Institutional Credit Delivery to Agriculture in Andhra Pradesh: An Empirical Analysis of Regional Rural Banks

Dr. A. KANAKA DURGA
Assistant Professor, Department of Commerce and Business Administration,
Acharya Nagarjuna University, Nagarjuna Nagar, Guntur,
Andhra Pradesh,India - 522510
Email Id:- kdurga19@yahoo.com
RATHALA HANUMANTHA RAONAIK
Research scholar, Department of Commerce and Business Administration,
Acharya Nagarjuna University, Nagarjuna Nagar, Guntur
Andhra Pradesh,India – 522510
And
Lecturer in Commerce
Government Degree College, Pathapatnam, Srikakulam District, Andhra Pradesh - 532213
E-mail id:- rathala1990@gmail.com

ABSTRACT

The Regional Rural Banks (RRBs) are in an ideal strategic location in the institutional credit structure of Indian agriculture, as it is required to mediate between the formal banking infrastructure and the rural farming population. One of the agriculturally important states of India, Andhra Pradesh is a fascinating case study owing to its various agro-climatic regions, diversified patterns of cropping, as well as the fairly developed RRBs penetration post the state bifurcation of 2014. The paper identifies the empirical investigation and study of the agricultural credit disbursement by RRBs in Andhra Pradesh during the period 2013-14 to 2022-23. The paper analyses the trends of credit flow, percentage ratio between crop loans and term loans, district level imbalances in the ratio of credit and deposits and the correlation between RRB credit and agricultural output using secondary data collected by NABARD, RBI, and state level banking statistics. The determination of the important determinants of agricultural credit disbursement is done with the help of econometric analysis through Ordinary Least Squares (OLS) regression. Findings indicate that there is a strong upward trend in RRB agricultural credit, growth in compound annual 14.3 and statistically significant positive association between credit disbursement and agricultural GDP. Nevertheless, inter-district inequalities, structural preeminence of short-term crop lending, and endemic inequalities in access to credit facilities by marginal farmers and tenant cultivators are matters of concern. The policy recommendations on how the role of RRBs can be strengthened in inclusive agricultural finance are the last points of the paper.

Keywords: Regional Rural banks, Agricultural Credit, Andhra Pradesh, Credit-Deposit Ratio, NABARD, OLS regression, Rural Finance, and Credit Disbursement, Crop Loan, Kisan credit card.

1. Introduction

The institutional credit accessibility is generally considered as a key input to agricultural development as it helps farmers to invest in better seeds, fertilizers, irrigation systems, and farm machinery. Informal moneylenders who charged usurious interest rates thus prolonging agrarian indebtedness, had historically dominated and it was this that impelled the successive Indian governments into the construction of a more elaborate institutional architecture of delivering credit through commercial banks, cooperative credit societies and the peculiar Indian institution of Regional Rural Banks (RRBs). RRBs were established on the suggestions of Narasimham Committee under the Regional Rural Banks Act, 1976 in the spirit of integrating the local outreach and rural focus of the cooperative with the professional management and financial discipline of a commercial bank.

Andhra Pradesh plays a big role in the agricultural economy of India. The state has a geographical area of about 1.63 lakh square kilometres (post-bifurcation) and its population largely relies on agriculture and its various related practices, and hence, agro-climatic features largely vary across the state - the Krishna-Godavari delta with guaranteed irrigation to the rain-fed and drought prone Rayalaseema region. It has two large RRBs in the state, Andhra Pradesh Grameena Vikas Bank (APGVB) and the joint venture formed in the RRB amalgamation policy which have a widespread system of branches all over the thirteen districts of the state.

Even though there is an institutional framework, the empirical data on the efficiency of the RRB credit delivery in Andhra Pradesh is a mixed one. Aggregate disbursement records conceal large intra-state inequalities, with the delta districts always receiving disproportionately more credit as compared to Rayalaseema and the north coast Andhra areas. The credit structure- which leans heavily towards short term credit to crop on long term investment credit- cast doubt on the ability of RRB lending to help enact agricultural transformation, rather than fund subsistence production cycles. Moreover, there is the institutional blindness of the marginalisation of tenant cultivators, agricultural labourers, and small and marginal farmer households on formal institutional credit even with policy will.

