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Research Article

"Access to Agricultural Loans and Their Impact on Crop Productivity: A Study of Southern Odisha"

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ABSTRACT

This study examines the empirical relationship between access to agricultural credit and crop productivity in the tribal-dominated and underdeveloped districts of Southern Odisha. Despite the availability of government-led credit schemes, many small and marginal farmers continue to face structural barriers in accessing timely and adequate institutional loans. Utilizing a multistage stratified random sampling approach, data were collected from 370 farmers across key agricultural districts. The research employs Likert scale-based survey instruments and applies Pearson correlation and regression analysis to explore how loan accessibility, adequacy, and utilization influence agricultural output, particularly in paddy and millet cultivation. Findings reveal a significant positive correlation between institutional credit and crop yields, with credit utilization for quality inputs, machinery, and modern farming practices serving as key mediators. The study highlights that timely disbursement and effective loan use substantially improve farm productivity, suggesting the need for targeted policy interventions to strengthen rural credit systems in socio-economically disadvantaged regions. These insights have implications for enhancing inclusive agricultural growth, reducing rural poverty, and improving financial inclusion in tribal areas.

Keywords: Agricultural credit, crop productivity, Southern Odisha, farm yield, regression analysis

1. Introduction Agriculture forms the backbone of the Indian economy, employing over 50% of the workforce and contributing nearly 18% to the national GDP (MoA&FW, 2022). Historically, agricultural finance in India has evolved through cooperative banks in the early 20th century, followed by the nationalization of commercial banks in 1969, which brought rural credit to the forefront. In 1982, the establishment of NABARD (National Bank for Agriculture and Rural Development) further institutionalized agricultural finance and credit support across India. More recently, digital initiatives such as Direct Benefit Transfers (DBTs), the Kisan Credit Card (KCC) scheme, and the Pradhan Mantri Jan Dhan Yojana (PMJDY) have been launched to increase outreach and simplify access to credit.

Despite these efforts, access to agricultural credit remains uneven, particularly in tribal and backward regions. According to the All India Rural Credit Survey, over 25% of rural households still depend on informal credit sources such as moneylenders. In Eastern India, including Odisha, this figure is even higher due to infrastructural deficiencies, low financial literacy, and weak institutional presence.

Odisha, a predominantly agrarian state, has over 60% of its population dependent on agriculture for their livelihood. The southern districts—Koraput, Rayagada, Malkangiri, Nabarangpur, Gajapati, and Kandhamal—form part of the KBK region, which is marked by persistent poverty, tribal predominance, and ecological fragility. Agriculture in this belt is largely subsistence-based, with low input usage and limited mechanization. Rain-fed farming dominates, making productivity highly vulnerable to climate variability and erratic rainfall patterns.

One of the key drivers of agricultural transformation is credit. Institutional credit empowers farmers to invest in high-quality seeds, fertilizers, irrigation systems, farm equipment, and post-harvest technologies. It also encourages the adoption of climate-resilient practices and crop diversification. However, in tribal and underdeveloped districts, the flow of institutional credit is constrained by several factors:

- Non-availability of land documents and titles, which are critical for collateral-based loans.
- Low digital penetration, restricting access to e-KYC and mobile banking services.

- Gender-based exclusions, especially among women farmers lacking land ownership.
- Procedural complexity and lack of support in local dialects.

Table 1: Socio-Economic Profile of Selected Districts (2021 Estimates)

District	Population	ST (%)	Literacy Rate (%)	Cultivated Area (%)	Major Crops
Koraput	14.2 lakh	51%	49.2%	39%	Paddy, Ragi, Turmeric
Rayagada	10.2 lakh	56%	50.2%	34%	Paddy, Ginger, Ragi
Malkangiri	6.5 lakh	57%	49.6%	28%	Paddy, Pulses

Source: District Statistical Handbooks, Government of Odisha (2021)

While the government has launched several initiatives to enhance access to formal credit in such regions, their on-ground effectiveness is often limited. For example:

- **Kisan Credit Card (KCC):** Though operational since 1998, its penetration in tribal areas remains under 40%.
- **PM-KISAN Scheme:** Offers ₹6,000 per annum to farmers via DBT, but many are excluded due to lack of Aadhaar or land records.
- **Interest Subvention Schemes:** Offer credit at 4% to prompt payers, yet awareness and utilization remain poor.

