

Tamil Nadu: Determinants and Constraints

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Abstract

The study was conducted in Thanjavur district of Tamil Nadu state covering a total of 80 aquaculture farmers. Data collected were analyzed using simple statistical tools such as means and percentages as well as multiple regression technique. The majority of sample farmers who used credit were in the age group of 35-45 years which indicates the productive age group. They were more likely to adopt new innovations than the older farmers. The education pattern shows that highest percent (35%) of farmers were college going followed by high school, middle school and higher secondary school and very few farmers were illiterate. The majority of farmers (73.25%) were in aqua-business alone having experience up to 10 years of farming with credit utilization with small and medium scale nature of aqua-farming business. Most of carp farmers (50.00%) had availed institutional credit followed by loan from money lender (30%) and relatives (10%). Among the formal institutional borrowers in carp culture, medium scale farmers received the maximum credit. With regard to adequacy, it was observed that the institutional credit was inadequate to meet the requirement of finance for aqua farming. Regression analysis indicate that farming experience with credit use is emphasized in the results obtained because the more the farming experience with credit use, the more is its ability to generate enough funds to repay aqua-loans. More number of farmers in the study area is depending on aquaculture, so there is a need for separate outlay for aquaculture under fisheries in order to satisfy the credit requirement.

Key words: Credit, Source, Utilization, Repayment, Correlation, Regression, Constraints, Carp farmers.

Introduction

Aquaculture, a vibrant and viable economic entity has become one of the fastest growing food production sectors in the world. Aquaculture also plays a major role, along with agriculture and animal husbandry as an income and livelihood generating venture among the rural community in our country. The demand for capital increases with transformation of aquaculture from traditional to commercial (OECD, 2010). The new technology has necessitated the use of capital on large scale, both for building of farm infrastructure and for meeting the operational costs. Consequently credit requirement in aquaculture have increased manifold. This growth required the use of chemical fertilizers, feed, seeds, water and equipment which in turn require the credit availability to the farmers. The farmers face financial constraints in order to purchase these inputs and depend on traditional credit with high interest rates for aquaculture which has caused exploitation of the ryots

resulting in rural indebtedness causing serious concern. The issue of growing indebtedness has become central and is associated positively with farmers' suicides (Satish, 2006, Sidhu et al., 2008). Financial institutions and banks (commercial and rural) are investing or lending money for development of commercially viable aquaculture project which form the part of agriculture sector (Gosh, 2008). Traditionally Indian fish farmers have been in the clutches of private money lenders, who had impoverished them to the extent that they could not plough back returns of their investment for developing their socio-economic status (Sidhu *et al.*, 2008). In order to check this, after independence lot of steps have been taken by the Government i.e., nationalizing banking sector, establishment of cooperative Banks, NABARD, and Regional Rural Banks and focusing on priority sector lending, etc. (Prafulla, 2007).

The large farmers may not find it difficult to get the credit required to increase their profitability whereas the

small and the medium scale farmers may have to face a lot of problems in availing credit (Hamlisch, 1979). Further, from the early nineties onwards the financing of aquaculture has assumed new dimensions. Government therefore has taken number of measures to meet the growing credit need of aquaculture through institutional finance. Even though the financial institutions are providing credit to the fish farmers, there is a need to assess the credit utilization pattern and determinants of repayment of fish farmers, in order to assess the existing credit facilities and its contribution to the growth of fish farming. Against this backdrop this study attempted to assess the credit needs and sources, credit utilization pattern and factors affecting the repayment of credit by fish farmers in Thanjavur district of Tamil Nadu.

Methodology

This study was conducted in Thanjavur district of Tamil Nadu which was selected purposively since the district is endowed with a vast network of irrigation canals and ponds with river water available for about

6-8 months for aquaculture and distinction of having the largest number of dug out carp ponds in the state (Jayaraman, 1997). There were a total of 335 farmers culturing carps in Thanjavur, which comprised of 175 carp farmers from Pattukkottai block and 160 carp farmers from Orathanadu block. Twenty farmers from each block availing Institutional and non-institutional credit were selected using simple random sampling technique comprising a total of 80 carp farmers who availed credit from any source for fish farming from two selected blocks. Primary data were collected through structured interview schedule supplemented with unstructured discussion. Data covering socio-economic characteristics such as age, education, occupation, farm size, farming experience with credit use, income, family size and type of family, amount and source of credit availed, amount of credit repaid *et cetera* were collected from the sample farmers. For further analysis selected farmers were categorized on the basis of their operational land holdings into small (<2 ha of land), medium (2-5 ha) and large (>5 ha). The distribution of sample household according to farm size category is as follows:

