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ESTIMATION OF LOAN DEFAULT AMONG BENEFICIARIES OF A STATE GOVERNMENT OWNED AGRICULTURAL LOAN SCHEME, NIGERIA

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ABSTRACT

This paper analyses the extent of default among beneficiaries of government sponsored loan scheme. The loan performance indices estimated reveal that over 75% of the loans disbursed by AKSALB in the period under review were still held by 59 percent of the loan beneficiaries. This situation is an indication of high level of loan defaulting among the benefiting farmers. Certain personal and facility factors are estimated to determine the probability of default among the beneficiaries. Notably among these include sex, household size, farm size, loan from other sources, primary occupation of the beneficiary, time lapse between loan application and disbursement, total farm expenditure and duration of the granted loans. With such high level of default, the Board outreach and sustainability capacity is questionable thus putting a caveat on the relevance of the Board as agricultural micro financing institution.

KeyWord: Loan Default, Agricultural loan scheme, determinants, farmers, Nigeria

INTRODUCTION

Provision of viable credit delivery system has been a cardinal mission of government in developing economies. Often these governments practiced the policy of providing subsidized credits to resource-poor farmers through the formal financial intermediaries with the view to insulating them from the usurious tendencies of informal credit sources [26]. In Nigeria, governments at the three tiers of governance have involved directly or indirectly in small to large-scale financial assistance to farmers as a major policy strategy for increased agricultural productivity [25]; [13]; [2] and [4]. The practice of micro credit scheme is celebrated in many government circles as poverty reduction-focused programme. This informed the multiplicity of different financing programmes aimed toward resource poor farming households by different governments. The nature of these schemes tend to be all embracing in the context that lending bodies, which in most cases are government agencies, place little or no restriction on the potential beneficiaries. In essence, conditions for granting these micro credits to the beneficiaries are less restrictive [3].

The Nigerian Local Development Board (NLDB) was the first statutory body charged with the responsibility of providing agricultural credit in 1946 and by 1955, Regional Finance Corporations (RFC) took over the responsibility. However, a major reform occurred when the federal government instituted erstwhile Nigerian Agricultural and Cooperative Bank (NACB) and Agricultural Credit Guaranteed Scheme (ACGS). At the States levels, State Credit Corporations, Units of the States' Ministries of Agriculture, Cooperative organizations and the World Bank assisted Agricultural Development Programmes (ADP) have been involved in extending formal credits to agriculture.

The issue of accessibility and sustainability of these credits by government intermediation have been greatly debated and criticized. Lack of enforcement of loan contracts [11], low and poor recovery performance [18], and government imprudent interference [8] are some of the factors alleged for the poor performance of these government directed credit schemes. To large extent, provision of these 'soft' credits to the intended beneficiaries is fraught with difficulties. Notably among these difficulties is the problem of delinquency among the beneficiaries, which is a common feature of the public credit schemes in most developing countries (Osuntogun, [17] and Akinwumi, [2].

Strategic defaulting of loan is quite widespread among the opportunistic farmers who consider government sponsored loans more as gift than as debt that have to be paid back [19]. Specifically, Jackelen and Rhyne, [12]

noted that default rates are generally higher among those who borrow from government sponsored sources than those who borrow from moneylenders and other informal lenders. Besides, high covariate risk of agricultural production [6] and the low level of commercialization in farming business add to the propensity of defaulting among the beneficiaries of these credit sources. On the part of the lending institutions, they often lack detailed local knowledge about the beneficiaries' creditworthiness. These institutions also face problems in screening beneficiaries before lending and monitoring use of loans and ensuring repayment [19]; [10] and [1]. Generally, repayment rates have remained quite low and poor. As such, these government sponsored credit provision schemes are more or less avenues of welfare or patronage, rather than sustainable commercial schemes.

