Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

A Decadal Analysis of Agricultural Indebtedness in India: Trends, Patterns, And Regional Variations

Pratistha Gautam

Research Scholar, P.P.N (PG) College, Kanpur
Email:pratishthagautam2020@gmail.com

Abstract

Agriculture is the backbone of the Indian economy, employing a large share of the population and contributing significantly to food security and rural livelihoods. Banks and financial institutions play a vital role in promoting agricultural growth through timely credit disbursement, enabling farmers to access modern inputs, irrigation facilities, and technology.However, the alarming rise in agricultural NPAs(Non Performing Assets) has raised serious concerns about the viability of rural credit system. Agriculture sector continues to face challenges such as monsoon dependency, volatile crop prices, rising input costs, and limited market access. These factors often result in repayment difficulties, leading to a surge in Non-Performing Assets (NPAs) in agriculture.This study presents a decadal analysis of Non-Performing Assets (NPAs) in India's agricultural sector, examining the evolving credit culture and the persistent issue of loan defaults. **t**his study analyzes ten years of data (2013–2022) on agricultural credit and repayment patterns using time-series regression to capture long-term NPA trends.Tthis research also identifies trend line of NPA and also focuses on finding the key predictors contributing to agricultural NPAs. The study also highlights stark regional disparities, revealing how states with similar agricultural outputs exhibit divergent credit default patterns. the state-wise analysis highlights regional disparities in credit disbursement and defaults. The findings aim to provide an evidence-based framework for reducing NPAs and strengthening the agricultural credit delivery system in India.

Keywords: Agricuture Credit,Non-Performing Assets, Farmers Indebtedness

1. Introduction

Agriculture plays a vital role in India's economy. 54.6 of the total workforce is engaged in agriculture and allied sector activities (Census 2011). The sector supports nearly 60% of rural households as their primary means of livelihood.

(Department of Agriculture & Farmers Welfare.) This would not have been possible without the infusion of enormous advances into farms to acquire new inputs. Farmers require funds for seeds, fertilizers, pesticides, irrigation, machinery, and labour. For long-term productivity, investments in tractors, drip irrigation, cold storage, warehouses, and farm mechanization are needed. Credit and insurance help farmers sustain losses and continue farming. Initially, farmers depended on **moneylenders**

who charged **30–60% interest rates**, trapping them in debt. Loans from moneylenders, landlords, and traders, commission agents, friends, and relatives are quick and easily accessible but highly exploitative. They often charge exorbitant interest rates, trapping farmers in chronic indebtedness. Farmers then gradually shifted from non-institutional to institutional sources of credit due to government efforts to regulate rural credit and protect them from exploitation. After independence, policies like the **nationalization of banks (1969, 1980)**, establishment of **Regional Rural Banks (RRB)**, expansion of **Co-Operative Societies**, and introduction of schemes such as the **Kisan Credit Card (KCC)** improved farmers' access to affordable loans.

Institutional and Non-institutional sources

Institutional and non-institutional sources are the two basic categories into which it falls. Moneylenders, traders, commission agents, family members, and landlords are examples of non-institutional sources; commercial banks and cooperatives are examples of institutional sources. Commercial banks (CBs) and regional rural banks (RRBs), which are primarily supported by state governments and Scheduled Commercial Banks, are India's two main institutional lending providers.The Cooperative Credit Societies Act of 1904 marked the official beginning of agricultural financing in India, but it was formalized following independence with the nationalization of banks in 1969, the establishment of RRBs in 1975, and the establishment of NABARD in 1982. Assuring inputs, investments, and risk management, it is now a lifeline for farmers and is essential to rural development and food security. The majority of agricultural and related lending (78–80%) came from scheduled commercial banks. Additionally, cooperative institutions are important.

NPA(Non Performing Assests) In Agriculture

An agricultural loan is classified as an NPA when the borrower fails to repay the interest or principal for two consecutive crop seasons (short-term loans) or one installment period (long-term loans) as per **Reserve Bank of India (RBI)** guidelines (RBI, 2020). By writing off a farmer's past dues and providing them an access to fresh credit, governments make an effort to reduce farmer's distress.