Table.1. Distribution of sample households as per farm size category

Farm size category	Number of sample farms	Percentage to total	Total area (ha)	Average farm size (ha)
Small	33	41.25	51.26	1.22
Medium	34	42.5	81.36	2.71
Large	13	16.25	60.72	7.59
Overall	80	100.0	193.34	2.42

It is evident from the table1 that average farm size for small, medium and large scale farmers was 1.22, 2.71 and 7.59 hectare respectively. Data collected were analyzed

using descriptive statistical tools such as means and percentages as well as multiple regression technique were used to identify the factors affecting loan repayment.



Model Specification

The model used to identify determinants of loan repayment is implicitly stated below:

$$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, U) \dots \dots \dots (1)$$

Where,

- Y = amount of loan repaid (Rs.)
- X₁ = amount of loan collected and spent on aquaculture production (Rs)
- X₂ = annual net farm income (Rs.)
- X₃ = age (years)
- X₄ = farm size (hectares)
- X₅ = farming experience with credit use (years)
- X₆ = level of education (years spent in formal educational institution)
- U = error term

Four functional forms of the specified model were tried and their *a priori* expectations are explicitly stated as:

Linear Form

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U \dots \dots \dots (2)$$

Semi – logarithmic Form

$$Y = Lnbo + b_1LnX_1 + b_2LnX_2 + b_3 Ln X_3 + b_4Ln X_4 + b_5LnX_5 + b_6LnX_6 + U \dots \dots (3)$$

Exponential Form

$$LnY = bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + u \dots \dots \dots (4)$$

Double – logarithmic Form

$$LnY = Lnbo + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + u \dots \dots (5)$$

Where Ln = natural logarithms b₀, b₁,..... b₆ = estimated coefficients

Results and discussion

Socio-economic characteristics of sample farmers

The results of socio-economic characteristics of credit recipients of carp farmers are summarized in Table 2. The majority of farmers were in age group of 35-45 years followed by above 45 years and below 35 years respectively, which indicated that farmers of age group of 35-45 years were in majority in fish farming. Credit institutions might be willing to give loan facility to young and dynamic farmers who are more likely to adopt new innovations than the older farmers. The education pattern shows that highest percent (35%) of farmers were educated up to college level followed by high school (22.5%), middle school (16.25%), higher secondary school (15.0%) and very few farmers were illiterate. Most of the respondents have family size more than 5 members which indicated large household size were availing more credit. The majority of farmers (73.75%) were in aqua-business alone followed by farming and business (18.75%) and 7.5 percent were involved in both farming and government jobs. Half of the sample farmers had 6-10 years of experience in using credit followed by 26 percent of them having less than five of experience and 24 percent of them were using credit for a period more than 10 years. This indicated that aqua-farmers had substantial years of experience in credit utilization. Aquaculture being the high income generating activity in the study area, nearly 63 per cent of the farmers fell under high income group earning with an earnings of more than Rs.1,00,000 per annum followed by 22 percent of them earning between Rs.50,000-Rs 1,00,000 and 13 percent sample farmers earning less than Rs.50,000 per annum. Majority of the respondents (56.0%) had nuclear family system and 48 percent of respondents had family size of more than five.

Table. 2. Socio-economic characteristics of sample carp farmers.

Character	Category	Total (n=80)	
		No	%
Age	Young (up to 35 yrs)	16	20.0
	Middle (35- 45 yrs)	36	45.0
	Old (above 45yrs)	28	35.0
Education	Illiterate	1	1.25
	Primary school	3	3.75
	Middle school	13	16.25
	High School	18	22.50
	Higher secondary	12	15.00
	Collegiate	28	35.00
Occupation	Aqua Farming alone	59	73.75
	Farming + business	15	18.75
	Farming + govt. services	6	7.5
Experience with credit utilization	Up to 5 years	16	20.0
	6-10 Years	40	50.0
	>10 years	24	30.0
Annual income	Low (< Rs 50000)	11	13.75
	Medium (Rs 50000-1,00,000)	18	22.50
	High (>Rs.1,00,000)	51	63.75
Family size	<5	32	40.0
	>5	48	60.0
Type of family	Nuclear	56	70.0
	Joint	24	30.0

