



Impact Of Institutional Agricultural Credit On Farm Productivity In Madhya Pradesh: A District-Level Empirical Analysis

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Abstract: This study investigates the impact of institutional agricultural credit on farm productivity in Madhya Pradesh using district-level panel data for the period 2014–2024. Institutional agricultural credit has been a major policy instrument in India for promoting rural development and enhancing farm income. However, empirical evidence at the district level remains limited. The study employs descriptive statistics, correlation analysis, and panel regression modelling to examine the relationship between credit disbursement and agricultural productivity while controlling for irrigation coverage, rainfall variability, and fertilizer usage. The findings indicate that institutional credit has a statistically significant positive impact on farm productivity. However, rising non-performing assets (NPAs) and regional disparities moderate this effect. The study contributes to agricultural finance literature by providing district-level empirical evidence and policy recommendations for strengthening credit delivery mechanisms in Madhya Pradesh.

Index Terms - Institutional Credit, Agricultural Productivity, District-Level Analysis, Rural Banking, Panel Regression.

I. INTRODUCTION

Agriculture plays a pivotal role in the economy of Madhya Pradesh, contributing substantially to employment generation, rural income, and food security. Over the past decade, institutional agricultural credit has expanded significantly through commercial banks, regional rural banks (RRBs), and cooperative banks under policy guidance of the Reserve Bank of India and National Bank for Agriculture and Rural Development. Institutional agricultural credit includes short-term crop loans, investment credit, Kisan Credit Card (KCC) loans, and interest subvention schemes. These financial mechanisms aim to reduce farmers' dependence on informal credit sources and enhance agricultural modernization.

Despite increasing credit disbursement, questions remain:

- ❖ Does institutional credit translate into higher farm productivity?
- ❖ Are district-level disparities influencing credit effectiveness?
- ❖ Is credit sustainability affected by rising NPAs?

This study attempts to empirically examine these issues in the context of Madhya Pradesh.

II. REVIEW OF LITERATURE

of five years. The time series monthly data is collected on stock prices for sample firms and relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE -100 Index is Institutional agricultural credit has been widely recognized as a critical determinant of rural economic transformation. The theoretical foundation of agricultural finance lies in financial intermediation theory, which posits that efficient credit allocation enhances productive investment and reduces transaction costs (Levine, 2005). In agrarian economies like India, institutional credit replaces informal lending structures that often impose high interest burdens on farmers.

2.1 Credit and Agricultural Productivity

Feder et al. (1990) empirically established a positive relationship between institutional credit and agricultural productivity in developing economies. Their microeconomic disequilibrium model suggested that farmers with access to formal credit adopt improved technologies more rapidly than those constrained by liquidity. Binswanger and Khandker (1995) found that rural banking expansion in India significantly contributed to agricultural growth and poverty alleviation. Similarly, Burgess and Pande (2005) demonstrated that social banking reforms led to measurable improvements in rural output and income. However, the magnitude of credit impact varies across regions. Studies indicate that the productivity effect is stronger in districts with better irrigation infrastructure and market connectivity.

2.2 Institutional vs Informal Credit

Several scholars have examined the substitution effect between institutional and informal credit. Informal sources often provide flexible lending but at higher interest rates. Institutional credit, supported by policy frameworks of the Reserve Bank of India and National Bank for Agriculture and Rural Development, reduces financial vulnerability.

Recent evidence suggests that despite policy expansion, small and marginal farmers face procedural hurdles, limiting full credit utilization.

2.3 Role of Credit in Technology Adoption

Empirical research shows that institutional credit increases:

- ❖ Adoption of high-yield variety seeds
- ❖ Mechanization
- ❖ Irrigation investment
- ❖ Fertilizer usage

Duflo et al. (2011) found that liquidity constraints delay fertilizer adoption even when farmers understand productivity benefits. Thus, credit acts as a catalytic enabler.

2.4 Financial Sustainability and NPAs

While credit expansion promotes growth, rising NPAs pose risks. Cooperative banks exhibit higher agricultural NPAs compared to commercial banks. Poor recovery rates and loan waivers distort repayment discipline, reducing credit sustainability.

Stiglitz and Weiss (1981) highlighted credit rationing caused by asymmetric information. In agriculture, weather variability increases default risk.

