

Effects of Institutional Agricultural Credit on Agriculture of in India

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ABSTRACT

This study examined the nature of relationship between institutional agricultural credit and agricultural gross value added in India, using the time series data covering the period from 2011-12 to 2021-22. The study used the Ordinary Least Square (OLS) estimation technique to assess the effect of institutional credit on agricultural output in India. The findings from the investigation suggest that over this period, all selected independent variables significantly and positively impacted the agricultural output. But all other things remain constant; individually, a 10 percent increase in institutional production (short term) credit and medium-term/long-term credit led to the rise of 4.5 percent and 1.1 percent in the agricultural output, respectively. Thus, institutional credit seems to be an effective tool for agricultural growth, but its effectiveness is weakened by improper utilization and low productivity. Further results showed that the government expenditure on agriculture positively and significantly affected the agricultural output by 1.9 percent.

Keywords: Institutional Credit, Agricultural Gross Value Added, Agricultural growth in India.

INTRODUCTION

Agriculture is considered an essential building block of the Indian economy. The sector has been playing a very crucial role in employment, poverty reduction, and food security in India. Notwithstanding its contribution, the sector faces multiple constraints in various stages (Chatterjee & Oza, 2017). One of the main constraints is access to formal sector institutional credit. Farmers, mainly marginal and small farmers, often have access to non-institutional credit sources, even though they are usurious because they are easy to access comparatively (Kumar et al., 2007; Sidhu & Gill, 2006). To address the above challenges Government of India (GoI) introduced RRBs, Kisan Credit Card and other financial

inclusion policies such as Pradhan Mantri Jan Dhan Yojana and the Pradhan Mantri Mudra Yojana. It resulted in a continuous increase in institutional credit to the agriculture sector. Despite this increase, the Agricultural Gross Value Added (AGVA) as a percentage of total Gross Domestic Product (GDP) stagnantly remained low, 18.3 per cent, 17.6 percent, 18.3 percent, 20 percent, 18.6 percent only from the past five years (Agricultural Statistics at a Glance 2021). This observed phenomenon in institutional credit and agricultural gross value added raises the question of whether the credit had really impacted the agriculture sector. A profound analysis of the credit type, production (Short Term) credit, and Medium-term/Long-term credit discloses a significant degree of disparity with the greater share of production

(ST) credit. It raises another question of whether imbalance causes the irresponsiveness of AGVA in India at a macro level. Thus, the primary objective of the study is to investigate the impact of institutional agricultural credit on agricultural growth in India. Particularly this study seeks to 1) Examine the impact of institutional short-term agricultural credit on India's agricultural output. 2) Assess the impact of institutional medium/long-term agricultural credit on India's agricultural output. 3) Determine the impact of the government's expenditure in the sector on agricultural production in India.

MATERIALS AND METHODS

The study mainly relied upon secondary data. The time-series data were collected on an annual basis from Agricultural Statistics at a Glance 2021, Department of Agriculture, Cooperation & Farmers Welfare Directorate of Economics and Statistics, GoI. This study adopted descriptive and analytical methods in analyzing and estimating the causal relationship between independent variables and dependent variable. The descriptive methodology employed descriptive statistics, simple tables, and graphs to analyze the trend performance of the variables. Further, to estimate the relationship among the chosen variables, Ordinary least square (OLS) estimation techniques were used with the help of a statistical package for social sciences (SPSS) version 25. An increase in credit to the agriculture sector by the financial institutions paves the way to invest in the industry, which leads to a rise in the Indian agriculture sector. Based on this, the study quantified agriculture sector production as a linear function of Production (ST) credit, MT/LT credit provided by the formal institutions and government expenditure on agriculture. It is considered the agriculture

output as a dependent variable and is being proxied by the Agriculture Gross valued Added (AGVA). Based on these factors, the functional model for this study is

$$AGOUT = f(ISTC, IMT/LTC, GEXPA)$$

The estimated form of the model is

$$AGOUT = a_0 + a_1 ISTC + a_2 IMT/LTC + a_3 GEXPA + U$$

$$\text{LOG}(AGOUT) = a_0 + a_1 \text{LOG}(ISTC) + a_2 \text{LOG}(IMT/LTC) + a_3 \text{LOG}(GEXPA) + U$$

Where;

AGOUT= Agricultural output measured by AGVA in India.

ISTC = Institutional Production (short-term) credit to the agriculture sector in India.

IMT/LTC = Institutional Medium term/ Long term credit to agriculture sector in India.

GEXPA = Government expenditure on Agriculture in India.

a_0 = The autonomous intercept.

a_1 to a_3 = Parameter to be estimated.