Sources of credit availed by aquaculture farmers

Table 3 revealed that most aquaculture farmers (50.00%) of the study area had availed institutional credit followed by credit from money lender (30%) and relatives (10%), which indicate better accessibility of institutional credit to the carp farmers as compared to other source. This may be due to the fact that the banks were having least risk in carp culture in relation to other which had motivated banks to extend credit to carp farmers. It was

also observed that cent percent of the large scale farmers and 66.67 percent of medium scale farmers accessed institutional credit while only 28.57 percent of small scale farmers availed institutional credit. Majority of the small scale farmers (71.43%) were dependent on money lenders and relatives for credit. Similar results were reported by Kalita and Sarma (2000). Various farm level studies have shown that the access of smallholders to institutional finance is limited and inadequate. They are excluded from the institutional credit delivery system due to high transaction cost, poor recovery and low margins (Vyas, 2004).

Table. 3. Source-wise credit availed by sample carp farmers

Farm size	Source						Total (n=80)	
	Banks		Money lenders		Relatives		No.	%
	No.	%	No.	%	No.	%		
Small	12	28.57	20	47.62	10	23.81	42	100
Medium	20	66.67	10	33.33	-	-	30	100
Large	8	100.0	-	-	-	-	8	100
Overall	40	50.00	30	37.50	10	12.50	80	100

Farmer's perception towards credit

Perception of farmers about Institutional credit

Table 4 depict the perception towards the interest rate charged by the institutional credit. Seventy per cent of the farmers were highly satisfied; seventeen percent of the farmers were satisfied and twelve percent of the farmers were not satisfied. Regarding credit sufficiency, fifty per cent of the farmers reported that credit was highly sufficient for aquaculture followed by 37 per cent in satisfied category and 12 per cent in unsatisfied

category. Fifty percent of the farmers were not satisfied with the procedures, 31 per cent of the farmers were satisfied and only 18 per cent of the farmers were highly satisfied. Sixty two per cent of the farmers were satisfied with collateral security. Majority (87%) reported to untimely disbursement of the credit. Several studies have shown that institutional credit had contributed positively to the adoption of modern production inputs and private investments in tube-well irrigation, tractorization and other farm machinery in the Punjab state, which contributed towards to the growth of the agricultural sector (Sidhu et al. 2008).

Table. 4. Farmer's perception towards institutional credit

S. No.	Perception	HS		S		NS	
		No	%	No	%	No	%
1	Rate of interest	56	70.00	14	17.50	10	12.50
2	Credit Sufficiency	40	50.00	30	37.50	10	12.50
3	Procedure for availing credit	15	18.75	25	31.25	40	50.00
4	Providing collateral security	20	25.00	50	62.50	10	12.50
5	Timely disbursement of credit	-	-	10	12.50	70	87.50

(HS-Highly satisfied, S- Satisfied, NS- Not satisfied)

Perception of Farmers regarding non-institutional credit

Table 5 gives the perception towards the interest rate charged by the non-institutional credit and credit sufficiency. 75 per cent of the farmers were not satisfied and one fourth (25%) were satisfied. Cent per cent of

the farmers were highly satisfied with the procedures. Regarding the timely disbursement of credit majority (81.25%) reported high level of satisfaction. The increased role of non-institutional sources in financing capital requirements led to the problem of indebtedness due to unscrupulous nature of such loans along with decelerating growth (Singh et al., 2005).

Table. 5. Farmer's perception towards non-institutional credit

S. No.	Perception	HS		S		NS	
		No	%	No	%	No	%
1	Rate of interest	-	-	20	25.00	60	75.00
2	Credit Sufficiency	60	75.00	20	25.00	-	-
3	Procedure for availing credit	80	100.00	-	-	-	-
4	Providing collateral security	10	12.50	60	75.00	10	12.50
5	Timely disbursement of credit	65	81.25	15	18.75	-	-

(HS-Highly satisfied, S- Satisfied, NS- Not satisfied)

Credit availed by carp farmers

It is evident from table 6 that small scale farmers received maximum credit per hectare (Rs. 1,56,457),

followed by medium scale farmers (Rs. 1,22,787) and large scale farmers (Rs. 98,155). This indicated that small scale farmers required more credit to use latest technology to enhance production and productivity.

