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Risk Management in Farming Enterprise in Rural Anambra State: Exploring the Financial Institutions' and Farmers' Mitigation Strategies.

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Abstract
Risk Management in Agriculture Enterprise in Rural Anambra State from Financial Institutions' and Farmers perceptive was investigated. The research is as a result of numerous risks associated with agricultural enterprises which increased their inability in loan repayment. Many researchers have neglected this important issue in agricultural funding. To achieve the broad objective of this study, a combination of purposive and random sampling techniques were used to select 140 agricultural enterprises and 50 Rural Financial Institutions. Relevant data were sourced from both primary and secondary sources. Data generated were analyzed using descriptive statistics and probit regression model. The major findings of the study is Production/yield risks and price risk were highly rated as factors that influence their loan repayment ability. The study also identified diversification as the most practiced form of risk mitigation strategy. In addition, majority of financial institutions used Asset Financing and collateral as risk mitigation strategies. Based on this findings, development of Microfinance Institutions (MFIs) that will build on existing social capital in their area of domain is important in reducing the risk associated with lending to Rural Agricultural Enterprise as well as informing Agricultural Entrepreneurs on insurance policies through education and capacity building workshops were major recommendations of the study.
Keywords: Risk, rural agricultural enterprise, financial institutions

Introduction

Agriculture is a vital determinant of livelihood of Rural Entrepreneurs and to a larger extent, Small-holder Farmers in Nigeria. Rural enterprise and agricultural growth have been the pro-genitor of broad-based economic growth in developing countries. In addition, the development of linkages between farm and non-farm economic activities (rural enterprise) generate income, create employment and wealth (Coulter and Onumah, 2002)). Therefore, growth in rural enterprise especially agricultural activities in rural areas is a sure opportunity for enhancing reduction of rural poverty and hunger in Nigeria. In addition, the largest population of the poor is in the farming sector and small businesses (NBS, 2011).

However, the Rural Agricultural Enterprise Sector of Nigeria is characterized by lack of resources in terms of land, capital and labour. Lack of finance has been singled out as the most important limiting resource in rural enterprise development in Nigeria (Sandstorm, 2009; Okpukpara, 2010). Specific challenges of rural enterprise financing especially are based on the fact of credit inaccessibility and inadequacy or both. More importantly, risk associated with financing rural enterprise, many financial institutions shy away from financing rural enterprise in spite of government regulation that mandates state government and Commercial Banks to provide at least 1% of their fund to rural enterprise including farming in their state of operation (CBN, 2011). This has resulted low performance of rural enterprises. For instance, in 2011, National Bureau of Statistics reports put the average performance of rural enterprise to be 20% (NBS, 2011). One of the major ways to improve the productivity of rural enterprise is to adequately finance all the value chains along the production lines.

Credit is a major factor in rural enterprise development and lack of it is known to be a problem facing this sector in Nigeria. For instance, in agricultural enterprise, credit can promote the growth of agriculture by its contribution towards the procurement of modern inputs like tractors, ploughs and other machineries, which would minimize the use of obsolete tools like hoes, cutlasses and spades. Credit serves as a vehicle through which farmers overcome low productivity, poverty, poor savings etc (Liu, 2010). Credit and indeed adequate agricultural finance is a vehicle for rural enterprise development. Credit for rural enterprise is sourced from formal and informal means. The formal financial systems in Nigeria, traditionally lend to medium and large entrepreneurs who are judged to be credit worthy and who can provide tangible collateral. Worse still, formal financial system in Nigeria despite government interventions through providing multiplicity of credit institutions over the years, have proven to be inefficient and costly in the provision of financial services to the rural enterprise and rural entrepreneur (Olomola 2000). Informal credit institutions are characterized by flexible small operations and they operate mostly in a circumscribed area or a specific niche of the market. They tend to deliver

