

# FINANCIAL INCLUSION AS A CATALYST FOR ENHANCING THE AGRICULTURAL PRODUCTIVITY IN RURAL ODISHA

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## Abstract

Financial inclusion provides a crucial role to maximize agricultural productivity and fostering economic progress in rural economies, particularly in regions like rural Odisha. Availability of economic services, including credit facility, insurance, savings, along with digital payment systems, empowers farmers to promote modern farming techniques, procure quality inputs and adopt innovative farming technologies. These advancements improve crop yields, reduce production risks, optimize time management, and ultimately increase farmers' income levels. Furthermore, financial inclusion strengthens rural farmers' market access through digital platforms, promoting agribusiness entrepreneurship and creating robust agricultural value chains that drive rural development.

However, significant obstacles such as inadequate infrastructure, limited financial literacy, and low adoption rates of financial products remain prevalent in rural Odisha. Objectives of this study are investigating the relationship between FI and agricultural productivity, investigating its benefaction to rural commercial evaluation and resilience. Data has been collected from the 230 participants of rural region, including farmers, financial service providers, and stakeholders involved in rural development. The analysis was conducted using Smart PLS 4 software, enabling robust assessment of the structural relationships between FI and agricultural productivity. The findings emphasize the transformative potential of FI in addressing rural agricultural challenges, achieving food security, and building economic resilience in rural Odisha.

**Key words:** Financial inclusion, agricultural productivity, irrigation facility, financial awareness and literacy. Bardhan, P. (1989). *The Economic Theory of Agrarian Institutions*. Clarendon Press.

Smith, A. (1776). *The Wealth of Nations*. W. Strahan and T. Cadell.

Marshall, A. (1890). *Principles of Economics*. Macmillan.

# 1. Introduction

Financial inclusion (FI) plays a crucial role in addressing the capital constraints faced by farmers in rural Odisha, significantly influencing agrarian relations, tenancy practices, and agricultural productivity. Limited access to formal credit institutions often compels farmers to rely on informal credit sources, leading to exploitative interlinked transactions involving land, labor, credit, and product markets. These imperfect market structures not only perpetuate inequality but also hinder investments in modern agricultural techniques and inputs, ultimately limiting productivity and income growth.

Credit market imperfections in rural areas create dependency relationships, where farmers enter interlinked tenancy contracts to secure financial resources. These contracts, often characterized by sharecropping and cost-sharing arrangements, are inherently inefficient compared to fixed rent tenancy systems. While sharecropping allows resource-poor farmers to access land and credit, it frequently results in suboptimal resource utilization and lower productivity. Classical economists like Smith (1776) and Marshall (1890) have long argued that fixed rent tenancy systems exhibit higher efficiency levels compared to sharecropping arrangements. Access to formal credit through financial inclusion initiatives empowers farmers to transition towards fixed rent tenancy, enabling better planning, higher investments in quality seeds, fertilizers, and irrigation systems, and ultimately improving agricultural productivity (Bardhan, 1989).

In the context of Odisha, financial inclusion facilitates access to institutional credit, insurance products, savings mechanisms, and digital payment systems. These services provide farmers with the financial flexibility needed to adopt modern farming practices, invest in mechanization, and optimize cropping patterns and irrigation intensity. Additionally, FI impacts agrarian institutions by reducing dependency on informal credit channels, thereby restructuring traditional tenancy relationships. Initiatives such as Operation Barga in West Bengal have demonstrated how institutional reforms, backed by access to credit, can empower tenant farmers, improve land productivity, and create resilient agricultural systems.

Furthermore, FI enhances entrepreneurship in agribusiness by providing access to capital for setting up agro-processing units, improving market linkages, and enabling participation in agricultural value chains. Digital financial platforms bridge the gap between rural farmers and markets, fostering transparency and reducing transaction costs. These advancements contribute to a more inclusive agrarian economy.

The genesis and evolution of rural credit markets in Odisha must be critically analyzed to address the persistent gaps in financial accessibility. Policymakers must prioritize expanding institutional credit networks, enhancing financial literacy, and improving rural infrastructure to strengthen financial inclusion initiatives. By doing so, FI can act as a transformative force, fostering agricultural productivity, promoting entrepreneurial activities, and ultimately driving rural economic resilience in Odisha.

## 2. Literature Review

**Laha, A., & Kuri, P. K. (2013)** explores the relationship between financial inclusion and agricultural productivity in rural West Bengal. It highlights through which improve the financial access to enhances farmers' capacity to invest in quality seeds, fertilizers, and modern technologies. The authors emphasize the role of microfinance institutions and regional rural banks in reducing financial constraints, ultimately improving crop yields and farmers' income levels.