Table. 6. Credit availed by sample carp farmers

Farm size category	Total no of farms	Total credit availed (Rs.)	Credit availed (Rs./farm)	Credit availed (Rs./ha)
Small	42	80,20,000	1,90,952	1,56,457
Medium	30	99,90,000	3,33,000	1,22,787
Large	8	59,60,000	7,45,000	98,155

Source-wise institutional credit availed by carp farmers

It evident from table 7 that small scale farmers used relatively more credit per hectare, in comparison to medium and large scale farmers. The farmers of medium scale received maximum loan (Rs.63,40,000), followed by large scale farmers (Rs.59,60,000) and small scale farmers (Rs.26,60,000). The institutional credit per farm used had increased with increase in farm size while in per hectare terms it had increased with the decrease in farm size. The

small scale farmers received credit of Rs.1,39,852/ha, followed by medium scale farmers Rs.1,16,032/ha and large scale farmers Rs. 98,155/ha. According to the model bankable project for composite fish culture the minimum amount required to be sanctioned for construction of 1 hectare fish farm was Rs.2,02,000 (including both fixed and variable cost (Mehta, 2010). But it was found that no bank had provided this amount as a loan for any of the sample farmer. Due to insufficient credit, sampled fish farmers had faced many difficulties and constraints in their aquaculture operations

Table. 7. Source-wise Institutional credit availed by carp farmers

Size of farm (ha)	Total no of farms	Total area ha	Per farm area ha	Total credit availed (Rs.)	Credit availed (Rs./farm)	Credit availed (Rs./ha)
Small	12	19.02	1.58	26,60,000	2,21,666	1,39,852
Medium	20	54.64	2.73	63,40,000	3,17,000	1,16,032
Large	8	60.72	7.59	59,60,000	7,45,000	98,155

Source-wise non-institutional credit availed by carp farmers

It is evident from table 8 that small scale farmers received comparatively more credit per hectare, in comparison to medium and large scale farmers. The non-institutional credit availed per farm had increased

with increase in farm size while on per hectare basis; it had increased with the decrease in farm size. The small scale farmers borrowed Rs.1, 66,356/ha while medium scale farmers borrowed Rs.1, 36, 704/ha. None of the large farmers had availed non-institutional credit for carp culture.

Table. 8. Source-wise non-institutional credit availed by sample carp farmers

Category of farm	Total no of farms	Total area (ha)	Per farm area (ha)	Total credit availed (Rs.)	Credit availed (Rs./farm)	Credit availed (Rs./ha)
Small	30	32.22	1.07	53,60,000	1,78,666	1,66,356
Medium	10	26.7	2.67	36,50,000	3,65,000	1,36,704
Large	-	-	-	-	-	-

Credit utilization pattern

Source-wise credit utilization by carp farmers

Farmers used to divert the borrowed amount to unintended purposes. In order to ascertain the diversification, the nature of utilization of credit and quantum of diversified amount were estimated and shown in Table 9, which depict that 42.50 percent farmers had utilized the credit for intended purposes, but the rest had partly utilized the credit for purposes other than that for which the loan had been obtained. No farmer

was found to have diverted/ mis-utilized the total credit borrowed. Fifty per cent of the farmers who had taken loan from the institutional sources had utilized the same for the intended purpose and the rest utilized the money partially for unintended purposes. The non-aquaculture purposes for which borrowed funds were used included children education, house maintenance and repaying old debts. Credit acts like a double-edged weapon; if used productively it raises productivity and production, but if used irrationally on unproductive activities, it leads to the problem of indebtedness (Sidhu, et. al., 2008).