personal services very close to the location of the borrower. They are usually less bureaucratic and much more flexible in respect of loan purpose, interest rates, collateral requirements, maturity periods and debt rescheduling (Ghatak and Guinnance 1999). Though informal credit source in developing countries tend to be more competitive, especially for low-income borrowers, the lenders in this credit option also face a number of risk. However, the lending methodology of formal financial institutions is more risky than those faced by informal financial institutions (Soren, 2002; Tudela and Young, 2002). The reasons for this are lack of well-trained personnel on 5Cs of credit (that is character, collateral, condition, capacity and capital). The overall effect of risk factors on credit delivery to farmers is high loan delinquency and poor productivity. In view of this, it has been observed that there has not been enough information both past and present in the analysis of risk involved in extending credit to rural agricultural enterprises by these financial institutions in Anambra State. The interest in Anambra State is that the state had the higher number of Microfinance Institutions compared to any state in Nigeria. Therefore, investigating this research issue using Anambra State as a case study will help to identify critical problems associated with risk in credit lending. The need to address the risks encountered by credit institutions in extending credit to Rural Agricultural Enterprise as well as highlight the management strategies adopted by financial institutions in events of the risks is the major motivation for this study.

METHODOLOGY

The research was conducted in Anambra State, Nigeria. The dominant criterion for selecting Anambra State is the prevalence of formal and informal financial institutions in most of the rural areas in the state as well as the presence of many small-scale businesses. Report has it that Anambra State has the largest number of Microfinance Institutions situated in rural areas (CBN, 2011). In addition, the people in both rural and urban areas of the state are known for their entrepreneurial capacity. The state is made up of 11 core rural local government areas NBS, 2011). Anambra State – which is made up of 21 local government areas – is one of the 36 states of the federation. Multi-stage sampling technique was used to select the respondents for the study in the following ways. First, the sample frame for this study is rural farmers and financial institutions in the areas. Five rural local government areas were selected at random from the 10 core local government areas of the state. Agricultural Development Project (ADP) in the state helped to provide the list of farmers based on their type of farming namely farmers in animal and crop production, farmers in Agro-industry and farmers in Agribusiness. A random sampling technique was to select 40 respondents from each of the categories. This gave a total of 120 farmers. In the selection of financial institutions a purposive sampling technique was used to select 6 informal and 4 formal financial institutions that had operated for more than 8 years in each of the selected local government areas. This gave a total of 20 formal and 30 informal financial institutions. Therefore, a total of 120 farmers and 50 financial institutions were use for the study.

Relevant primary data were collected through questionnaire, focus group discussions and lead informant interview. The secondary information were also collected. The major analytical tools used to to achieve the objectives of the study are descriptive statistics and probit regression model.

FINDINGS

The findings from the study have been discussed under the following sub-heads

Factor Constraints Facing Smallholder Farmers

There are number of factors affecting the farmers in obtaining loan. However a general constraint in farming by the respondents is presented in the table below. Generally, it was observed that all the respondents interviewed were faced by one or more Agricultural production constraints.

The distribution of respondents according to types of agricultural production constraint faced is presented in the Table 1.

Table 4.10: Distribution of respondents according to factors constraints

Factor constraints	Frequency	Percentage
Labour	50	42
Land	32	27
Capital	68	57
Entrepreneur	10	8
Total	160*	>100

* Multiple responses were recorded

Source: Field Data, 2011

The multiple responses from the respondents showed that some of the some of the farmers are faced with more than one constraints in agricultural production. The survey showed that majority of the respondents had problem in financing their agricultural activities and this might be attributed to the inaccessibility of credit by

farmers and the reluctance of the financial institutions to extend loan to rural farmers. Similar result had been reported elsewhere (Hess *et al*., 2002).