**Antil, S., Swain, N., & Kumar, M. (2022)** examines the factors influencing financial inclusion among rural agricultural households in India. It identifies key determinants like financially literate, access to banking infrastructure, and online systems of transaction. The study concludes that targeted financial interventions significantly boost farmers' participation in financial markets, leading to increased productivity and economic resilience in rural areas.

**Jha, S. S. (2018)** The (RRB) evaluates the role of Regional Rural Banks in fostering FI among farmers. It highlights the importance of RRBs in providing accessible credit and financial services to marginalized agricultural communities. The study underscores that financial inclusion facilitated through RRBs has positively impacted farm productivity, risk mitigation, and rural economic growth.

**Anthony-Orji, O. I., et al. (2024)** study investigates the impact of financial inclusion on agricultural productivity sector in Nigeria. The researcher identifies commercial services like credit access, insurance, as well savings as critical drivers of agricultural development. The findings suggest that financial inclusion not only enhances farmers' productivity but also reduces poverty and promotes economic stability in rural areas.

**Muafueshiangha, I. M. (2016)** focuses on the role of financial inclusion in agricultural development in Ngoketunjia, Cameroon. Study examines the impact of accessible financial activity for smallholder farmers, involving credit facilities and insurance. The research reveals that financial inclusion significantly enhances farmers' adoption of modern agricultural practices, reduces financial vulnerability, and boosts overall productivity.

**Fowowe, B. (2020)** study investigates the impact of FI on agricultural productivity in Nigeria, focusing on credit access, insurance, and savings. The findings reveal that financial inclusion significantly enhances farmers' ability to adopt modern agricultural techniques, purchase quality inputs, and mitigate financial risks. The study emphasizes that financial inclusion not only boosts crop yields and productivity but also contributes to poverty alleviation and food security. Policymakers are urged to address barriers such as low financial literacy and limited infrastructure to maximize financial inclusion's benefits in the agricultural sector.

**Roy, D. (2007)** provides an in-depth analysis of rustic credit reforms in India, examining the issues and challenges faced by agricultural financing systems. The study highlights the role of rural credit institutions in supporting small and marginal farmers, emphasizing the need for policy interventions to improve credit delivery mechanisms. It also explores structural inefficiencies in rural banking systems and advocates for a comprehensive reform approach to enhance financial accessibility for farmers. The findings suggest that better-

designed rural credit policies can act as a catalyst for agricultural productivity and rural economic growth.

**Mishra, S., & Takhatpur, B. (2015)** explores the function of microfinance as an operator of financial inclusion. It emphasizes how microfinance institutions facilitate access to credit, savings, and insurance for marginalized farmers and rural entrepreneurs. The study demonstrates that microfinance has significantly contributed to enhancing agricultural productivity, empowering rural women, and reducing financial vulnerability. Key challenges, including inadequate financial literacy and poor infrastructure, are discussed. The authors recommend integrating technology and policy support to optimize microfinance's role in fostering financial inclusion in rural regions.

**Rather, W. A., & Lone, P. A. (2014)** examines the role of microfinance in addressing financial exclusion in Jammu and Kashmir. The authors highlight how microfinance institutions have improved financial accessibility for marginalized farmers and rural entrepreneurs, enhancing agricultural productivity and income levels. The study identifies key challenges, including lack of financial literacy, infrastructure deficits, and low digital adoption rates. The authors recommend tailored microfinance programs, financial education initiatives, and government support to enhance the effectiveness of microfinance in promoting financial inclusion and rural development.

**Mishra, D., Kandpal, V., Agarwal, N., & Srivastava, B. (2024)** explores the ripple effects of FI on socially and economic development, with a focus on the agricultural sector. The study highlights how financial services such as credit, savings, and insurance enhance farmers' productivity and income security. It emphasizes the impactful function of digital financial services in bridging rural economic gaps. The authors identify key barriers, involving limited facility to technology and financial illiteracy, and propose policy recommendations to address these challenges. The findings underscore the consequences of integrated economic systems towards sustainable rural development.

**Kumar, R. K., Mohanty, P., Das, K. S., & Haritha, M.** explores the role of Farmer Producer Organizations (FPOs) as enablers of financial inclusion and rural transformation in India. The authors emphasize how FPOs act as collective platforms for farmers, improving their access to financial services, quality inputs, and modern technologies. The study highlights the role of FPOs in fostering agribusiness entrepreneurship and enhancing value chains. Despite facing challenges such as inadequate infrastructure and financial literacy, FPOs have significantly

contributed to improving agricultural productivity and rural livelihoods. Policy recommendations focus on strengthening institutional support for FPOs.