U = Random error term.

RESULTS AND DISCUSSIONS

Table 1 Data presentation on selected variables

(Rupees in crore)				
Year	AGVA	ISTC	IMT/LTC	GEXPA
2011-12	1501947	396158	114871	16753.1
2012-13	1675107	473500	133875	18028.38
2013-14	1926372	548435	181687	19027.58
2014-15	2093612	635412	209916	19513.58
2015-16	2227533	665312	250197	15333.92
2016-17	2518662	689457	376298	37029.81
2017-18	2829826	753214	409403	37538.77
2018-19	3029925	752209	504620	46583.5
2019-20	3358364	825151	567578	94251.62
2020-21	3609494	893757	681641	108272.8
2021-22	3964312	720736	476369	118294.2

Source; Agricultural Statistics at a Glance 2021.

Table 2 Descriptive statistics for model variables (Rupees in crore)

Variables	Mean	SD	Mini.	Max.
Agriculture GVA	2612286.73	812910.49	1501947	3964312
Institutional production (ST)	668485.55	148441.05	396158	893757
Credit to Agriculture				
Institutional MT/LT Credit to Agriculture	355132.27	190011.07	114871	681641
Government total expenditure on Agriculture	48238.84	39417.10	15333.92	118294.20

Source: Authors' Calculation.

Table 2 Shows that the agriculture GVA for the period under review averaged 2612286.73 crore rupees, institutional production (ST) term and MT/LT credit to the sector averaged 668485.55 and 355132.27 crore rupees respectively. The GOI's total expenditure on agriculture averaged 48238.84 crore rupees. The distribution of institutional credit to agriculture between production (ST) and MT/LT has been uneven, where a major share is given to production (ST) purposes. The short-term credit increases input use (Fertilizers, pesticides and seeds) but it doesn't increase the

agricultural output (Narayanan, S. 2016). Therefore, along with the short-term credit, the MT/LT credit lending rates should also pace up to increase the adoption of modern methods and technology to improve agricultural productivity. The sector performed well in 2021-22, with the highest gross value added of 3964312 crore rupees. GOI had spent significantly less, i.e., 15333.92 crore rupees in 2015-16, whereas in 2021-22, 118294.20 crore rupees have been spent in the sector, which is the highest compared to all other years.

Table 3 Student t-test results

Institutional Credit	N	Mean	St. Deviation	t value	Sig.
ISTC	11	668485.55	148441.05	4.310	0.0003
IMT/LTC	11	355132.27	190011.07		

Source: Authors' calculation

The results obtained from the t-test are summarized in table 3. The independent sample t-test results revealed that the t value was 4.310 and the calculated p-value of 0.0003, which is lesser than the 0.05 significance level; it indicates a significant

difference between the means of IST and IMT/LTC. Therefore, it can be inferred that the formal institutions have lent more short-term credits than the medium-term/long-term credit to the agriculture sector.

Table 4 Pattern of the flow of Institutional credit to the agriculture sector

(Rupees in crore)

Year	Production (ST) Credit			MT/LT Credit		
	Co-operative Banks	RRBs	CBs	Co-operative Banks	RRBs	CBs
2011-12	81829	47401	266928	6134	7049	101688
2012-13	102592	55957	314951	8611	7724	117540
2013-14	113574	70697	364164	6389	11956	163342
2014-15	130350	89326	415736	8119	13157	188640
2015-16	143803	101579	419930	9492	17681	223024
2016-17	131880	105001	452576	10878	18215	347205
2017-18	136102	119790	497322	14219	21426	373758
2018-19	142750	125654	483805	9591	24013	471017
2019-20	148287	138069	538795	9080	27257	531241
2020-21	558121	179267	156369	636583	11415	33643
2021-22	462501	134579	123656	436368	12484	27517
Total	2151789	1167320	4034232	1155464	172377	2578615

Source: Agricultural Statistics at a Glance 2021

From Table 4, it is evident that commercial banks have lent the highest production (ST) credit, *i.e.*, 4034232 crore rupees to the sector, followed by co-operative banks and RRBs with 2151789 and 1167320 crore rupees, respectively. In MT/LT credit, again commercial banks are the leading banks followed by co-operative banks and RRBs in terms of lending to the sector. Here RRBs have to penetrate their role in lending to the

sector since they have been established in rural areas and one of the main reasons is to grant the loan for agriculture purposes in India. From figure 1, it is clear that there is a massive difference in production (ST) credit and MT/LT credit over the period of time. It also shows a steep down in the distribution of the institutional output (ST) credit and MT/LT credit to the sector during 2021-22.

