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Status of institutional agricultural credit in Guntur district of Andhra Pradesh

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ABSTRACT

The study examined the status of institutional agricultural credit in Guntur district of Andhra Pradesh during 2014–15 to 2024–25 using secondary data. Compound Annual Growth Rate (CAGR), Coefficient of Variation (CV), Cuddy–Della Valle Instability Index (CDVI), credit gap, credit adequacy ratio and multiple regression analysis were employed. The results revealed that total institutional agricultural credit increased from Rs. 2,850 crore in 2014–15 to Rs. 7,860 crore in 2024–25, showing a CAGR of 10.68 per cent. Commercial banks accounted for the largest share of institutional agricultural credit in 2024–25 (57.63%), followed by cooperative banks (25.45%) and Regional Rural Banks (16.92%). Credit supply grew faster than credit demand, resulting in an improvement in the credit adequacy ratio from 87.85 per cent in 2014–15 to a peak of 99.10 per cent in 2020–21, before declining to 96.38 per cent in 2024–25. The number of institutional bank branches increased steadily, with rural branches recording relatively higher growth than urban branches. Total overdues increased by 293.85 per cent during the study period, compared with a 175.79 per cent increase in total loan disbursement, indicating deterioration in repayment performance. The first-difference regression analysis revealed that the annual change in agricultural credit demand was positively and significantly associated with the annual change in institutional agricultural credit supply. The findings emphasize the need for demand-based credit planning, adequate and timely credit disbursement, strengthened rural banking outreach, and effective credit monitoring and recovery mechanisms to improve the sustainability of institutional agricultural credit delivery.

Key Words: *Agricultural credit, Credit adequacy, Credit gap, Institutional finance, Overdues and Regional Rural Banks*

Agriculture continues to play an important role in the Indian economy by contributing to food security, employment and rural livelihoods. The increasing use of modern agricultural technologies, mechanization, improved seeds, fertilizers, irrigation and plant protection measures has increased the financial requirements of farmers. Consequently, timely and adequate institutional agricultural credit has become an important input for supporting agricultural production, investment and farm income. Institutional agricultural credit plays an important role in reducing farmers' dependence on informal sources of finance. Commercial banks, cooperative banks and Regional Rural Banks (RRBs) constitute the major institutional agencies providing agricultural credit in India. Policy initiatives such as Priority Sector Lending, the Kisan Credit Card (KCC) Scheme, interest subvention programmes and financial inclusion measures have contributed to improving farmers' access to formal credit and supporting agricultural investment (Gaikar *et al*., 2021; Kumar *et al*., 2021).

Despite the expansion of institutional agricultural credit, challenges related to adequacy and repayment continue to influence the agricultural credit system. Agricultural credit requirements have increased due to rising input costs, revisions in the scale of finance, mechanization and changes in cropping patterns (Chavan, 2020). The extent to which institutional credit supply meets these requirements is important for assessing credit adequacy. At the same time, increasing overdues may adversely affect repayment performance and the

sustainability of institutional lending. Therefore, an assessment of institutional agricultural credit needs to consider not only the growth in credit flow but also the demand–supply gap, credit adequacy, banking outreach and repayment performance.

Guntur district of Andhra Pradesh is an agriculturally important district characterized by diversified cropping systems and an extensive institutional banking network comprising commercial banks, cooperative banks and RRBs. Although institutional agricultural credit has expanded over time, district-level empirical evidence integrating agency-wise credit flow, estimated credit demand and supply, credit adequacy, banking outreach, repayment performance and factors associated with changes in credit supply is limited. Most existing studies have examined agricultural credit at broader national or state levels, leaving scope for a district-level assessment of the dynamics of institutional agricultural credit.

Against this background, the present study examines the status of institutional agricultural credit in Guntur district of Andhra Pradesh during 2014–15 to 2024–25. Specifically, the study analyses the agency-wise flow and share of institutional agricultural credit; estimates credit demand, supply, credit gap and credit adequacy; examines growth and instability in credit demand and supply; assesses the expansion of rural and urban bank branches; analyses trends in loan disbursement and overdues; and examines the factors associated with year-to-year changes in institutional agricultural credit supply. The findings are expected to provide useful insights for improving credit planning, banking outreach, repayment performance and the sustainability of institutional agricultural credit delivery.

