Influence of Enterprise Decision Making on Agribusiness Loans Default Rate in Agricultural Finance Corporation, Mount Kenya Region

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Abstract: Farming projects funded using Agricultural Finance Corporation (AFC) capital are successful due to input of effective and efficient decisions. Farmer decisions have been observed to affect the loan default rate. The default rate for these loans has been reported to be 20.33%, which by standards is high since the yardstick for all types of loans in Kenya is 10%. This study aimed at establishing the influence of enterprise decision making on AFC loan default rate in Mount Kenya Region. Descriptive research design was used to study a population of 3,002 agribusiness borrowers in the 11-branch network region. Using systematic random sampling with an interval of 10, a sample of 300 respondents was obtained. Primary data on enterprise decision making was collected using a structured questionnaire. Statistical Packages for Social Sciences (SPSS V.27) and Stata version 15 was used to analyse data. To establish the effect of variables in estimating default rate, regression analysis was utilized. F-statistic was derived by performing ANOVA. The econometric model that was used to specify the statistical relationship between the independent variable and AFC loan default was binary logistic regression which showed that the all the four indicators of enterprise decision making that were used in the model explained 36.98% of AFC loan default rate. Results of the study revealed that agricultural enterprise diversification was significant at 5% while implementation of purposed project, land size and land use dynamics were significant at 10%, 5% and 1% levels of significance. Agricultural enterprise diversification and implementation of purposed project were found to have 7.6% and 6% associations with default respectively. In mitigation of default, borrowers should make decisions of using good agricultural practices of enterprise diversification and avoid diverting their loans to non-agribusiness projects. They should also make decisions on reasonable landholding which should be engaged in production while paying attention to dynamics of land use in regard to parcel purposes and consolidation. Farmers may utilize the output of this study to make effective and proficient decisions about good agricultural practices that are motivated by integration of credit into farming. The study recommends resource use-efficiency by encouraging borrowers to adopt land use and credit use strategies, use effective farming technologies, adopt risk mitigation through insurance schemes and form common interest groups to tap the dynamic externalities of grouping.

Keywords: AFC Loan, Default Rate, Enterprise, Enterprise Decision Making, Repayment

1. Introduction

The efficiency of farmer decisions influences the attainment of technical efficiency and subsequent loan repayment capacity [1]. There are several decisions involved in achieving efficiency of the enterprise that is implemented using borrowed funds. These includes: making decisions about risk mitigation and the loan products to match farmers' needs [2]; decisions to adopt better and effective farming

technologies [3]; decisions to purchase agricultural inputs, timing of production and marketing, decisions to improve the efficiency of businesses [4] and decisions to utilize loans in enterprise investments and repay the loans [5]. The farmers' decisions regarding the enterprise in which to put funds depends on access to credit facilities [6].

Decision-making about agribusiness projects is chiefly hampered by bounded rationality regarding cognitive constraints, information limitation and time constraints [7]. Symmetrical information contributes majorly in the adoption of contemporary superior decisions regarding effective farming technologies such as procurement of quality agricultural inputs like improved seeds, pesticides and fertilizers [8]. The level of education translates into cognitive capacity and knowledge which inspires the farmer decision-making processes relating to borrowing, investing borrowed funds and repayment [9]. The result of effective enterprise decision making is farmers' ability to make choice on input combinations that optimizes the yields thus shortening the rate of return of an investment; as such revenue sufficiency is guaranteed to service the farmer needs and credit instalments [10]. In addition, such decisions ameliorate the choice of farm investment options that have low risk profile so as to safeguarded the invested funds and eschew the imminent default risk [11].

Extant studies have linked enterprise decision making to loan default by the establishing that deficiency in decisioning is closely tied to loan default. For instance, Ramanujam [12] observed that information asymmetry of the borrower and the risk profile of the enterprise contributed to agribusiness loan default. Adusei [13] found that enterprise decision making was based on quality of decisions and that default rate was caused by poor education, limited experience, gender, age, level of income and number of employees in the enterprise. Gichuki [14] established that the default risk in agribusiness loans emanated from limited information especially on loan utilization into agribusiness enterprise. These studies have methodological gaps by being limited in analysis methods. They also have contextual gaps by covering limited areas of study. This study addressed these gaps by comprehensive analysis via descriptives, regression and ANOVA; besides, a wider geographical coverage of Mount Kenya region was studied to broaden the purview.