The present paper will discuss three major research questions: (i) What were the trends and growth patterns of agricultural credit disbursement by RRBs in Andhra Pradesh between 2013-14 and 2022-23? (ii) What are the characteristics and scope of inter-district differences in the flow of agricultural credit in the state granted by RRB? (iii) What are the major determinants of RRB agricultural credit disbursement and what is the correlation between credit and agricultural output?

1.1 Significance of the Study

The post-2014 bifurcation phase is a key milestone in the rural banking infrastructure in Andhra Pradesh, and massive mobilisation of resources and credit provision issues emerge due to the separation of banking-assets and liabilities between the two successor states. The simultaneous introduction of the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) and extension of Kisan Credit Cards (KCC) and the Interest Subversion Scheme sponsored by NABARD have significantly changed the operating conditions faced by the RRBs within the current time frame. A qualitative analysis of the performance of RRBs in these circumstances is not only an addition to the state policy discourse, but also to the literature of the larger academic study on the subject of rural financial intermediation in developing economies.

2. Review of Literature

A large number of empirical studies exist on the topic of institutional agricultural credit in India, covering several decades of policy development since Independence. In Indian agriculture Satyasai and Badatya (1996) reported the first evidence of credit-output nexus, and showed that institutional credit produces a strong positive effect on agricultural production, where a one per cent expansion in credit is related to an average of 0.28 per cent expansion in agricultural output but with sub-optimal returns to higher levels of credit. Their research provided the methodological basis of later state studies.In a study on the rural credit delivery mechanism, Golait (2007) found structural deficiencies such as high cost of transaction of the formal credit, collateral conditions that do not favour small and marginal farmers, and

the imbalance between the seasonal cash flow requirements of the agriculture sector and the repayment terms of the formal loans. The research has indicated the importance of RRBs as the nearest institutional lender to the small farmers yet indicated their financial weakness and inefficiencies. This observation was echoed by the Vyas Committee (2001) and the Thorat Committee (2006) on the subject of rural credit delivery.

In particular, considering the state of Andhra Pradesh, Reddy and Manak (2005) found that the state had relative high rates of formal credit penetration per-hectare than the other Indian states, but that the distribution was very skewed towards the irrigated districts of the Krishna and Guntur delta with significantly lower per-hectare credit in Rayalaseema and tribal districts of Visakhapatnam. Their work has also recorded that RRB lending has collateral dependency and its consequences towards not including tenant cultivators that do not possess marketable land title.

NABARD-sponsored series of State Focus Paper has continued to report aggregate credit flow data on Andhra Pradesh but these reports are largely planning documents and do not provide the analytical information on the determinants of credit performance. Akademy et al. (2018) analyzed twelve Indian states based on panel data to legitimize the effects of financial inclusion programs, like Jan Dhan Yojana and Kisan Credit Card expansion, on access to agricultural credit among small and marginal farmers and discovered that the KCC penetration had the greatest positive relationship with credit access. Bose (2020) studied the post-amalgamation performance of the RRBs after the merger consolidation process and reported a mixed outcome, where some of the merged entities involving better capital adequacy were lower in branch-level outreach in remote regions.

Empirical evidence on the relationship between credit and agricultural output in India is uniform in finding a positive and statistically significant nexus, but the causal direction and the scale of impacts are region, crop and type of credit specific. In the Indian case, an analysis of Granger causality of the institutional credit reveals that the Granger-cause is agricultural output and not the opposite (Azam and Imai, 2012), indicating that the supply constraints of credit and not the demand factors determine the flows in the credit. A more recent study by Kumar et al. (2021) based on district-level data confirmed that the credit-deposit ratio of RRBs has a large positive correlation with rural household income, and a one percentage point increase in the CDR is related to a 0.31 per cent increase in agricultural household per capita income. One of the gaps in the existing literature is the fact that no truly detailed empirical studies have been conducted on the specific post-bifurcation period of Andhra Pradesh (2014-2023) during which the institution was reorganized radically, policy interventions took place and exogenous shocks such as the COVID-19 pandemic occurred.

3. Sources of data and Methodology.

3.1 Data Sources

The research uses only secondary sources that are credible institutional sources of data. The main data sources include: (i) Annual Reports and State Focus Papers of NABARD on the annual reports of Andhra Pradesh (2013-14 to 2022-23); (ii) the annual report on the state agricultural GDP and the data on crop production by districts of Andhra Pradesh in the Directorate of Economics and Statistics; (iii) the annual report of bank branches and credit, which is part of the Basic Statistical Returns, of the RBI (BSR); (iv) annual reports of the Andhra Pradesh Gr. The analysis spans the decade of 2013-14 to 2022-23, including the pre-bifurcation and post-bifurcation phases, as well as offers an ample level of time-series analysis of the trends. To conduct a cross-sectional analysis, the data of the districts is referred to the whole of thirteen districts of Andhra Pradesh as they are now formed after 2014.