MATERIAL AND METHODS

Study Area

The study was conducted in Guntur district of Andhra Pradesh, an agriculturally important district characterized by diversified cropping systems and an extensive institutional banking network. Commercial banks, cooperative banks and Regional Rural Banks (RRBs) constitute the major institutional agencies providing agricultural credit to the farming community in the district.

Data Sources

The study was based on secondary data covering the period from 2014–15 to 2024–25. Data on institutional agricultural credit, loan disbursement, bank branches and overdues were compiled from the District Level Bankers' Committee (DLBC), State Level Bankers' Committee (SLBC), National Bank for Agriculture and Rural Development (NABARD), Directorate of Economics and Statistics, Government of Andhra Pradesh, and published reports of commercial banks, cooperative banks and Regional Rural Banks. Crop area statistics were obtained from the Directorate of Economics and Statistics, while the scale of finance for major crops was obtained from the District Level Technical Committee (DLTC).

Estimation of Agricultural Credit Demand

Agricultural credit demand was estimated based on the area under major crops and the corresponding Scale of Finance approved by the District Level Technical Committee (DLTC). It was estimated as:

$$\textbf{Credit Demand} = \textbf{Sum of } (\textbf{Area under each crop} \times \textbf{Scale of Finance for the respective crop})$$

Estimation of Agricultural Credit Supply

Institutional agricultural credit supply was measured as the total agricultural loans disbursed by commercial banks, cooperative banks and Regional Rural Banks operating in Guntur district.

Credit Gap and Credit Adequacy

The credit gap was estimated as the difference between agricultural credit demand and institutional credit supply:

$$\textbf{Credit Gap} = \textbf{Credit Demand} - \textbf{Credit Supply}$$

A positive credit gap indicates that institutional credit supply was lower than the estimated credit requirement.

The credit adequacy ratio was calculated as:

$$\textbf{Credit Adequacy Ratio } (\%) = (\textbf{Credit Supply / Credit Demand}) \textbf{ x 100}$$

A higher ratio indicates a greater proportion of the estimated agricultural credit requirement being met through institutional sources.

Compound Annual Growth Rate

The Compound Annual Growth Rate (CAGR) was estimated to examine the growth in institutional agricultural credit, credit demand and supply, bank branches and other selected indicators during the study period. CAGR was calculated as:

$$\mathbf{CAGR} = \left[\left(\frac{\mathbf{Y_n}}{\mathbf{Y_0}}\right)^{\frac{1}{n}} - \mathbf{1}\right] \times \mathbf{100}$$

where,

Y_0 = value in the initial year; Y_n = value in the final year; and n = number of time intervals.

Coefficient of Variation and Instability

The Coefficient of Variation (CV) was used to measure variability in agricultural credit indicators:

$$\boldsymbol{CV}(\%) = \frac{\boldsymbol{SD}}{\boldsymbol{x}} \times \mathbf{100}$$

where

SD is the standard deviation and $\bar{x}$ is the mean.

Since CV does not account for the underlying trend in a time series, the Cuddy–Della Valle Instability Index (CDVI) was also estimated:

$$\mathbf{CDVI} = \mathbf{CV} \times \sqrt{(\mathbf{1} - \mathbf{R^2})}$$

Where:

CDVI = Cuddy–Della Valle Instability Index

CV = Coefficient of Variation

R^2 = Coefficient of determination from the time-trend regression

where is the coefficient of determination obtained from the time-trend regression. A higher CDVI indicates greater trend-adjusted instability.

Overdue Ratio

Repayment performance was assessed using the overdue ratio:

$$\textbf{Overdue Ratio}\ (\%) = (\textbf{Total Overdues} \div \textit{Total Loan Disbursement}) \times \mathbf{100}$$

A higher overdue ratio indicates a greater proportion of disbursed institutional loans remaining overdue.