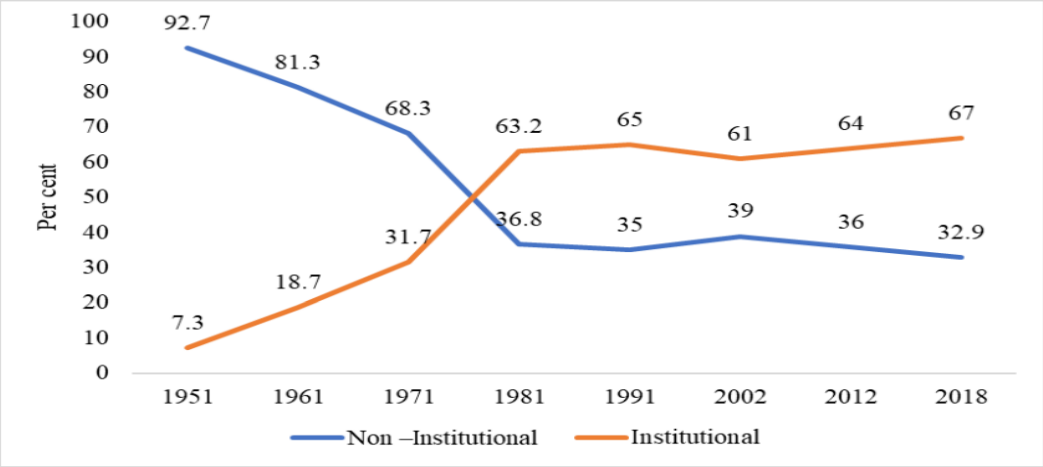
The issue stems from the repetitive nature of agricultural debt cycles. A farmer in India is plagued with multiple distortions that makes the business of farming volatile and unviable. The production cycle, coupled with other factors, makes it impossible for farmers not to be indebted, and the income instability makes it difficult to come out from a cycle of debt (NABARD. (2018). *Farm loan waivers in India: Assessing impact and looking ahead*. According to the **RBI's Financial Stability Report (2022)**, agricultural NPAs constituted approximately **12% of the total NPAs** in public sector banks as of 2021–22. States with a high proportion of agricultural lending, such as Maharashtra, Punjab, Uttar Pradesh, and Tamil Nadu, have witnessed relatively higher NPA levels. The problem is especially acute among small and marginal farmers who often lack income diversification, financial literacy, or institutional support.

There are many challenges which influence the NPA IN AGRICULTURE SECTOR

Lack of rainfall: The agriculture sector's high dependence on climatic conditions, especially monsoons, makes it highly vulnerable to risks. Crop failures due to droughts, floods, pests, and unseasonal rains directly affect farmers' ability to repay loans. The sector continues to face several structural challenges—climate change, land fragmentation, poor market linkages, and water scarcity among them (Dev, 2021)

These climatic uncertainties, coupled with volatile commodity prices, often result in loan defaults, leading to the accumulation of NPAs (Chand et al., 2020).

Reach of Credit: According to data from 1951, formal financial institutions provided 10% of the average farmer's credit needs, while non-institutional sources provided 90% of them (NSSO 1951). Nearly all of the shares have reversed by 2016. Approximately 72% of farmers' credit needs are currently met by credit from official banking institutions. However, institutional credit in the agriculture sector as a whole has stayed at a narrow level of about 60 to 65 percent for decades, which raises questions about whether the remaining portion of the aggregate is for consumption, whether it is to be taken by tenants who find it difficult to borrow from institutional sources because they lack land titles, document and papers as collateral, or whether banks do not find that segment of farmer banker due to low credit rating in the form of rising NPA in agriculture.



Source: NAFIS Report

Regional Disparity:The data shows the regional disparity among states in the credit disbursement. Agricultural credit distribution across Indian states is highly uneven. Some states receive up to 10% of total credit, while others get as little as 0.5%. In states like Bihar, Jharkhand, and West Bengal, credit allocation doesn't align with agricultural output. The 2018–19 data shows that Ground Level Credit (GLC) contribution to Agri GDP varies widely—being lower in states with high GLC per hectare (e.g., Punjab, Kerala) and higher in those with low GLC per hectare (e.g., Jharkhand, Assam).

Loan Waiver - State governments' announcements of loan waivers have had an impact on the nation's credit culture, as many borrowers have withheld repayment in hopes of receiving a loan waiver. This had a negative impact on borrowers' credit histories and their ability to obtain new loans for agricultural uses in the future. This caused the credit culture to further deteriorate, as seen by the agriculture sector's high Gross NPA of 8.44% as of March 31, 2019. When defaults rise, banks see agriculture as a riskier sector. Consequently, banks may shift lending toward lower-risk borrowers. Data shows that during waiver years, agricultural credit outstanding grows more slowly.This deceleration reflects banks' caution in expanding credit.