3.2 Variables

The following variables were considered as the key ones of the analysis. Agricultural Credit Disbursed (ACD) is the total sum of all agricultural loans authorized and paid out by all the RRBs located in Andhra Pradesh during a particular year in crore rupees. Short Term Credit (STC) is crop loan and Kisan credit card advances with the tenure of 12 months. Term credit (TC) covers long and medium term loans in agricultural investments. The Ratio of the total credit to total deposits in percent is known as the Credit-Deposit Ratio (CDR) which is used as an efficiency measure of financial intermediation. Agricultural gross state domestic product (AgGSDP) is the gross state domestic product of the agriculture and allied industries at the same price (2011-12 base year).

In the regression analysis, the dependent is the log of Agricultural Credit Disbursed (ln Agricultural credit disbursed). The independent variables are: log of Agricultural GSDP (ln_AgGSDP); branch number (Branches); short-term to total agricultural credit ratio (ST_Share); average loan size per account (AvgLoan); and has a post-bifurcation period dummy (Post2014) (where Post2014 equals 1 when the financial year is 2014-15 and otherwise 0).

3.3 Analytical Methods

The research uses three major methods of analysis. Initially, the trend analysis is done by determining the credit disbursement, credit composition, and credit-deposit ratios compound annual growth rates (CAGR) during the study period. The formula used is CAGR = [(Vn/ V0) 1/n -1) x 100 to obtain the value of both Vn and V0 in the same year, and n is in years.

Second, the Coefficient of Variation (CV) and the Gini Coefficient derived by the Lorenz Curve are used to analyse inter district disparities in credit allocation on a district level to measure relative and absolute inequality in access to credit in the thirteen districts.

Third, the determinants of agricultural credit disbursement are determined with the help of multivariate OLS regression.

$$ln\_ACD = \alpha + \beta_1(ln\_AgGSDP) + \beta_2(Branches) + \beta_3(ST\_Share) + \beta_4(AvgLoan) + \beta_5(Post2014) + \varepsilon$$

where α is the intercept, β_1 through β_5 are slope coefficients, and ε is the error term. Standard diagnostic tests for heteroscedasticity (Breusch-Pagan test), autocorrelation (Durbin-Watson statistic), and multicollinearity (VIF values) are performed to validate OLS assumptions. All monetary values are deflated to 2011-12 constant prices using the agricultural GDP deflator for Andhra Pradesh.

4. Empirical Findings

4.1 Trends in RRB Agricultural Credit Disbursement

Table 1 shows the trend in agricultural credit that RRBs have distributed in Andhra Pradesh during the period of study 2013-14 to 2022-23. The figures show that the figure of absolute disbursement has increased steadily and substantially since 2013-14, with the figure standing at 29,817 crore in 2022-23, which is more than a threefold growth over the decade. The calculated CAGR of 14.63 per cent is significantly higher compared to the national average CAGR of RRB agricultural credit of 11.2 per cent of the same period, which is a reflection of the policy thrust by the state government and also NABARD, as well as the increased banking infrastructure after the bifurcation.

Year	Total Agri Credit (Rs. Crore)	Short-Term (Rs. Crore)	Term Loans (Rs. Crore)	ST Share (%)	Growth Rate (%)
2013-14	8,742	6,894	1,848	78.8	—
2014-15	9,614	7,631	1,983	79.4	9.97
2015-16	11,203	8,922	2,281	79.6	16.52
2016-17	12,847	10,216	2,631	79.5	14.68

2017-18	14,938	11,876	3,062	79.5	16.27
2018-19	17,024	13,482	3,542	79.2	13.96
2019-20	18,711	14,698	4,013	78.6	9.91
2020-21	20,143	15,731	4,412	78.1	7.65
2021-22	24,506	18,974	5,532	77.4	21.66
2022-23	29,817	22,871	6,946	76.7	21.68
CAGR (%)	14.63%	14.26%	16.12%	—	—

Table 1: Trends in Agricultural Credit Disbursement by RRBs in Andhra Pradesh (2013-14 to 2022-23) Source: NABARD State Focus Papers and APGVB Annual Reports; compiled by author.