Regression Analysis

Multiple regression analysis was employed to examine the factors associated with changes in institutional agricultural credit supply. Preliminary examination of the variables expressed in levels revealed strong common time trends and high multicollinearity. Therefore, based on the preliminary diagnostic results, the regression model was re-specified in first differences to reduce trend-induced multicollinearity and examine year-to-year changes in institutional agricultural credit supply

The regression model was specified as

$$\mathbf{\Delta CS_t = \beta_0 + \beta_1 \Delta CD_t + \beta_2 \Delta OR_t + \beta_3 D_t + \varepsilon_t}$$

where,

ΔCS_t = Annual change in institutional agricultural credit supply (Rs. crore), ΔCD_t = Annual change in agricultural credit demand (Rs. crore), ΔOR_t = Annual change in overdue ratio (percentage points) D_t = Loan-waiver dummy variable (1 = loan-waiver period; 0 = otherwise), β_0= Intercept, β_1 ,β_2, β_3 = regression coefficients, and ε_t = Random error term.

As first differencing requires two consecutive annual observations, the 11-year time series yielded 10 observations for the regression analysis.

Regression Diagnostics and Statistical Analysis

The regression model was subjected to diagnostic tests to address the concerns regarding model specification. Variance Inflation Factors (VIFs) were estimated to assess multicollinearity among the explanatory variables. The Durbin–Watson statistic and Breusch–Godfrey LM test were used to examine residual autocorrelation, while the Breusch–Pagan test was employed to test for heteroskedasticity. The significance of individual regression coefficients was assessed using the t-test, while the overall significance of the model was examined using the F-test. Model fit was assessed using R^2 and adjusted R^2. Statistical significance was evaluated at the 1, 5 and 10 per cent levels. Descriptive and growth measures were calculated using Microsoft Excel, while regression

Table 1. Agency-wise Flow and Share of Institutional Agricultural Credit in Guntur District

Year	Commercial Banks (₹ crore)	Share (%)	Cooperative Banks (₹ crore)	Share (%)	RRBs (₹ crore)	Share (%)	Total Credit (₹crore)
2014–15	1,620	56.84	780	27.37	450	15.79	2,850
2015–16	1,780	57.05	840	26.92	500	16.03	3,120
2016–17	1,960	57.31	900	26.32	560	16.37	3,420
2017–18	2,180	57.22	980	25.72	650	17.06	3,810
2018–19	2,450	57.51	1,070	25.12	740	17.37	4,260
2019–20	2,710	57.42	1,190	25.21	820	17.37	4,720
2020–21	2,980	57.53	1,310	25.29	890	17.18	5,180
2021–22	3,310	57.47	1,460	25.35	990	17.19	5,760
2022–23	3,700	57.63	1,630	25.39	1,090	16.98	6,420
2023–24	4,100	57.58	1,810	25.42	1,210	16.99	7,120
2024–25	4,530	57.63	2,000	25.45	1,330	16.92	7,860
CAGR (%)	**10.83**		**9.87**		**11.45**		**10.68**

estimation and diagnostic tests were performed using R software (version 4.5.3)

RESULTS AND DISCUSSION

Flow of Institutional **Agricultural Credit in Guntur District**. Table 1 presents the agency-wise flow and percentage share of institutional agricultural credit in Guntur district during 2014–15 to 2024–25. Total institutional agricultural credit increased from [1] 2,850 crore rupees in 2014–15 to Rs.7,860 crore rupees in 2024–25, with a CAGR of 10.68 per cent, indicating substantial expansion in formal agricultural credit during the study period.

Commercial banks remained the major source of institutional agricultural credit, with their share increasing marginally from 56.84 per cent in 2014–15 to 57.63 per cent in 2024–25. Cooperative banks accounted for 27.37 per cent of total credit in 2014–15, which declined to 25.45 per cent by 2024–25. The share of RRBs increased from 15.79 per cent to 16.92 per cent over the same period. Although RRBs accounted for a relatively smaller share, they exhibited the highest CAGR of 11.45 per cent , followed by commercial banks (10.83%) and cooperative banks (9.87%). These results indicate the continuing dominance of commercial banks along with the growing contribution of RRBs to agricultural credit delivery in the district.

Demand and Supply of Institutional **Agricultural Credit in Guntur District.** The demand for agricultural credit was estimated by multiplying the area under major crops by the scale of finance approved by the District Level Technical Committee (DLTC). The supply of agricultural credit was measured in terms of total agricultural loans disbursed by institutional agencies. The difference between estimated credit demand and actual credit supply was considered as the credit gap. The demand and supply of institutional agricultural credit in Guntur district during 2014–15 to 2024–25 were presented in Table 2.

