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THE ROLE OF INSTITUTIONAL CREDIT IN TAMIL NADU'S FISHERIES SECTOR DEVELOPMENT

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ABSTRACT

The study looks at how important borrowing money from banks is for the fishing business in Tamil Nadu to grow. A lot of people in the state make their living from fishing, which is a big part of the business. Banks that are run by the government help sailors and fish farmers by lending them money for short-term needs, to buy things, and to learn how to use new technology. This study asks 384 people in coastal Tamil Nadu how easy it is to get credit, what they do with it, and how that affects income and output growth. We can see that bank credit has helped with growth efforts. Not enough people know about the business, there is too much paperwork, and loans are too small to make it grow. Getting a loan is strongly connected to several things that promote growth. Number-based tests like chi-square, ANOVA, and regression models can show this. Credit is given in a very bad way right now. The study suggests rules changes that will help more people in the fishing line get credit. This study gave us more information about the connection between the government credit systems of coastal countries and the long-term growth of fishing. The fishing business in Tamil Nadu, financial inclusion, seaside growth, country banks, getting more done with less, and loans are some of the things that this piece talks about.

KEYWORDS: institutional credit, the fishing industry in Tamil Nadu, financial inclusion, coastal development, agricultural banking, increasing productivity, and the use of credit.

1. INTRODUCTION

Tamil Nadu's extensive coastline of 1,076 kilometers positions it as a cornerstone of India's marine fishing industry, contributing approximately 18% of the nation's total fish production (Food and Agriculture Organization [FAO], 2020). The sector provides direct employment to over 1.2 million individuals, with millions more dependent on ancillary activities including ocean fishing, freshwater aquaculture, brackish water farming, fish processing, and marketing (National Fisheries Development Board [NFDB], 2021). Despite its economic significance, the industry faces persistent challenges in accessing adequate financial resources, creating a critical barrier to sustainable development and

modernization. Traditional fishing communities in Tamil Nadu have historically relied on informal credit sources, including moneylenders, commission agents, and fish traders (Béné, 2006).

These intermediaries, while providing immediate liquidity, impose exploitative interest rates that perpetuate cycles of indebtedness among vulnerable fishing populations (Kurien, 2005). Research by Subramanian (2009) demonstrates that informal credit in Tamil Nadu's fishing sector often carries interest rates exceeding 36% annually, compared to formal institutional rates of 7-12%. This disparity creates significant wealth extraction from fishing communities, undermining their economic stability and capacity for capital accumulation. In contrast, formal credit sources including commercial banks, cooperative societies, and specialized financial institutions offer substantially lower interest rates and structured repayment schedules (Reserve Bank of India [RBI], 2022). These institutions provide critical financing for capital investment in motor boats, GPS tracking systems, and mechanized fishing gear that enhance fishing efficiency and safety (Salim & Biradar, 2018), aquaculture development including construction of tanks and implementation of modern technologies (Ayyappan & Jena, 2003), processing infrastructure such as cold storage facilities and quality control systems (Kumar et al., 2008), and working capital for daily operational expenses and marketing costs (Sathiadhas & Kanagam, 2000).

The Indian government has implemented several schemes to enhance institutional credit access in the fisheries sector, most notably the Pradhan Mantri Matsya Sampada Yojana (PMMSY), launched in 2020 with an investment of ₹20,050 crores to modernize the sector through enhanced credit availability and infrastructure development (Department of Fisheries, 2020). The Fisheries and Aquaculture Infrastructure Development Fund (FIDF) was established with ₹7,522 crores to bridge critical infrastructure gaps through concessional financing (National Bank for Agriculture and Rural Development [NABARD], 2021), while NABARD refinance schemes provide support to banks and cooperative institutions extending credit to fisheries activities (NABARD, 2019).

