

# Institutional Credit to Agriculture Sector : A Study of its Impact on the Agriculture Sector of India

Rahul Singhal<sup>1</sup>  
Prateek Gupta<sup>2</sup>

## Abstract

Agriculture is one of the most prominent sectors of India's economy. Agriculture sector is providing employment to more than 50% of India's workforce and more than 60% of India's population is directly or indirectly dependent on it. Institutional credit always plays a crucial role in the economic development of any sector. In this study, we have analyzed the role of institutional credit on the economic growth of the agriculture sector of India. Along with institutional credit, role of area cultivated, consumption of fertilizers, and production of agriculture in economic growth of the agriculture sector were studied. For analyzing the data, correlation matrix, Philips – Perron test, and Cobb – Douglas function were applied. The results revealed that institutional credit and area cultivated had a positive and significant impact on the growth of the agriculture sector of India. The study further suggested changes in government policies to promote the agriculture sector as a business venture, and institutional credit to the agriculture sector should also be sanctioned by private banks other than public sector banks.

**Keywords :** agriculture credit, agriculture sector, growth, institutional credit, GVA, production

**JEL Classification :** G2, M2, O4

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Agriculture is the backbone of any economy. In India, the agriculture sector has always been an economic sector that lays foundation for the sustainable growth of other economic sectors (Mohan, 2004). The agriculture sector's contribution in India's GDP was approx 52% in 1950 – 51 and in 2018 – 19, it was approx 14% (Ministry of Statistics and Programme Implementation, 2019). This decrease of the agriculture sector's contribution in India's GDP is constant on a year to year basis, although the stream of credit to agriculture area has expanded substantially (Narayanan, 2015). Primary roles of the agriculture sector in Indian economy are to promote inclusive growth, increase rural income, and provide sustainable food security. Approximately 60% of the Indian population is dependent on the agriculture sector and it accounts for approx 14% of India's exports.

Since independence, production of agriculture produces has witnessed significant growth. There is extreme need of shifting from traditional subsistence nature of agriculture to commercialization of the agriculture sector. Earlier, the prime objective was to increase production, and extension activities were limited to providing physical inputs like fertilizers, seeds, etc. Now, the focus has shifted from providing physical inputs to educating

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<sup>1</sup> Assistant Professor, Ajay Kumar Garg Institute of Management, 27th KM Milestone Delhi Meerut Expressway, Ghaziabad – 201 009, Uttar Pradesh. (Email : rahul.singhal@akgim.edu.in) ; ORCID iD : 0000-0002-2672-8521

<sup>2</sup> Associate Professor, KIET Group of Institutions, Delhi NCR Meerut Road (NH 58) Ghaziabad -201 206, Uttar Pradesh. (Email : dr.prateekgupta@gmail.com) ; ORCID iD : 0000-0001-6641-268x

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farmers about market conditions and latest technologies that help them in deciding what to produce, how to produce, and how much to produce.

Availability of adequate and timely credit plays a crucial role in promoting growth of agriculture. Despite various efforts of central governments, state governments, and financial institutions, amplex of credit and ideal accessibility of credit are the significant limitations for agriculture credit in India (Biradar, 2013).

Agriculture credit is basic contribution alongside current innovations for higher efficiency in the agriculture segment. Since 1951, credit plays an important role in formation of strategies for agriculture sector in India. Indian credit framework comprises of formal and casual wellsprings of credit. Formal source of credit has three channels for credit dissemination, that is, commercial banks, cooperative societies, and micro financial institutions (Das, Senapati, & John, 2009).

Since the last couple of decades, it has been a tough time of the agriculture sector in India. Commitment of agriculture division in GDP is diminishing and benefit of agriculture area is declining. There is immediate pressure on policy makers to reframe policies for the agriculture sector. Institutional credit is the most important concern that attracts special attention of policy makers while drafting policies.