Credit demand increased from Rs. 2,123.50 crore in 2014–15 to Rs. 3,379.09 crore in 2024–25, representing an overall increase of 59.13 per cent.

Institutional credit supply increased from Rs. 1,865.40 crore in 2014–15 to Rs. 3,256.80 crore in 2024–25, representing an increase of 74.59 per cent. The credit gap declined from Rs. 258.10 crore in 2014–15 to Rs. 25.05 crore in 2020–21, but subsequently increased to Rs. 122.29 crore in 2024–25. The credit adequacy ratio correspondingly improved from 87.85 per cent in 2014–15 to 99.10 per cent in 2020–21, before declining moderately to 96.38 per cent in 2024–25. Overall, the results indicated a substantial improvement in institutional credit coverage during the study period, although a small gap between estimated credit demand and supply persisted.

Table 3 presents the growth and instability in agricultural credit demand, supply and credit gap

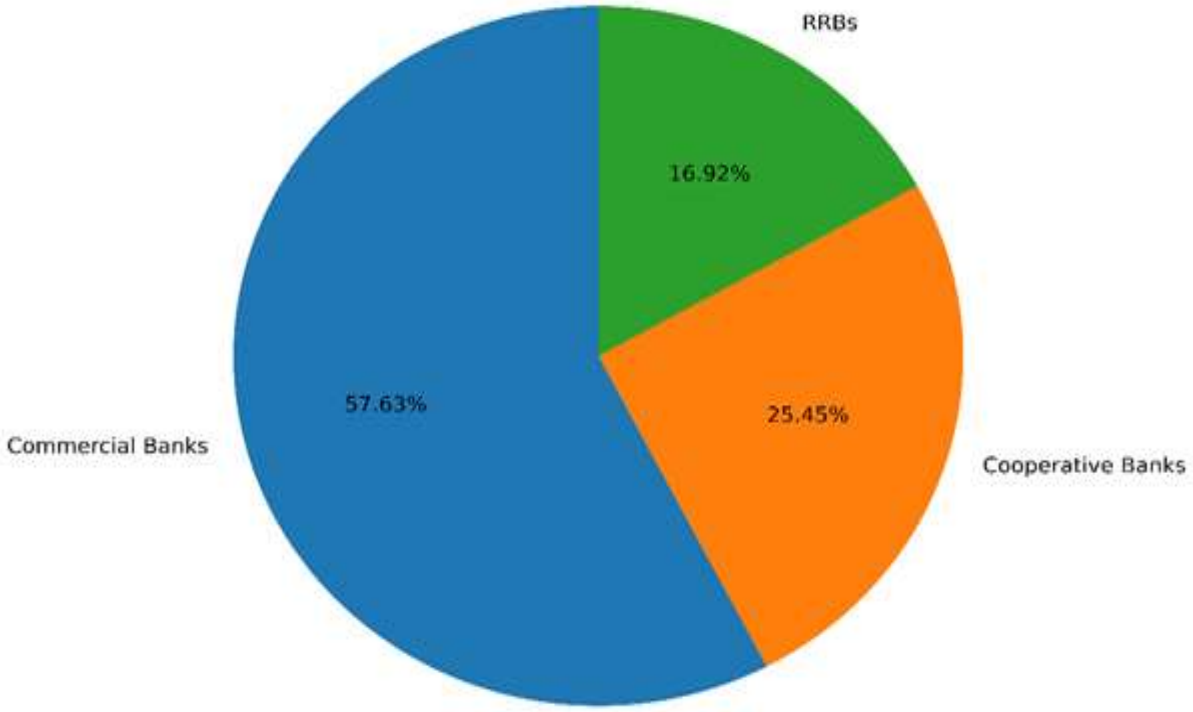


Fig. 1. Agency-wise share of institutional agricultural credit in Guntur district, 2024–25

Table 2. Demand and Supply of Institutional Agricultural Credit in Guntur District (2014 –15 to 2024–25)