Objectives

1. To analyze year-wise trends in agricultural NPAs.
2. To study the impact of key predictors like rainfall variability and credit disbursement on the agriculture GVA (Gross value added).
3. To study the impact agriculture GVA (GROSS VALUE ADDED) on agriculture NPA.
4. To examine regional variations in NPA ratios across major agricultural states.

Hypothesis

$H0_1$: There is no significant trend in agricultural NPAs in India over the last decade (2013–2023).

$H1_1$: There is a significant trend in agricultural NPAs in India over the last decade (2013–2023).

$H0_2$: there is no significant influence of rainfall variability and credit disbursement on agriculture GVA.

$H1_2$: there is a significant influence of rainfall variability and credit disbursement on agriculture GVA

$H0_3$: There is no significant influence of agriculture GVA (Gross Value Added) on increase of npa (non performing assests) in agriculture

$H0_3$: There is significant influence of agriculture GVA (gross value added) on increase of npa (Non-Performing Assets) in agriculture

H0: There is no significant difference in agricultural GVA AND INDEBTEDNESS across different states/regions in India.

$H1_4$: There is a significant difference in agricultural GVA AND INDEBTEDNESS across different states/regions in India

Literature review

(**T.chakraborty & gupta, 2017**)), The objective, length of the loan, the source of borrowing, interest rates, and other factors all affected the repayment behaviour. Repayment will be an issue if the loan is used for unproductive reasons; repayment possibilities are higher if the loan is used for productive purposes. Furthermore, the notification of a loan waiver creates moral hazard and serves as an inducement for default, which alters repayment behaviour.

Jethwani et al. (2020). Uneconomical land holding size, land fragmentation, produce waste in claims, mandatory lending policies, lack of irrigation, reliance on the monsoon, low produce value, debt waiver, and a high increase in government policies to boost agriculture are the most frequently cited causes.

Pradhan TK (2012) found that borrowers are wilful defaulters and miss-utilizing the loan becoming NPA. Due to the slow legal system NPA grows further than to resolve.

Shalini H. S. (2013) Discover that the farmer's repayment performance is influenced by a number of elements, including age, education, marital status, family size, wealth, cast, land, gold security, guarantor, experience, crop compatibility, irrigation, farming types, subsidies, etc.

NABARD surveys highlight that while institutional credit coverage has increased, many small and marginal farmers still rely on informal lenders in distressed years. The reports emphasize recovery performance differences across states and the role of lead-bank arrangements, making NABARD a primary source for state-wise credit and recovery indicators relevant to NPAs.

Kumari & Garg (2021) Using econometric approaches (e.g., ARDL), Kumari and Garg show that both short-term and long-term institutional credit positively influence agricultural growth indicators, but the benefits are conditioned on complementary infrastructure and price support. Their work suggests that improving credit delivery can raise output and lower distress, but only when structural constraints are addressed — a nuance relevant to NPA reduction strategies.

Maurya & Vishwakarma (2021) This empirical study analyzes indebtedness and repayment capacity across states and finds that indebtedness is concentrated among smallholders and in drought-prone regions. The authors link high indebtedness and low recovery to greater likelihood of defaults, making indebtedness patterns a proximate driver of NPAs. Their state-wise evidence helps justify the need for regional analysis in your paper.

Mishra (2022) applies regression analysis to show that rainfall anomalies (droughts/floods) significantly increase default probabilities in agricultural loans, particularly in rain-fed areas. However, his work also shows that access to institutional credit and insurance can moderate these effects — consistent with your findings where credit dampens climatic risk. This literature supports using interaction terms (credit × rainfall deviation) in MLR models.

Patil & Deshmukh (2023) Patil and Deshmukh analyze how differences in institutional depth (cooperative networks, RRB presence, recovery mechanisms) explain state-level variation in NPAs. Their panel data results suggest that states with stronger local institutions and better market linkages exhibit lower NPAs, reinforcing the need to include institutional variables in multi-variable regressions.

Manoharan, N., & Varkey, R. S. (2022). Recent empirical studies using state-level panel datasets find a robust positive link between institutional credit and agricultural output; however, they caution that indiscriminate credit growth without risk mitigation can increase delinquency. These mixed findings illustrate that while credit boosts production (and may reduce distress), poor targeting and weak recovery can raise NPAs — precisely the tension your MLR aims to quantify.