The high rate of default nevertheless reduces the loanable funds available and requires substantial amount of administrative cost and time to recover the loans. Thus, potential beneficiaries seldom benefit from reliable and preferential access to future loan funds. As noted in the separate works of Eaton et al [9] and Bell [5] the prevalence of strategic defaulting can be optimal for the lender to ration credit, and the maximum credit offered decrease with the interest rate. It therefore follows that demand for these productive credits is still higher than the supply due to the problem of high defaulting rate. Consequently, this creates high moral hazard problems and mistrust, which deter financial needs of farmers. This issue of delinquency among other issues therefore makes the policy of providing these cheap credits by government not to achieve its desired result [20]. This study therefore attempts to evaluate the loan default rate among beneficiaries of a State government sponsored loan scheme, Akwa Ibom State Agricultural Loan Board (AKSALB), the level of loan performance of the Board and the factors affecting loan default among the beneficiaries with a view to suggesting remedial actions.

Akwa Ibom State Agricultural Loan Board (AKSALB) was set up in 1988, as empowered by Edict No. 6 of the State. But the Board actually started granting loans to farmers in 1990. Its loan portfolio covers short-, medium- and long-term loans to mainly farmers and agro-allied operators. The organization and operation of the Board is through two separate committees- one at the State level, Special Project Unit (SPU) and the other at the local government level, Local Loan Committee (LLC). Though the SPU is the executive body, the process of loan granting begins at the LLC, where application forms are obtained. The LLC, which is available at every local government area in the State, is directly involved in screening, monitoring and enforcement activities. It

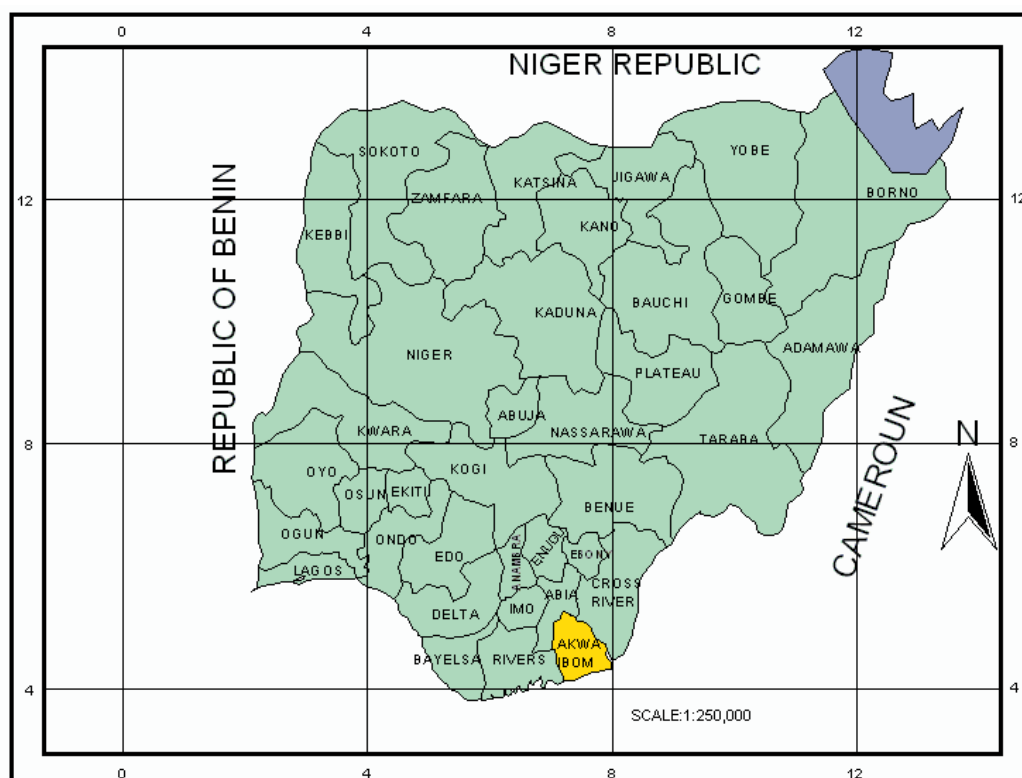


Figure 1: Map of Nigeria showing the study area, Akwa Ibom State

is actually the LLC that recommends or otherwise the suitability of prospective beneficiaries to the SPU for or against granting of such loans. The disbursement of the loan fund in cheque starts immediately the Board, SPU approves it and the loan is guaranteed by a third party (usually a civil servant), which is the only collateral required by the intended beneficiary to present. In every year, over 70 percent of the loans approved are disbursed as short term facilities so as to ensure rapid circulating of the limited fund to interested farmers.