Year	Credit Demand (₹ crore)	Credit Supply (₹ crore)	Credit Gap (₹ crore)	Credit Gap (%)	Credit Adequacy Ratio (%)
2014–15	2,123.50	1,865.40	258.1	12.15	87.85
2015–16	2,225.69	1,978.20	247.49	11.12	88.88
2016–17	2,319.78	2,115.60	204.18	8.8	91.2
2017–18	2,428.44	2,284.30	144.14	5.94	94.06
2018–19	2,556.84	2,468.90	87.94	3.44	96.56
2019–20	2,678.00	2,645.20	32.8	1.22	98.78
2020–21	2,779.65	2,754.60	25.05	0.9	99.1
2021–22	2,920.23	2,876.40	43.83	1.5	98.5
2022–23	3,061.52	2,984.80	76.72	2.51	97.49
2023–24	3,209.44	3,112.60	96.84	3.02	96.98
2024–25	3,379.09	3,256.80	122.29	3.62	96.38
Change (%)	59.13	74.59	−52.62		

Table 3. Growth and Instability in Demand and Supply of Agricultural Credit

Particulars	CAGR (%)	CV (%)	CDVI (%)
Credit Demand	4.76	16.25	3.82
Credit Supply	5.74	18.43	4.25
Credit Gap	-7.16	48.62	11.37

during the study period. Credit supply showed a higher CAGR (5.74%) than credit demand (4.76%), indicating that institutional credit disbursement expanded faster than the estimated credit requirement. Consequently, the credit gap showed a negative CAGR of 7.16 per cent, indicating an overall contraction in the demand–supply gap during the study period.

The CV was 16.25 per cent for credit demand and 18.43 per cent for credit supply, while the corresponding CDVI values were relatively low at 3.82 and 4.25 per cent, respectively. This indicates that much of the observed variation in demand and supply was associated with their underlying growth trends, with relatively low instability after adjusting for the trend. In contrast, the credit gap showed a substantially higher CV (48.62%) and CDVI (11.37%), indicating greater year-to-year instability in credit gap.

Table 4 presents the expansion of institutional bank branches in Guntur district during 2014–15 to 2024–25. The total number of branches increased from 412 in 2014–15 to 546 in 2024–25, showing a CAGR of 2.85 per cent, indicating a gradual expansion of banking infrastructure during the study period. Rural branches increased from 238 to 318, with a CAGR of 2.95 per cent, while urban branches increased from 174 to 228, showing a CAGR of 2.74 per cent.

Rural branches constituted the major share of the banking network throughout the study period, increasing marginally from 57.77 per cent in 2014–15 to 58.24 per cent in 2024–25, while the share of urban branches declined marginally from 42.23 to 41.76 per cent. The slightly higher growth and share of rural branches indicated a relatively greater expansion of banking infrastructure in rural areas, which is important for improving the physical outreach of institutional financial services to the farming community.

Table 5 presents the trend in institutional loan disbursement and overdues in Guntur district during 2014–15 to 2024–25. Total loan disbursement

Table 4. Expansion of Institutional Bank Branches in Guntur District

Year	Rural Branches	Rural Share (%)	Urban Branches	Urban Share (%)	Total Branches
2014–15	238	57.77	174	42.23	412
2015–16	246	58.02	178	41.98	424
2016–17	254	57.99	184	42.01	438
2017–18	262	57.84	191	42.16	453
2018–19	270	58.06	195	41.94	465
2019–20	279	58.13	201	41.88	480
2020–21	286	58.13	206	41.87	492
2021–22	294	58.1	212	41.9	506
2022–23	302	58.3	216	41.7	518
2023–24	311	58.24	223	41.76	534
2024–25	318	58.24	228	41.76	546
CAGR (%)	**2.95**		**2.74**		**2.85**