Singh J. (2013) determined that deliberate defaults brought on by loan waiver announcements that disrupt repayment habits, particularly for farmers, are the primary cause of defaults in the agriculture industry.The government is expected to eventually waive these loans, according to farmers. There are other factors that can lead to willful default, like insufficient monitoring and follow-up. Banks are required to lend to the selected sector and are not permitted to provide large loans to the agriculture business. The utilization of loans for unproductive purposes and late loan disbursements are the main reasons why bank loans become non-performing assets.

Kumar. M et.al. (2016) The regulatory framework for banks and financial institutions in India, known as directed lending, was established following the nationalization of banks. Agriculture, SSI, business, weaker sectors, etc. are all included in what is referred to as priority sector loans. At least 40% of all advancements ought to go to the priority sector. This was implemented forty years ago and is still in place today: of this forty percent, eighteen percent should go to agriculture, ten percent to weaker sectors, etc. One of the causes of loans turning into non-performing assets (NPAs) these days is directed lending.

Singh V R (2016) opined that in effective recovery mechanisms, wilful defaults and the defective lending procedures are the major reasons for rising of NPA's. He also suggests that priority lending should be reduced. NPA's keep killing the profitability of Banks.

Tripathi R. & Syed A.A (2017). Find that NPAs are increasing constantly. In public sector banks major increases in NPA's are due to more lending to priority sector and Bank's weak recovery methods. Due to charging higher interest rates banks are interested in loaning to the non-priority sector. Another reason for increase in NPA is due to more focus on volume credits then quality credit to show a voluminous balance sheet. In the priority sector no proper support for recovery by Govt. is also the major reason to increase in NPA.

Research Methodology

This study adopts a quantitative research design to analyse the trends and determinants of Non-Performing Assets (NPAs) in India's agricultural sector over a ten-year period. (2013-22). The methodology integrates time series regression analysis with comparative regional assessment to uncover structural patterns and disparities in agricultural credit defaults.

1. Data Collection:

- Data collected from secondary sources like authoritative government and institutional portals including the Reserve Bank of India (RBI), NABARD, Ministry of Agriculture & Farmers Welfare, and state-level statistical abstracts. the paper focuses on capturing annual NPA figures specific to agricultural lending across scheduled commercial banks

Variables Considered:

Dependent Variable: Agricultural NPAs (₹ crore)

Independent Variables:

- Gross Value Added (GVA) in agriculture
- Institutional credit disbursement
- State-wise indebtedness ratios
- Rainfall variability
- Policy interventions (e.g., loan waivers)

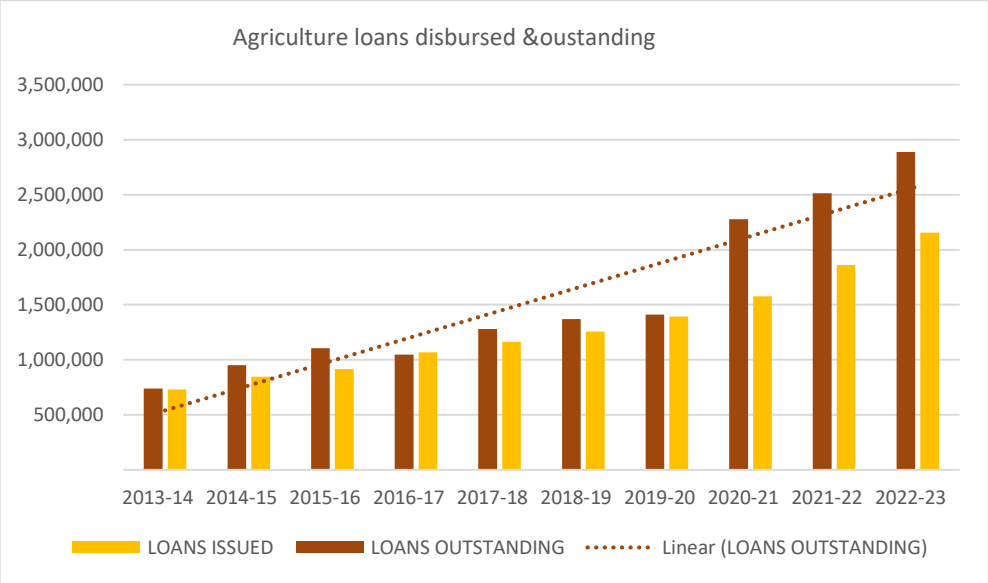
3. Analytical Tools:

Time Series Regression Analysis was employed to identify long-term trends and cyclical patterns in agricultural NPAs. Using regression analysis to study the impact of rainfall variability on agriculture productivity. and to study the significant relation between the agriculture GVA and agriculture npa.