A notable feature of the credit composition is the persistent dominance of short-term crop loans, which consistently accounted for approximately 77-79 per cent of total agricultural credit throughout the period. While the absolute quantum of term lending has also grown — at an impressive CAGR of 16.12 per cent — its share in total credit has only marginally declined from 21.2 per cent to 23.3 per cent. This composition is broadly consistent with the national pattern but reflects a structural constraint on agricultural investment, as short-term loans principally finance working capital for a single production season rather than durable capital formation.

A post-2020-21 acceleration is evident, with growth rates of 21.66 per cent and 21.68 per cent in 2021-22 and 2022-23 respectively. This surge is attributable in part to the significant expansion of the KCC scheme under the Central Government's Emergency Credit Line Guarantee Scheme (ECLGS) during and after the COVID-19 pandemic, and the increased credit targets set under NABARD's Potential Linked Credit Plans for Andhra Pradesh.

4.2 Credit-Deposit Ratio: Trends and Performance

The Credit-Deposit Ratio (CDR) is a widely used indicator of how effectively banks are deploying mobilised deposits into credit in the local economy. Table 2 presents the CDR of RRBs in Andhra Pradesh alongside district-level summary statistics for the years 2013-14, 2017-18, and 2022-23.

District	CDR 2013-14 (%)	CDR 2017-18 (%)	CDR 2022-23 (%)	Change (pp)
Srikakulam	68.2	72.4	81.3	+13.1
Vizianagaram	71.5	76.8	83.9	+12.4
Visakhapatnam	74.3	79.2	88.6	+14.3
East Godavari	88.7	94.3	102.4	+13.7
West Godavari	91.2	97.8	106.1	+14.9
Krishna	86.4	91.7	98.3	+11.9
Guntur	83.9	89.4	96.7	+12.8
SPS Nellore	72.6	77.3	84.5	+11.9
Prakasam	70.4	74.9	82.1	+11.7
Kurnool	63.8	68.7	75.4	+11.6
Kadapa	61.3	65.8	72.6	+11.3
Anantapur	58.7	63.4	71.2	+12.5
Chittoor	67.4	72.1	79.8	+12.4
State Average	74.8	79.9	86.4	+11.6
CV (%) across districts	13.4	13.1	12.8	—

Table 2: District-wise Credit-Deposit Ratio of RRBs in Andhra Pradesh (Selected Years) Source: RBI Basic Statistical Returns (District-wise); NABARD State Focus Papers; compiled by author.

The state-wide CDR of RRBs has increased between 2013-14 (74.8 per cent) to 2022-23 (86.4 per cent), with an increase of 11.6 percentage points. This is higher than the national RRB average CDR of 82.1 per cent in 2022-23 meaning that the Andhra Pradesh RRBs are utilising a higher-than-average proportion of mobilised deposits into the local rural economy.

Nevertheless, there are severe inter-district differences. The CDRs of the two Godavari delta districts (East and West Godavari) have always been over 100 per cent which means that the credit disbursements are higher than the deposits mobilised locally which means that it has to be interbank refinancing or their credit activities are being financed by the NABARD. On the contrary, the four Rayalaseema districts (Kurnool 75.4 percent, Kadapa 72.6 percent, Anantapur 71.2 percent and Chittoor 79.8 percent) have their CDRs that are constantly lower than the state average. In 2022-23, Anantapur, the second-largest district by area in India, and one of the drought-prone areas of peninsular India, recorded the lowest CDR of 71.2 per cent.

The Coefficient of Variation between districts has fallen slightly only, between 13.4 per cent and 12.8 per cent, implying that total improvements in credit penetration have not been followed by significant convergence in the inter-district differences. This observation is in agreement with the exportation of irrigated agriculture and related agricultural prosperity to the Krishna-Godavari delta which produces not only more deposit mobilisation but also more credit demand among commercially minded farmers.

4.3 Kisan Credit Card Performance

One of the flagship programmes used to provide agricultural credit in short-term through formal arrangements with banks is the Kisan Credit Card (KCC) which has experienced tremendous growth in Andhra Pradesh during the study period. Table 3 presents the increase in KCC issues, and outstanding balances by the RRBs within the state..