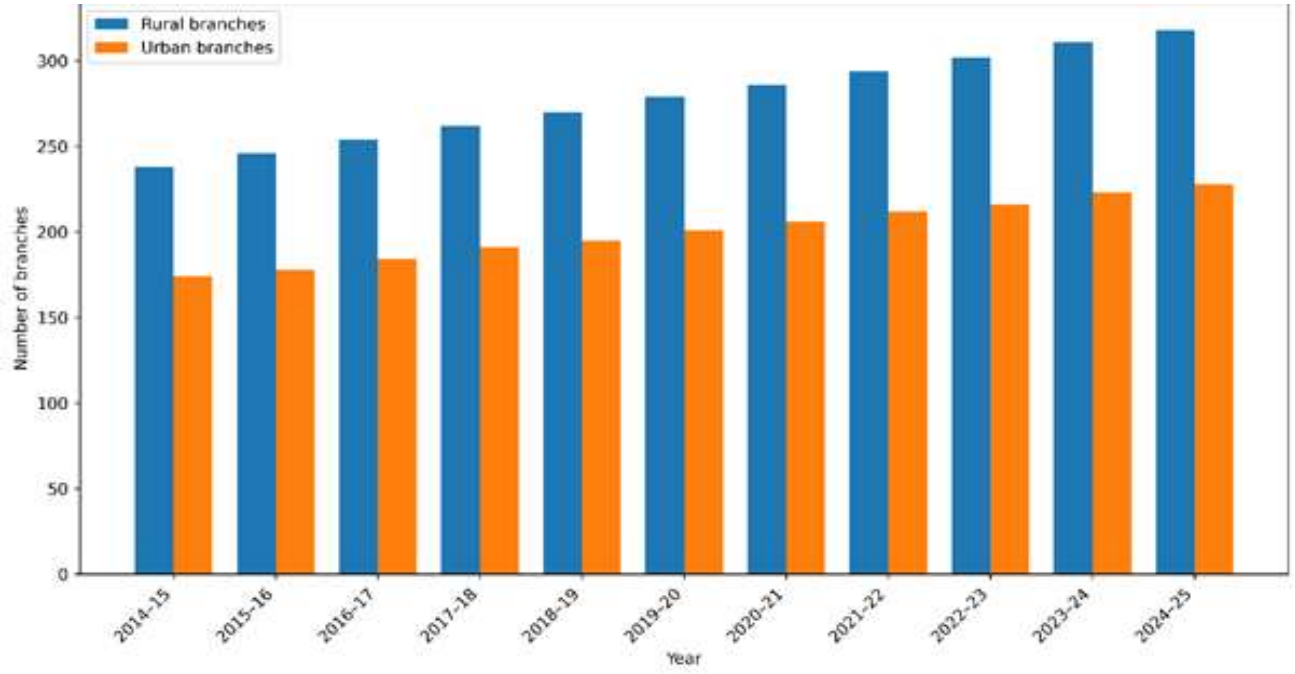


Fig. 2. Expansion of rural and urban institutional bank branches in Guntur district (2014–15 to 2024–25)

Table 5. Trend in Institutional Loan Disbursement and Overdues in Guntur District (2014–15 to 2024–25)

Year	Agricultural Productive Loan Disbursement (₹ Crore)	Non-Agricultural Loan Disbursement (₹ Crore)	Total Disbursement (₹Crore)	Agricultural overdue (₹Crore)	Non-Agricultural overdue (₹ Crore)	Total overdue (₹ Crore)	Overdue Ratio (%)
2014–15	1,885	965	2,850	215	110	325	11.4
2015–16	2,065	1,055	3,120	248	125	373	11.96
2016–17	2,270	1,150	3,420	285	157	442	12.92
2017–18	2,530	1,280	3,810	338	191	529	13.88
2018–19	2,840	1,420	4,260	392	223	615	14.44
2019–20	3,150	1,570	4,720	455	278	733	15.53
2020–21	3,460	1,720	5,180	502	308	810	15.64
2021–22	3,840	1,920	5,760	585	356	941	16.34
2022–23	4,290	2,130	6,420	632	393	1,025	15.97
2023–24	4,760	2,360	7,120	715	461	1,176	16.51
2024–25	5,240	2,620	7,860	775	505	1,280	16.28
Change (%)	177.98	171.5	175.79	260.47	359.09	293.85	4.88

increased from Rs. 2,850 crore in 2014–15 to Rs. 7,860 crore in 2024–25, representing an overall increase of 175.79 per cent. Agricultural loan disbursement constituted the major component and increased by 177.98 per cent, from Rs. 1,885 crore to Rs. 5,240 crore, while non-agricultural loan disbursement increased by 171.50 per cent, from Rs. 965 crore to Rs. 2,620 crore.