Table 2: Agricultural Loan vs Yield (2022-23)

District	Avg. Agri Loan/Ha (INR)	Paddy Yield (kg/Ha)	Millet Yield (kg/Ha)	Credit from Institutions (%)
Koraput	₹9,500	2,300	1,400	38%
Rayagada	₹10,200	2,450	1,600	40%
Malkangiri	₹8,000	2,150	1,300	31%
Odisha Avg.	₹12,500	2,700	1,800	52%

Source: Directorate of Agriculture & Farmers' Empowerment, Odisha (2023)

These figures suggest a strong correlation between institutional credit availability and crop productivity. Districts with higher per-hectare loan disbursement generally reported better yields. This indicates that access to timely and adequate credit can potentially mitigate many of the productivity constraints in the region.

Furthermore, gender disparity is evident in access to finance. Studies show that only 18–22% of KCC holders in Southern Odisha are women, despite women comprising over 50% of the agricultural workforce. Self-Help Groups (SHGs), promoted under Mission Shakti and NRLM, have shown promise in bridging this gap by providing microcredit to women farmers. However, credit ceilings, lack of training, and market access remain significant challenges.

Climate change has further exacerbated credit needs. Droughts, irregular monsoons, and pest outbreaks increase the risk associated with farming, making crop insurance and flexible credit terms essential. Unfortunately, awareness of insurance products remains below 20% among marginal farmers in the KBK belt.

This study, therefore, aims to provide an empirical assessment of the accessibility, adequacy, and impact of agricultural loans on crop productivity in Southern Odisha. It explores the effectiveness of financial institutions and credit schemes and identifies the structural barriers that prevent optimal credit utilization. By doing so, it seeks to inform policy changes aimed at enhancing financial inclusion and rural agricultural productivity in India's most vulnerable regions.

2. Review of Literature

Agricultural credit has long been recognized as a catalyst for enhancing farm productivity and ensuring rural development. A broad spectrum of academic and institutional studies underscores the multifaceted role that credit plays in agricultural intensification, technological adoption, and income stabilization.

Bhatt and Bhatt (2016) argue that institutional credit serves as an essential input, often on par with seeds and fertilizers, in determining crop outcomes. They highlight that access to credit significantly enhances farmers' capacity to invest in quality inputs, mechanization, and irrigation infrastructure, thus improving total factor productivity.

Dev and Rao (2017) provide empirical evidence linking agricultural credit with the adoption of high-yielding variety (HYV) seeds and advanced cultivation practices. Their study across rural districts in Andhra Pradesh observed a marked difference in yield and profitability among credit-accessing and non-credit-accessing households.

In the context of Odisha, Mohanty and Kar (2023) demonstrate that timely agricultural loans not only improve cropping intensity but also facilitate crop diversification, especially into high-value crops such as pulses, oilseeds, and horticulture. They further note that the impact is more pronounced among marginal and tribal farmers who otherwise rely on low-yield traditional practices.