Tamil Nadu has complemented these national initiatives with state-specific programs including subsidized loans through the Tamil Nadu Fisheries Development Corporation, insurance premium subsidies, and community-based credit facilitation through fisheries cooperatives (Government of Tamil Nadu, 2021). However, despite these policy interventions, several challenges persist that limit the effectiveness of institutional credit delivery. Formal institutions often perceive fishing activities as high-risk, leading to stringent collateral requirements and credit rationing (Chand et al., 2003). Limited awareness about available schemes among fishing communities and inadequate financial literacy constrain effective utilization (Anon, 2015), while complex documentation requirements, bureaucratic delays, and geographical distance from banking facilities create access barriers, particularly for small-scale fishers (Nayak & Berkes, 2011).

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Variations in program implementation across regions result in uneven credit penetration and benefit distribution (Bavinck et al., 2013). Comprehensive research is therefore essential to understand the functioning and impact of institutional credit in Tamil Nadu's fishing sector, particularly to identify credit constraints and map the spatial and demographic distribution of credit gaps, assess impact on productivity and income through rigorous evaluation methodologies, analyze how various fishing sub-sectors and fisher categories access and utilize credit differently, and inform policy design with evidence-based recommendations for sustainable and inclusive growth. While government initiatives have expanded formal credit access, persistent challenges related to credit rationing, information asymmetries, and implementation gaps require continued research and policy attention to design interventions that effectively support the livelihoods of millions dependent on this vital sector and ensure its long-term economic and environmental sustainability.

2. REVIEW OF LITERATURE

A lot of research has been done on the link between bank loans and the rise in fishing. It shows how difficult it is for social effects, using technology, and having access to cash to all work together. According to Sharma and Kumar (2018), the way loans are given in coastal Karnataka had a big impact on the number of boats that could be automated and the number of fish that could be caught per unit of work. Their study of regression showed that the amount of fish caught each year went up by 7% for every 10% increase in credit access. This shows how important it is to get things done with government money.

Venkatesan and Ravi looked into the fishing business in Kerala in 2019. They found that only 42% of small-scale fishermen used institutional credit, even though there were a lot of joint credit networks. The others kept getting their money from places that were not supposed to have it. The study found that not having enough security, having trouble applying, and having to wait a long time to make credit payments were all big turnoffs. The fact that people in rural places cannot get money fits with what other studies have found. This shows that there are bigger issues at play than just not being able to get loans.

Gopalakrishnan et al. (2020) studied how sailors and shellfish farmers in Tamil Nadu used loans in different ways. Farmers who raised fish for food were better at getting loans and paying them back, according to the study. Farmers who raised fish were able to do this because their rounds of production were more stable and their business risks were lower. The study found that different types of fishing should get different kinds of loans based on how risky they are and how much cash they need.

We can learn a lot about money and fishing if we look at them in the bigger picture. Dey et al. (2017) looked into microfinance programs in Bangladesh's fishing industry and found that small loans worked

better for fishing families' income trends than one-time loans for farming. Flexible payment plans and group loans are very helpful for fishing towns that do not have much else to offer in terms of getting credit. A lot of research has been done on how institutional credit changes the way people use technology. Narayanakumar and Sathiadhas (2016) found that fishers in Tamil Nadu who were given rewards were 38% more likely to use modern fishing gear like echo sounders, tracking systems based on satellites, and engines that use less energy. The study stressed that credit must be combined with job training and social services to help people get the most out of new technology and get more done.

The role of gender in fishing loans is getting more and more attention. In 2021, Rao and Srinivas did a study on how women in Andhra Pradesh sold and packed fish. 60% of the people who worked on chores after the harvest were women, but they only got 15% of the money. The study said that this difference happened because men owned land and women did not know much about money. It also said that different banking rules favour men over women. As you can see, this shows how important it is for the growth of fishing to have age-based loan rules.

A lot of writing on fishing finance has talked about how important joint loan companies are. Pillai (2018) said that fishing unions offer culturally sensitive community-based loan options that private banks cannot offer. On the other hand, Mishra and Panda (2020) found that many cooperative societies have problems with bad money management, bad leadership, and politics that get in the way. The second study looked at what kinds of mixed models might work best. These models combine the advantages of group social capital with the speed of commercial banks.