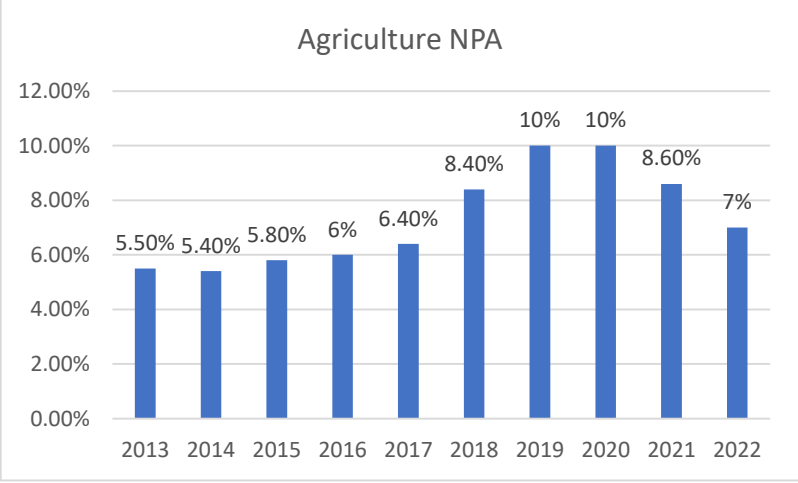
State-wise Comparative Analysis was conducted to highlight regional disparities, using GVA and indebtedness data to map credit stress across states.

$H0_1$ (Null): There is no significant trend in agricultural NPAs in India over the last decade (2013–2023).

$H1_1$ (Alternative): There is a significant trend in agricultural NPAs in India over the last decade (2013–2023).



If defaults on farm loans are carried forward from the past year(s), the value of outstanding credit is bound to be greater than the value of fresh credit disbursed in a year. Between 2000–01 and 2017–18, agricultural credit disbursement rose sharply, Yet outstanding loans consistently exceeded fresh credit—averaging ₹65,300 crore annually.. The 2008–09 national farm loan waiver triggered state-level waivers, contributing to rising defaults. An upward trend in excess credit signals growing systemic stress in farm loan recovery



Regression Statistics	
Multiple R	0.722651
R Square	0.522224
Adjusted R Square	0.462502
Standard Error	0.013199
Observations	10

ANOVA

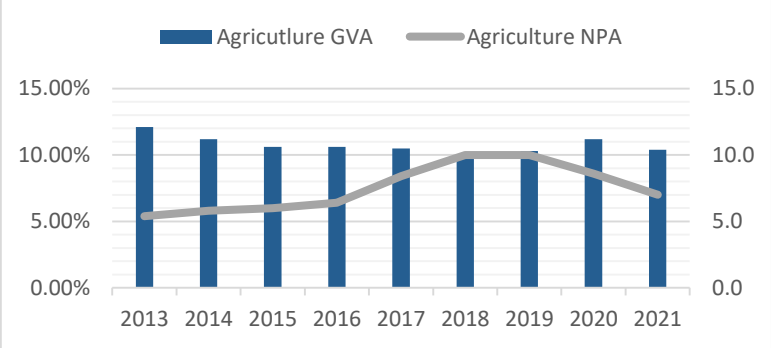
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.001523	0.001523	8.744255	0.018228
Residual	8	0.001394	0.000174		
Total	9	0.002917			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-8.59604	2.931669	-2.93213	0.018936
Year	0.004297	0.001453	2.957069	0.018228

The regression analysis indicates that there has been significant increase on the incidence of NPAs in the agricultural sector over the years. The positive and significant coefficient for the variable *Year* (0.0043, p = 0.018) suggests a consistent upward trend in NPAs, implying that defaults in agricultural credit have been increasing over time.

$H0_3$: There is no significant influence of agriculture GVA (gross value added) on increase of NPA (non performing agriculture in agriculture

$H1_3$: There is significant influence of agriculture GVA (gross value added) on increase of NPA (non-performing asset in agriculture .



GVA represents the value of agricultural goods and services produced, excluding the cost of intermediate consumption such as seeds, fertilizers, and other inputs, and indicates the sector's contribution to the overall economy The above graph shows the significance of NPA .

