lending policy which demanded that bankers approved loan applications only for the SMEs that were believed to have low probabilities of loan default. Also, Olagunju and Adeyemo (2007) found a high loan repayment rate of 78.02% in their investigation of the determinants of loan repayment decisions among smallholder farmers attached to the National Agricultural Cooperative and Rural Development Bank (NACRDB) in Oyo and Ondo States of southwest Nigeria and attributed this to merger effects of the bank with risk assets of the defunct Family Economic Advancement Programme (FEAP) and the Peoples Bank of Nigeria (PBN). Though at first sight the 69% total rate of repayment seemed to portray a good performance, the fact that the amount actually repaid accounted for only 71.2% of the total amount borrowed during the period gave some cause for concern.

It meant that close to 30% of the amount approved and borrowed could not be recovered in addition to all accrued interests. Nevertheless, the reported cases of high loan repayment performance of smallholder farmers in the south-western area of Nigeria could be linked to the rising influence of the cooperative activities among farmers in the region. On determinants of loan repayment capacity of cooperative farmers, the result revealed a strong positive and significant relationship between loan size and capacity to repay. By implication, given that beneficiaries did not have the tendency to divert, if substantial amount was approved as loan to farmers, they would use the funds to acquire the basic tools, equipment, and improved technology and other inputs they would require to enhance their operational and marketing efficiency and make positive returns. In other words, larger loan sizes would enhance the beneficiary farmer's access to basic inputs and improved farm management opportunities, which would lead to higher productivity, reduced per unit cost and increased income. The investment would be able to pay back itself and consequently support the farmer to repay the borrowed fund within the specified period. Similar positive influence of loan size on repayment performance had been variously reported in separate studies (Afolabi, 2010; Kohansal and Mansoori, 2009; Roslan and Karim, 2009; Oladeebo and Oladeebo, 2008). In the case of Afolabi

(2010), for example, it was contended that increases in amount granted enabled farmers to adopt improved agricultural innovations which could translate to increase in the levels of income and high loan repayment. Suffice that to say that timely repayment of borrowed funds makes more loanable funds available for potential borrowers. Another variable with significant positive influence on repayment capacity was the farm size. That loan repayment capacity of farmers could increase with increases in sizes of their farms was not surprising.

The implication was that as sizes of farmers' farm holdings increased, they became more inclined toward commercialization and more likely to adopt improved technologies and farm management systems. This would lead to increase in their levels of efficiency and profitability and by extension capacity to repay the borrowed fund. Afolabi (2008) also arrived at similar conclusion in his study of loan repayments among small-scale farmers from Oyo State of Nigeria. The results from this study also revealed existence of negative influence of household size on repayment capacity. This could have resulted from the fact that large household sizes increased the household head's domestic obligations and thereby constituted leakage to the household's income stream. As household income depleted liability of the household, especially to the outside interests increased and there would be greater tendency to default in loan repayment. This result was corroborated by Ugbomeh et al. (2008) who in their study of loan repayment performance among women self-help groups in Bayelsa State, Nigeria, found that household size impacted negatively on loan repayment performance of women farmers. They attributed the outcome to the propensity of women with large household members to divert some of the borrowed fund to unintended purposes for the upkeep of their households. To the contrary, however, Afolabi (2008) found a positive relationship between family size and loan repayment and attributed it to the respondents' extensive utilization of family labour in the farming activities. Both sides of the discourse could hold true accounting for our a priori anticipation of an indeterminate sign for the variable. The policy implication of the foregoing finding is that efforts at promoting smallholder cooperative farmers' loan repayment capacity would require conscious use of policy thrusts directed at increasing loan size and farmers' farm holdings, as well as reducing household size.

However, the study had showed that the coefficients of elasticity associated with each of these three driver variables was less than unity, implying that higher increases were required in each variable to attain a desired level of increase in loan repayment capacity.

Conclusion

The study examined the socio-economic and

demographic characteristics of smallholder cooperative members that used agricultural credit, assessed the loan repayment rates and analyzed the factors influencing the farmers' loan repayment capacity. The finding led to the conclusion that promoting smallholder cooperative farmers' loan repayment capacity would require conscious use of policies directed at increasing loan size and farmers' farm holdings and/or reducing household size. Larger loan sizes would enhance the beneficiary farmer's access to basic inputs and improved farm management opportunities, which would lead to higher productivity, reduced per unit cost and higher income. In the same vein, higher farm sizes would be used to encourage commercial farming, maximize market opportunities while manageable household sizes would substantially reduce leakages in the household's income stream and by extension lead to improved welfare and better standard of living for household members.

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¹ The exchange rate of the Nigerian Naira (NGA ₦) to the United States Dollar (US \$) at the period of this study was NGA ₦140.00/US \$1.00.