Theoretical and Statistical Issues

Lending institutions, either public or private, consider certain characteristics of potential borrowers before loan/credit of any kind is granted. These, according to Poulton et al, [19] include economic characteristics (their capacity to make good use of additional capital, so as to generate funds for repayment of the loan in the time specified) and their personal characteristics (their likely reliability in repaying the loan, given the means to do so). Evaluation of the vectors of these factors forms the framework of decision by lending body to grant loan to intending beneficiaries on the expectation of full recovering. As such, the finite number of potential borrowers seeking credit from a lending body has different

probabilities of either repaying or defaulting irrespective of the credit contract, which specify the condition of lending. Strategic defaulting is associated with personal characteristics of the borrowers whereby there is a willful decision by the borrower to default- moral hazard, even when the benefiting business has yielded enough revenue to effect repayment. According to papers such as [9], [[5] and [7] prevalence of strategic defaulting noted in developing economies is a condition for credit rationing by uninformed lender. Business failure, as characterized agricultural operations, increases the risk of portfolio default. Therefore, the probability of portfolio loan default is high in event of poor price and crop yield and failure.

Lender extends productive credit to his client under the condition of imperfection. That is, he cannot say with certainty that the borrower will repay under the agreed contract terms. Hence, repayment of loan by borrower is a probability decision: full repayment, partial repayment and no repayment when due. The probability of full repayment is formally presented as;

$$\text{PrF}(L_i) = E [L_i + \theta_i] \quad (1),$$

where L_i represents the amount of loan collected at specified interest rate, i , θ_i is the amount of interest the

Table 1: Description of Explanatory Variable in the Model

Explanatory Variables	Description of the Variable
AGE	Age of beneficiaries in years
SEX	Sex of beneficiaries (male=1 and female=0)
HHS	Numbers of people living in the beneficiaries
FAS	Farm size of the beneficiaries cultivated with the loan collected
EDU	Number of years of education of beneficiaries
LOS	Loan from other sources (dummy, 1=yes and 0, otherwise)
VIS	Visit by loan supervisor (dummy; 1= yes and 0, otherwise)
POC	Primary occupation of the beneficiaries (farming=1 and 0 otherwise)
TIL	Time lapse between loan application and disbursement
TFE	Total farm expenditure in naira
DUL	Duration of loan to the beneficiaries

Table 2: Loan Statistics of AKSALB (1990-2003)

Description	Uyo Zone	Eket Zone	Ikot Ekpene Zone
No. of loan application	665	830	740
No. of beneficiaries	431	509	454
Amount granted as loan	₦5,617,000.00	₦ 7,336,000.00	₦ 5,842,000.00
No. of beneficiaries who repaid fully	202	192	187
Amount fully repaid	₦ 1,451,457.94	₦ 1,309,642.86	₦ 986,589.63
No. of beneficiaries who repaid partially	140	155	165
Amount partially repaid	₦ 2,327,658.56	₦ 2,824,714.00	₦ 3,078,397.57
No. of beneficiaries who made no repaid	89	162	102
Amount not repaid	₦ 1,837,883.50	₦ 3,201,643.14	₦ 1,777,012.80

Note: \$1.00 is equivalent to about ₦150.00 as at 2004.

Source: Akwa Ibom State Agricultural Loans Board (AKSALB), 2003.

borrower pay to the lender for using the credit within the specified time period t . Equation (1) shows that an equilibrium state of financial contract between lender and borrower is attained when probability of default is zero. In the cases of partial and no repayment, the equilibrium is distorted and the probability of default is presented as;

$$\Pr D(L_i) = E[L_i + \theta_i] - \eta_{it} \quad (2)$$

Where η_{it} = composite default effect of partial (p) and no (n) repayment at a specific time period. Thus $r = p + n$. The incorporation of η_{it} in equation (2) is meant to show the crowding-out effect of failure of borrower to meet contractual arrangement, which is considered as an exogenous cost to the lender. The magnitude of η_{it} indicates the intensity of borrower's deviation from the financial contract and it approaches 1 when the borrower has not made any repayment, i.e. $\eta_{it} \rightarrow 1$ for no repayment.