A new piece of writing looks at how loans, insurance, and climate change afect fishing. Kumar and Viswanathan found in 2022 that sailors with weather-indexed insurance were more likely to be able to borrow money from banks and buy safe, long-lasting fishing tools. They found that borrowers would be less likely to lose their jobs quickly because of climate change and lenders would be less afraid to take risks if they knew they were protected when they lent money.

Adding digital ways to help people get credit is now a new area of study in the field of fishing credit. Senthilkumar et al. (2023) looked into how Tamil Nadu residents who lived near fish farms used their phones for banking. People did not know how to use digital platforms, and it was hard for people in rural coastal areas to connect to the internet. Plus, digital platforms cut down on transaction costs and processing time. The study showed how useful fintech solutions could be for making digital change work for everyone. But it also showed that infrastructure and power issues need to be fixed.

3. RESEARCH GAP

The current study only looks at how people get and use credit over time. It does not look at how credit

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affects growth in other areas, like getting more money, using new tools, and moving up the social and economic ladder. A lot of studies only look at gardening near fresh water or fishing near the coast. They do not think about how different kinds of fishing in the same place might need different amounts of credit. In Tamil Nadu, there are a lot of different types of banks that help fishing groups. More research needs to be done on how well these banks help these groups.

Still, not a lot of real-life data exists about how people in fishing towns use credit. There are specifics about how people choose what to do, how they pay back loans, and whether official and informal credit sources work together or against each other.

4. OBJECTIVES OF THE STUDY

These are the important points of this study:

• To learn what kinds of loans from banks are easy for different kinds of fishermen in Tamil Nadu to get right now.

• To look into how credit is used in different types of fishing, such as catch, grow, process, and sell fishing.

• To find out if getting loans from banks helps fishing businesses make more money. • To find out what makes fishing towns better or worse at getting loans and paying them back.

• To find out how institutional credit affects the ability of fishing families to make money, move up in life, and get along with other people.

• To point is to find out what problems and limits fishermen face when they try to get and use loans from banks.

• To think of ways to improve institutional loan service systems and make it easy for people in Tamil Nadu's fishing industry to get loans.

5. RESEARCH DESIGN

We did both quantitative and qualitative study on the fishing industry in Tamil Nadu to get a full picture of how institutional credit changes over time. There are both detailed and analytical parts to the study style. In this study, data from a single point in time are used to show how credit works now. Data from the past are also used to show how credit use and its effects have changed over time. Anyone who likes fishing is asked to take part in a planned poll so that the quantitative part can get information. This includes things like income levels, social factors, output measures, loan access trends, and usage habits. It took a lot of reading to make the poll tool, and 30 people tried it ahead of time to make sure it was clear, useful, and trustworthy.

There were questions that were both factual and subjective. They asked about loan amounts, interest rates, payback plans, catch counts, and income numbers, among other things. Subjective questions

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asked about trust in the group, happiness, and how far people thought they could go. In the qualitative part, semi-structured interviews were done with community leaders, bank employees, and people from the government's fishing department, among other important people. From these talks, we learn more about how loans are given and where they happen than from numbers alone. People in some fishing towns got together in focus groups to talk about their own experiences, how they meet new people, and what the limits of the community are.

There were also government papers, the Central Marine Fisheries Research Institute (CMFRI), private banks, cooperative groups, and the Department of Fisheries of the Government of Tamil Nadu that were used to find information. It gives us a bigger picture, backs up the main results, and lets us compare them to state and national standards.

Ethics rules were followed during the study. We kept all of the participants' personal and financial information hidden. We also spoke to them in Tamil and English, which they spoke, to make them feel comfortable and make sure they understood what was being said. The data was gathered over the course of six months, from January to June 2025. There were busy and slow fishing seasons, which shows how credit needs and uses change with the seasons.