**Bathla, S., Joshi, P. K., & Kumar, A. (2020)** examines the relationship between agricultural progress and rural poverty reduction. The authors highlight how financial inclusion facilitates investment in modern farming technologies, risk management tools, and quality agricultural inputs. The study emphasizes the role of credit and insurance in enhancing farmers' productivity and resilience. It also identifies regional disparities in financial accessibility and agricultural productivity. The findings suggest that targeted financial policies, improved infrastructure, and digital financial tools are critical for achieving inclusive rural development and poverty

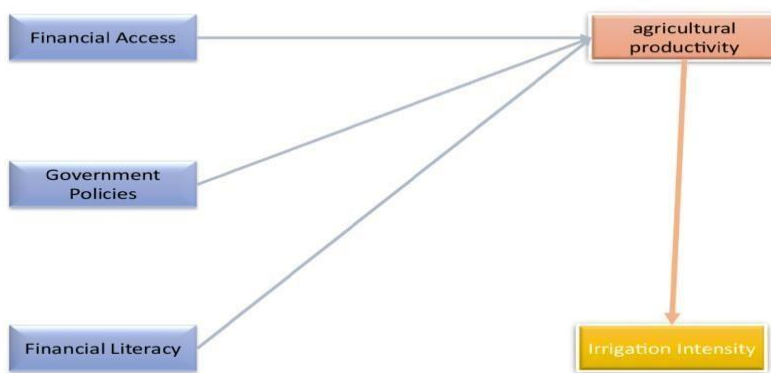
reduction.

**Kadaba, D. M. K., Aithal, P. S., & KRS, S. (2023)** investigates the impact of digital financial inclusion (DFI) initiatives on self-help groups (SHGs) in India. The findings reveal that DFI significantly enhances financial accessibility, reduces transaction costs, and fosters entrepreneurship among rural farmers and SHG members. Digital tools, involving mobile banking and digital payment platforms, have streamlined financial transactions and improved financial literacy. The study also highlights challenges such as technological barriers and financial illiteracy. The authors recommend integrating digital financial tools with traditional financial services to maximize their impact on rural development.

### 3. Research Framework

The research model highlights that differential access to formal credit significantly influences disparities in input utilization, cropping patterns, tenancy contracts, and irrigation intensity, all of which directly impact agricultural productivity in rural Odisha. Strengthening irrigation intensity, institutional credit access, and financial literacy through integrated financial policies and rural infrastructure investments is essential for creating an ecosystem where financial inclusion serves as a catalyst for sustainable agricultural productivity and entrepreneurial growth in rural Odisha.

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### 3. Research Objectives:

1. To examine the impact of FI on agricultural productivity in rural Odisha,
2. To diagnose the role of FI in transforming agrarian relations
3. To explore the agricultural intensity of the farmers of rural Odisha

#### 4. Research Hypotheses:

**H1:** There is significant impact of financial Awareness on agricultural productivity **H2:** There is significant impact of financial Literacy on agricultural productivity

**H3:** There is significant impact of government policies on agricultural productivity

**H4:** There is significant impact of agricultural productivity on irrigation intensity

#### 6. Research Methodology:

This study investigates the role of financial inclusion as a catalyst for enhancing agricultural productivity and promoting entrepreneurship in rural Odisha. Primary data were collected by structured questionnaire from 230 randomly selected respondents from Udala and Kuliana blocks (Mayurbhanj district), Harichandanpur and Ghasipur blocks (Keonjhar district), Jaleswar and Nilagiri blocks (Balasore district) during the period 2022-2023. These regions were chosen due to their significant agricultural dependence and varying levels of financial inclusion. The questionnaire focused on key aspects such as access to credit, usage of financial services, tenancy contracts, cropping patterns, irrigation practices, adoption of modern agricultural technologies, and participation in agribusiness activities.

The collected data were examined by using SPSS for statistical interpretation and Smart PLS software for structural equation modeling to evaluate the relationships between financial inclusion, agricultural productivity, tenancy practices, irrigation intensity, and entrepreneurship. This approach provides a robust analytical framework to understand the multifaceted impacts of financial inclusion on rural agricultural systems, offering valuable insights for policymakers, financial institutions, and development practitioners aiming to drive sustainable agricultural and entrepreneurial growth in rural Odisha.