Taking η_{it} as an event that can occur when loan is granted

to a borrower, then it is right to say that η_{it} will happen, say e to 1 odd. This means it is possible that η_{it} will occur e times as likely that η_{it} will not occur. Statistically therefore, e to f odds will be taken to mean the same thing as e/f to 1, i.e., the ratio between the two numbers is the only quantity of importance when stating odd f . Now if it is e times as likely that η_{it} will occur as that η_{it} will not occur, then the probability that η_{it} occurs must be $e/(e + 1)$, since we have

$$P(\eta_{it}) = e P(\bar{\eta}_{it}) \quad (3)$$

and

$$P(\eta_{it}) + P(\bar{\eta}_{it}) = 1 \quad (4)$$

In general, the statement that the odds are e to f in favor of an event η_{it} occurring

is equivalent to the statement that

$$P(\eta_t) = \frac{e/f}{e/f + 1} \quad (5)$$

If we let $P(\eta_t) = p$, then the equation (5) can easily be solved for e/f in terms of

$$p; \text{ we obtain,} \\ e/f = p/(1 - p) \quad (6)$$

METHODOLOGY

Area of Study

The study was carried out in Akwa Ibom State, Nigeria. It is one of the 36 States in the Nigeria and it is a major crude oil producing State in the Niger Delta region. The State falls within the humid tropics with two distinctive seasons- dry and rainy season. Mean daily maximum temperature are regular about $26^{\circ} - 33^{\circ} \text{C}$ and the relative humidity is between 50 to 60% during the dry season and between 60 and 90% in the rainy season. The favorable climate encourages extensive agricultural production. With a population of about 3.9 million people, over 70% are involved in agriculture for both subsistence and income generation.

DATA COLLECTION AND SAMPLING PROCEDURE

Empirical data used in this study include both primary data and secondary data. Secondary data were collected from the office of AKSALB. The primary data were collected with the aid of structured questionnaire, which were administered to selected

beneficiaries of the loans. Multistage sampling method was employed in selecting the beneficiaries. The first stage involved purposive selection of the three zones of the Board operation. This is to ensure that all the operative base of the Board is covered. The second stage involved random selection of three local government areas from each of the three zones. The last stage involved random selection of 10 beneficiaries from each of the nine LGAs, thirty from each zones, from the list of beneficiaries made available by the Board.

DATA ANALYSIS

Loan Performance Measures

This involved evaluation of two indices. These include loan repayment index and borrower repayment rate.

Loan Repayment Index

This is evaluated as follows:

$$\text{LRI} = [\text{BVR}_f/\text{VB} + w_2 (\text{BVR}_p/\text{VB})] * 100 \quad (7)$$

Where LRI is loan repayment index, which shows the level of repayment made by a beneficiaries; $w_2 = \text{NRC}_p/\text{TNLO}_p$; BVR_f = value of loan collected by those who made full repayment; VB = total value of loans outstanding in a particular period; BVR_p = value of loans collected by those who made partial repayment; NRC_p = number of borrowers who made partial repayment; TNLO_p = total number of borrowers who have outstanding loan to repay.

Loan default index is thus measure as follows:

$$\text{LDI} = 100 - \text{LRI} \quad (8)$$

Borrower Repayment Rate

This is given as:

$$\text{BRR} = [\text{BNF}_f/\text{NB} + w_1 (\text{BNR}_p/\text{NB})] * 100 \quad (9)$$

Where BRR is the borrowers' repayment rate, which is defined as the rate at which the borrowers repay or fulfill their loan obligation; $w_1 = \text{VRC}_p/\text{TVLO}_p$; BNF_f = number of borrowers who made full repayment; NB = total numbers of beneficiaries in a particular period; BNR_p = numbers of borrowers who made partial repayment; VRC_p = value of repayment collected from those who made partial repayment; TVLO_p = total value of loans outstanding for those who made partial repayment.

Borrowers' default index is then measures as follows:

$$\text{BDR} = 100 - \text{BRR} \quad (10)$$

Where BDR is borrowers' default ratio.