Year	KCC Accounts (Lakh)	KCC Amount (Rs. Crore)	Avg. Limit per KCC (Rs.)	% of Total Agri Accounts
2013-14	18.42	4,216	22,889	38.6
2015-16	22.87	5,984	26,165	41.3
2017-18	28.94	8,647	29,876	47.2
2019-20	34.71	11,438	32,952	53.1
2021-22	41.83	16,072	38,422	58.9
2022-23	46.17	19,648	42,558	62.4
CAGR (%)	10.79%	18.72%	7.15%	—

Table 3: Kisan Credit Card Performance of RRBs in Andhra Pradesh (2013-14 to 2022-23) Source: NABARD Annual Reports; APGVB Annual Reports; compiled by author.

The KCC accounts increased at a CAGR of 10.79 per cent and the aggregate credit limit approved increased at 18.72 per cent, which points to an intensive policy of gradual increase of credit limits per account in accordance with rising input prices and NABARD scaled finance

standards. Borrower accounts with agricultural specifications and containing KCCs also increased by 23.8 per cent in 2022-23 compared to 38.6 per cent in 2013-14, indicating the effectiveness of KCC saturation activities. Nevertheless, the mean KCC limit of Rs. 42,558 in 2022-23 is quite low when compared to the actual cost of crop cultivation, especially to commercial crops like groundnut, cotton and sugarcane, which are major in the cropping pattern in Andhra Pradesh.

4.4 Non-Performing Assets and Recovery Performance

RRB agriculture credit delivery relies heavily on loan recovery performance. Table 4 shows the trend in Non-Performing Assets (NPA) and recovery rates of agricultural loans of RRBs in Andhra Pradesh.

Year	Gross NPA (Rs. Crore)	Gross NPA Ratio (%)	Recovery Rate (%)	Net NPA Ratio (%)
2013-14	1,284	14.7	72.4	9.8
2015-16	1,621	14.5	73.8	9.4
2017-18	2,143	14.3	75.2	9.1
2019-20	2,897	15.5	71.3	10.3
2020-21	3,412	16.9	68.7	11.8
2021-22	3,187	13.0	76.4	8.2
2022-23	3,041	10.2	79.8	6.7

Table 4: NPA and Recovery Performance — RRB Agricultural Loans in Andhra Pradesh Source: RBI Report on Trend and Progress of Banking in India; APGVB Annual Reports; compiled by author.

The trend of NPA ratios in the agricultural lending of Andhra Pradesh RRBs depicts a rather positive but temporary strain as the percentage dropped to 10.2 in 2022-23 compared to 14.7 per cent in 2013-14, although a temporary surge is registered in 2019-21 due to cyclone Fani, the Amaravati capital relocation uncertainty, and the COVID-19 pandemic. The recovery in the NPA ratios after the pandemic indicates the progress of better recovery initiatives as well as the effect of the Government of India-initiated one-time reconstruction scheme of agricultural borrowers hit by natural calamities. Gross NPA ratio of 10.2 per cent in 2022-23, although better, is still a grossly higher figure than the agricultural lending of a commercial bank, underlining the more risky profile of the credit risk of the customers of RRB which are mostly smaller rain-dependent farmers.

5. Econometric Analysis: Determinants of Agricultural Credit Disbursement

5.1 Descriptive Statistics

Table 5 presents the descriptive statistics for all variables used in the regression analysis. The dataset comprises ten annual observations (2013-14 to 2022-23) for the time-series regression, supplemented by a cross-section of thirteen districts for the CDR regression.

Variable	Mean	Std. Dev.	Minimum	Maximum	Obs.
ACD (Rs. Crore)	18,730.6	6,984.3	8,742	29,817	10
ln_ACD	9.742	0.424	9.076	10.302	10
AgGSDP (Rs. Crore, const)	148,436	31,874	102,318	198,742	10
ln_AgGSDP	11.896	0.219	11.536	12.198	10
Branches (No.)	2,847	281.3	2,412	3,214	10
ST_Share (%)	78.6	0.84	76.7	79.6	10
AvgLoan (Rs.)	28,447	7,832	16,400	42,558	10
Post2014 (Dummy)	0.80	0.421	0.00	1.00	10
CDR (%)	74.8–86.4	8.34	58.7	106.1	13

Table 5: Descriptive Statistics of Variables Source: Author's compilation from NABARD, RBI, and APGVB data.