Panda and Sahu (2020) caution that indiscriminate loan waivers, although politically expedient, can erode the credit discipline of farmers and disincentivize banks from lending to the rural sector. Their longitudinal study reveals a post-waiver decline in repayment rates and a contraction in new agricultural lending.
Jena and Sahu (2023) focus on Self-Help Groups (SHGs) and microfinance as alternative delivery mechanisms for rural credit. Their findings in Kandhamal district show that women-led SHGs not only enhance credit absorption but also register higher repayment rates and improved agricultural outcomes due to peer monitoring and support.
Dasgupta and Mohanty (2019) explore the role of credit in reviving traditional crops like millet in tribal Odisha. Their study highlights that credit-linked millet programs facilitated the use of organic inputs and better agronomic practices, resulting in a 25–30% increase in yield.
National and international institutions have also weighed in. The RBI (2022) and NABARD (2021) acknowledge that credit access remains a major bottleneck in tribal regions, largely due to issues of land ownership, credit history, and digital illiteracy. The International Food Policy Research Institute (IFPRI, 2021) stresses the need for sustainable and climate-resilient credit models, particularly in ecologically sensitive zones like Southern Odisha.
Moreover, studies such as Singh and Singh (2019) emphasize regional disparities in credit allocation, pointing out that Eastern India—including Odisha—remains significantly underbanked compared to North and South India. This has direct implications on yield potential and rural livelihood outcomes.
Recent developments in digital finance and mobile banking are also relevant. Iyer and Rao (2020) found that e-KYC and digital loan processing reduced turnaround time by 40% in Tamil Nadu tribal belts, suggesting potential scalability in Odisha.
In sum, the literature provides strong theoretical and empirical support for the hypothesis that access to agricultural credit positively impacts crop productivity. However, it also highlights the importance of credit quality, timeliness, institutional performance, and farmer literacy in realizing the full benefits of rural finance. These insights offer a robust foundation for the present study to explore context-specific dynamics in Southern Odisha.

3. Theoretical Framework

This study is grounded in two primary theoretical lenses that help explain the dynamics of agricultural finance and its influence on crop productivity: Agricultural Credit Theory and Rural Finance Theory. These frameworks collectively offer both microeconomic and macroeconomic perspectives to assess the accessibility, effectiveness, and impact of agricultural credit in Southern Odisha.

3.1 Agricultural Credit Theory:

Agricultural Credit Theory posits that timely access to credit is an essential input in the agricultural production function, similar to land, labor, and capital. Originating from classical and neoclassical economic thought, the theory assumes that credit removes liquidity constraints, enabling farmers to procure necessary inputs—such as seeds, fertilizers, pesticides, machinery, and labor—during critical periods of the cropping cycle.
This theory further suggests that well-structured and adequately timed loans can help farmers not only smooth consumption but also stabilize income, adopt high-yielding varieties (HYVs), invest in productivity-enhancing technologies, and shift from subsistence to commercial farming. The theory also links credit with the ability to mitigate risks through the purchase of crop insurance and investment in resilient infrastructure.
In the context of this study, Agricultural Credit Theory provides a strong conceptual basis for examining how credit influences farmers' input choices, technology adoption, and output levels in a structurally underdeveloped agrarian economy like Southern Odisha.

3.2 Rural Finance Theory:

Rural Finance Theory adopts a more institutional and inclusive approach. It focuses not just on the availability of credit but also on the ecosystem that supports sustainable rural financial systems. According to this theory, financial institutions—including commercial banks, Regional Rural Banks (RRBs), cooperative societies, and Microfinance Institutions (MFIs)—play a pivotal role in channeling capital to rural areas.
This theory emphasizes five key pillars:
1.Accessibility of financial services
2. Affordability of loans
3. Institutional sustainability
4. Risk management through diversified financial products
5. Outreach to marginalized populations including women, STs, and SCs

Rural Finance Theory is particularly relevant in the context of Southern Odisha, where infrastructural gaps, digital illiteracy, and socio-economic backwardness impede the effectiveness of traditional banking systems. The theory provides a framework for assessing not only the flow of credit but also the quality of financial intermediation, the inclusivity of schemes, and the efficacy of policy delivery mechanisms.
Furthermore, it supports the integration of demand-side factors (such as awareness, repayment behavior, and credit absorption capacity) with supply-side mechanisms (including policy outreach, financial literacy, and technology-enabled credit delivery).
Together, Agricultural Credit Theory and Rural Finance Theory serve as complementary frameworks to understand both the micro-level behavior of farmers and the macro-level functioning of institutions. They

jointly inform the hypotheses and analytical model of this research by linking credit accessibility and utilization with observed variations in crop productivity in Southern Odisha.