Loan Default Determinants

Conceptually, the inability of borrower to meet contractual arrangement as agreed when due amounts to defaulting. But there are degrees and intensities of defaulting. This therefore suggests that Tobit estimation should be used [22]. We chose the Tobit model by assuming that the concentration of the dependent variable cluster toward the left limit (i.e. zero) and because it does not only explain the value of dependent or the probability of defaulting or not defaulting, but also the magnitude of the defaulting.

We develop the loan default model following [14] and [15] specifications:

Let IA = intensity of loan default, IA^* = the solution to utility maximization problem of intensity of loan default subject to a set of constraints per beneficiary and conditional on being above a certain limit, IA_0 , situation of full repayment. Therefore:

$$\text{IA} = \text{IA}^* \text{ if } \text{IA}^* > \text{IA}_0 \\ = 0 \text{ if } \text{IA}^* \leq \text{IA}_0 \quad (11)$$

Equation (11) represents a censored distribution of

intensity of defaulting since the value of IA for full repayment of loan equals zero. Following Tobin [22] and Nkonya et al [15], the expected intensity of loan default $E(IA)$ is given as:

$$E(IA) = X\beta F(z) + \sigma f(z) \quad (12)$$

Where X is a vector of explanatory variables, $F(z)$ is the cumulative normal distribution of z , $f(z)$ is the value of the derivative of the normal curve at a given point, z is the Z-score for the area under normal curve, β is a vector of Tobit maximum likelihood estimates, and σ is the standard error of the error term.

The marginal effect of each explanatory variable on the probability of default is evaluated as :

$$6\delta E(IA)/\delta X_i = F(z)\beta_i \quad (13)$$

RESULTS AND DISCUSSION

Summary of Loan Statistics

Table 2 presents summary of loan statistics as reported by the Board between 1990 and 2003.

According to the Table, in all the three zones, at least sixty percent of the applications were approved and granted loans. Of those who received the loans, barely forty percent of them made full repayment while about thirty percent and twenty percent made partial and no repayment respectively. In all the zones, over fifty percent of the beneficiaries defaulted. On the amount, about 25%, 18% and 17% of the total loan disbursed were fully repaid in Uyo, Eket and Ikot Ekpene zones respectively. On the contrary, about 41%, 39% and 53% of the loan were partially repaid in Uyo, Eket and Ikot Ekpene zones respectively. But about 33%, 44% and 30% of the loan were held by beneficiaries who did not made any form of repayment in the three zones respectively. The distribution therefore reveals that in all the zones, over 75% of the loan disbursed by AKSALB in the period under review were still held by the benefiting farmers. This situation is an indication of high level of loan defaulting among the benefiting farmers. However, to fully evaluate the level of loan default, loan performance indices are estimated and presented on Table 3 and figure 2.

Loan Default and Performance measures

The various measures of default and performance computed and shown on Table 3 and figure 2 indicate high rates of loan default among the benefiting farmers across the three zones. Specifically, about 73 percent of the loan granted to the borrowers during the period under review was not repaid when due. This substantial amount is however held by about 59 percent of the loan beneficiaries. This result of high rate of loan default is similar to the findings of [16] and [2]. With such high

level of default, the Board outreach and sustainability capacity is questionable thus putting a caveat on the relevance of the Board as agricultural micro financing institution.

Loan Default Determinants

The result of the determinants of loan default by the beneficiaries of AKSALB is presented in Table 4