Table. 9. Source-wise credit utilization by carp farmers

S. No	Utilization pattern	Institutional (n=40)		Non institutional (n=40)		Over all (n=80)	
		No.	%	No.	%	No.	%
1.	Full	20	50.00	14	35.00	34	42.50
2.	Partial	20	50.00	26	65.00	46	57.50

Credit utilization pattern by the carp farmers for various purposes

Farmers had utilized the credit amount for both aquaculture and non-aquaculture purposes and the details on utilization of credit for various purposes are presented in table 10 which shows that 81 per cent of borrowed amount was spent on aquaculture by the carp farmers. Major portion of the borrowed amount was spent towards farm construction (44.0%), followed by feed (11.0%), equipment/machineries (7.0%), seed (5.0%), electricity (4.0%), and labour (3.5%) by the carp farmers. Among the aquaculture purpose, carp farmers had used 51

percent of credit for investment purpose and remaining was used for meeting the operational expenses. Towards institutional use of credit for labour wages was reported nil. The unintended purpose for which the amount was used includes repayment of old debts, children education and house maintenance which amounted to 19% of total usage by carp farmers. This may be due to long duration of culture in carp farming.

It could be inferred that while 92% of the borrowed funds from institutional agencies were used for aquaculture by the carp farmers, the major portion of the borrowed funds was utilized towards investment purpose

i.e. Pond construction (56.0%), followed by purchase of equipment/machineries (10.0%). Among the items of expenditure, the major proportion of funds were spent towards feed (14.0%) followed by purchase of seed (6.0%), pond preparation (3.0%) and electricity (3.0%). The amount spent towards unintended purposes includes

education of children (4.0%) and repayment of old debts (4.0%). The institutional borrower, utilized most of the borrowed money towards intended purposes and only a small portion of amount was diverted for unintended purposes. This may be due to untimely disbursement of credit and multiple disbursements by banks.

Table. 10. Credit utilization pattern by carp farmers

S. No.	Particulars	Institutional	Non-institutional	Over all
I.	Aquaculture purpose	(%)	(%)	(%)
A.	Investment Purpose			
1	Farm Construction	56.00	42.00	44.00
2.	Equipments/Machineries	10.00	4.00	7.00
B.	Expenditure Purpose			
1	Purchase of chemicals/ Fertilizers	3.00	2.00	2.50
2	Purchase of Seed	6.00	4.00	5.00
3	Purchase of Feed	14.00	8.00	11.00
4	Diesel/Electricity	3.00	5.00	4.00
5	Labor	-	7.00	3.50
	Total	92.00	72.00	81.00
II.	Non-aquaculture purpose			
1	House maintenance	-	10.00	6.00
2.	Children's education	4.00	6.00	5.00
3.	Repaying old debts	4.00	12.00	8.00
	Total	8.00	28.00	19.00

Relationship between characteristics of borrowers and their utilization

The relationship between socio-economic characteristics of respondents and utilization pattern of credit are given in table 11. In order to find out the relationship, simple correlation co-efficients were worked out. Out of eight variables analyzed four variables such as educational status (X_2), occupation (X_3), experience (X_4), income (X_5) and farm size (X_8), had significant and positive relationship with the utilization pattern by carp farmers. Farmers who earned their income only through carp farming had utilized credit properly and

there was no issue of diversion. Those aquaculture farmers, who earned good income, utilized the borrowed loan for intended purposes as they already had sufficient funds for other purposes and hence the diversion was restricted. Farm size was found to have positive and significant relationship with utilization behavior. Such positive and significant relation between farm size and utilization behavior was also reported by (Singh *et al.*, 2001), (Akram, 2008) (Singh, *et al.*, 2005), (Mishra *et al.*, 2006) and (Shivappa, 2005). Occupation (0.387) was positively and significantly related to overall credit use but it was highly significant in institutional credit at

five percent which explains that occupation profile have better institutional credit utilization in relation to non-institutional credit. Experience (0.292*) had positive and

significant relationship with utilization pattern in carp farming and the more experienced farmers were found to utilize more towards the intended purpose.

Table. 11. Correlation between independent variables Vs Credit utilization

S. No.	Independent variable	Institutional	Non-institutional	Over all
1	Age	0.142*	0.036*	0.191**
2	Education	0.328**	0.345**	0.335**
3	Occupation	0.346*	0.405**	0.387**
4	Experience	0.201*	0.344*	0.292*
5	Income	0.066**	0.095**	0.071**
6	Family size	0.167 ^{NS}	0.012 ^{NS}	0.813
7	Family type	0.039 ^{NS}	0.091 ^{NS}	0.562
8	Farm size	0.412**	0.432**	0.421**