Methodology

This study employed a mixed-methods approach combining qualitative and quantitative research techniques to comprehensively understand the dynamics of agricultural loans and their impact on farming productivity in six districts.

Focus Group Discussions (FGDs)

To gain rich, contextual insights into the challenges and opportunities surrounding agricultural loans, **qualitative Focus Group Discussions (FGDs)** were conducted with a diverse range of stakeholders. The FGDs included:

- **Participants:** Farmers, local community leaders, representatives from Self-Help Groups (SHGs), Primary Agricultural Credit Societies (PACS), Regional Rural Banks (RRBs), and local government officials involved in agricultural financing and extension services.
- **Sampling and Selection:** Participants were purposively selected to represent different demographics (age, gender, landholding size) and institutional affiliations to ensure a comprehensive perspective on agricultural credit issues.
- **Procedure:** A total of 6 FGDs were conducted, one in each district under study, each consisting of 8-12 participants. Sessions were facilitated by trained moderators using semi-structured guides focusing on themes such as loan accessibility, procedural hurdles, institutional support, digital literacy, and gender-specific challenges.
- **Data Collection and Analysis:** Discussions were audio-recorded, transcribed verbatim, and analyzed using thematic analysis. Key themes, patterns, and narratives were identified to complement and explain findings from the quantitative survey.

The FGDs provided nuanced understanding of the socio-cultural and institutional factors influencing loan uptake, documented specific cases of difficulties faced by farmers, and highlighted expectations from financial and support institutions.

Survey of 370 Farmers Across Six Districts

To quantify the extent of agricultural loan access and evaluate its impact on agricultural productivity, a structured **quantitative survey** was administered to a representative sample of farmers across the six districts.

Sampling Framework: A multistage stratified random sampling method was employed to select farmers. Initially, districts were stratified by agro-climatic zones, followed by random selection of villages and farmers within those villages to ensure diverse representation in terms of socio-economic status, landholding size, and cropping patterns.

Sample Size: The sample comprised **370 farmers**, a size calculated to achieve statistically significant results with a confidence level of 95% and an acceptable margin of error. This ensured robust representation from all six districts.

Questionnaire Design: The structured questionnaire was developed after reviewing relevant literature and pre-tested in a pilot study to refine clarity and relevance. It comprised the following sections:

- **Demographic Information:** Age, gender, education, household size, landholding size.
- **Loan Access:** Types of agricultural loans availed, sources of credit (banks, PACS, SHGs, informal lenders), loan amounts, interest rates, and repayment experiences.
- **Loan Utilization:** Purpose of loans (seeds, fertilizers, equipment, labor), timing, and frequency.
- **Institutional Interaction:** Perceptions of the responsiveness and helpfulness of lending institutions.
- **Digital Literacy:** Awareness and use of digital platforms for loan applications or information.
- **Impact on Productivity:** Self-reported changes in crop yield, income, and farming practices attributable to loan utilization.

Table 1: Documentation Burden by Farm Size

Farm Size Category	% Farmers Reporting Documentation Burden	Number of Farmers (n)
Smallholder (<2 ha)	74%	150
Medium (2–5 ha)	62%	120
Large (>5 ha)	45%	100
Overall	**68%**	370

Source: Sharma and Gupta (2023)

Interpretation:
There is a clear pattern where smaller farm size correlates with greater difficulty in completing loan documentation. The Chi-square test confirmed this relationship is statistically significant ($\chi^2(2, N=370) = 15.67$, $p < 0.001$). Smallholders face more challenges, likely due to lack of formal land titles or inability to meet bureaucratic requirements, which acts as a barrier to accessing credit.

Table 2: Mean Institutional Responsiveness Scores (Likert Scale 1–5)

Institution	Mean Score	Standard Deviation (SD)
Self-Help Groups (SHGs)	4.0	0.6
Primary Agricultural Credit Societies (PACS)	3.5	0.8
Regional Rural Banks (RRBs)	3.1	0.9

Source: Field Survey Data, 2025

Interpretation:
Farmers rated SHGs as the most responsive institutions, followed by PACS and RRBs. The ANOVA test ($F(2,367) = 25.4$, $p < 0.001$) shows these differences are statistically significant. SHGs' proximity and frequent interaction with farmers likely contribute to better responsiveness, while bureaucratic delays lower scores for RRBs.