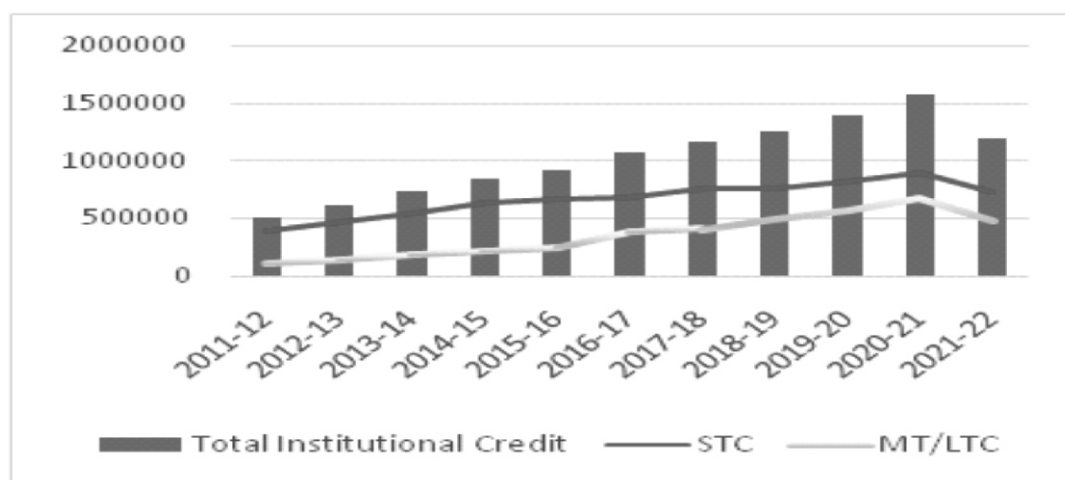


Figure 1 Flow of institutional credit to the agriculture sector.

Table 5 ANOVA Results

Groups	Sum of squares	df	Mean square	F	Sig.
Between Groups	385816826544.061	2	192908413272.030	12.725	0.000
Within Groups	454778482996.182	30	15159282766.539		
Total	840595309540.242	32			

Source: Authors' calculation

As ANOVA results are shown in Table 5, there is a significant difference between the co-operative banks, RRBs and commercial banks' short-term credit to the agriculture sector. The result is evident from the calculated p-value of 0.000, which is lesser than the 0.05 significance level. Thus, one among the co-operative banks, RRBs, and

commercial banks' lending amount is different from others. However, which financial institution is lending the highest short-term credit to the sector is not clear from the ANOVA results. Thus, Least Significant Difference (LSD) test is employed in the following section to find the difference among the financial institutions.

Table 6 Post Hoc test Result

(Mean Difference in crore Rupees)

(I) Parameters	(J) Parameters	Mean Difference (I-J)	Std. Error	Sig.
Cooperative Banks	RRBs	89497.18182	52499.84029	0.099
	CBs	-171131.18182*	52499.84029	0.003
RRBs	Cooperative Banks	-89497.18182	52499.84029	0.099
	CBs	-260628.36364*	52499.84029	0.000
CBs	Cooperative Banks	171131.18182*	52499.84029	0.003
	RRBs	260628.36364*	52499.84029	0.000

*. The mean difference is significant at the 0.05 level.

The short-term institutional credit by the different financial institutions has been compared through the LSD multiple comparison test in Table 6. The results clearly show that commercial banks are significantly lending the highest amount of short-term credit than the co-operative banks and RRBs.

Though co-operative banks lent more short-term credit than the RRBs, it is statistically insignificant. Therefore, co-operative banks and RRBs have to penetrate their short-term lending to the sector as they are easily accessible by the rural population and intendedly established to lend to the sector.

Table 7 ANOVA Results

Groups	Sum of squares	df	Mean square	F	Sig.
Between Groups	266115155485.273	2	133057577742.636	5.161	0.012
Within Groups	773412498706.909	30	25780416623.564		
Total	1039527654192.182	32			

Source: Authors' calculation

It is apparent from Table 7 that the mean difference of medium-term/long-term credit by the financial institutions significantly differs

since the calculated p-value, i.e., 0.012, is less than the 0.05 significance level in the ANOVA results. But which financial

institutions' credits have significantly differed is not clear from the ANOVA results. Therefore, to do multiple comparisons LSD test is conducted as a post hoc analysis. Further analysis showed in table No.8 that on average, commercial banks' medium-term/long-term credit is more than the cooperative banks' and RRBs' credit. Still, the

difference is only significant against the RRBs' credit, not of cooperative banks' credit. Therefore, it can also be interpreted that the commercial banks have distributed more medium-term/long-term credit to the agriculture sector than the cooperative banks and RRBs in the reference period.