6. SAMPLING METHOD

Two-stage stratified random sample is used to make sure that all of Tamil Nadu's fishing businesses are looked at in the study. For the sample method to be scientifically sound and work, it had to take into account how places, types of fishing, and users are different.

Stage 1: Selection a district

Thirteen places in Tamil Nadu that are close to the water are good for fishing. Six places were picked because they have a lot of work, a lot of fish, and a lot of different types of fishing.

The names of these districts are Cuddalore, Kanyakumari, Nagapattinam, Ramanathapuram, Thoothukudi, and Chennai. There are about 75% of the state's sea fish that come from each of these places. They have a lot of different ways to fish, towns, and ways to pay.

Stage Two: Organizing by sub-sector

In some areas, the fishing industry was split into four groups: powered boat fishermen, traditional craft fishermen, farmers who raise fish in fresh water, and units that process and sell fish. These groups are set up in this way because loan needs, entry trends, and the impact of growth are very different in each sub-sector. Proper sharing was used to split the data among the groups based on the number of people who lived in each place.

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Step 3: Pick a town or landing area

Random selection was used to choose fishing towns and landing hubs from each area. There was Random selection was used to choose fishing towns and landing hubs from each area. There was a full list of all the fishing towns in each area from the Department of Fisheries. The nth village was picked at random from the starting point. Thus, 24 fishing towns and 12 large landing hubs were chosen and spread out across the six districts.

Step Four: Choose respondents

Random selection was used to choose fishing towns and landing hubs from each area. There was a full list of all the fishing towns in each area from the Department of Fisheries. The nth village was picked at random from the starting point. Thus, 24 fishing towns and 12 large landing hubs were chosen and spread out across the six districts.

7. SAMPLE SIZE

This study only looked at a small part of the population, some changes were made to Cochran's method for figuring out sample size in large groups. This was used:

$$n = (Z^2 \times p \times q) / e^2$$

n is the number of samples that are needed, Z is the standard normal variate at a 95% confidence level (1.96), p is the average number of people in the population who have the trait of interest (0.5 is thought to be the highest possible variability), q is 1 minus p, and e is the level of accuracy that is desired, which is set at 0.05 (5 percent error). The smallest sample size that was needed was found to be 384 answers, based on this value. To make up for people who might not answer or give bad information, the sample size was increased by 10%, to 422 people who did answer. The study only looked at 384 full results because 38 polls had data that was missing or not clear. The 384 people who answered were split into three groups: motorized boat fishermen (152, or 39.6%), traditional craft fishermen (128, or 33.3%), inland aquaculture farmers (68, or 17.7%), and fish processing/marketing units (36, or 9.4%). Each part of Tamil Nadu's fishing business is shown by a different number in this area.

Out of the 384 people who answered, 276 (71.9%) had borrowed money from a bank or credit union in the last five years. Of the other 108 (28.1%), either they had never tried to get college credit or they had been turned down before. This mix makes it easy to compare people who use credit and people who don't. This lets us look into what makes it hard for some groups to get credit and how that changes for others.

With 384 pieces of data, you can do chi-square tests, ANOVA, multiple regression analysis, and logistic regression, among other statistical tests. These tests can also be done because there are enough degrees of freedom and good Type I and Type II mistake rates. After the fact, a power study showed

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that the sample size was good enough to find moderately large effects with 80% power at the 0.05 level of significance.

8. ANALYSIS AND INTERPRETATION

8.1 Descriptive Statistics

Table 1: Sample Distribution by Fishing Sub-sector

Fishing Sub-sector	Number of Respondents	Percentage (%)
Mechanized boat fishermen	152	39.6%
Traditional craft fishermen	128	33.3%
Inland aquaculture farmers	68	17.7%
Fish processing / marketing units	36	9.4%
Total	**384**	**100.0%**

Source: Primary data

The 384 people who answered the survey are a good representation of Tamil Nadu's fishing industry as a whole. Traditional craft fishermen make up 33.3% of the group, while mechanized boat fishermen make up 39.6%. The spread shows how the fishing industry is structured, with powered activities making up the largest part. Smaller but still important parts of the value chain are inland farming and processing and selling.