Enterprise decision making is measured by indicators such as: on-farm diversification, type of farming enterprise, purpose of the loan, land ownership, land size, mount of funding, repayment period, financial information and industry risk [15]. Other measures include loan diversion and enterprise diversification as the main elements of decision making [16]. Additionally, land size and land use dynamics are also an important decision aspect which influences default in farm loans [17]. Agricultural enterprise diversification is a solid risk management strategy especially for the smallholder farms which explains multiplicity of enterprises on the farm which cushions the project implemented using borrowed funds from the effects of failure [18]. Diversification of farming in turn spreads farmer's

revenue streams thus reducing credit default risks in face of imminent project collapse [11]. Multiplicity and variety of enterprises on the farm guarantees the farmer of at least some source of revenue which helps the farmer to remain current in regularizing their repayment obligations in agricultural loans [9]. The farmer's strategy to adopt diversification activities presents an opportunity to utilize farming technologies to achieve smart farms that are characterized by good agricultural practices [19].

Implementation of the funded agribusiness project is important because committing funds to intended activities, in line with relevant frameworks, is indicative of productive investment which generates income that facilitates loan repayment [20]. The use of funds into the project omits implementation frictions which are consistent with the interests and expectations of the lender [21]. Funds use into the project matches with budgeted use before the loan application implying that the borrowed loan funds are engaged into productive use [22]. Land is the medium of implementation of agribusiness project, therefore justifying the need for borrowing loan in the first place [23]. It may also be used as collateral for securing agricultural loan especially where land is consolidated [24]. Land size increases contact with extension agents and lenders [25]. The possibility of participation in agribusiness is incentivized by increased landholding [26]. This results to better farming income and access to loans which can be used for boosting revenue from agribusiness [27].

Land use dynamics translates into resource utilization efficiency [28] emanating from consolidation and multiplicity of purpose for which land is used [29]. Land multiplicity identifies combinations of land use as living places, investment spaces and collateral for securing loan [30]. Efficiency in use is achieved when a farmer concentrates all efforts in one big sized land rather than smaller fragments [31]. This incentivizes credit access translating into improved production which is associated with good loan repayment [32]. This study adopts four indicators of enterprise decision making namely: agricultural enterprise diversification, implementation of purposed project, land size and land use dynamics. The objective of this study was to establish the influence of enterprise decision making on agribusiness loans default rate. Default disrupts the public policy intervention in meeting the social objective of enhancing access to affordable farm loans to smallholder agribusiness operators. If this state of affairs remains unabated, there is a likelihood of loan rationing, perpetuation of poverty levels and shut down of credit financing.

2. Research Methodology

2.1. Study Area

The study was conducted between June and December, 2022 in Mount Kenya region, which is one of the AFC catchment areas within the country. This region was selected through convenience sampling because of good branch

network, variety of agribusiness activities and agroclimatic zones. The branch network of this region comprises of 11 branches which includes Meru, Chogoria, Embu, Kerugoya, Thika, Murang'a, Nyahururu, Maralal, Nanyuki, Nyeri and Karatina. These branches are spread in the 9 counties which include Meru, Tharaka-Nithi, Embu, Kirinyaga, Kiambu, Murang'a, Samburu, Laikipia and Nyeri.

2.2. Research Design

The study used descriptive research design. This design was accurate and systematic and enabled the possibility of using diverse methods of research to examine, observe and measure enterprise decision making as a determinant of default in AFC agribusiness loans in Mount Kenya Region.

2.3. Population, Sampling Procedures and Sample Size Determination

2.3.1. Study Population
This study is based on a population of 3,002 farming borrowers who were the beneficiaries of agribusiness loans from the 11 branches of Mount Kenya region for the period 2018/2022.

2.3.2. Sampling Procedures
Using systematic random sampling method with a 'skip' of ten, a sample of 300 borrowers was retrieved and reviewed. By "skipping" at the interval of 10, overconcentration in one branch was eliminated, thus fair distribution which guaranteed representativeness. In our case the sampling interval was determined thus: k= 3,002/300 = 10. This means that, the respondents were selected from AFC list at random after skipping ten.

2.3.3. Sample Size Determination
To calculate the size of the sample Daniel [33] formula was used as follows:

$$n = \frac{Z^2 P (1-P)}{d^2}$$

where;

n = sample size; Z = Z statistic for a level of confidence; P = expected default or proportion (in proportion of one; if 20%, P = 0.2), and d = precision (in proportion of one; if 5%, d = 0.05). For the level of confidence of 95%, which is conventional, Z value is 1.96. In our case, defaulters represented 24.15% of the total beneficiaries. To establish the sample size, the following calculation was done:

$$n = \frac{1.962 \times 0.2415(1-0.2415)}{(0.04843)^2} = \frac{0.7036956444}{0.0023454649} = 300$$

Z=confidence level =1.96; P= Default =0.2415; d = precision =0.04843; n = 300

2.4. Pilot Study

The structured questionnaire was pilot tested in Central Rift region where respondents were drawn from 4 branches namely Nakuru, Naivasha, Molo and Kericho using 30 respondents who are agribusiness borrowers. Central rift is more similar to Mount Kenya due to its weather conditions and diversity of agribusiness projects.

