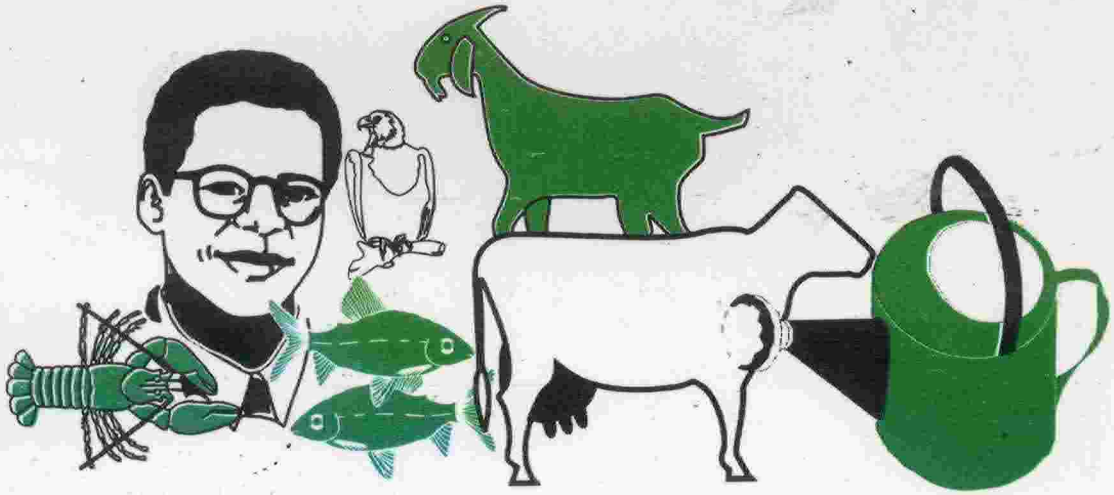
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All correspondences to:
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bankymao@yahoo.co.uk

OR

ESSIEN, Antigha (Coordinating Editor, JOAFSS)
Department of Animal Science,
Faculty of Agriculture and Forestry,
Cross River University of Technology (CRUTECH),
PMB 102, Ovonum-Obubra, CRUTECH,
E-mails: antigha2005@yahoo.com
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DETERMINANTS OF LOAN REPAYMENT AMONG FISH FARMERS IN NIGERIA

BY

[1]Adinya, I.B, [2]Awolumate,S.,[3]Angba ,C.W. and [4]Okey, I.B

[1]Department of Agricultural Economics and Extension, Cross River University of Technology, Obubra, Cross River State.

[2]Department of Agricultural Extension and Management. School of Science and Technology, National Open University of Nigeria,Ahmadu Bello Way, Victoria Island,Lagos,Nigeria.

[3]Department of Agricultural Economics and Extension, University of Calabar.

Department of Fisheries and Aquatic Science, Cross River University of Technology, Obubra, Cross River State, Nigeria
E-mail for correspondance : adinyaignatiusb@yahoo.com

ABSTRACT

In Nigeria, fish farming provides an important source of livelihood for fish farmers and also provides foreign exchange earnings. This study ascertained the determinants of loan repayment among fish farmers in Nigeria.. Primary data were obtained from 360 respondents in the study area by means of a set of structured and semi-structured questionnaire. This study used multi-stage random sampling technique to select 360 respondents from the study area. Data collected were analyzed using descriptive statistic and Ordinary Least Square (OLS) multiple regression technique. The results indicated that semi-log production function had the best fit in explaining the relationship between loan repayment and independent variables used. The coefficient of multiple determinants (R^2= 0.59) indicates that 59 percent of the variability in loan repayment is explained by the independent variables used in the model. The volume of credit granted to fish farmer, fish farming experience, fish farmers' educational level, and fish farmers' income exerted positive influences on loan repayment. Only 45.83 % of fish farmers in the study area repaid the loans. The major problems that lead to default in loan repayment by fish farmers were loan diversion, lack of skill, post-harvest losses and delay in loan approval 2.78%, 12.22%, 1.39% and 6.66% respectively. Micro-credit institutions should monitor and assess the repayment ability of borrowers on time with view to intervene at critical periods to prevent loan defaults. Extension agents should train fish farmers to use available resources efficiently and adopt new technologies to ensure increase productivity and loan repayment.