Previous studies have primarily focused on institutional credit to the agriculture sector by public sector banks and cooperative societies, short term credit to agriculture sector, and credit under various government schemes to agriculture sector.

In this present study, the correct effect of institutional credit on the agriculture area of India is analyzed. We try to address the question whether growing institutional credit will result in improvement of the agriculture sector in India or not alongside impact of area cultivated, fertilizers consumed, and production of agriculture produced on gross value added in the agriculture sector of India.

## **Review of Literature**

There has been detailed study on the areas such as institutional credit to agriculture sector, agriculture credit and small farmers, effect of agriculture credit on revenue of farmers, adequacy of credit to agriculture sector, and productivity of institutional credit. A short review of literature has been done with respect to effect of institutional credit on agriculture, small farmers, provincial region farmers, and issues in dissemination of credit to agriculture area in India and a portion of the economies of the world significantly subject to agriculture.

A study by Das et al. (2009) suggested that in the recent couple of years, institutional credit to agriculture division had expanded, and on the other hand, the commitment of agriculture segment in GDP had diminished. One of the issues in disbursement of institutional credit is unequal regional distribution.

Narayanan (2015) investigated that agriculture sector credit through formal channels and inputs of agriculture had a positive relationship during the period from 1996 – 2012 ; whereas, relationship between credit to agriculture sector and contribution of agriculture sector in India's GDP was negative. Agriculture credit and agriculture inputs had high elasticity, but overall, impact on agriculture produce was not effective. Credit had a positive impact on agriculture input, but negative impact of agriculture's contribution on GDP was due to price of agriculture outputs.

Dong, Lu, and Featherstone (2012) found that one of the reasons for low productivity of small farmers was credit constraints. Due to lack of credit for acquiring adequate labor with capabilities and education, input, and resources, even young farmers were not be able to completely leverage physical farm capability. Farmers who were credit unconstrained had high agriculture productivity. Due to credit constraints and low productivity, farmers were forced to move from rural areas to urban areas in search of employment. The manufacturing sector exploits labor by employing them at low cost that causes social problems and negatively impacts education of farmers' children. By removing credit constraints, farmers would have adequate credit and high productivity that helps them to stay in rural areas.

Akoijam (2013) suggested that the rural credit system is most important to strengthen agriculture and farmers' economic position in rural areas. For improving the agriculture sector of India, focus must be given on increasing agriculture production, marketing of agriculture products, processing of farm produces, trading and distribution of agriculture products, and this could be done through responsive rural credit. For making rural areas attractive, an environment should be created where agriculture is considered vibrant and responsive.

Bashir, Gill, and Hassan (2009) concluded that credit and agriculture produce with special reference to production of wheat had a positive correlation. Through credit by commercial banks to the agriculture sector, living standards of people in rural areas was improving, poverty was reducing, and at large, it helped the economy of the nation to grow.

Mamatzakis and Staikouras (2020) suggested that providing investment funds to agriculture sector helped farmers increasing their income, and on the other hand, direct payment of subsidies to farmers would have a negative impact on their income.

Bharti (2018) found that in most of the developing countries including India, the major economic activity was agriculture. The prime motive of developing countries is to develop a profitable agriculture sector. For developing a profitable agriculture sector, the major constraint is absence of access to finance. No access to finance constraints could be removed through promotion of microfinance institutions and formation of appropriate policies. It is important to develop a self reliant model rather providing subsidies or grants. Accessibility of moderate and fitting credit would assist with converting agriculture into a beneficial endeavor.

Raifu and Aminu (2019) suggested that the financial sector plays a pivotal role in development of various sectors of any economy. Maia, Eusébio, and da Silveira (2019) concluded that farmers who were engaged in agriculture activity on a large scale did intensive commercial farming, were educated and employed farm technology, and had more access to farm credit than those who lacked these characteristics.

A study by Nordjo and Adjasi (2019) revealed that small farmers who had access to credit had higher level of farm productivity. The availability of production credits along with access to farm credit could increase farm productivity at a much higher rate.