2.5. Validity

The study employed a questionnaire which was tailored keenly and thoroughly to ensure that all relevant material facts were captured. This established its relevance to the study by producing accurate results.

2.6. Reliability

Cronbach's alpha was used to evaluate questionnaire since it is appropriate for dichotomous variables coded as 0 or 1 meaning no internal consistency or consistency is perfect between items in the questionnaire respectively [34]. Results from this study indicated that the questionnaire was reliable since the scale reliability coefficient was 0.7318>0.7 which is the acceptable scale. This value of more than 0.7, means that the data taken was sufficiently reliable and consistent by Hair [35] who agreed that the value of more than 0.7 in Cronbach's Alpha indicates that collected data was sufficiently reliable and consistent (Table 1).

Table 1. Reliability Test Using Cronbach Alpha.

Variable	Value
Average interim covariance	2.365
Number of items in the scale	15
Scale reliability coefficient	0.7318

2.7. Data Collection

A structured questionnaire was used to collect quantitative data where the 300 respondents provided answers regarding their enterprise decision making. Respondents were guided on how to answer questions by enumerators.

2.8. Data Analysis

2.8.1. Data Analysis Techniques and Tools
The software for analysis was Statistical Packages for Social Sciences (SPSS V. 27.0) and Stata version 15. The output from quantitative data was given in descriptive statistics and regression analysis. Regression analysis was used to describe the relationship between independent and dependent variables. The econometric model that was used was binary logistic regression model. Correlation analysis was used to evaluate the strength of a relationship between the variables. ANOVA was performed to get the F-statistic so as to test for the adequacy of the regression model.

2.8.2. Model Specification: Influence of Enterprise Decision Making on AFC Loan Default Rate
The regression model which was utilized was Binary logistic. The dependent variable was dichotomized with a value of '0' or 'yes' if the farmer complied in repayment or '1' or 'no' to imply noncompliance or default. The use of this model for data analysis is justified owing to its usefulness as tool for analysis which contains binary dependent variables

such as default and compliance. The specific regression model for binary logistic regression can therefore be represented by:

$$\gamma = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

where γ is AFC loan default rate; β_0 is the intercept; $\beta_1 - \beta_4$ are parameters; X_1 = Agricultural enterprise diversification; X_2 = Implementation of purposed project; X_3 = Land size; and X_4 = Land purpose dynamics; and ε is the error term.

3. Results and Discussion

3.1. Influence of Enterprise Decision Making on AFC Loan Default Rate

3.1.1. Agricultural Enterprise Diversification

(i). Loan Repayment Status Based on Agricultural Enterprise Diversification

The tabulation of loan performance based on agricultural enterprise diversification shows that a majority of borrowers (62%) were engaged in more than two to five activities in their farms. Borrowers with more than five to eight activities in their farms consisted of 3.33%. This implies that borrowers who had more than two activities (multiplicity of enterprises) comprised 65.33%. The indication is that in the study area, diversification of agribusiness was a common occurrence, thus land-use efficiency. Borrowers with one to two activities encompassed 34.67% (Table 2).

In default analysis, the respondents with one to two activities recorded the highest default at 62.30% while those with five to eight activities in their farms defaulted by 1.64%. Borrowers with more than two to five activities defaulted by 36.07%. Cumulatively, the default rate of borrowers whose farms were used to operate more than two activities was 37.71%. This means that a majority of borrowers (65.33%), registered a less rate of default. It is also evident that borrowers with one to two activities, albeit minority (34.67%) recorded the highest default rate of 62.30%. There is linear relationship between the number of activities and loan default. This implies that default reduces in a consistent fashion with the escalation of farm operations. The probable reason is that pursuit of alternative enterprises gave impetus to diversify risk in production and marketing thus increasing income and loan repayment.