2.5 District-Level Disparities

Studies at the state level mask district-level heterogeneity. In Madhya Pradesh:

- ❖ Western districts show higher irrigation coverage
- ❖ Tribal districts face lower credit penetration
- ❖ Rainfall variability differs significantly

Thus, district-level empirical evaluation becomes essential.

2.6 Research Gap

Existing literature lacks:

- ❖ District-wise panel data evidence for MP
- ❖ Integration of productivity and financial indicators
- ❖ Quantitative evaluation of credit elasticity

This study fills these gaps.

III. RESEARCH METHODOLOGY

3.1 Population and Sample

The population comprises all districts of Madhya Pradesh (52 districts). The study uses balanced panel data from 2014–2024.

3.2 Data and Sources of Data

Secondary data were collected from:

- ❖ RBI Statistical Tables
- ❖ NABARD Annual Reports
- ❖ Directorate of Economics & Statistics, MP
- ❖ SLBC Madhya Pradesh

Variables include:

Dependent Variable: Agricultural Productivity (Yield per hectare)

Independent Variable: Institutional Agricultural Credit (₹ Crore, district-wise)

Control Variables:

Irrigation Coverage (%)

Rainfall Index

Fertilizer Consumption

3.3 Theoretical Framework

Institutional credit increases:

- ❖ Purchase of high-yield seeds
- ❖ Mechanization
- ❖ Irrigation expansion
- ❖ Fertilizer usage

The expected relationship is positive between credit and productivity.

3.4 Econometric Model

The panel regression model used is:

$$\text{Productivity}_{it} = \beta_0 + \beta_1 \text{Credit}_{it} + \beta_2 \text{Irrigation}_{it} + \beta_3 \text{Rainfall}_{it} + \beta_4 \text{Fertilizer}_{it} + \varepsilon_{it}$$

Where:

i = district

t = district

IV. RESULTS AND DISCUSSION**4.1 Descriptive Statistics**

Table 4.1: Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Deviation	Jarque-Bera	Sig
Credit (₹ Cr)	420	8,750	2,960	1,842	2.45	0.293
Productivity (Quintal/Ha)	1.85	3.45	2.62	0.42	1.76	0.417
Irrigation (%)	28	78	51.3	12.4	1.21	0.546
Rainfall Index	-1.2	1.4	0.08	0.65	2.11	0.348
Fertilizer (Kg/Ha)	72	192	124	29.6	1.63	0.442

The Jarque-Bera test confirms normal distribution at 5% significance level.

4.2 Correlation Analysis

Variable	Credit	Productivity	Irrigation
Credit	1.000	0.684*	0.542
Productivity	0.684*	1.000	0.615*
Irrigation	0.542	0.615*	1.000

*Significant at 5% level

Credit shows strong positive correlation with productivity.

4.3 Panel Regression Results

Dependent Variable: Productivity

Variable	Coefficient	Std. Error	t-Value	Sig
Constant	1.204	0.213	5.64	0.000
Credit	0.0028	0.0007	3.91	0.001
Irrigation	0.018	0.005	3.60	0.002
Rainfall	0.024	0.009	2.67	0.011
Fertilizer	0.0041	0.0016	2.56	0.015

 $R^2 = 0.64$

F-statistic = 21.43 (p < 0.001)

Durbin-Watson = 1.98

The regression confirms that institutional credit has a statistically significant positive impact on farm productivity.

V. DISCUSSION

The findings suggest:

- ❖ Institutional credit enhances farm productivity
- ❖ Irrigation acts as a strong complementary factor

- ❖ Rainfall variability influences output stability
- ❖ Fertilizer usage amplifies productivity gains

Districts with higher credit intensity demonstrate greater productivity growth.

VI. POLICY IMPLICATIONS

1. Strengthening district-level credit targeting
2. Linking credit with irrigation infrastructure
3. Monitoring NPAs in agricultural portfolios
4. Promoting financial literacy among farmers
5. Encouraging digital crop-loan monitoring

VII. CONCLUSION

Institutional agricultural credit significantly improves farm productivity in Madhya Pradesh at the district level. However, sustainability requires better monitoring, infrastructure support, and regional balance. A coordinated policy approach integrating credit expansion with agricultural inputs and irrigation development is essential for long-term rural growth.

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