Saqib, Kuwornu, Ahmad, and Panezai (2018) found that age, education, household size, proportion of own land, experience, and total land holding of farmers influenced access and adequacy of credit. Farmers with higher land holding had more access to formal wellspring of credit and farmers with lower land holding had more access to casual wellspring of credit. Small farmers had higher level of deficiency of credit.

Fowowe (2020) suggested that financial inclusion of farmers had a positive and huge effect on agriculture productivity. Strategies should be framed by the central bank for intensive financial inclusion of farmers that will result in increased agriculture productivity.

According to Ponnarasu and Mohanraj (2017), Indian agriculture currently needs new policies that concentrate on inputs such as technology, better infrastructure, supply of power at subsidized rates, supply of fertilizers, seeds, tractors, last and most important, credit to the agriculture sector through formal sources of credit.

According to Anwar, Farooqi, and Khan (2015), sustainable economic development of any economy depends of sustainable development of agriculture sector of that economy. For the growth of agriculture, policy framework is required for commercialization and modernization of this sector.

Prakash and Srivastava (2016), in their study, found that combination of modern and traditional farming technologies had a significant impact on value created by agriculture. Pandeya (2015) found that majorly, two activities had formed capital in agriculture sector ; first, transportation components and second, irrigation projects. There is further requirement of framing of government policies for making these factors' contributions more prominent.

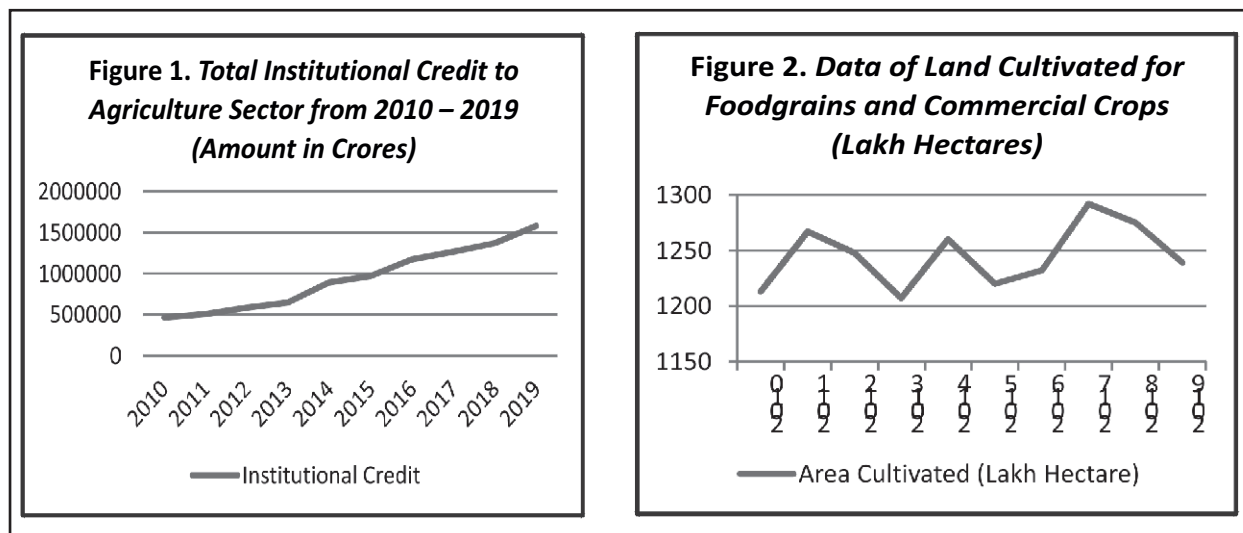
## Objectives, Database, Time Frame, and Methods

### Objectives

This study is focused to explore the association (relationship) among gross value added (GVA) in agriculture sector as dependent variable and four independent variables, that is, institutional credit to agriculture sector, consumption of fertilizers in food grain & commercial crop production, land cultivated for production of food grains & commercial crops, and total production of agriculture produces.