Overdues increased at a considerably faster rate than loan disbursement. Total overdues increased from Rs. 325 crore to Rs. 1,280 crore, representing an increase of 293.85 per cent during the study

Table 6. Regression Estimates for Changes in Institutional Agricultural Credit Supply in Guntur District

Variable	Coefficient	Standard Error	t-value	p-value	VIF
Constant	−46.837	167.567	−0.280	0.789	—
Change in Agricultural Credit Demand (₹ crore)	4.722***	1.177	4.011	0.007	1.68
Change in Overdue Ratio (percentage points)	−46.109	47.556	−0.970	0.37	2.44
Loan Waiver Dummy	−74.974	56.696	−1.322	0.234	1.79
R^2	0.911				
Adjusted R^2	0.867				
F-value	20.569***			0.0015	
Durbin–Watson statistic	2.122				
Breusch–Godfrey LM test (p-value)	0.423				
Breusch–Pagan test (p-value)	0.987				

period. Agricultural overdues increased by 260.47 per cent, from Rs. 215 crore to Rs. 775 crore, while non-agricultural overdues showed a relatively higher increase of 359.09 per cent, from Rs. 110 crore to Rs. 505 crore. Correspondingly, the overdue ratio increased from 11.40 per cent in 2014–15 to 16.28 per cent in 2024–25, an increase of 4.88 per cent, although year-to-year fluctuations were observed. The ratio reached its highest level of 16.51 per cent in 2023–24.

Overall, the substantially higher increase in total overdues (293.85%) compared with total loan disbursement (175.79%) indicatesd a deterioration in repayment performance during the study period. The results highlight the need for strengthening credit monitoring and loan recovery mechanisms to ensure the sustainability of institutional lending.

Factors Influencing Institutional Agricultural Credit Supply in Guntur District

To examine the factors associated with institutional agricultural credit supply, preliminary diagnostic assessment of the variables expressed in levels revealed strong common time trends and high multicollinearity. Therefore, the regression model was specified in first differences to reduce trend-induced multicollinearity and examine year-to-year changes in institutional agricultural credit supply.

The factors influencing institutional agricultural credit supply in Guntur district are presented in Table 6.

The change in agricultural credit demand was the only statistically significant variable, with a positive coefficient of 4.722, significant at the 1 per cent level ($p = 0.007$). This indicated that a Rs. 1 crore increase in the annual change in agricultural credit demand was associated with an increase of about Rs. 4.72 crore in the annual change in institutional agricultural credit supply, other factors remaining constant. The result indicated that institutional credit supply responded positively to changes in agricultural credit requirements during the study period.The model showed a good fit ($R^2 = 0.911$; adjusted $R^2 = 0.867$) and was statistically significant ($F = 20.569$, $p < 0.01$). The VIF values (1.68–2.44) indicated the absence of problematic multicollinearity. Further, the Durbin–Watson statistic (2.122) and Breusch–Godfrey test ($p = 0.423$) indicated no evidence of autocorrelation, while the Breusch–Pagan test ($p = 0.987$) indicated no evidence of heteroskedasticity.

CONCLUSION

The study examined the status of institutional agricultural credit in Guntur district of Andhra Pradesh during 2014–15 to 2024–25. Institutional agricultural credit increased substantially during the study period, with commercial banks accounting for the largest share, while Regional Rural Banks exhibited the highest growth rate. Credit demand increased during the study period, while credit supply increased at a

faster rate, leading to an overall improvement in credit adequacy; however, a positive credit gap persisted throughout the study period.

The expansion of rural bank branches indicated improvement in the physical outreach of institutional banking services. However, total overdues increased at a considerably faster rate than loan disbursement, accompanied by an increase in the overdue ratio from 11.40 per cent to 16.28 per cent, indicating deterioration in repayment performance. The revised regression analysis revealed that the change in agricultural credit demand was positively and significantly associated with the change in institutional agricultural credit supply. The diagnostic tests confirmed the absence of problematic multicollinearity, autocorrelation and heteroskedasticity in the revised model.

The finding suggest the need for demand-based credit planning, adequate and timely credit disbursement, strengthening of rural banking outreach, and effective credit monitoring and recovery mechanisms. These measures would help improve credit adequacy, repayment performance and the sustainability of institutional agricultural credit delivery in the district.

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