Table 2. *Loan repayment status based on agricultural enterprise diversification.*

Number of activities	Percentage performance		
	Compliance	Default	Total
One to two activities	27.62	62.30	34.67
more than 2 to 5 activities	68.62	36.07	62
more than 5 to 8 activities	3.77	1.64	3.33
Totals	100	100	100

Pearson chi2(2) = 25.8254 Pr = 0.000

This study found that multiplicity of farm use reduces the incidences of default in repayment performance of farm loans. The likely reason is that diversification of portfolio spreads the risk profile, thus cushioning the farmer against the unforeseen

shocks since all farm enterprises could not be affected at the same magnitude in a single instance. Besides, multiplicity and variety of enterprises on the farm facilitated balancing of risk and reward in investment portfolio since it generated additional income. These findings agree with those of Kray [11] who observed that diversification manages agriculture-related risks. Also, Das [36] found that diversification also diversified income sources. Lastly, Ayamo [37] agreed that farmers with diversified enterprises had more revenue streams thus ensuring consistent loan repayments.

(ii). Loan Repayment Status Based on Sum of Agricultural Activities

Results showed that the minimum number of agribusiness activities was one activity (for total, compliance and default) while the maximum number of activities was eight activities (for total and compliance). The maximum activities for default were observed to be five. The mean activities for all sampled respondents were 2.163 activities. This means that for compliance in loan repayment to be achieved, the borrower should be engaged in at least 2.163 activities. The mean number of activities for defaulters was 1.721 while that of non-defaulters was 2.774 activities (Table 3).

The findings of this study show that compliance in loan repayment increases with multiplicity of farm use which was above average. The possible explanation is due to increased diversification of income streams which would guarantee sufficient cashflows to service transactional demand and also repay the loan. In addition, the loan applications for borrowers with more enterprises were not likely to be declined or revised downwards by AFC officials since they were guaranteed of source of income which would service the loan before the funded project could fully sustain itself or in event of failure. Also, multiplicity indicated farm use efficiency whereby the cost of farm visit for loan officer is justified since they would be able to find a number of activities in one farm. These findings are in concurrence with those of Kimkong [38] who concurred that diversification spreads risk such that distribution of risks to more enterprises, consequently minimises the probability of defaulting on the loan. Besides, Barrett [39] agreed that the safety and security of the money that is disbursed is guaranteed and thus disbursement to a diversified borrower is less stressful to the credit officer. Vu [40] agreed that the lender does not fear missing the diversified farmer during visit to the farm, implying farmers are settled on their farms working for improved income.

Table 3. *Credit repayment status based on sum of agricultural activities.*

Agricultural activities	Observations	Mean	Std. Dev.	Min	Max
Compliance	239	2.774	0.921	1	8
Default	61	1.721	0.581	1	5
Total	300	2.163	0.862	1	8

This study also found that multiplicity of farm enterprises translated into convenience for training, advisory and farm demonstration. Diversification of enterprises helped the farmer how to hedge out against perils; even if these

borrowers diverted their loan funds, they were likely to do on-farm diversion which was safer than off-farm diversion. Farmers with multiple enterprises were efficient and retained their market share since they were able to meet supply obligations as agreed. These findings are in agreement with those of Girma [41] who reported that the farmer has more to do on the farm when enterprises were diversified and would be available for training and advisory services; Castro [42] indicated that such borrowers were cushioned against imminent risks due to availability of activities and options to pursue; Corporate Finance Institute [43] stated that diversification guarantees efficiency in marketing by ensuring that farmers retain their market share since they have produce to deliver as required.

3.1.2. Use of Loan Funds in Project Implementation

Results indicated that 79.67% of borrowers used loan funds in the projects specified in their proposals. A minority of respondents (20.33%), diverted the borrowed funds to other uses or projects different from what was captured in their proposals. More implementation represents good character of the borrowers and the efficiency of the credit officer in implementing supervised lending. Further, results on loan repayment performance indicated that 62.30% default is due to diversion of funds while the default for those who used loan funds in the project was 37.70% (Table 4).

Table 4. Distribution of loan repayment status based on Loan use in the project.

Loan use	Percentage performance		
	Compliance	Default	Total
Use of loan in project	90.38	37.70	79.67
Diversion of loan funds	9.62	62.30	20.33
Totals	100	100	100

Pearson chi2 (1) = 83.2291 Pr = 0.000

The results of this study showed that loan diversion increased loan default. Also, most of the diversion of loan was to non-agricultural and unproductive undertakings thus spoiling the chances of generating revenue for loan servicing. The supervised lending model adopted by AFC advises non-diversion since diversion limits the loan effectiveness of farming by putting opportunities for production and access to future loans at jeopardy. The findings of this study conform to the observation by Gietzen [44] that diverters of loan defaulted more than non-diverters; Hainz [22] stated that it would be challenging to achieve yields to facilitate debt servicing in instances of off-farm diversion; Yeboah [20] indicated that loan diverters diminished farm production with time and were likely to be denied graduation in future loans or face credit rationing.