Keywords: Fish production, Resource Use Efficiency, Agricultural credit, Loan repayment

INTRODUCTION

Fish farming is one of the oldest occupations in the world. It provides an important source of livelihood for fish farmers and also provides foreign exchange earnings (Adinya and Ikpi, 2008a). Fish provides an excellent source of protein in the diet of many families in tropical Africa (Sule, 2006). Fish is rich in protein, fats, phosphorus, sulphur, potassium, iron, calcium and copper. Its oil has high quantities of vitamins especially vitamin A, B and D, thiamin, riboflavin, nicotinic acid and vitamin B12(Disney *et al*, 1978; Adinya and Ikpi, 2008).

Nigeria has a population of over 140 million (Population Census, 2006) an projected that by 2050, the country's population will be 303.6 million (Adinya, Although poverty level declined from 46.7 percent in 1985 to 42.70 percent in 1 rose sharply to 65.60 percent in 1996(Federal Office of Statistic (FOS, 1999). Acc to (Federal Office of Statistics, FOS, 1999) Nigeria's poverty level was 65.60 p and was ranked among the 25th poorest countries in the world. The Human P Index (HPI) was 41.6 percent implying that one out of two Nigerians are poor (Nations Development Programmes (UNDP;1998; UNDP, 2011).

In Nigeria, there is demand – supply gap for fish, the demand for fish in 2005 wa metric tones while supply was 77490 metric tones (Central Bank of Nigeria, 2005) increase in population, non-adoption of improved production techniques, unfo government policies, high cost of fish production equipment, high cost of inefficient agricultural financing, inefficient/ineffective agricultural extension delivery, inefficient allocation of available resource by fish farmers among others low productivity (Adinya and Ikpi, 2008a). According Fabiyi(1996) the output c production in Nigeria have a very low growth rate of -11.17_:the demand for 2005 was 8990 metric tones while supply was 77490 metric tones (Central B Nigeria, 2005 Nigeria's population growth rate is put at 2.8 percent per annum w fish production decline to -11.17(Fabiyi, 1996; Nsikak-Abasi *et al*, 2005; Adin Ikpi, 2008a). Central Bank of Nigeria (CBN, 2005) revealed that the output production in Nigeria for 1970 and 2005 were 131.3 million tonnes and 182.1 tonnes respectively. Food and Agricultural Organization (FAO, 2005; Essien, A Etop, Umoh and Adinya, 2008_) maintained that the low price of fish is a very indicator that can be used to bridge the wide animal protein gap that has beco hallmark of most developing countries including Nigeria. The challenge that is cu confronting Nigerian fish farmers is the problem of poverty, low capital for inve and low productivity resulting from inefficient use of associated resources production (Adinya and Ikpi, 2008a). The only way to carry out production effe and efficiently is by having sources of funding it, which are provided by l institutions. Fish production requires capital for a successful operation. Capital is for procuring vital inputs and services, which the fish farmers cannot finance fro savings. Since the present economic threshold of traditional agriculture cannot any capital formation. Then capital required for investment in fish must necessa injected from formal and informal credit institutions (Angba and Imoke, 2008, Ad al, 2008; Enya and_Adinya, 2008). Fish production is associated with rapid retu unit investment. The two most important factors responsible for credit supply incr fish production has been profitability and quick returns on invested capital encourages formal and informal credit institutions to provide needed capital more for fish production than other agricultural productions(Adinya and Ikpi, 2008 ; Of *al*, 2008). According to Offem *et al*, (2008) a net returns on capital invested in fishing operation in Cross River State was ₦20,215,644.00 with returns on ever invested of ₦64.48 is positive indicating a profit from the business and bene ratio(BCR) of 64.4 is greater than 1.0(break even position)indicated that fish proc investment was highly profitable.

In Nigeria, one of the main objectives of Nigerian agricultural policies is to becom sufficient in fish production. In pursuance of this objective, credit schemes are

place to increase these facilities so that fish production would be increased. Nigerian government has created specialized credit institution such as the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) to cater for credit needs in the agricultural sector (Oladeebo, 2003). Government had also mandated the commercial banks in Nigeria to give credit facilities to the agricultural sector of the country(Ajakaiye, 1998; Oladeebo and Oladeebo, 2008). However, the important roles played by fish make it imperative for financial assistance to fish farmers. In Nigeria, fish farmers obtain agricultural credit from either formal and informal credit institutions.