From the maximum likelihood estimates of the Tobit regression, the sigma is 24.2264 and is significant at 1% confidence level. This implies that the model has a good fit to the data, thus all the explanatory variables are jointly significant. Exception of age, educational level and visit by loan supervisor, other variables included in the model are statistically significant. The non significant of visit by loan supervisor's coefficient may not be unconnected to the general lack of commitment common among public servants. The significant variables include sex, households size, farm size, loan from other sources, primary occupation of the beneficiary, time lapse between loan application and disbursement, total farm expenditure and duration of the granted loans. Sex's coefficient, 0.0065 is significant at 5% and carries a positive sign implying that male beneficiaries have higher tendencies to default than females. This may be because of the multiplicity of responsibilities of men as breadwinners, which may require them to diverse the proceeds from their farms to offset domestic financial commitments rather than fulfilling their loan obligations. Household size of the beneficiaries is highly significant at 1% with a positive sign, which implies that those beneficiaries with larger household size tend to default more than those whose household size is smaller. This may not be unconnected to the problem of both high children and perhaps adult dependence. The estimate for farm size is significant at 5% and is inversely related to the probability of loan delinquency. Specifically, the probability of loan default decreases at magnitude of 0.019 as the farm size is increased, signifying that operators of small scale farm land have higher propensity to default loan than large-scale farm operators. The issue of economies of scale always associated with large scale farm production with resultant large profit margin as noted by Sankhayan [21] may explain the negative relationship of farm size and likelihood of loan defaulting. It therefore follows that beneficiaries who cultivate large hectare of arable crops repaid their loans promptly and are credit worthier than small-scale farmers. This finding supports the finding of [19]. Further, beneficiaries of AKSALB who had collected loans from other financial intermediaries are more likely to repay their outstanding loans than those who are not under any other loan obligations. The statistical significance and sign of the estimated coefficient clearly show that

ESTIMATION OF LOAN DEFAULT AMONG BENEFICIARIES OF A STATE GOVERNMENT OWNED AGRICULTURAL LOAN SCHEME, NIGERIA

Table 3: Loan Default and Performance

Zones	LRI (%)	LDI (%)	BRR (%)	BDR (%)
UYO	21.84	78.16	37.98	62.02
EKET	27.43	72.57	40.42	59.58
IKOT EKPENE	30.09	69.91	43.90	56.09
AVERAGE	26.45	73.54	40.77	59.23

Source: Computed from equations 7, 8, 9 and 10

Table 4: Result of MLE of loan default determinants

Explanatory Variables	ML estimates	t-ratio
AGE	0.00977	1.2847
SEX	0.0065**	2.5172
HHS	0.0875***	6.5801
FAS	-0.0190***	-1.9923
EDU	-0.0558	-1.6254
LOS	-0.0562**	-2.2684
VIS	0.0637	0.4502
POC	0.0415**	1.7451
TIL	0.0369**	2.1180
TFE	0.0066**	1.9913
DUL	-0.1871**	-1.7546
Sigma δ	0.0576***	2.7301

= Significant @ 5% and *= Significant @ 1%

the probability of loan defaulting would fall by 0.0562 for the beneficiaries with multiply loan sources. This is in line with the result of [3] who examined the determinants of repayment in the Gramen Bank-style model (PPPCR) in Burkina Faso that beneficiaries with multiple sources had low level of defaults, and were creditworthier. This may be because for such beneficiaries, who have access to more credit stock, it would be much earlier for them to use credits from other sources to effect repayment even when the benefiting farming operation has not yielded enough returns to offset loan obligation when due. The estimate of 0.0415 for primary occupation of the beneficiaries, which is statistically at $\alpha = 5\%$, suggests that the beneficiaries who engaged in farming as their major occupations would have higher probabilities of defaulting than those beneficiaries whose primary occupations are not farming. This result further supports the existence of high covariate of risk in financing agricultural projects as reported in many micro finance empirical literatures. Time lapse between loan application and disbursement is estimated to be positive and statistically significant at $\alpha = 5\%$, showing that the probability of loan default increased by 0.0369 as the time between loan application and disbursement increases. This is an indication of high tendency to default among beneficiaries when loans are disbursed later than necessary. This is because loan was

not available when the beneficiaries really needed it for the intended purposes of application. Because of official bureaucracy and corruption, government sponsored agricultural credit facilities are extended to prospective beneficiaries late after planting season has commenced. As such, the beneficiaries of such loans would easily diverse the loan into unproductive uses thereby promoting strategic defaulting. Expectedly, total farm expenditure of the beneficiaries is noted to be one of the major determinants of loan default. The positive nature of the relationship between total farm expenditure and the probability of loan default among the beneficiaries is an indication that farmers who encounter high cost of production would likely not make enough profit sufficient to meet the financial commitment attached to loan collected. This is particularly so when inputs use efficiency among the beneficiaries is low. In such situation, the marginal value of what is produced with the loan is lower than the unit cost of the inputs used as reported in most of the work carried out in the area [23]; [25]; [26] and [27]. Duration of loan to the beneficiaries is inversely related to the probability of loan delinquency, showing that beneficiaries of short-term loan portfolio have higher affinity of defaulting than those who collected medium term loans. This result is understandable considering the nature of agricultural produces, which require a longer