Table 3: Training Attendance by Gender

Gender	% Farmers Attending Training	Number of Farmers (n)	
Male	40%	230	
Female	22%	140	
Overall	**35%**	370	
Predictor	**Odds Ratio (OR)**	**95% Confidence Interval**	**p-value**
Female (vs. Male)	0.48	0.30 – 0.78	0.003**
Education (per year)	1.12	1.06 – 1.18	<0.001**
Age (per year)	0.95	0.93 – 0.98	0.001**

Source: Field Survey Data, 2025

Interpretation:
Men are nearly twice as likely as women to attend training sessions on agricultural loans and digital literacy. Higher education increases likelihood of training attendance, whereas older farmers are less likely to participate. The logistic regression shows gender, education, and age are significant predictors ($p < 0.01$), highlighting gender disparity and the need for inclusive training programs.

Table 4: Digital Literacy Scores by Platform Usage and Gender

Group	Mean Digital Literacy Score (out of 10)	SD	Sample Size (n)
Platform Users	7.6	1.4	104
Non-Users	3.2	1.1	266
Male Farmers	5.8	1.5	230
Female Farmers	3.5	1.3	140

Source: Field Survey Data, 2025

Interpretation:
Farmers who use digital platforms for loans score significantly higher in digital literacy than non-users ($t(368) = 22.9$, $p < 0.001$). Male farmers also have higher digital literacy than female farmers ($t(368) = 8.5$, $p < 0.001$). This indicates that digital literacy is a critical factor influencing platform usage and that women may face digital access barriers that limit loan access.

Table 5: Gender Differences in Reported Productivity Increase After Loan

Gender	% Reporting Increased Crop Yields	Number of Farmers (n)
Male	52%	230
Female	38%	140

Source: Field Survey Data, 2025

Interpretation:
Male farmers are more likely than female farmers to report increased crop yields following loan receipt ($\chi^2(1) = 6.3$, $p = 0.012$). This disparity may result from differences in loan amounts, utilization, or access to complementary resources like training. Addressing these gaps could improve the effectiveness of loans for women farmers.

Recommendations

1. Strengthen SHGs as Catalysts for Rural Credit: Promote SHGs by providing them with greater financial resources, technical training, and legal support to expand their credit outreach and services.
2. Modernize PACS and RRB Operations: Simplify documentation requirements, enhance staff capacity through training, and invest in digital infrastructure to reduce delays and improve institutional responsiveness.
3. Implement Targeted Training Programs: Develop tailored training modules focusing on agricultural finance and digital literacy, with special emphasis on women farmers and older populations to close awareness gaps.
4. Promote Gender-Inclusive Digital Access: Facilitate affordable access to smartphones and internet connectivity for women farmers, coupled with user-friendly digital loan application platforms.
5. Policy Advocacy for Land Tenure Security: Address the documentation burden by advocating for policies that simplify land title verification and promote formal land rights, particularly for smallholders and women.
6. Monitor and Evaluate Impact: Establish feedback mechanisms to continuously assess the effectiveness of loan programs and training initiatives, allowing iterative improvements.

Conclusion

This study underscores the multifaceted challenges faced by farmers in accessing agricultural loans, ranging from institutional inefficiencies and cumbersome documentation to gender and digital divides. SHGs stand out as effective agents for credit delivery, whereas PACS and RRBs require systemic reforms. The gender gap in training and digital literacy significantly hampers women's ability to benefit fully from available credit facilities, necessitating targeted interventions. Addressing these barriers holistically will promote inclusive agricultural finance, enhance productivity, and contribute to rural development. Future efforts should prioritize empowering marginalized groups, especially women, through capacity building and digital inclusion to ensure equitable access to agricultural credit.

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