This study also established that loan diversion was rampant in AFC courtesy of extraneous macroeconomic and environmental shocks, disbursement lag and inadequacy of funds to implement projects which presented a moral cost. As such, respondents advised that AFC credit officers should screen the justification for diversion lest they penalized innocent borrowers via adverse selection in future. AFC

considered borrowers who diverted loans to be of questionable character. These findings concur to those of Ding [45] observed that diverting funds was also a likely scenario when a project was failing in order to avert total loss by using funds in another project; Kaur [46] found that diversion caused trust deficit which spoilt the chances of graduation to the next repeat and higher loan. Credit officers imposed serious penalties by denying borrowers the opportunity to participate in borrowing, thus recommending for exit and discharging of charge for their collaterals which were erstwhile pledged to secure loans [21].

3.1.3. Land Size

(i). Loan Repayment Status Based on Land Size

The results indicated that borrowers whose landholding was up to one acre constituted 31.34% while those with acreage exceeding one up to three acres represented 51.33% and were the majority. Respondents who owned more than three to five acres comprised of 10.33% of the borrowers and those with above five acres comprised 7% of the borrowers. The sum total of borrowers with land acreage not exceeding three comprised of 82.67%. This implies that majority of borrowers in the area of study held small to average-sized land. Borrowers considered to hold large sizes of land exceeding 3 acres constituted 17.33%. This finding is informed by the fact that Mount Kenya region is considered a prime area in terms of agro-ecological classification, thus implying that the land is arable. The blossoming population means land is growing in price and further subdivision continues with time. The net effect of this is reduction in per capita landholding (Table 5).

Table 5. Servicing status of credit based on land size.

Land acreage	Percentage performance		
	Compliance	Default	Total
Up to one acre	23.43	62.30	31.34
More than one to three acres	55.23	36.07	51.33
More than three to five acres	12.55	1.64	10.33
Above five acres	8.79	0.00	7
Totals	100	100	100

Pearson chi2(3) = 37.8636 Pr = 0.000

Loan performance results indicated that the default rate for borrowers with acreage up to one acre was 62.30% while default rate for borrowers with acreage exceeding one up to three acres was 36.07%. Borrowers with more than three to five acres defaulted by 1.64% while borrowers with above five acres did not default in loan repayment thus 0.00% default rate. This depicts a linear relationship between landholding and loan default which means that sequential increase in landholding reduced loan default. The likely reason is due the fact that intensive agriculture has not yet been upheld in the study area. The highest default rate was registered among the respondents who had less than one acre of land at 62.30%. For respondents with over 5 acres of land, no defaulting case was confirmed. This confirms that farmers with bigger sizes of land default less. This is perhaps due to

capacity of land to accommodate a multiplicity of agribusiness portfolio in addition to large scale of operation which justifies employment of skilled workforce and economies of scale in operations.

The findings of this study showed that land size is positively related with compliance in loan repayment. This is because large cultivated land size meant productive resources and more income for farmers to settle their debt servicing on time compared to farmer with smaller cultivated land size. Reasonable land size translated into higher production capacity due to active participation in farming, better farming income and access to loans which could be used for boosting revenue from agribusiness. These findings are concomitant to those of Ramashia [23] who reported that large farm size augmented with other factors of production may give higher produce that may enable the borrower to repay the loan and invest in additional other income generating activities. Also, Nasereldin [25] found that land size increases contact with extension agents and lenders and also increases the likelihood of participating in the farming business. Ntunzwenimana [47]

reported that bigger sized land earned more income from agricultural activities. Nassoro [24] observed that large sized land holdings justify the possibility of borrowing loan and using it to carry out farming activities. Lastly, Dubale [26] found that farmers with larger cultivated land remained efficient and earned more income.

(ii). Loan Repayment Status Based on Sum of Land Sizes

The maximum land for all borrowers was 20 acres, which is also the maximum for compliant borrowers. The maximum landholding for defaulter was 4.5 acres. The total minimum landholding for all borrowers was 0.25 acres which was also the minimum size for defaulters. The minimum size for compliant borrowers was 0.5 acres. The average acreage for the interviewed respondents was 2.382 acres. This implies that for borrowers to participate in effective and sustainable farming which enabled them to comply in loan servicing, they must have at least 2.382 acres of land. Defaulters had an average farm size of 1.255 acres while compliant borrowers held farms averaging 2.669 acres (Table 6).