According to Adinya and Ikpi (2008a) Nigeria has the potential to be self- sufficient in fish production because of the presence of river and suitable ecological zone for its production either in ponds, dams or rivers. They further maintained that fish production in the country has been inadequate to bridge the demand-supply gap because of non – optimal use of resource and enormous losses in post –harvest of fish. To reverse this trend, the rural fish farmers must learn to use improved technologies and improvement in efficiency of resource use.

Theoretical/analytical framework

Farrel (1957) revealed that there are three important production efficiencies namely: technical, allocative and economic efficiencies. Technical efficiency is the measure of the farms success in producing maximum output from a given set of resources or is the ability of producing a given level of output with a minimum quantity of inputs under a given technology. Allocative efficiency is the ability of the farmer to use the inputs in optimal proportions given their respective prices and the production technology. Economic efficiency is the product of the technical and allocative efficiencies(Adinya *et al*, 2008c). However, given the low rate of adoption of fish technologies by fish farmers, improvement in resource use efficiency remains the most cost effective way in enhancing productivity that enables fish farmers make gains that can enable them repaid loans obtain from commercial banks or informal credit institutions(Adinya and Ikpi, 2008a).

Loans are expected to be paid back on time to ensure the recycling of money for the benefit of other fish farmers. In spite of the importance of loan in agricultural production, its acquisition and repayment are fraught with a number of problems especially in the smallholder farming (Awoke, 2004). Okorie(1988) reported that the default rates ranging from 9.7 percent to 67.1percent among smallholder farmers. He further noted that the problem of default rate has been further aggravated by the slanted publicity given by the Central Banks of Nigeria (CBN) to the introduction of Agricultural Credit Guarantee Scheme, which made many bank loan recipients feel that the loans were their own share of national cake. So banks now insist on adequate collateral before credits are released to recipients. From both theoretical and applied perspectives, measuring efficiency in loan repayment is very important because it might lead to effective loan recovery by banks to prevent commercial banks from liquidation and also have important implication for both policy formulations and banks management (Bravo-Ureta and Rieger,1991; Egbetokun and Ajijola, 2008; Enya and Adinya, 2008).

Against the foregoing background this study was designed to attain the following objectives :

describe the socio-economic characteristics of fish farmers in the study area;
determine resource use efficiency(allocative efficiency) in fish production in the study area;
determine and analyze loan repayment; and identify major problems of default of loan repayment by fish farmers in the study area.

METHODOLOGY

Study area: The study was carried out in Nigeria. There are two distinct climate seasons in the study area, rainy season from March to October and dry season from November to February. The annual rainfall varies from 2,942mm to 3,424mm. The average temperature is about 28 °C(Adinya *et al*, 2010). Nigeria has a population of about 140 million (Population Census, 2006). Fishing and rearing of animals such as goats, sheep, pigs, poultry etc, is also common among farmers in the study area. Furthermore, the people also engage in agro-based activities and good numbers of them are civil servants.
This study used a multi-stage random sampling technique to select respondents in the study area. There are thirty-six states in Nigeria. In the first stage, twelve states (River, Ekiti, Cross River, Delta, Akwa Ibom, Ebonyi, Niger, Taraba, Nasarawa, Benue, Osun and Oyo states) were randomly selected from thirty-six states in the study area. This was followed by a random selection of 3 Local Government Areas (LGAs) from each of selected States. One fish farming community was purposively selected from each of selected LGAs. This was followed by a purposive selection of one village from each of selected fish farming communities because of finance/fund to cover all fish farming communities. Then (10) respondents were randomly selected from each of the villages giving a total of three hundred and sixty (360) respondents.
Data for the study were obtained from both primary and secondary sources. The primary source of data were mainly from field survey, while secondary data were obtained from statistical documents, census data, annual reports, review of journals, magazines and books.