Table 2: Credit Usage Pattern

Credit Usage Category	Number of Respondents	Percentage (%)
Institutional credit users	276	71.9%
Non-users/Rejected applicants	108	28.1%
Total	**384**	**100.0%**

A big majority (71.9%) of those who answered have used institutional credit at least once in the last five years. This shows that credit is pretty well spread out in the fishing industry. But almost a third of those who answered (28.1%) are still not in the official credit system, either because they have not applied or because they were turned down. This distribution has enough variation to allow comparisons between people who use credit and people who do not use credit.

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Table 3: Demographic Characteristics of Respondents

Characteristic	Mean	Standard Deviation	Range
Age (years)	42.6	11.3	-
Fishing experience (years)	23.4	9.8	5-48

Education Level Distribution

Education Level	Percentage (%)
No formal schooling	22.4%
Primary education	38.5%
Secondary education	28.1%
Higher secondary/College	11.0%

The responders are an experienced group of workers; the average age is 42.6 years, and the average number of years they have been fishing is 23.4. The educational background shows that most people (77.6%) have some kind of formal education, but only 11% have high school or college degrees. The high percentage of people with a basic education (38.5%) shows that reading skills are average. The wide range of fishing experience (5–48 years) shows that there is a mix of seasoned experts and people who are new to the sport.

Table 4: Credit Characteristics and Lending Sources

Credit Parameter	Value
Average loan amount	Rs. 2,84,500 (SD = Rs. 1,76,200)
Loan range	Rs. 25,000 - Rs. 10,00,000
Average interest rate (institutional)	9.2% (SD = 2.1%)
Average interest rate (informal)	36.4%

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Lending Institution Distribution

Lending Institution	Percentage (%)
Commercial banks	48.2%
Regional rural banks	26.1%
Cooperative societies	18.8%
Microfinance institutions	6.9%

The average institutional loan value of Rs. 2,84,500 shows that the sector is not getting a lot of credit. Commercial banks give the most money (48.2%), followed by regional country banks (26.1%). This shows that official banking lines are where most institutional credit comes from. The interest rate charged by institutions is 9.2%, which is a lot less than the 36.4% rate charged by casual loans. This is a savings of about 27 percentage points. The big difference between the two shows that getting credit from a bank is better financially and shows how unfair private credit markets are.

Table 5: Credit Utilization Pattern

Purpose of Credit	Percentage (%)
Productive assets (boats, engines, gear, pond construction)	58.3%
Working capital (fuel, labor, seeds, feed)	24.7%
Marketing and processing infrastructure	12.2%
Household consumption and debt repayment	4.8%

The structure of credit use shows that it is mostly used for useful purposes, with 58.3% spent in productive assets and 24.7% in working capital, making up 83% of all credit use. Putting 12.2% of your money into marketing and processing facilities shows that you are trying to improve the value chain. The small amount (4.8% of the total) that goes to family consumption says that institutional credit is mostly used for activities that make money instead of activities that smooth out consumption, which is good for long-term economic growth.

Table 6: Chi-square Analysis - Credit Access by Fishing Sub-sector

Statistical Parameter	Value
Chi-square statistic (χ^2)	24.67
Degrees of freedom (df)	3
P-value	< 0.001
Significance	Highly significant

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Credit Access Rates by Sub-sector

Fishing Sub-sector	Credit Access Rate
Mechanized boat owners	82.2%
Traditional fishermen	64.1%

The chi-square test shows a very strong link ($p < 0.001$) between the fishing sub-sector and loan access. Traditional fishermen have a much lower rate of access to loans (64.1%) than owners of mechanized boats (82.2%), a gap of 18.1 percentage points. This difference is probably because mechanical companies have more assets and security available, as well as maybe better paperwork and more official business arrangements. Traditional fishermen have a harder time getting institutional credit, which shows that credit markets are not fair and may keep the economic gaps between different types of fishers.