Acquisition of Finance

The distribution of respondents according to their source of credit is presented in Table 2. The survey shows that out of 120 farmers interviewed, 58 percent obtained credit while 42 percent did not have access to credit. In addition, the table shows that out of the number of respondents that obtained credit, about 33 percent of the respondents, sourced their credit from money lenders, 30 percent through friends and relatives, 25 percent through Esusu contribution and 12 percent through banks. Further, analysis of the result shows that majority of the respondents (88%) had access to informal credit while only 12 percent had access to formal credit. Survey has shown that formal financial institutions were reluctant to lend to smallholder farmers either because there were not adequately funded or they viewed farmers as potential risk in terms of credit repayment. In addition, it could be as a result of limited number of formal financial institutions in the area.

Table 2: Distribution of respondents according their source of credit

Credit Source	Frequency	Percentage
Informal:		
Esusu Contribution	30	25
Friends and relatives	36	30
Money lenders	40	33
Formal Banks	14	12
Total	120	100

Source: Field Data, 2011

Area of Credit Utilization in Rural Agricultural Enterprises

The need for credit in Rural Agricultural Enterprises is worth investigating because it will guide the lender to know their area of concentration when administering credit. The distribution of loan according to the areas of utilization by the respondents is presented in Table 3. The Table shows that 38 percent of the respondents utilized their credit in procuring equipment and implements, 30 percent of respondents utilized their credit on improved seed and agro-chemicals while 16 percent of the respondents utilized their credit on hiring of labour and agroprocessing respectively.

Table 3: Distribution of respondents according to areas of credit Utilization

Utilized area	Frequency	Percentage
Equipments and implements	45	38
Labour hiring	19	16
Improved seed and agrochemicals	36	30
Agro-processing	20	16
Total	120	100

Source: Field Data, 2011

It is also important to examine the criteria set by formal financial institutions in their loan disbursement. The response of respondents to institutions according to their criteria for granting loan is presented in Table 5

Table 5: Reponses of respondents to institutions according to criteria for granting loan

Criteria	Frequency	Percentage
Actual need	40	34
Repayment ability	58	48
Security provided	22	18
Total	120	100

Source: Field Data, 2011

The table shows that 48 percent of the respondents was given loan based on repayment ability, 34 percent was based on actual need while 18 percent was based on security provided. It is also important to emphasize that the filed survey shows that 63 percent of the respondents received less than N20,000.00 as loan. The major problem associated with repayment default is presented in Table 6. The result shows that the respondents encountered more than one problem that delayed the repayments of their loan as shown in the Table 5. As shown in Table 6, 37 percent of the respondents who had loan repayment problem attributed the problem that delayed their repayment as natural disaster while 27 percent of the respondents attributed the delay to high cost of production. Further, 19 percent of respondents delayed their loan repayment due to family responsibilities. These problems, which made loan repayment difficult, can lead to poor credit history. Credit history is the most important criterion used by financial institution to determine successful loan applicant.

Table 6: Distribution of respondents according to problems that delayed repayment of loan

Problem of repayment	Frequency	Percentage
High cost of production	31	27
Low market price	32	26
Duration of acquisition	38	32
Family responsibilities	23	19
Natural disaster	44	37
Total	168*	>100

* Multiple responses were recorded
Source: Field Data, 2011

Risk factors Associated with Agricultural Production

The agricultural sector is exposed to a variety of risks. These include climate and weather risks, natural catastrophes, pest and diseases. These risks always causes high variability in agricultural enterprise production outcomes. Production risks are exacerbated by price risks, credit risks, technological risks and institutional risks. Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. For most banks, loans are the largest and most obvious source of credit risk; however, other sources of credit risk exist through some of the activities of a bank. The distribution of respondents according to the risk factors in agricultural enterprises, which is associated with securing loans from financial institution is presented in Table 7 below. It was observed that all the respondents interviewed had experienced losses or risk which affected their farm income.