The analytical tools that were employed in this study so as to achieve the already stated objectives of the study include; descriptive statistic to attain objectives i, and iv while the Ordinary Least Square (OLS) multiple regression technique was used to achieve objectives ii and iii. The multiple regression analysis was used to determine the relationship between loan repayment by fish farmers and the selected variables. The linear, Cobb-Douglass and semi-log functional forms were tried to determine which form of the functional forms would best fit the relationship between loan repayment by fish farmers and the explanatory variables.
The implicit form of regression model for this analysis was given as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15} + e)$$

While explicitly form of the regression models for this analysis are given by:
where Y =loan repayment among fish farmers(naira)

X_1 = age of fish farmer (years)
X_2= farmer's educational level(years of schooling)
X_3 = fish pond size(farm size in hectares)
X_4 = feed (kilogram)
X_5 = labour used in fish production in (man-days)

X_6= farming experience (years)
X_7 = credit access, (a dummy variable) which takes the value of unity(1) if the fish farmer has access to credit and zero(0.00001) otherwise
X_8 =extension visit, (a dummy variable) which takes the value of unity(1) if the fish farmer was visited by extension agent and zero(0) otherwise(not visited by extension agent)
X_9 =gender, (a dummy variable) male = 1, female=0
X_{10} = member of cooperative; member= 1, non -member=0.00001
X_{11} = marital status(a dummy variable) which takes the value of unity(1) if the fish farmer is married and zero(0) otherwise
X_{12} = income(naira)
X_{13} = size of loan (naira)
X_{14} = interest rate(percentage)
X_{15} = amount sourced from financial outlet
e = error term
b_o = intercept
b_1- b_{15} = parameters to be estimated

Three functional forms were tried; these are linear, Cobb-Douglas and semi- log production functions. Whichever function that has the highest R^2 and shows many statistical significant variables will be adopted following (Awoke, 2000; Adinya and Ikpi, 2008a)..

(a)Linear production function:

$$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}LnX_{13} + b_{14}LnX_{14} + b_{15}LnX_{15} + e \ldots \text{equation (1)}$$

(b)Exponential function:

$$Y = \underline{Lnb_o} + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + b_7LnX_7 + b_8LnX_8 + b_9LnX_9 + b_{10}LnX_{10} + b_{11}LnX_{11} + b_{12}LnX_{12} + b_{13}LnX_{13} + b_{14}LnX_{14} + b_{15}LnX_{15} + e \ldots \text{equation (2)}$$

(c)Cobb-Douglas (Double-log) production function

$$\text{Ln } Y = \text{Ln}b_o + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + b_7LnX_7 + b_8LnX_8 + b_9LnX_9 + b_{10}LnX_{10} + b_{11}LnX_{11} + b_{12}LnX_{12} + b_{13}LnX_{13} + b_{14}LnX_{14} + b_{15}LnX_{15} + e \ldots \text{equation (3)}$$

RESULTS AND DISCUSSION

Results of the findings are presented as shown in the next few pages

Table 1: Socio-economic characteristics of fish farmers in Nigeria

Age of fish farmers	Frequency	Percentage(%)
20-30	67	18.61
31-40	83	23.06
41-50	112	31.11
51years and above	98	27.22
Total	360	100
Educational attainment		
First school leaving certificate	97	26.94
Junior secondary school/ Senior secondary school	115	31.94
Tertiary institution	44	12.22
No formal education	104	28.89
Total	360	100
Fish pond size(farm size in hectares)		
0.1-2	282	78.33
3-4	56	15.55
5-6	12	3.33
7 hectares and above	10	2.78
Total	360	100
Feed/ Diet (kilogram)		
30-34% protein diet	115	31.94
35-44% protein diet	104	28.89
45-55% protein diet	141	39.17
Total	360	100
Labour used in fish production in (man-days)		
1-4	137	38.06
5-8	124	34.44
9 man-days and above	99	27.50
Total	360	100
Farming experience (years)		
1-5	128	35.56
6-10	139	38.61
11 years and above	93	25.83

Total	360	100
Gender		
Male	325	90.28
Female	35	9.72
Total	360	100
Marital status		
Married	262	72.78
Single	98	27.22
Total	360	100