* - significant at 5 percent level of probability

** - significance at 10 percent level of probability

NS -Non- Significant

Repayment Pattern of Carp Farmers

Repayment pattern of credit

Repayment pattern refers to whether the borrowers repaid the loan in time or repaid only part of the loan in time, or did not repay at all (Rao and Chowdry, 2005). Table 12 depicts repayment pattern of carp farmers which shows that 56 per cent of the borrowers were prompt repayers and 38 per cent of them were irregular and rest of them (5.0%) were defaulters. The defaulters were only associated with non-institutional credit. No defaulter was observed among carp farmers who availed institutional credit and defaulters were only due to low production and diversification of credit use from intended purpose of farming. The loans given by these informal sources

were mostly crop loans which ought to be repaid after the harvest. The poor recovery by the non-institutional sources was largely due to the exorbitant rate of interest which the borrowers could not afford to pay coupled with the regular personal contact of the money lenders constantly exerting pressure by reminding them about the repayment. The interest rate ranged between 25 to 45 per cent in the study area. They had tie-up with the borrowers to repay the loan in kind, during the time of harvesting which ensured prompt repayment. The repayment pattern of farmers who have taken institutional credit showed that, half of the farmers were regular re-payers of the credit and rests of them were irregular re-payers. The reason for irregular repayment of loan may be due to crop failures, and also because of practice of social evils like drinking and gambling.

Table. 12. Distribution of carp farmers according to repayment pattern of credit

S. No.	Repayment pattern	Institutional (n=40)		Non-institutional (n=40)		Over all (n=80)	
		No.	%	No.	%	No.	%
1.	Regular	24	60.00	21	52.50	45	56.25
2.	Irregular	16	40.00	15	47.50	31	38.75
3.	Defaulter	-	-	4	10.00	4	5.00

Reason for non-repayment of loan by carp farmers

Table 13 reveals that majority (78.26%) of the respondents reported that natural calamities were the

major problem. Heavy floods (78.26%) during the monsoon season followed by high rate of interest (65.56%), increased input cost (52.17%) and low market price (51.63%) were the reasons for non-repayment of loans by carp farmers.

Table. 13. Reasons for non- repayment of loan by carp farmers

S. No.	Reason	No	Total	%	Rank
1.	Natural calamities (Flood)	36	46	78.26	I
2.	High rate of interest	32	46	65.56	II
3.	Increased input cost	24	46	52.17	III
4	Low market price	20	38	51.63	IV

Factors influencing credit repayment

To determine the factors affecting repayment of credit, multiple regression analysis using the four functional forms were tried and results so obtained are presented in Table 14. Among all the 4 functions tried, double-log functional form was chosen on the basis of high value of adjusted R^2 , and expected sign of coefficients. Four out of the six variables in the regression had significant effect on the dependent variables. The amount of loan availed and spent on aquaculture production (X_1) had a positive coefficient of 0.768 and was significant at 5 percent level of significance. The value of coefficients for experience in carp farming with credit (X_5) and level of education (X_6) were significant at 10 percent level of significance and were 0.164 and 0.119 respectively. However, age had a negative coefficient of 0.197 and was significant at 10 percent level of significant. The adjusted R^2 value of 0.732 obtained indicates that about 73% of the observed variation in the amount of loan repaid by the farmers could be attributed to the combined influence of the independent variables included in the regression equation. The implications of the positive and significant explanatory variables are that the larger the loan size, the more money the aqua-farmer has for investment. This might lead to increased possibility of adopting better technology which might enhance the income generating ability of the farmer, and consequently leading to more loans being repaid. Also, the importance of farming experience with credit use is emphasized in the results obtained because more the farming experience with credit use, the more is its ability to generate enough funds to repay aqua-loans. This might arise from better management of funds, thus resulting in increased productivity which in turn leads to higher farm income and high repayment of loans. Literate farmers tend to repay more of the loans obtained than illiterate farmers having understood the advantages of prompt loan repayment. However, the negative but significant age variable implies that, older the borrower, lower is the probability of loan repayment.