#### 7. Findings and Data Interpretation:

Table 1: Validity and Reliability results

	alpha	rho_a	CR	AVE
<b>Agricultural Productivity</b>	0.705	0.694	0.742	0.590
<b>Financial Awareness</b>	0.830	0.843	0.885	0.659
<b>Financial Literacy</b>	0.894	0.918	0.934	0.824
<b>Govt. Policies</b>	0.785	0.883	0.851	0.588
<b>Irrigation Intensity</b>	0.740	0.753	0.834	0.558

The validity and reliability (Table 1) of the constructs in this study, examining "Financial Inclusion as a Catalyst for Enhancing Agricultural Productivity and Promoting Entrepreneurship in Rural Odisha," were assessed using key statistical indicators: Cronbach's Alpha ( $\alpha$ ), rho\_A, composite reliability (CR), and average variance

Extracted (AVE). Cronbach's Alpha values range from 0.705 to 0.894, the acceptable to excellent internal consistency across constructs. Composite Reliability (CR) values, indicating from 0.742 to 0.934, confirm that the constructs are highly reliable, surpassing the threshold of 0.7. The AVE values showing convergent validity, with most constructs exceeding the minimum acceptable value of 0.5, confirming that each construct explains over 50% of the variance of its respective indicators. However, Agricultural Productivity (0.590) and Government Policies (0.588) have marginal AVE scores, suggesting moderate convergent validity. Overall, these results suggest that the measurement model is reliable and exhibits satisfactory convergent validity, supporting the robustness of the constructs in capturing agricultural productivity, financial literacy, financial awareness, government policies, and irrigation intensity within the context of rural Odisha's financial inclusion framework.

Table 2: R-square and Adjusted R-square values

	R-square	R-square adjusted
<b>Agricultural Productivity</b>	0.199	0.187
<b>Irrigation Intensity</b>	0.187	0.183

In this study on "Financial Inclusion as a Catalyst for Enhancing Agricultural Productivity and Promoting Entrepreneurship in Rural Odisha," the R-square (R<sup>2</sup>) values indicate that 19.9% of the variance in Agricultural Productivity and 18.7% variance in Irrigation Intensity are illustrated by the predictor variables. The Adjusted R-square, slightly lower at 18.7% and 18.3%, accounts for the number of predictors, providing a more accurate estimate of the model's explanatory power. These values suggest a moderate relationship, highlighting the leverage of FI, government policies, and financial literacy on agricultural productivity and irrigation intensity.

Table 3: Estimation of Path Coefficient

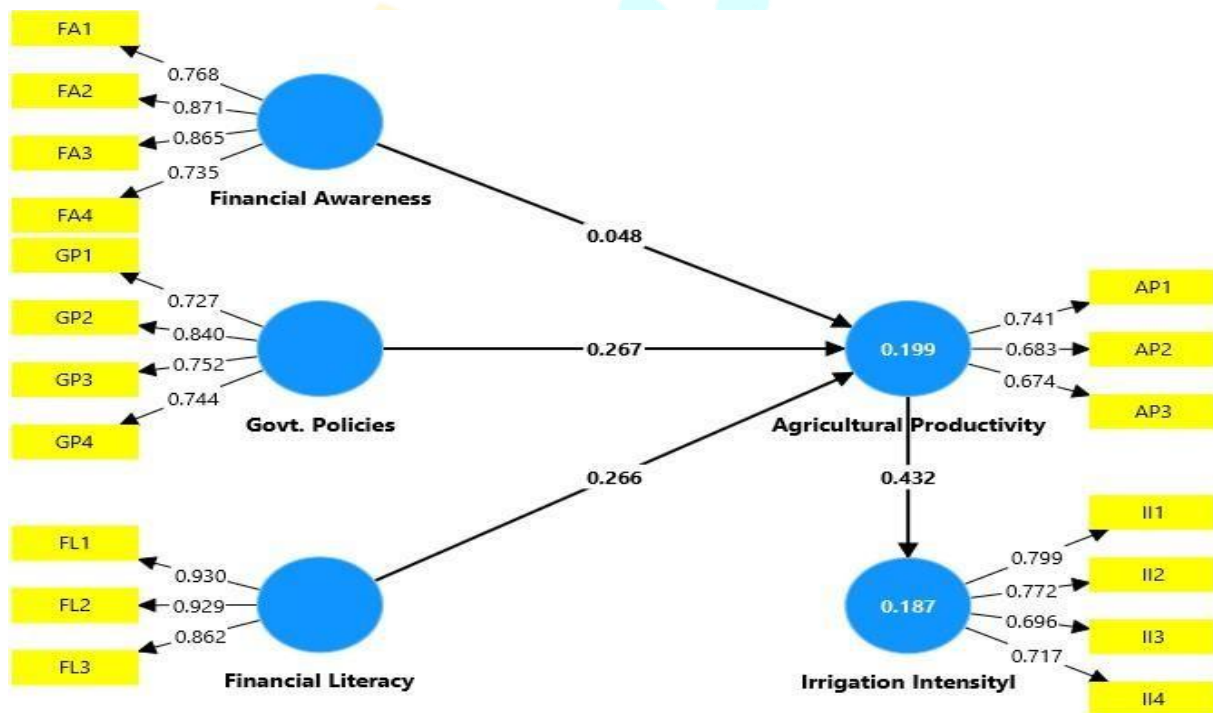
	Path Coefficient	STDEV	T statistics	P values
Agricultural Productivity-> Irrigation Intensity	0.432	0.048	8.914	0.000
Financial Awareness Agricultural -> Productivity	0.448	0.078	5.743	0.000
Financial Literacy Agricultural -> Productivity	0.266	0.079	3.375	0.001
Govt. Policies -> Agricultural Productivity	0.267	0.082	3.268	0.001