Source: **Field survey, 2010.**

Table 1, indicated that fish farmers within the age range of 41-50 years were highest in number (31.11%). Only 23.06% of them were with the age range of 31-40 years. The implication of the results is that majority of the respondents were within the economically active age. These findings are synonymous with Asa (2003) that people in age group of 41-50 years are more economically active and independent than those in age group of less than 20 years. Table 1 also revealed that 26.94 % of fish farmers had attended primary school. Further analysis of Table 1 reveals that 28.89% of fish farmers were illiterate. The result presented in Table 1, reveals that, majority (78.33%) of fish farmers had farm sizes between 0.1-2.0 hectares. Only 2.78% of fish farmers were large- scale farmers with farm sizes between 7 hectares and above. This information implies that small-scale fish farmers out number the large scale fish farmers in the study area. The result corroborates with earlier findings by Awoke and Okorji (2003), who were of the opinion that more than 70 per cent of the population of farmers in Nigeria are small-scale farmers cultivating 1.0-2.0 hectares with limited capital resources and characterized by hand tool technology. From Table1, 38.06% of fish farmers used between 1-4 man-days in fish production. Only 27.50 % of fish farmers used 9 man-days and above. The years of farming experience is shown in Table 1. The result shows that 35.56- (use the word "percentage" instead of "%" in all discussions) of fish farmers had 1-5 years of farming experience. Only 25.83% of fish farmers had farming experience of 11 years and above. This implies that some of the respondents are well experienced in fish production. Table 1, indicated that 90.28 % of fish farmers in the study area were male and 9.72% were female. This information implies that the male fish farmers outnumber the female ones in the study area. What is your take about this development? Further analysis of Table 1 reveals that 72.78 % of fish farmers in the study area were married and 27.22% were single.

Table 2: Distribution of respondents according to source of finance, amount of loan requested/ amount of loan granted

Source of finance (₦)	Frequency	Percentage(%)
Savings		
None	124	34.44
less than 10,000.00	137	38.06
11,000-30,000	10	2.78
31,000-60,000	12	3.33
61,000-90,000	56	15.55
91,000 and above	21	5.83
Total	360	100
Amount of loan requested		
less than 10,000.00	14	3.89
11,000-30,000	56	15.55
31,000-60,000	141	39.17
61,000-90,000	137	38.06
91,000 and above	12	3.33
Total	360	100
Amount of loan granted		
less than 10,000.00	25	6.94
11,000-30,000	50	13.89
31,000-60,000	140	38.89
61,000-90,000	135	37.50
91,000 and above	10	2.78
Total	**360**	**100**

Source: Field survey, 2010

Take note on table format and position.

The result presented in Table 2 reveals that, most (38.89%) of the respondents have between ₦31, 000 .00 - ₦ 60,000.00 granted to them as loan of the amount requested. Table 2 also, reveals that, majority (38.06%) of the fish farmers had less than ₦ 10, 000.00 in their savings account. Only 5.83% of fish farmers had ₦ 91,000 .00 and above in their savings account. This implies that fish farmers are within middle-class of income earners . The result of this findings agrees with the findings of Disney, *et al*, 1978; Ofem et al, 2008.

Table 3: Distribution of respondents according to Bank assistance to fish farmers after loan

Form of assistance	Frequency	Percentage(%)
Monitoring loan repayment	112	31.11
Training of fish farmers	83	23.06
Technical assistance	44	12.22
Provision fishing equipment and fish farmers needs	98	27.22

Evaluation process	10	2.78
None	13	3.61
Total	360	100

Source: Field survey, 2010

Table 3 shows the various forms of assistance given by banks to her loan beneficiaries. The banks take interest in monitoring the loan utilization and repayment as reported by most (31.11 %) of the respondents. Provision fishing equipment and fish farmers' needs was also another form of assistance as reported by 27.22% of the respondents in the study area. While training, evaluation and technical assistance as reported by them had 23.06%, 2.78% and 12.22% respectively.

Table 4: Distribution of respondents according to loan repayment by fish farmers in Nigeria

Loan repayment /loan repayment default	Frequency	Percentage(%)
Loan repayment	165	45.83
loan repayment default	195	54.17
Total	360	100

Source: Field survey, 2010

Table 4, indicated that 45.83 % of fish farmers in the study area repaid their loans and 54.17% were defaulter of loan repayment. This result corroborates with earlier findings by Okorie(1988) who reported that the default rates ranging from 9.7 percent to 67.1 percent among smallholder farmers. He further noted that the problem of default rate has been further aggravated by the slanted publicity given by the Central Banks of Nigeria(CBN) to the introduction of Agricultural Credit Guarantee Scheme, which made many bank loan recipients feel that the loans were their own share of national cake.

Table 5: Distribution of respondents according to some problems that cause loan repayment default of fish farmers in the study area.