Table 7: Chi-square Analysis - Credit Access by Education Level

Statistical Parameter	Value
Chi-square statistic (χ^2)	18.93
Degrees of freedom (df)	3
P-value	< 0.001
Significance	Highly significant

There is a very strong link between education level and loan access ($p < 0.001$). Higher levels of education are linked to easier access to credit. This is probably because people with more education can better record their information, understand official processes better, and be more familiar with the lending company. Borrowers who have more education may be better at dealing with red tape and knowing loan terms. This result shows that education is a key factor in determining financial inclusion. It also says that programs that teach people about money could make it easier for fishermen with less education to get loans.

Table 8: ANOVA - Annual Income by Credit Usage Status

Statistical Parameter	Value
F-statistic	42.18
Degrees of freedom	3, 380
P-value	< 0.001
Significance	Highly significant

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Mean Annual Income Comparison

Credit Usage Category	Mean Annual Income
Credit users	Rs. 3,86,400
Non-users	Rs. 2,24,800
Income difference	Rs. 1,61,600 (71.9% higher)

The ANOVA results show that there are very big changes in income between the types of credit use ($p < 0.001$). Credit users make a lot more money (Rs. 3,86,400) than people who do not use credit (Rs. 2,24,800), which is a 71.9% income premium. Post-hoc tests show that users who invest in useful assets make more money than those who mostly use credit for working capital. Based on this gradient, it looks like long-term investments in capital produce higher economic returns than short-term practical financing. The results back up the idea that having access to institutional loans is strongly linked to better economic outcomes, but to prove correlation, we need to carefully look at selection effects.

Table 9: Multiple Regression Analysis - Determinants of Annual Fish Production

Model Statistics	Value
R^2	0.687
Adjusted R^2	0.679
F-statistic	84.32
P-value	< 0.001
Model significance	Highly significant

Regression Coefficients

Predictor Variable	Standardized Beta (β)	P-value	Significance
Credit amount	0.412	< 0.001	***
Vessel mechanization	0.298	< 0.001	***
Fishing experience	0.234	< 0.01	**
Technology adoption rate	0.186	< 0.05	*

*Significance codes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$*

The regression model explains 68.7% of the variation in yearly fish production (modified $R^2 = 0.679$), which means it is very good at making predictions. The amount of credit is the most important indicator ($\beta = 0.412$), explaining 41.2% of the variation in production by itself. This main result is strong proof that institutional credit directly raises the ability to produce. The next most important

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factor is the mechanization of the vessel (β = 0.298), then fishing experience (² = 0.234), and finally the use of technology (² = 0.186). Access to money and new technology are more important for increasing production, even though standard factors like knowledge are still important. These results show that bank credit is an important part of growth in the fishing industry.

Table 10: Logistic Regression Analysis - Determinants of Credit Access

Model Statistics	**Value**
Chi-square statistic (χ^2)	128.47
Degrees of freedom (df)	8
P-value	< 0.001
Nagelkerke R^2	0.542
Classification accuracy	78.6%

Predictor Variables and Odds Ratios

Predictor Variable	**Odds Ratio (OR)**	**P-value**	**Significance**	**Interpretation**
Awareness of credit schemes	4.21	< 0.001	***	321% higher odds
Land ownership	3.67	< 0.001	***	267% higher odds
Cooperative membership	2.89	< 0.01	**	189% higher odds
Education level	2.14	< 0.01	**	114% higher odds
Distance to bank	0.73	< 0.05	*	27% lower odds per unit

*Significance codes: *** p < 0.001, ** p < 0.01, * p < 0.05*

The logistic regression model has a good fit (Nagelkerke R^2 = 0.542) and classification accuracy (78.6%), which means it can find the main things that make it hard to get credit and things that make it easier to get credit. The best indicator (OR = 4.21) is knowing about credit schemes. This means that fishers who know about these schemes are more than four times more likely to get credit. This