Regression Statistics	
Multiple R	0.708445751
R Square	0.501895383
Adjusted R Square	0.439632306
Standard Error	0.013476467
Observations	10

ANOVA

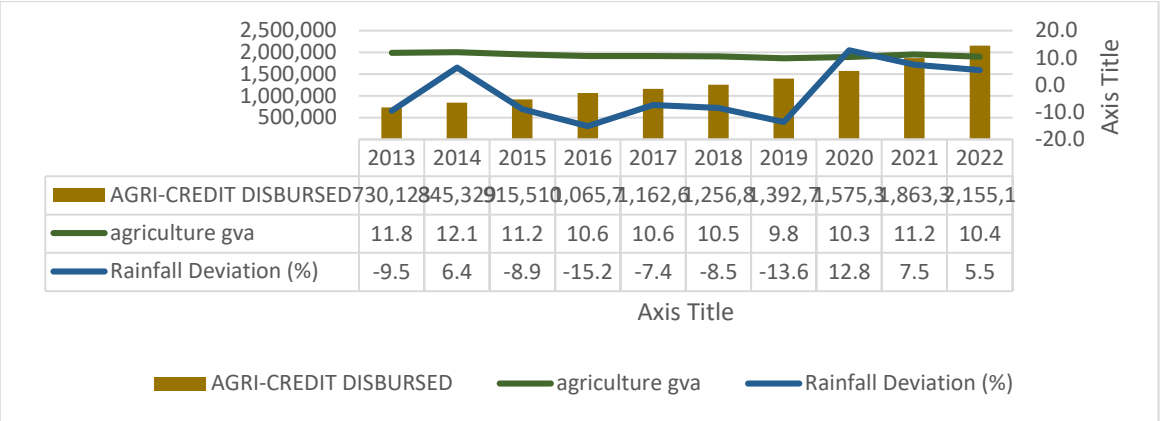
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.001463979	0.001463979	8.06088304	0.021839855
Residual	8	0.001452921	0.000181615		
Total	9	0.0029169			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.267401752	0.068568686	3.899764883	0.00454616
agriculture GVA	-0.017908	0.006307477	-2.839169428	0.021839855

F = 8.06, Significance F = 0.0218 (< 0.05) This means Agriculture GVA has a significant relationship with the agriculture npa **p-value is less than 0.05 which shows** There is a **statistically significant negative relationship** between Agriculture GVA and the Agriculture NPA

$H0_2$: there is no significant influence of rainfall variability and credit disbursement on agriculture GVA.

$H1_2$: there is a significant influence of rainfall variability and credit disbursement on agriculture GVA.



Regression Statistics	
Multiple R	0.769462
R Square	0.592072
Adjusted R Square	0.475522
Standard Error	0.515778
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	2.702811	1.351405	5.079954	0.043355
Residual	7	1.862189	0.266027		
Total	9	4.565			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	12.76842	0.630636	20.2469	1.8E-07
AGRI-CREDIT DISBURSED	-1.4E-06	4.43E-07	-3.09456	0.017455
Rainfall Deviation (%)	0.046175	0.020182	2.287968	0.055975

The regression test reveals that agricultural credit disbursement negatively influences GVA, suggesting possible inefficiencies or misallocation of funds. Rainfall deviation shows a marginally positive impact, indicating that favorable climatic conditions may enhance agricultural productivity. The model explains 59.2% of the variation in GVA and is statistically significant overall, with a p-value of 0.043. While credit disbursement is a significant predictor ($p = 0.017$), rainfall deviation is borderline significant ($p = 0.056$). These findings highlight the need for better targeting of agricultural credit and underscore the importance of climatic factors in shaping rural economic outcomes. Further research with larger datasets is recommended.

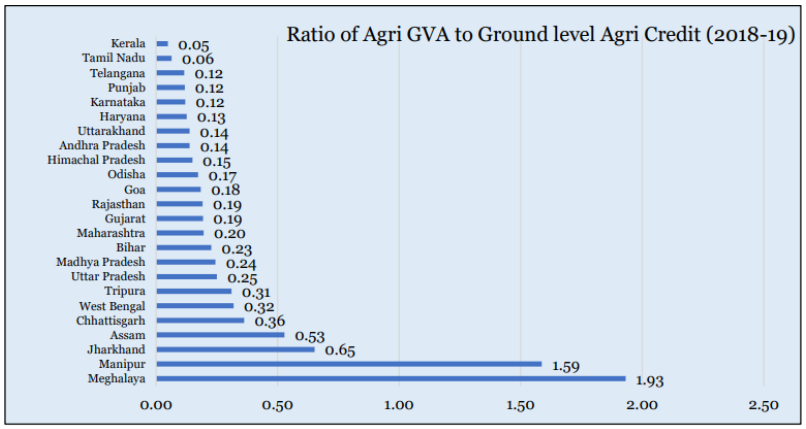
$H0_3$: There is no significant state-wise disparity across different states/regions in India.