Some problems that cause loan repayment default of fish farmers In Nigeria	Frequency	Percentage(%)
Loan diversion	10	2.78
Post-harvest losses	5	1.39
Delay in loan approval	24	6.66
Lack of appropriate skills	44	12.22
Lack of monitoring loan repayment	112	31.11
Unpaid/uncleared debts before repayment time)	165	45.83
Total	360	100

Source: Field survey, 2010.

Table 5 reveals that the major problems of default of loan repayment by fish farmers were loan diversion, lack of skill, post-harvest losses and delay in loan approval occupied

2.78%, 12.22%,1.39% and 6.66% respectively. Awoke (2004) reported similar results in he studies.

Table 6: Multiple regression equation for loan repayment by fish farmers in Nigeria

Production function	Constant	X_1 Age	X_2 Educ. level	X_3 Farm size	X_4 Feed	X_5 Labour	X_6 Farming experience	X_7 Credit access	X_8 Extension visit	X_9 Gr
linear	301321	10952	24550	55126	11825	50579	27958	60653	11825	12
	(1.524)	(1.9)	(0.49)	(2.7)	(3.7)	(6.29)	(0.90)	(0,9)	(3.7)	(0.
Semi-log	22192	50802	10210	50201	11723	50162	21063	60012	10621	43
	(1.561)	(0.17)	(0.36)	(2.6)	(3.0)	(2.7)	(0.28)	(0.9)	(3.0)	(2.
Cobb-Douglas	1.2013	10800	96235	55423	11634	65310	24053	58012	10463	20
	(1.40)	(0.17)	(1.49)	(1.70)	(3.5)	(2.1)	(2.0)	(0.28)	(2.1)	(1.

Source: Field survey, 2010.

Continuation of Table 6: Multiple regression equation for loan repayment by fish farmers in Nigeria

Production function	constant	X_{11} Marital status	X_{12} Income	X_{13} Size of loan	X_{14} Interest rate	X_{15} Amount sourced from financial outlet	R^2	Adj R^2	F	DW
linear	301321	56243	11623	670213	40613	51311	0.47	0.14	50.42	2.2
	(1.524)	(1.23)	(3.6)	(2.30)	(2.3)	(0.28)				
Semi-log	22192	62312	10425	11634	11634	65201	0.59	0.45	46.00	1.8
	(1.561)	(0.11)	(2.1)	(3.76)	(3.76)	(3.76)				
Cobb-Douglas	1.2013	198677	57341	67030	67030	42132	0.55	0.42	41.89	1.7
	(1.40)	(1.49)	(1.23)	(2.0)	(2.0)	(0.29)			2	

Source: Field survey, 2010.

Table 6 revealed that semi-log(exponential function) production function had the best fit in explaining the relationship between loan repayment and independent variables used, the coefficient of multiple determinant (R^2= 0.59) indicates that fifty nine percent of the variability in loan repayment is explained by independent variables. The F-value was 46, indicates the overall significance of the model at 5 percent, indicating that there is significant linear relationship between the independent variables taken together and loan repayment among fish farmers in Nigeria. While Durbin Waston(DW) statistics was 1.87. The Durbin Waston value of 1.87 was within the specified range between 0 and 2, indicating a positive autocorrelation.The volume of credit invested in fish production had significant and positive influence on loan repayment. This study shows that education,

farming experience and income has positive influence on loan repayment and it is significant at 5 percent level of significance.

CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between loan repayment among fish farmers in Nigeria and selected explanatory variables. This study showed the various forms of assistance given by banks to her loan beneficiaries (incomplete sentence). The banks take interest in monitoring the loan utilization and repayment as reported by most (31.11 %)of the respondents. Provision of fishing equipment and fish farmers' needs was also another form of assistance as reported by 27.22% of the respondents in the study area. While training, evaluation and technical assistance as reported by them had 23.06%, 2.78% and 12.22% respectively. The study also shows that 45.83 % of fish farmers in the study area repaid the loans while 54.17% were defaulters of loan repayment. The major problems of default of loan repayment by fish farmers were loan diversion, lack of skill, post-harvest losses and delay in loan approval occupied 2.78%, 12.22%, 1.39% and 6.66% respectively. It was recommended that micro-credit institutions should monitor and assess the repayment ability of borrowers on time with a view to intervening at critical periods to prevent loan defaults. Banks should strictly monitor all their loans to beneficiaries to ensure loan repayment. Beside that extension agents should train fish farmers to use available resources efficiently and adopt new technologies to ensure increase productivity and loan repayment

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