Table 7: Distribution of respondents according to risk factors

Risk factors in farm production	Frequency	Percentage
Production/ yield risk	56	47
Price risk	24	20
Institutional risk	12	10
Financial risk	10	8
Assets risk	12	10
Personal risk	6	8
Total	120	100

Source: Field Data, 2011

The table shows that out of 120 respondents interviewed, majority of the respondent (47%) reported that major risk associated with their farming activities is production/ yield risk. This type of risk is often related to weather (excessive or insufficient rainfall, extreme temperature) and plants and animal diseases. The second major risk reported by respondents is price risk (20%). This probably is attributed to high costs of inputs and low cost of output especially price glut associated with peak harvest without storage facilities. In this event, farmers in production areas sell their product at a very low prices because of supply and demand gap. Personal risk is perceived as the least important. The result of Focus Group Discussion and Lead Informant Interview on the effect of risks on agricultural enterprise shows that majority reported that risks affected the quality of their produce, the price of output and quantity of produce. The risk factors more importantly affected their income, which was the major source of delay or default in loan repayment. The obvious consequence of this is making rural agriculture entrepreneur inability to repay loan, which gives most formal financial institutions low confidence on rural agricultural entrepreneur's ability to honour terms of loan agreement. Similar findings have been reported elsewhere (Hess *et al*, 2002).

Types of Risk that Influence Loan Repayment in Rural Agricultural Enterprises

The distribution of respondents according to the type of risks that influence the ability to repay in agricultural enterprise is presented in Table 8. About 38 percent of the respondents reported that production/yield risk was the major risk factor that delayed their loan repayment. The table also indicates that 25% of respondent that delayed in their loan repayment attributed that to price risk especially during the glut periods. Asset risk received lowest response in terms of factor that caused their loan repayment difficulty. It is important to note that when the rate of default is high for the previous year, the amount of credit available for farmers the preceding year will be low and vice versa.

Table 8: Distribution of Respondent According to Types of Risk that Influence Loan Repayment

Risk factors	Frequency	Percentage
Production/yield risk	45	38
Price risk	31	25
Institutional	21	20
Financial risk	15	13
Asset risks	5	4
Total	120	100

Source: Field Data, 2011

Strategies Used to Mitigate Risk Factors from Farmers' Perspective

Risk management in agriculture ranges from informal mechanism such as using more risk tolerance crops, diversification of products, diversification across crops and across income sources to formal mechanisms like agriculture insurance, minimum support price system and future's markets. It was observed that out of 120 respondents interviewed, 87 percent had engaged in different risk mitigation strategies to minimize agricultural risk or its effect while 13 percent had not. The distribution of respondents according to the strategies or measures used to mitigate agricultural risk is presented in Table 9

Table 9: Distribution of respondents based on strategies used

Strategies or measures used	Frequency	Percentage
Micro insurance	12	10
Contract farming	26	22
Improved information system	7	6
Diversification	38	32
Non farm activities	20	17
And management	10	8
Timeliness of operation	35	29
Total	148*	>100

*** Multiple responses were recoreded**

Source: Field Data, 2011

The multiple responses from the respondents showed that no farmers used just one measure or strategy. From the table, diversification is a form of strategy used by majority (32%) of the respondents. These farmers either diversify within the same crop(s) or livestock and nonfarm activities. These findings are supported by Von (2003) who reported agricultural diversification as a veritable tool in agricultural risk reduction. This is followed by timeliness of operation, which was practiced by 29% of the respondents. The least practiced form of strategy among the respondents was improved information systems. The varying number of respondents using different forms of risk mitigation strategies is dependent on their choice, risk perception and availability of the strategy in the area. There are specific mitigation strategies used for specific agricultural production. The general strategy used by farmers is presented in Table 10.

The result of the survey show that majority of the respondents (33%) usually diversified within crops and livestock to guard against failure in agricultural production that exposes the farmers to risk. About 23% generally used contract farming in both crop and livestock farming and the least strategy generally used by the respondents was buffer stock which was (15%) as at the time of survey.