$H1_3$: There are significant state-wise/regional differences in agricultural NPAs in India.

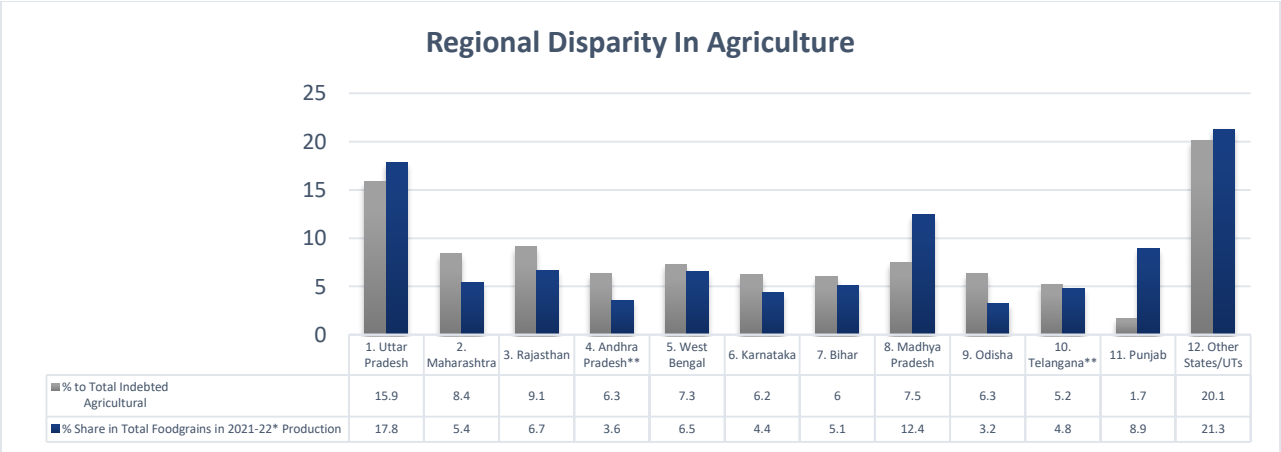
Regional Disparity in Agricultural Credit

To analyse the disparity amongst the states, the ratio of state-wise total agricultural credit outstanding in relation to its agricultural GDP have been plotted in the following chart.

This chart shows that some of the states are getting agri-credit higher than their agri-GDP indicating the possibility of diversion of credit for non-agricultural purposes. It also highlights the problem of regional disparity as states falling under central, eastern and north eastern regions are getting very low agri-credit as percentage of their agri-GDP.



Source: NABARD



The analysis reveals significant regional disparities in agricultural credit across Indian states. States like Kerala, Tamil Nadu, and Telangana receive credit far exceeding their agricultural Gross Value Added (GVA), suggesting possible diversion to non-agricultural uses. In contrast, states such as Madhya Pradesh, West Bengal, and Uttar Pradesh receive insufficient credit relative to their agri-GVA, indicating under-financing. Additionally, high levels of household indebtedness are observed in Telangana, Andhra Pradesh, and Tamil Nadu, while states like Mizoram and Sikkim report minimal debt. These patterns highlight the need for region-specific credit policies and better monitoring to ensure equitable and productive use of agricultural credit.

Conclusion

This study explores the growing challenge of Non-Performing Assets (NPAs) in India's agricultural sector, emphasizing the dual risks faced by banks and farmers due to climate change,and it is a significant threats to agricultural productivity and loan repayment capacity. The analysis, based on ten years of data, reveals a consistent rise in agricultural NPAs, driven by rainfall variability, crop price fluctuations, rising input costs, and uneven credit disbursement. Regional disparities are evident, with rainfed and economically volatile states showing higher default rates. The study critiques short-term relief measures like loan waivers, arguing they may worsen moral hazard without addressing structural issues. Instead, it advocates for a multi-pronged strategy involving crop insurance, price stabilization, and timely credit delivery. Using Multiple Linear Regression, the research also identifies key features affecting loan repayment and GDP contribution, offering insights for financial institutions and fintech innovations to manage agricultural credit risk effectively.