Table. 14. Regression results of determinants of credit repayment

Variables	Linear	Double-log	Exponential	Semi-log
Constant	1687.04 (-0.415)	1.093 (0.921)	9.113 (49.13)	189132 (-5.824)
Amount of loan Collected (X ₁)	0.712* (6.521)	0.841* (7.361)	2.92x10 ⁻⁵ * (7.417)	16241.2 (6.103)
Annual net farm income (X ₂)	0.181* (4.512)	0.156 (1.631)	2.905x10 ⁻⁶ ** (1.991)	7578.1* (3.113)
Age of respondents (X ₃)	-151.81 (-1.375)	-0.197** (-1.915)	-2.13x10 ⁻³ (-0.587)	7852.45 (-1.211)
Farm size (X ₄)	341.35 (0.371)	0.111 (0.915)	3.107x10 ⁻² (0.928)	2836.01 (0.907)
Farming experience with use of credit (X ₅)	423.56 (1.261)	0.164** (1.957)	3.659x10 ⁻² * (2.954)	2836.01 (0.662)
Level of education (X ₆)	846.16 (1.125)	0.119** (1.865)	2.65x10 ⁻² (1.091)	3212.87 (1.812)
R ²	0.578	0.761	0.571	0.551
Adjusted R ²	0.661	0.732	0.643	0.630
F- value	22.10*	21.45*	20.62*	15.31*

Source: Based on analysis of survey data.

Note: * Significant at 5% level, ** Significant at 10% level,

Values in parenthesis indicates t- values

Constraints of carp farmers towards credit

Constraints in availing institutional credit

The farmers faced numerous problems in availing institutional credit, as enumerated in table 15. All farmers who availed the loan borrowed from institutional sources reported that getting institutional credit is 'time consuming process. About 90 per cent of the farmers

reported that untimely credit disbursement, banks not being ready to give credit to aquaculture and insufficient credit as the major constraints. About 70 percent of the farmers reported that more number of visits was needed to obtain the loan. Ultimately it affects the regular activities of the farmers and creates negative opinion towards the banks. About 25 per cent of the farmers reported that interest rate was high as compared to agricultural loans. Like other agricultural and allied activities security was not a problem faced by the aqua farmers.

Table. 15. Constraints in availing institutional credit

S. No.	Constraints	No	Total	%	Rank
1.	Time consuming procedure	40	40	100	I
2.	Untimely disbursement of credit	36	40	90.00	II
3	Insufficient credit	36	40	90.00	II
4	Not ready to give loan for Fish farming	36	40	90.00	II
5	More number of visits to get loan	28	40	70.00	III
6	High rate of interest	10	40	25.00	IV

Constraints in availing non-institutional credit

Table 16 showed that 75 percent of the farmers reported that interest rate charged by the non-institutional sources was the major problem faced by the farmers followed by stringent recovery by the money lenders.

Table. 16. Constraints faced by carp farmers in availing non institutional credit

S. No.	Non institutional constraints	No	Total	%
1.	High interest rate	30	40	75.00
2.	Stringent Recovery	20	40	50.0

Reasons for preference of non-institutional credit by carp farmers

Various reasons reported by the farmers for approaching the non-institutional agencies for meeting their deficit requirements which are listed in table 17. The non-institutional loans disbursed at an appropriate time were reported by 90 per cent of the farmers, and 'easy to avail' was reported by 80 percent of the farmers. Lack of formalities, inability to get bank finance and absence of "no transaction costs" were the other reasons reported for the preference to non-institutional loans.

Table. 17. Reasons for preference for non- institutional loans

S. No.	Reasons for preference	No	Total	%	Rank
1	Fulfill the timely requirement	38	40	90.00	I
2	Easy to avail	32	40	80.00	II
3	No formality needed	20	40	50.00	III
4.	Inability to obtain bank finance	20	40	50.00	III
5	No transaction cost	12	40	30.00	IV

Conclusion and recommendations

The results of study revealed that amount of loan collected, age, farming experience with credit use and level of education were the major significant socio-economic factors determining loan repayment in the study area. However, other socio-economic factors which did not have significant influence on loan repayment were gross farm income earned by respondents and cultivated farm size. Based on the results, it can be recommended that disbursement of loans should be directed at young and dynamic farmers who are more likely to adopt new innovations in aquaculture production than their older counter parts. Educational programme should be organized for illiterate farmers in the study area because literate farmers are also likely to adopt new innovations which may enhance their income and thereby positively influence loan repayment. The failure of credit schemes were caused by credit default by their beneficiaries. There

is greater need to reduce or provide solutions to default in aquaculture credit.

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