Table 10: Distribution of respondents according to strategy used on their production

General used strategy	Frequency	Percentage
Micro insurance	22	18
Contract farming	27	23
Diversification	40	33
Buffer stock	18	15
Forward and backward production	23	19
Total	130*	>100

*Multiple responses

Determinants of Access to Loan Using Probit Regression Model

This investigated the econometric effect of risk factors on access to credit using probit regression. Suppose response variable Y is binary, that is, it can have only two possible outcomes which we will denote as yes (1) and no (0). For example, Y may represent presence/absence of a certain condition, success/failure of some

device, answer yes/no on a survey, etc. We also have a vector of regressors X (different agricultural risks), which are assumed to influence the outcome Y. Specifically, we assume that the model takes form

$$\Pr(Y = 1 \mid X) = \Phi(X'\beta),$$

where Pr denotes probability, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. The parameters β are typically estimated by maximum likelihood. It is also possible to motivate the probit model as a latent variable model. Suppose there exists an auxiliary random variable

$$Y^* = X'\beta + \varepsilon,$$

where ε ~ N(0, 1). Then Y can be viewed as an indicator for whether this latent variable is positive:

$$Y = \mathbf{1}_{\{Y^*>0\}} = \begin{cases} 1 & \text{if } Y^* > 0 \text{ i.e. } -\varepsilon < X'\beta, \\ 0 & \text{otherwise.} \end{cases}$$

The use of the standard normal distribution causes no loss of generality compared with using an arbitrary mean and standard deviation because adding a fixed amount to the mean can be compensated by subtracting the same amount from the intercept, and multiplying the standard deviation by a fixed amount. To see that the two models are equivalent, note that

$$\begin{aligned} \Pr(Y = 1 \mid X) &= \Pr(Y^* > 0) = \Pr(X'\beta + \varepsilon > 0) \\ &= \Pr(\varepsilon > -X'\beta) \\ &= \Pr(\varepsilon < X'\beta) \quad \text{(by symmetry of the normal dist)} \\ &= \Phi(X'\beta) \end{aligned}$$

Maximum likelihood estimation

Suppose data set $\{y_i, x_i\}_{i=1}^n$ contains n independent statistical units corresponding to the model above. Then their joint log-likelihood function is

$$\ln \mathcal{L}(\beta) = \sum_{i=1}^{n} \left(y_i \ln \Phi(x_i'\beta) + (1 - y_i) \ln\left(1 - \Phi(x_i'\beta)\right) \right)$$

The estimator $\hat{\beta}$ which maximizes this function will be consistent, asymptotically normal and efficient provided that E[XX'] exists and is not singular. It can be shown that this log-likelihood function is globally concave in β, and therefore standard numerical algorithms for optimization will converge rapidly to the unique maximum.

Asymptotic distribution for $\hat{\beta}$ is given by

$$\sqrt{n}(\hat{\beta} - \beta) \xrightarrow{d} \mathcal{N}(0, \Omega^{-1}),$$

where

$$\Omega = \mathrm{E}\left[\frac{\varphi^2(X'\beta)}{\Phi(X'\beta)(1 - \Phi(X'\beta))} XX' \right], \qquad \hat{\Omega} = \frac{1}{n} \sum_{i=1}^{n} \frac{\varphi^2(x_i'\hat{\beta})}{\Phi(x_i'\hat{\beta})(1 - \Phi(x_i'\hat{\beta}))} x_i x_i'$$

and φ = Φ' is the Probability Density Function (PDF) of standard normal distribution.
The result of probit regression is presented in Table 11

Table 11: Probit Regression

Y	Coefficient	Z	P> /Z/	dy/dx (marginal effect
Asset risk	-0.9659076	-1.15	0.248	-0.63665
price risk**	-0.1692797	-2.19	0.028	0.0406374
Institutional risk	0.1642284	0.89	0.375	0.0394248
Production risk**	-0.6219739	-3.61	0.000	-0.1493116
Personal risk**	-10.98326	-3.92	0.000	-0.236659
Constant**	7.876848	2.68	0.007	

Note: Asterisks (**) means significant at 5% probability level
Source: Computed from Field Survey, 2011

From the analysis, it was observed that personal risk not only had negative relationship with the access to credit but also was significant to access to credit at 5% probability level, therefore the null hypothesis of no influence of risk on agricultural credit was rejected. The result also showed that when there is 1% increase in personal risk, access to loan will be reduced by 24 percent. This was also observed in Production Yield Risk and Price Risk in that ranking order and the result showed that when there is 1% increase in these risks, access to credit will be reduced by 14 percent and 3 percent respectively. Institutional Risk and Asset Risk were not significant to access

to credit by the respondents. Therefore, the policy strategies to credit inadequacy should focus on personal and production risks.