Table 8 Post Hoc Test Results

(Mean Difference in crore Rupees)

(I) Parameters	(J) Parameters	Mean Difference (I-J)	Std. Error	Sig.
Cooperative Banks	RRBs	89371.54545	68464.21311	0.202
	CBs	-129377.36364	68464.21311	0.068
RRBs	Cooperative Banks	-89371.54545	68464.21311	0.202
	CBs	-218748.90909*	68464.21311	0.003
CBs	Cooperative Banks	129377.36364	68464.21311	0.068
	RRBs	218748.90909*	68464.21311	0.003

*. The mean difference is significant at the 0.05 level.

Table 9 Model Summary

Model	Sum of squares	df	Mean of square	F	Sig.
Regression	0.982058	3	0.327353	61.042349	0.000022
Residual	0.037539	7	0.005363		
Total	1.019597	10			

Source: Authors' Calculation

Table 10 Empirical Results

Dependent variable: LOG(AGVA)				
Variables	Coefficient	Std. error	t-Statistic	Prob.
Constant	5.250	3.508	1.496	0.178
LOG(ISTC)	0.450	0.428	1.052	0.328
LOG (IMT/LTC)	0.111	0.235	0.471	0.652
LOG (GEXPA)	0.196	0.079	2.473	0.043
R-Squared	0.963183	Adjusted R-Squared	0.947404	
Durbin-Watson stat	2.017735			

Source: Authors' Calculation.

To determine the presence/absence of autocorrelation in the selected variables Durbin-Watson (DW) statistic was employed. The calculated DW value of 2.017735 (Table No. 5) lies between 1.5 to 2.5; it implies no

autocorrelation between the successive observation of the model.

Table 9 presents a calculated $F(3,7) = 61.042349$ and a p-value of 0.000022, which is lesser than the significance level of 0.05; it

indicates that institutional production (ST) credit, institutional medium term/long term credit to the sector and the government expenditure on the agriculture can play a significant role in bringing the short-run changes in the Indian agricultural output during the reference period. Table No. 5 specified the high value of R-Squared of 0.963183 and Adjusted R-Squared of 0.947404 revealed that the model has a goodness of fit on the estimation. Moreover, adjusted R-Squared 0.963183 illustrates the 96 percent systematic variation in the dependent variable (AGVA) due to changes in the independent variables (ISTC, IMT/LTC and GEXPA). The statistical significance of the overall model confirms that there is a high degree of a linear relationship between the variables. This also implied that all explanatory variables have a combined effect on the explained variable.

As mentioned in Table No.10 estimated regression line of the constant term has a positive intercept value of 5.250 which means that all explanatory variables cause a 5.250 percent change in the agricultural output, given the condition that all things remain equal. The positive sign of the coefficient of institutional production (ST) credit and institutional MT/LT credit shows the existence of a positive relationship between the ISTC, IMT/LT credit and agricultural output (AGVA) in India. This means that other factors remain the same; a percentage increase in ISTC and IMT/LT credit will lead to a 0.450 percent and 0.111 percent increase in the Indian agriculture output respectively. Even though both types of institutional credit positively affect the dependent variable, the effect is statistically insignificant in the reference period. The positive sign of government expenditure on agriculture revealed a positive relationship between GEXPA and the agricultural output in India. This means that a

percentage increase in GEXPA will lead to a 0.196 percent increase in the Indian agriculture output., *ceteris paribus*.

CONCLUSION

Despite an increase in efforts by the GoI to increase access to agricultural credit through the formal institutions' disbursements, the growth in agriculture output continues to be stagnant. Timely and sufficiently available agricultural credit makes all activities in the farm possible and leads to an increase in agricultural production. Corresponding to the perception, the study aims to ascertain the impact of institutional credit on the agricultural output in India. The study found that institutional production (ST) credit and MT/LT credit have a positive role in agricultural output performance. The study's outcomes exhibited that the institutional production (ST) credit has a higher impact on AGVA than MT/LT credit, as it has the lion's share in the total institutional credit. The model results of the positive effect of institutional credit, but statistical insignificance demands more allocation of formal sector credit to agriculture in India; simultaneously, the lending institutions have to follow up on whether the given credits are being used for agriculture purposes only. This can be achieved through the active involvement of formal financial institutions in India. Further investigation revealed that government expenditure on agriculture through the various schemes have a positive and significant effect on agricultural output in India. Therefore, it is suggested to come up with new schemes which can revamp the agriculture sector in India.

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