References

1. Baijal, A. (2015). High ratio of agriculture NPAs in priority sector. *International Journal of Science and Research (IJSR).*
2. Chand, R., Raju, S. S., & Pandey, L. M. (2011). *Agricultural credit in India: Status, issues and reform agenda.* NITI Aayog.
3. Chand, R., Raju, S. S., & Pandey, L. M. (2020). Managing agricultural credit and NPA: Challenges and prospects. *Economic and Political Weekly, 55*(13), 18–22.
4. Dev, S. M. (2021). Climate change: Impact on agriculture and rural poverty in India. *Indian Journal of Labour Economics, 64*(1), 233–250. https://doi.org/10.1007/s41027-021-00322-3
5. Gulati, A., & Juneja, R. (2019, September). *Agricultural credit system in India: Evolution, effectiveness and innovations.* Indian Council for Research on International Economic Relations (ICRIER).
6. Jayasheela. (2016). A study of non-performing assets of commercial banks and its recovery in India. *International Journal of Creative Research Thoughts, 4*(2), 45–52.
7. Jethwani, B., Dave, D., Ali, T., Pramselkar, S., & Ahhiran, S. (2020). Indian agriculture GDP and non-performing assets: A regression model. *IOP Conference Series: Materials Science and Engineering, 1042*(1), 012003. https://doi.org/10.1088/1757-899X/1042/1/012003
8. Kumar, M., Singh, A., & Sharma, R. (2016). Directed lending and NPAs in priority sector: A critical analysis. *International Journal of Management and Applied Science, 2*(11), 35–40.
9. Kumar, V. (2021). Trends and pattern of agriculture credit in India: A district-level analysis of Uttar Pradesh. *NABARD Occasional Paper.*

10. NABARD. (2018). *Farm loan waivers in India: Assessing impact and looking ahead.* National Bank for Agriculture and Rural Development.
11. RBI. (2017–2018). *Handbook of statistics on the Indian economy.* Reserve Bank of India.
12. RBI. (2020). *Master circular: Prudential norms on income recognition, asset classification and provisioning pertaining to advances.* Reserve Bank of India.
13. RBI. (2022). *Financial stability report.* Reserve Bank of India.
14. RBI. (2023). *Report on trend and progress of banking in India.* Reserve Bank of India.
15. Saini, S., Hussain, S., & Khatri, P. (2021). Farm loan waivers in India: Magnitude, impact, and lessons. *NABARD Working Paper Series.*
16. Selvarajan, B., & Vikkraman, G. (2013). A study on management of non-performing assets in priority sector reference. *International Journal of Finance & Banking Studies, 2*(1), 1–12.
17. Singh, J. (2013). Causes of defaults in agriculture sector loans: A study of willful default and loan waivers. *Journal of Rural Development Studies, 29*(4), 65–74.
18. Singh, V. R. (2016). Non-performing assets in priority sector: An empirical analysis of Indian banks. *International Journal of Commerce and Management Research, 2*(5), 1–6.
19. T. Chakraborty, & Gupta, A. (2017). Loan repayment behaviour of Indian farmer households. *International Journal of Social and Economic Research, 7*(2), 89–101.
20. Tripathi, R., & Syed, A. A. (2017). Priority sector lending and rising NPAs in India: An analysis of public sector banks. *International Journal of Business and Administration Research Review, 1*(17), 135–142.
21. T. K. Pradhan. (2012). Management of NPA in commercial banks in Odisha: An empirical analysis. *International Journal of Scientific and Research Publications, 2*(9), 1–6.
22. Kumari, A., & Garg, V. (2021). *Impact of credit on sustainable agricultural development in India.* Journal of Sustainable Finance & Investment**:** Maurya, S. K., & Vishwakarma, N. (2021). *Status of agricultural credit and indebtedness in India: An analysis.* Indian Economic Journal
23. Mishra, (2022). *Rainfall variability and agricultural loan defaults: Evidence from India.* (Journal / working paper).
24. Patil, S., & Deshmukh, R. (2023). *Institutional determinants of agricultural NPAs: A state-level panel analysis.* Journal of Rural Studies / Development.
25. *Agricultural credit and productivity across Indian states.* Journal of Public Affairs. Shivaswamy, G. P., et al. (2020). *Impact of institutional credit on agricultural productivity in India: A time-series analysis.* Indian Journal of Agricultural Sciences.