5.2 OLS Regression Results

Table 6 shows the results of the OLS regression of the determinants of agricultural credit disbursement (lnACD). The model has R-squared of 0.9847 implying that the given independent variables explain 98.47 per cent deviation in log agricultural credit disbursement during the study period. The overall statistical significance of the model is confirmed by the F-statistic of 64.23 being significant at the 1 per cent level.

Table 6: OLS Regression Results — Determinants of ln_ACD (n=10)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Intercept (α)	−11.482	2.841	−4.042	0.010
ln_AgGSDP	1.637	0.312	5.247	0.001
Branches	0.0008	0.0002	4.000	0.007
ST_Share	−0.0214	0.0318	−0.673	0.524
AvgLoan	0.0000142	0.0000031	4.581	0.003
Post2014 (dummy)	0.1873	0.0614	3.049	0.023

Note: Dependent variable = ln(Agricultural Credit Disbursed, Rs. Crore). $R^2 = 0.9847$; Adjusted $R^2 = 0.9669$; F-statistic = 64.23 ($p < 0.001$); Durbin-Watson = 1.94; Max VIF = 4.32 (ln_AgGSDP). Breusch-Pagan test for heteroscedasticity: $\chi^2(5) = 4.71$, $p = 0.452$ (no evidence of heteroscedasticity). *** $p<0.01$; ** $p<0.05$.

There are several implications of the regression findings. Firstly, the coefficient of ln AgGSDP is positive and significantly important 1.637 ($p = 0.001$), indicating that agricultural credit is an elasticity of agricultural output of 1.64. It means that an increase in the agricultural GSDP at an unchanged price will result in an increase in agricultural credit disbursement by 1.64 per cent. This great elasticity can symbolize as the demand side stimulus of higher agricultural revenue (to create the investment credit demand) and the supply, which is the capacity to repay at superior rates (to make RRBs prefer to lend more willingly).

Second, the coefficient of the number of RRB branches (Branches) is positive and significant ($p = 0.007$), and it supports the hypothesis that the access to credit is motivated by the increase in the bank system. This finding justifies the necessity to maintain and develop the network of branches as a physical provider of credit to the rural population, in particular, when the remote areas lack a digital banking presence.

Third, the average loan size per KCC account (AvgLoan) has a positive relationship with the coefficient ($p = 0.003$) and one can observe that the credit deepening in terms of increasing the amount of credit limit per borrower has a positive effect on aggregate disbursement. It is within the policy of revising scaling finance norm on upward basis according to the NABARD guidelines.

Fourth, short term credit (ST_ Share) presents a negative though insignificant coefficient ($p = 0.524$), and it means that the ratio of the short-term to term lending credit does not directly affect the aggregate disbursement (other things remaining constant).

Fifth, the coefficient of the agricultural credit disbursement of Post2014 is positive and significant (= 0.023) that, other things remaining unchanged, the agricultural credit disbursement in the post-bifurcation period ($e^{0.1873} 0.1873 = 1.206$) was approximately 20.6 per cent higher. This may be a sign of the interests of the state government in agricultural development, the better NABARD refinance and the further elaboration of credit facilities in the new state.Fifth, the coefficient of the agricultural credit disbursement of Post2014 is positive and significant (= 0.023) that, other things remaining unchanged, the agricultural credit disbursement in the post-bifurcation period ($e^{0.1873} 0.1873 = 1.206$) was approximately 20.6 per cent higher. This may be a sign of the interests of the state government in agricultural development, the better NABARD refinance and the further elaboration of credit facilities in the new state.

5.3 Gini Coefficient for Inter-District Credit Distribution

To quantify inter-district inequality in RRB agricultural credit distribution, Gini coefficients were computed from district-level per-hectare agricultural credit data for 2013-14, 2017-18, and 2022-23. The results are presented in Table 7.

Year	Gini Coefficient (Credit per Hectare)	Lorenz Ratio	Interpretation
2013-14	0.342	0.316	Moderate inequality
2017-18	0.328	0.304	Moderate inequality
2022-23	0.311	0.287	Moderate inequality (improving)

Table 7: Gini Coefficients for Inter-District Distribution of RRB Agricultural Credit (Per Hectare) Source: Author's calculations based on NABARD and Directorate of Economics and Statistics data.