The level of significance of Personal Risk may be attributable to the division of loan or fund for investment in agricultural production, death, illness or injury of the farm operator and or its labour force, possibility of capitals or income loss arising from the uncertainties of human factors. Production Yield Risk could be due to incidence of disease and variation in yields, Price Risk may be due to failing output and/or rising input prices after a production decision has been made. The insignificance of Asset Risk may be because farmers did not experience fire incidence, theft and loss of equipment during the production period. In addition, Institutional Risk may be because there were no changes in the policy framework in agricultural and other policies.

Strategies Used to Mitigate Risk Factors from Financial Institutions' Perspective

A major objective of bank management is to increase shareholders' return. Financial institutions have faced difficulties over the years for a multitude of reasons in advancing credit, the major cause of serious banking problems continues to be directly related to lax credit standards for borrowers and counterparties, Poor Portfolio Risk Management, or a lack of attention to changes in economic or other circumstances that can lead to a deterioration in the credit standing of a bank's counterparties. Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. The goal of credit risk management is to maximise a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Banks should also consider the relationships between credit risk and other risks. Strategies used by the financial institutions in the area are presented in Table 12

Table 12: Distribution of financial Institution based on strategies used

Strategies or measures used	Frequency	Percentage
Asset Financing	15	75
Collateral	20	100
Monitoring	7	35
Business Development Services	5	25
Total	20	100

*** Multiple responses**

Computed from Field Survey, 2011

The responses from the respondents show that majority of financial institutions used asset financing and collateral as risk mitigation strategies. The least applied risk mitigation strategy is offering business development strategies to the farmers. The key informant interview conducted shows that the financial institution opted out of monitoring and BDS because of their overhead cost.

Recommendations

Following the findings from the investigation of risk factors in extending credit to rural farmers by financial institutions as well as mitigation strategies used by farmers and financial institutions in Anambra State, the following recommendation were made:

Development of Microfinance Institutions (MFIs) that will build on existing social capital in their area of domain. The fact that least practiced form of risk strategy in rural area among the respondents was improved information systems shows that rural entrepreneurs lack adequate information on risk. Therefore, the ability of MFIs to build in educational information on sources of risk in agricultural production will enhance the loan repayment performance of rural agricultural entrepreneur.

The information on insurance premiums or policies should make available to rural agricultural entrepreneurs through education and capacity building workshops.

There is need to create greater awareness on the use of improved technological skills and accessibility of credit to enable farmers produce at the commercial level.

The fact that many farmers agreed that production risk is a major problem that contributed in loan repayment difficulty among rural agricultural enterprise, implies need for improved agricultural production strategies. Farmers should update their skills through periodic workshops.

Price risk is also an important element that incapacitates rural agricultural entrepreneurs to pay their loan. Government should develop price stabilization strategies for this type of entrepreneurs through facilitating the idea of contract farming to the farmers.

Though training of rural financial institutions on loan disbursement management is an important element that cannot be neglected, business development services is also more critical in helping rural agricultural entrepreneurs repay their loan. Therefore, RFIs should make business development services part of their loan advancement process.

Conclusion

Lending to the hard core was considered by financial institutions to be very risky, because of the likelihood that loan proceeds would be used to finance pressing basic needs, i.e., consumption, rather than investments in income-generating microenterprises. This would result in unacceptable default rates. However, this risk can be reduced if we consider the above recommendations.

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