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makes it clear how important it is to share knowledge and teach people about money. It is much easier to get credit when you own land (OR = 3.67) or belong to a cooperative (OR = 2.89) because they provide security and institutional ties, respectively. Having more education (OR = 2.14) makes it twice as likely that you can get credit. The distance to the bank (OR = 0.73) is a barrier; for every unit increase in distance, the odds drop by 27%. The results show that getting credit depends on a lot of things, including the availability of knowledge, the ownership of assets, the connections between institutions, the amount of human capital available, and how easy it is to get to.

Table 11: Correlation Analysis - Credit Access and Development Indicators

Development Indicator	Correlation (r)	P-value	Relationship
Household asset index	0.624	< 0.001	Strong positive
Housing quality	0.531	< 0.001	Moderate positive
Children's education expenditure	0.487	< 0.001	Moderate positive
Savings accumulation	0.412	< 0.01	Moderate positive

All of the relationships are positive and statistically significant, showing that getting credit is linked to overall social growth. The best link is with the buildup of family assets (r = 0.624), which suggests that credit helps people build wealth in ways other than making direct investments in useful activities. Moderately positive associations with home quality (r = 0.531), spending on children's schooling (r = 0.487), and savings (r = 0.412) show that institutional credit has effects other than increasing production. Investing in children's schooling shows that people can move up in the family, and saving money shows that people are more financially stable. Because they affect many areas, these effects show that institutional credit is a driver for overall social growth, not just making money.

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Table 12: Constraint Analysis - Barriers to Credit Access *(Garrett's Ranking Method)*

Constraint	Mean Garrett Score	Rank
Inadequate credit limits relative to investment needs	72.4	1
Complex documentation requirements	68.9	2
Delays in loan processing and disbursement	64.2	3
Lack of awareness about credit schemes	61.7	4
Collateral requirements excluding asset-poor fishermen	58.3	5

Garrett's ranking shows that the biggest problem is that credit limits are too low (mean score = 72.4). This means that loan amounts are too low to meet the real investment needs of modern fishing businesses. Second place goes to complicated paperwork (68.9), which shows that government hurdles hurt less-educated fishers more than others. Processing delays (64.2) cost money and time and make things less certain. Potential users do not even try to get credit because they are not aware of it (61.7). Even though collateral rules (58.3) are only ranked fifth, they are a major obstacle for traditional fishers who do not have much property. Getting around these problems will take policy changes like higher credit amounts, easier processes, faster handling, a lot of marketing, and different ways to use security.

Table 13: Repayment Difficulties among Credit Users *(Constraint Analysis)*

Repayment Challenge	Mean Garrett Score	Rank
Income instability from seasonal variation and adverse weather	69.8	1
High operational costs (fuel, labor) reducing margins	65.4	2
Market price fluctuations affecting revenue predictability	62.1	3
Overlapping repayment schedules from multiple lenders	56.8	4

Income instability (69.8) is the main problem with payback, which is because fishing jobs are unstable because of regular trends, changing weather, and not knowing what you will catch. High running costs (65.4%) cut into profit margins, making it harder to pay off debt. Price changes in the market (62.1) make it hard to plan your finances because you cannot be sure of your income. Having payback

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obligations that overlap (56.8) could mean that you have too much debt from taking money more than once. These results show that strict loan payback plans do not work well with the unpredictable, seasonal income that comes from fishing. For credit programs in the sector to last, they need flexible ways for people to pay back loans that work with crop cycles and income patterns.