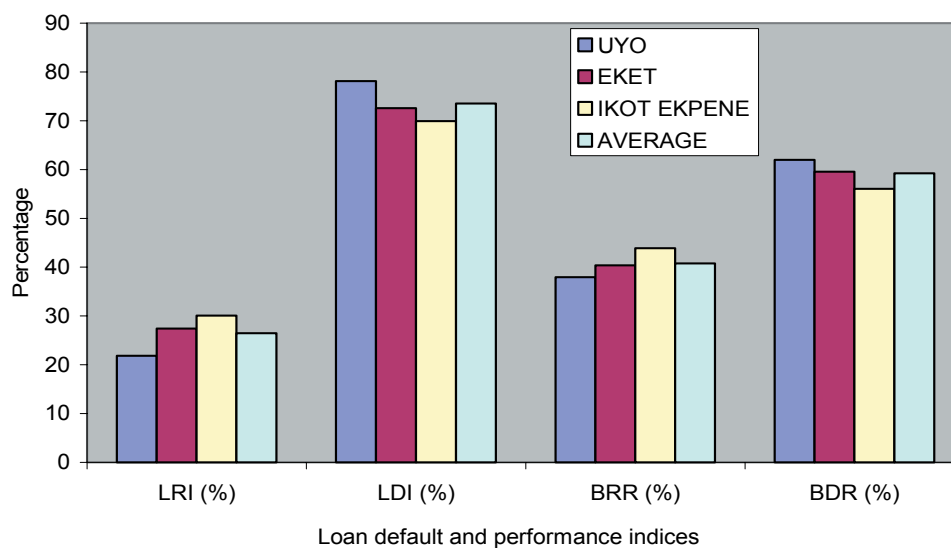


Figure 2: Loan default and repayment indices among beneficiaries of AKSALB, 1990-2003

time period before any meaningful economic returns could be recorded. Therefore, beneficiaries of short-term loan portfolios may not made substantial turnover to repay their loans when due. This result aptly explains the high rate of loan delinquencies recorded among the AKSALB beneficiaries whose loan portfolios are mostly short term.

CONCLUDING REMARKS

This study evaluates the incidence and severity of loan delinquency among beneficiaries of a State government owned agricultural loan board (AKSALB). Factors affecting the probability of loan default among the beneficiaries are also evaluated. Loan default and performance measure estimated indicate low level of repayment among the beneficiaries during the period under review. Accordingly, the indices reveal that over 75% of the loans disbursed by AKSALB in the period under review were still held by the benefiting farmers. This situation is an indication of high level of loan default among the benefiting farmers.

Empirical evidence from the Tobit regression estimated indicates that certain farmer specific, farm specific and facility specific factors significantly affected the probability of defaulting of loan by the beneficiaries. This suggests that both endogenous and exogenous factors contribute to the problem of loan delinquency among the beneficiaries in a developing economy. Thus the observed loan defaults have some elements of moral hazard, strategic defaulting and portfolio defaulting

arising from business risk.

Appropriate policy option would be to overhaul the institutional framework of the loan board to ensure timely disbursement of the approved loan to benefiting farmers on or before planting season commence. Further, the board should grant more medium and long-term loans than short-term loans currently practiced. Benefiting farmers should be given adequate training on ways to increase their input use efficiency and minimize cost of production.

Default among users of productive credits is principally a major constraint to increased production and investment in any economies of the world. Therefore, suppliers of this indispensable resource to practitioners in agricultural sector need to evaluate the probability of the farmers defaulting within the context of farmer specific, farm specific and facility specific factors. The factors shown in this paper to influence farmers' probability of defaulting in developing economy like Nigeria could also influence the probability of farmers in Central Europe to default. The financial sector serving European farmers should be aware that high covariate of risk in financing agricultural projects as reported in this study permeate regional and continental boundaries and guide against high level of default as shown in this paper. Also, in case of subsidized credit delivery, financial sectors in Europe should guide against possibility of strategic and portfolio defaulting as is the case reported in this paper.

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