Table 6. Credit status of repayment based on sum of land sizes.

Land sizes	Observations	Mean	Std. Dev.	Min	Max
Compliance	239	2.669	2.714	0.5	20
Default	61	1.255	0.831	0.25	4.5
Total	300	2.382	2.515	0.25	20

This study established that compliant borrower held larger sizes of land as compared to defaulters and that the total average land size is bigger than the mean holding for defaulters. However, land size without efficiency is not the solution to productivity constraints because other factors must be put in place to make land size a reasonable factor of productivity. Respondents from the study area linked large farm sizes to enjoyment of economies of scale, thus saving cost and maximizing revenue, part of which was used for loan servicing. AFC borrowers also argued that big land made it possible to invest in research, technology and more innovative solutions all of which are requisite for agripreneurs to scale up agribusiness to competitive profitability. such land was indispensable especially when approving the funding of projects such as steers fattening, contract farming and large-scale mechanized farming. These findings conform to those of Wangu [48] that compliant borrowers held bigger parcels of land enabling them to maximize output and repay loan. Besides, Ahmad [49] reported that the total landholding for defaulters was smaller than that of compliant loanees. Ramashia [50] reported that without efficiency enhancement factors, the land is as good as fallow. Adequate landholding enables farmers to achieve efficiency in production due to convenience in diversification, mechanization and scale economics in procurement of inputs [51].

3.1.4. Land Use Dynamics

The results of this study revealed that borrowers who had consolidated parcels of land constituted 45.67%. Those with fragmented pieces of land were 8.33% of borrowers. There

were other categories of borrowers who had two parcels of land where one parcel served two AFC purposes and the other parcel served one purpose. These categories include: borrowers whose one parcel was used for project and security (collateral) purposes, while the other parcel was used for home of residence. This constituted 13% of the borrowers.

Borrowers whose one parcel was used for project and home purposes, while the other parcel was used for security (collateral) purpose constituted 25% of the borrowers; and borrowers whose one parcel was used for home and security purposes, while the other parcel was used for project purposes constituted 8% of the borrowers. Considering these purpose dynamics cumulatively, it means that 45.67% of the borrowers had a consolidated parcel which was used for all the 3 AFC purposes. Conversely, borrowers comprising of 54.33% of the total had fragmented parcels (either three or two parcels). This means that in the area of study, land fragmentation was still rampant (Table 7).

The findings on repayment performance indicated that the highest default rate of 29.51% was registered among the borrowers whose parcels were completely fragmented (at least 3 parcels of land). The default rates of other fragmented pieces (2 parcels of land) were as follows: same parcel for project and security but home different (22.95%); same parcel for home and security but project different (14.75%); same parcel for project and home but security different (4.92%). In all, the default rate associated with fragmentation accounted for 72.13%. The probable reason for low repayment (high default) is divided attention at commitment in project implementation and also moral hazard associated

with feeling secure when the collateral that is charged at AFC is not the land for home of residence purposes (Table 7).

Table 7. Distribution of loan repayment status based on land use dynamics.

Land purposes	Percentage Performance		
	Compliance	Default	Total
Same parcel for project and security but home different	10.46	22.95	13
Same parcel for project and home but security different	30.13	4.92	25
Same parcel for home and security but project different	6.28	14.75	8
Consolidated parcel used for all purposes	50.20	27.87	45.67
Fragmented parcels each for its own purpose	2.93	29.51	8.33
Totals	100	100	100

Pearson chi2(4) = 67.2482 Pr = 0.000

The findings of this study showed that the default rate for consolidation (one parcel of land) was 27.87%. This indicates that there was more default rate due to fragmentation (72.13%) compared to default for consolidated land owners (27.87%). The likely reason is that consolidation is associated with land use efficiency due to ownership conferred through the institution of private property rights. This brings the aspect of settlement to owners thus encouraging them to make permanent improvements and invest in permanent projects; besides, the owner is able to concentrate and allocate full time commitment in projects implementation. In this study, most of the full-time farmers owned consolidated land (Table 7).

It noteworthy that land used for project and home and the security land located differently, albeit the element of fragmentation, defaulted least at 4.92% rate. The findings also showed that 25% of the borrowers (second largest group) owned land under this arrangement. The likely reason for the lowest default in this case was commitment and concentration of the borrower when the residence is attached with project. This means these farmers are full time since most hours of their waking are used productively in project engagements. This compares unfavourably with the other two different ownership set ups where project is the same parcel for security purposes or security farm serves the same purpose as home. In these two scenarios, there is the element of detachment from home. The implication is that the borrower has to commute to either project or home of residence. In this case, there is overreliance on hirelings who work independently with minimal supervision. It is likely that the owner just catches up to be updated on the progress of the project or operations at home of residence. The net effect is divided attention which probably downgrades the implementation of supervised project, resulting to low yields, low income and eventually poor loan repayment (Table 7).