Table 14: Propensity Score Matching (PSM) - Impact of Credit Access

Outcome Variable	Treatment Effect (% Increase)	Statistical Significance
Fish production	+42.6%	Significant
Income	+38.4%	Significant
Asset accumulation	+31.2%	Significant

Matching method: Nearest neighbor with caliper width = 0.01
Comparison: Credit users vs. matched non-users

Controls for selection bias

To get rid of selection bias, Propensity Score Matching compares people who use credit with people who do not use credit who are similar to them. This gives more accurate estimates of causes than simple relationships. The results show that the treatment had a big good impact on all outcomes. Having access to credit boosts income by 38.4%, asset buildup by 31.2%, and fish output by 42.6%. These numbers are important from an economic point of view because they show that institutional credit leads to real productivity gains, not just correlational links. The PSM method improves cause reasoning by making sure that comparisons are made between people who are mostly the same but have different access to credit. The good benefits that are seen across many aspects show that institutional credit has a positive effect on growth.

Table 15: Pre-Post Comparison - Changes among Recent Borrowers *(N = 164)*

Outcome Indicator	Mean Increase	P-value
Productivity	34.8%	< 0.01
Income	29.6%	< 0.01
Technology adoption score (10-point scale)	+2.4 points	< 0.001

*Significance codes: *** $p < 0.001$, ** $p < 0.01$*

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The pre-post study looks at how the same 164 borrowers changed before and after getting credit. This shows how credit affected the same people. The fact that output went up by 34.8%, income went up by 29.6%, and technology usage went up by 2.4 points shows that credit access leads to real good changes. The rise in the use of new technologies shows that credit helps fishing get better gear and start using new methods. When you put these results together with the PSM results, they show that institutional credit really does have positive effects on growth. It is easier to believe that credit leads to industry growth because the results are the same when comparing two different methods (between-group PSM comparison and within-group pre-post analysis).

MAJOR FINDINGS

A lot of different types of statistics were used, including descriptive statistics, chi-square tests, ANOVA, multiple regression, logistic regression, correlation analysis, constraint ranking, PSM, and pre-post comparison. The results showed a few main things:

1. Access to Credit: 71.9% of fishermen get loans from banks, but there are big differences between sub-sector and school level.
2. Effects on Credit: It is clear that institutional lending raises production (34.8–42.6%), income (29.6-38.4%), and assets (31.2%).
3. Key Things That Determine Access: Awareness (OR=4.21), owning land (OR=3.67), joining a group (OR=2.89), and getting an education (OR=2.14) are all very important.
4. Big Problems: Not enough credit amounts, complicated paperwork, handling delays, not enough knowledge, and the need for security.
5. More expansive growth: Access to credit is linked to better living, better schooling for children, and savings, which shows that credit has multiple effects.
6. Problems with Repayment: Unstable income and high operating costs make it hard to pay back debt, so flexible payback options are needed.

Using three different types of data from different types of analysis gives strong support for the role of institutional credit in the growth of fishing. It also shows what kinds of policy changes are needed to make credit easier to get and work better.

CONCLUSION

This in-depth look at how institutional credit works in the fishing industry of Tamil Nadu paints a picture of chances and problems that are hard to understand. There is strong evidence that giving fishing groups access to government loans makes them more productive, helps them make more money, gets them used to new technologies, and makes their social life better in general. A lot of people in fishing areas still can not get loans because the paper work is too hard, the credit limits are too low, the process takes too long, and insurance is needed. One group that really feels this is small-

scale native fishermen and women who work after the crop. Most loans are given out by commercial banks. This is good for keeping money in check, but it does not always work for fishing companies because of their unique risk profiles and cash flow patterns.

Different loan rates in different fishing areas show how important it is to have financial products that are made to fit your needs. Traditional fishermen are still on the outside, even though they make up a big part of the workforce. Seasonal payment plans, weather-based insurance links, and group loan choices that make it easier for people to put up protection should all be part of these goods. Second, there needs to be a lot of work done to improve people's knowledge and programs that teach people about money. This will fill in the gaps in knowledge and give fishing communities the tools they need to use government credit systems effectively. Third, making cooperative credit institutions stronger through better management, new technology, and training staff can help them offer credit solutions that are sensitive to different cultures while still making money.

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