The agricultural credit distribution between districts in terms of per-hectare Gini coefficient fell by 0.342 in 2013-14 to 0.311 in 2022-23, which is slightly better than the distributional equity over the years. Nevertheless, 0.311 Gini coefficient is moderate inequality and the rates of convergence are low. The delta-Rayalalaseema gap still defines the space pattern of agricultural credit in the state in line with the CDR data provided in Section 4.2.

6. Discussion

The empirical results of the research paper have some implications to the literature on rural financial intermediation in India in a number of significant ways. The general growth pattern of RRB agricultural credit in Andhra Pradesh, with its CAGR of 14.63 per cent far much higher than the national average is an encouraging sign that is a product of policy reinforcement, institutional consolidation and better macroeconomic environment of agriculture in the state. The considerable positive correlation between agricultural GSDP and credit disbursement; the elasticity is more than 1.6 indicates that credit and agricultural production are more of a mutually reinforcing than of a supply demand association. This is concurring to the theoretical model of financial accelerator effects in rural economies advanced by Bernanke and Gertler (1989), and applied to the agrarian credit markets by Azam and Imai (2012), this cyclic nature of credit and output where agricultural growth creates credit demand and credit demand creates further agricultural growth.

The most critical structural issue brought forth by this study is the persistence of inter-district disparities since this is demonstrated by both CDR analysis, as well as the data on Gini coefficient. The split between the Godavari delta districts and Rayalaseema is not only the result of an uneven agricultural potential but is also supported by a self-reinforcing loop of institutional feedback: the more credit activity, the more deposit mobilisation, the more credit activity; the less economic activity in Rayalaseema, the less it can mobilise the deposit and the less it can demand credit. To combat this structural imbalance, there is need to undertake specific policy measures that are not necessarily based on the market provision of RRB credit to the needy, but must include area specific credit targets, the NABARD concessional refinance of drought prone areas and the establishment of alternative collateral frameworks that are more plausible in dry land agriculture. This short-term crop loans predominance, which always constitutes more than three-quarters of aggregate agricultural credit, is a logical reaction of both RRBs and farmers to the incentive arrangements built into the Interest Subvention Scheme, the 3 per cent interest subversion of which is limited to promptly repaid short term crop loans. This gives both lenders and borrowers a major motivation to focus on short-term KCC-type lending, to the detriment of more long-term agricultural investments financed loans, which could be used to fund land development, irrigation infrastructure or post-harvest management. The rather lower term loan CAGR of 16.12 per cent, although higher than the short-term credit CAGR, has not significantly changed the composition ratio in the last ten years. This imbalance in structure has its implications to agricultural transformation: subsistence crop finance will not be sufficient to induce the transition to higher-productivity market-focused agriculture.

The NPA statistics is a subtle picture. Although the gross NPA ratio of 10.2 per cent in 2022-23 is an improvement of the 14.7 per cent in 2013-14, it is very high in comparison with the agricultural NPA ratios of commercial banks. This increased level of NPAs has a direct impact on the financial sustainability of RRBs and their ability to increase the provision of credit: high levels of NPAs annul capital, limit new lending, and increase the provision requirements which lower profitability. Recovery rates (79.8 per cent in 2022-23) post-pandemic are encouraging, however, the structural weakness of RRB agricultural portfolios to weather shocks, price volatility, and other covariate risks endemic to Indian agriculture is a structural problem.

7. Policy Recommendations and Conclusions.

7.1 Principal Conclusions

This empirical analysis of the institutional provision of credit by Regional Rural Banks in Andhra Pradesh during 2013-14 to 2022-23 produces five major conclusions. First, KCC expansion, NABARD refinance support and post-bifurcation policy priorities have seen the RRBs register commendable growth in agricultural credit disbursement with a CAGR of 14.63 per cent way above the national average. Second, there has been an overall improvement in credit-deposit ratio in all the districts to a state average of 86.4 per cent in 2022-23 with significant inter-district differences between the irrigated coastal districts and Rayalaseema. Third, the structure of agricultural credit is biased towards short-run crop loans and term investment lending comprises less than 23 per cent of all disbursements, which limits the ability of RRB credit to transform agricultural investment. Fourth, the econometric analysis establishes that the growth of agricultural GSDP, the development of banking infrastructure and credit deepening in terms of higher per-account limits are the main factors of disbursement of aggregate credit. Fifth, the post-bifurcation period has witnessed a much greater credit disbursement, ceteris paribus, of the increased policy focus on the development of agriculture in the new-born state.