The findings of this study show that land can be used as collateral to secure the loan; home of residence farm and for implementing farming project. There are five categories of farm purposes: project, security and home uses; project and security uses; project and home; security and home and each farm for its own use. This agrees with the findings of Weigel [32] who observed land use could be for collateral of loan, be used as a living home and space for project implementation. In addition, Chaiya [52] stated that land could be put into different purposes in relation to agricultural loans. The purposes include home, project and security farm, either located separately or combined. Lastly, Ali [53] observed that land titling offered an opportunity to increase landholding for farmers through home ownership, loan collateral and farming purposes.

The findings of this study established that farmland management tools (land fragmentation and consolidation) described land use dynamics in relation to AFC loan. Actually, it is necessary for agribusiness credit stakeholders to be equipped with knowledge regarding land use dynamics and its farmland management tools. This is because land is a sacrosanct resource which serves as a fulcrum that actualizes farming operations and their support functions. The findings of this study conform to those of [54]. In addition, Udessa [55] observed that land use dynamics translates into resource use efficiency emanating from size of land and land use dynamics. Quaye [56] reported that land use dynamics is explored in the dimension of farming operations and collateralization as the main indicators of efficiency in use.

This study also found that borrowers whose parcels were consolidated or were well known and documented by loan officials, registered less default. After disbursement of funds, the home farm and project farms become the most important in the short run due to traceability of the borrower to follow up on use of loan funds into the project. This study also found that fragmentation was however, a risk mitigation strategy that provided diversification opportunities to internalize the negative externalities that are associated with fragmentation. These findings agree with those of Hepelwa [57] who noted that fragmentation of land is associated with challenges of low productivity, increased family labour, increased costs, output fluctuations and drop in revenues. Korthals [58] advised that land consolidation enhanced crop diversification and yield status hence reducing credit default risks. Kurien [59] indicated that land fragmentation can be a risk mitigation strategy and a room for diversification.

Further, this study established that default in loan repayment increases with fragmentation while compliance increases with consolidation ceteris paribus. Consolidation of land purpose prevented borrower flight risk; failing to implement supervised lending and hidden costs as AFC officials criss-crossed the farms. Consolidation presents efficiency in loan making and management and should be encouraged if possible. Consolidation provides AFC officers with 'one-stop-shop' opportunity which makes it convenient

to implement all the lending procedures without much cost and hassle. Muruku [60] indicated that efficiency in land use is achieved when a farmer concentrates all efforts in one big-sized land. Besides, Jiang [29] stated that consolidation increased land use efficiency, thus higher productivity and better loan repayment.

3.2. Description of the Econometric Models on the Influence of Enterprise Decision Making on AFC Loan Default

This subsection discusses the results of binary logistic regression analysis for the influence of enterprise decision making on AFC loan default rate. This objective covers four indicators of the independent variables which includes: agricultural enterprise diversification, implementation of purposed project, land size and land use dynamics. The dependent variable which was AFC loan default rate takes the values of 1 for default and 0 for compliance. The binary logistic econometric model provides the logit estimates of the coefficients for the different indicators that constitutes enterprise decision making the results (Table 8).

***Table 8.** Logit estimates for the indicators in enterprise decision making.*

Indicator	Coefficient	Standard errors	Z	P>(z)
Agricultural enterprise diversification	-0.879	0.364	-2.42	0.016
Implementation of purposed project	1.233	0.193	6.40	0.000
Land size	-0.739	0.207	-3.57	0.000
Land use dynamics	0.109	0.144	0.76	0.449
Constant	-1.553	0.903	-1.72	0.085
Number of observations	300			
Pseudo R Squared	0.3698			
LR Chi squared	112.04			

The model was tested at 5% level of significance and several goodness-of-fit measures were done and reported. The first one is the pseudo-R squared and the second, the Likelihood ratio Chi-square which is an estimation of how well the model classified respondents correctly based on estimated probabilities. The likelihood ratio Chi-square of 112.04 with a p-value of 0.00<0.05 which explains that the model was statistically significant. The pseudo-R square was 0.3698 means that the indicators of enterprise decision making (independent variable) explained 36.98% of the dependent variable. The model results show that all the four indicators namely: agricultural enterprise diversification, implementation of purposed project, land size and land use dynamics showed statistical significance in influencing AFC loan default rate since their p-values (0.016, 0.000, 0.000 and 0.049), respectively were all less than the 0.05. To determine the direction of change of the indicators in the model, the coefficients are explained. The coefficient of agricultural enterprise diversification is negative at -0.879 meaning that there was a negative effect on the AFC loan default rate. The explanation is that when borrowers increased the opportunities for diversification of their agribusiness portfolio, default in AFC loan was reduced (Table 8).