The table 3, shows the results of path coefficients, STDEV, T-statistics and P values and these are shown in figure 2 and figure 3 respectively shown below. For the first hypothesis (H1) the significant P-value (0.000)

and high **T-statistic (5.743)** indicate a **strongly positive impact** of **Financial Awareness on Agricultural Productivity**. This suggests that greater awareness of financial services enables farmers to make informed financial decisions, enhancing productivity through improved access to credit, insurance, and investment in quality agricultural inputs.

For the second hypothesis (**H2**) the **positive path coefficient (0.266)** and significant **P-value (0.001)** confirm that **Financial Literacy significantly influences Agricultural Productivity**. Financial literacy equips farmers skills to effectively manage financial resources, utilize credit efficiently, and adopt modern agricultural technologies, contributing to improved productivity.

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The **positive path coefficient (0.267)** and significant **P-value (0.001)** indicate that **Government Policies have a significant effect on Agricultural Productivity**. Wellimplemented agricultural policies, subsidies, and financial schemes empower farmers to access resources, adopt best practices, and enhance farm-level productivity.

The **high path coefficient (0.432)** and **strong T-statistic (8.914)** indicate a **significant positive relationship between Agricultural Productivity and Irrigation Intensity**. Higher productivity encourages farmers to invest more in irrigation infrastructure, leading to better water management, enhanced cropping intensity, and increased agricultural output.

All four hypotheses (**H1, H2, H3, H4**) are support through the data, as evidenced by the **significant path coefficients and P-values**. Financial awareness, financial literacy, and government policies positively influence agricultural productivity, which, in turn, significantly enhances irrigation intensity. These findings underscore the interconnected role of financial and institutional support in improving rural agricultural systems in Odisha.

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### **Conclusion:**

Study analyzed the impact of FI on agricultural productivity and entrepreneurship in rural Odisha, focusing on key dimensions such as cropping patterns, cropping intensity, irrigation intensity, and tenancy practices. The results reveal significant differences in agricultural productivity between financially included and excluded households, with financially included farmers demonstrating higher mean yields. Access to institutional credit enables farmers to invest in capital-intensive crops, adopt modern agricultural technologies, and optimize resource utilization, while financially excluded farmers remain limited to subsistence farming with less capital-intensive crops.

The findings highlight that financially included farmers benefit from improved irrigation intensity, allowing them to achieve better crop yields and enhance cropping intensity. Access to institutional credit also influences the choice of tenancy contracts, with financially empowered farmers more inclined towards fixed rent tenancy, which has been shown to be more efficient compared to sharecropping or cost-sharing arrangements. These results align with the theoretical understanding that fixed rent tenancy leads to better productivity outcomes due to reduced moral hazard and increased farmer accountability.

Additionally, financial inclusion fosters entrepreneurship in agribusiness, enabling farmers to engage in value-added activities, improve market access through digital platforms, and participate in resilient agricultural value chains. Government initiatives and financial literacy programs have further strengthened farmers' able to make financial decisions, enhancing overall productivity and rural resilience.

In conclusion, FI a catalyst for agricultural productivity and entrepreneurship in rural Odisha by positively influencing cropping patterns, tenancy practices, irrigation intensity, and agribusiness development. Policymakers must prioritize expanding institutional financial access, improving rural infrastructure, and enhancing financial literacy to maximize the benefits of FI and drive sustainable agricultural and economic progress in rural Odisha.

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