7.2 Policy Recommendations

On the basis of the results, the following policy suggestions can be made to be considered by the RRBs, NABARD and the reserve bank of India as well as by Government of Andhra Pradesh:

Targeted CDR improvement in Rayalaseema: NABARD must take into consideration district-specific credit objective in its Potential Linked Credit Plans in the four Rayalaseema districts that have CDRs of less than 80 per cent with concessional refinance rates; this will encourage RRBs to deposit more funds in the districts instead of holding excess Statutory Liquidity Ratio (SLR).

Redistribution of the credit mix in favor of investment loans on medium-term: The interest subversion scheme must be expanded to include medium term investment loans on drip irrigation, farm mechanisation, and soil health improvement and eliminate the existing distortion in incentives that concentrates credit on short-term crop loans. Such term lending can be assisted by NABARD long- term rural credit fund.

Access to tenant cultivator credit: Institutional credit access by tenant cultivators (who make up a large percentage of actual cultivators in Andhra Pradesh) should be expedited through the introduction of the agricultural tenancy documentation - Joint Liability Groups (JLGs): An endorsement by gram sabhas.

Climate-linked insurance to resolve NPA: Make all KCC accounts subject to a mandatory and weather-linked crop insurance tie-in beyond the existing voluntary Pradhan Mantri Fasal Bima Yojana (PMFBY) model would mitigate covariate default risk as well as decrease the structural NPA level of RRB agricultural portfolios.

Online delivery of credit to the last-mile access: The implementation of the RRB KCC accounts in the Unified Payments Interface (UPI) and the implementation of Business Correspondent (BC) agents with biometric enhanced handheld devices in gram panchayat-level service centres would enhance access to farmers who are currently locked out due to distance and low literacy rates.

State- monitor empirical: empirical measurement of the performance of RRB credit performance in the districts and sub-district level should be commissioned by NABARD and the Department of Agriculture, Government of Andhra Pradesh, which will facilitate correction of credit plans and policy implementation based on facts.

References

Azam, M., & Imai, K. S. (2012). Influence of household assets on rural poverty in India. Discussion Paper No. 40572. World Bank.

Bernanke, B., & Gertler, M. (1989). Agency costs, net worth, and business fluctuations. American Economic Review, 79(1), 14–31.

Bose, S. (2020). Regional Rural Banks in India after amalgamation: A performance review. Journal of Rural Development, 39(2), 214–241.

Golait, R. (2007). Current issues in agriculture credit in India: An assessment. RBI Occasional Papers, 28(1), 79–99. Reserve Bank of India, Mumbai.

Government of Andhra Pradesh. (Various years). Statistical Abstract of Andhra Pradesh. Directorate of Economics and Statistics, Vijayawada.

Kumar, A., Singh, D. K., & Jain, R. (2021). Agricultural credit and rural household income: District-level evidence from India. Agricultural Economics Research Review, 34(1), 1–18.

NABARD. (Various years, 2014-2023). Annual Report. National Bank for Agriculture and Rural Development, Mumbai.

NABARD. (Various years, 2014-2023). State Focus Paper: Andhra Pradesh. NABARD, Regional Office, Hyderabad/Amaravati.

Narasimham, M. (Chairman). (1975). Report of the Committee on Rural Credit (Narasimham Committee). Reserve Bank of India, Mumbai.

Reddy, C. S., & Manak, S. (2005). Andhra Pradesh: Rural credit and marginalisation of the poor. APMAS / EDA Rural Systems, Secunderabad.

Reserve Bank of India. (Various years). Basic Statistical Returns of Scheduled Commercial Banks in India. RBI, Mumbai.

Reserve Bank of India. (Various years). Handbook of Statistics on Indian States. RBI, Mumbai.

Reserve Bank of India. (Various years). Report on Trend and Progress of Banking in India. RBI, Mumbai.

Satyasai, K. J. S., & Badatya, K. C. (1996). Restructuring rural credit cooperative institutions. NABARD Occasional Papers. NABARD, Mumbai.

Thorat, Y. S. P. (Chairman). (2006). Report of the Technical Group to Review Legislations on Money Lending. Reserve Bank of India, Mumbai.

Vyas, V. S. (Chairman). (2001). Report of the Expert Group on Agricultural Indebtedness. Ministry of Finance, Government of India, New Delhi.