The coefficient for land size is also negative (-0.739) indicating its negative effect on the dependent variable. This finding implies that big landholdings for borrowers enhanced their debt servicing capacity, thus reducing default rate, that is, increase in size of land, decreases cases of default in AFC

loan. The direction of change depicted by the coefficients of implementation of purposed project was positive (1.233) due to loan diversion which had positive effect on AFC loan default rate. Similarly, land use dynamics had positive coefficient (0.109) due to land fragmentation which caused positive influence on AFC loan default rate. This means that as more borrowers hold fragmented parcels of land, there is increase in default for AFC loan. To determine the magnitude of change caused by the indicators of enterprise decision making, marginal change was used to interpret the coefficients so that they don't mislead. To demonstrate the estimated marginal effects of the enterprise decision making indicators on the AFC loan default rate (Table 9).

The marginal derivatives revealed that an increase in agricultural enterprise diversification (number of activities on the farm) by a unit led to a 0.074 decrease in AFC loan default rate. This may imply that multiplicity of farm use strategies led to more borrowers complying in loan repayment thus reducing chances of defaulting. Henning [18] stated that the marginal derivatives for agricultural enterprise diversification directed that rise in projects by a unit decreased loan default by 1.320. For land size, the marginal derivatives show that increase in acreage of landholding by an acre resulted in 0.063 decrease in default for AFC loan. This hints at increased productivity due having more size of land. Jumpah [61] concluded that increase in farm size increased yield level which generated more income and better loan servicing.

***Table 9.** Estimated marginal effects of the indicators in enterprise decision making.*

Indicator	Dy/dx	Standard error	Z	P>(z)
Agricultural enterprise diversification	-0.074	0.033	-2.27	0.023
Implementation of purposed project	0.105	0.024	4.32	0.000
Land size	-0.063	0.013	4.65	0.000
Land use dynamics	0.009	0.012	0.75	0.455

Implementation of purposed project had marginal derivatives indicating that increase in loan diversion by a unit resulted in 0.105 increase in AFC loan default. This suggests that loan diversion, as opposed to loan use, increases default rate. Beygiharchegani [62] used logit model to show that diversion resulted to increase in cases of default. Land use dynamics had marginal derivatives which imply that increase in borrowers who had fragments of land resulted in 0.09 increase in AFC loan default This infers that land fragmentation, divergent from land consolidation, increases default rate in agribusiness loans. Dutta [63] indicated that increasing fragments of land parcels, decreased productivity. Agricultural enterprise diversification has been reported to have a negative association with AFC loan default rate at 7.6%. This means that implementation of diverse on-farm enterprises reduces AFC loan default rate. Kray [11] observed that enterprise diversification reduces loan default. Loan use in implementation of the purposed project has 6% of the positive association with AFC loan default rate due to the influence of loan diversion. Bryan [64] concurred that loan diversion increased default rate.

4. Conclusion

The study concluded that the future of lending in agribusiness credit lies in recruiting applicants who can make effective and efficient decisions regarding their farm enterprises. The future AFC borrowers need to be skilled in decisioning so that they are able to leverage on land resources, projects within the land and credit inputs that are expended in the land. Farming borrowers need to be techno-savvy so that they can easily deal with emerging issues in agribusiness. Such borrowers can reap returns from farming investment and may not need supervision. Big land size is good for effective farming, but land use efficiency such as consolidation is the panacea to scaling high into agribusiness performance. If fragmented parcels cannot be consolidated, then borrowers can accrue a competitive advantage of separate land diversification which is a risk mitigation strategy due to environmental dynamics. The study recommends that borrowers should take insurance schemes which can be supported by the lender and the government; adopt technology and resource use-efficiency in land use and credit use strategies that are economical to optimise their gains; besides, farming communities can forge common interest groups to tap dynamic externalities of grouping such as sourcing for affordable inputs, taking training sessions, marketing produce, taking joint insurance schemes, negotiating for improved conditions and lobbying for support.

Competing Interests

The authors have not declared any competing interests.

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