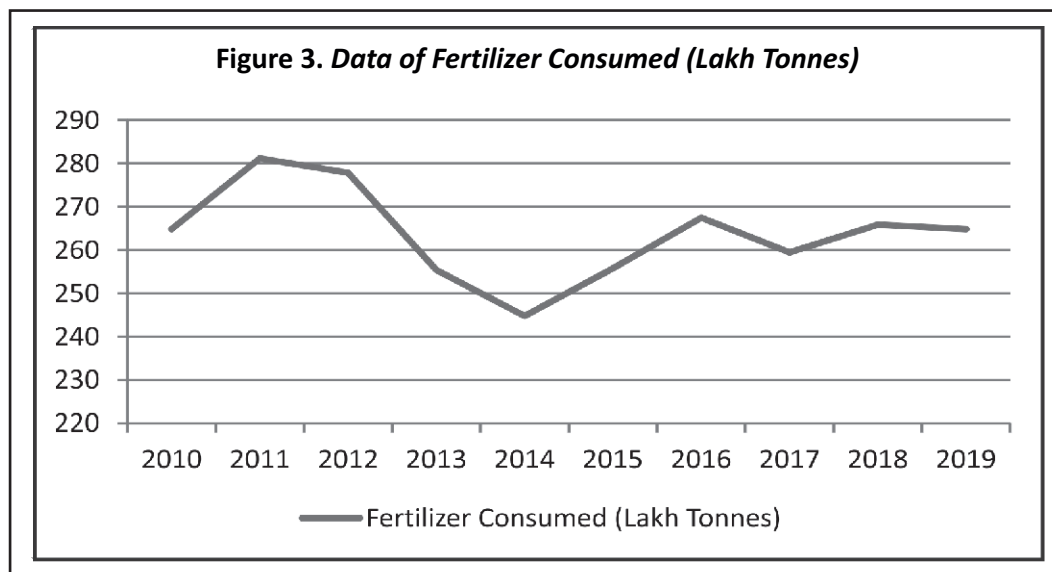
### Database

The present work is based on the data collected (secondary) from *Statistics of Indian Economy 2018 – 19* published by RBI, Ministry of Statistics and Programme Implementation of India, Economic Survey of India, Ministry of Food Processing Industries, and Agricultural & Produce Food Products Export Development Authority, etc. Time series data from 2009 – 2010 to 2018 – 2019 has been analyzed for dependent and independent variables. Figure 1 shows total institutional credit (in crores) sanctioned to agriculture sector by cooperative societies, regional rural banks, and scheduled commercial banks from 2009 – 2010 to 2018 – 2019. Figure 2 shows area cultivated (in lakh hectares) for production of food grains and commercial crops from 2009 – 2010 to 2018 – 19. Figure 3 shows total fertilizers consumed (in lakh tonnes) for production of food grains. Figure 4 represents data of production of commercial crops from 2009 – 2010 to 2018 – 2019, total production of agriculture produces (in lakh tonnes) from 2009 – 2010 to 2018 – 2019, and Figure 5 represents gross value added (GVA) to agriculture sector from 2009 – 2010 to 2018 – 2019, respectively.



### Time Frame

To explore relationship among gross value added (GVA) in agriculture sector and four independent variables, a time frame of 10 years from 2009 – 2010 to 2018 – 2019 has been taken into consideration. The agriculture sector has experienced major policy changes, and flow of credit to agriculture sector varied during the time frame from 2009 – 10 to 2018 – 19.



## Methods

In order to explore the relationship among gross value added (GVA) in agriculture sector as dependent variable and four independent variables, the following equation has been used :

$$Y = AX_1^{\beta_1} \cdot X_2^{\beta_2} \cdot X_3^{\beta_3} \cdot X_4^{\beta_4} \quad \text{.....(1)}$$

Using the natural logarithm of the above equation and considering four independent variables, the above equation is converted into the following equation :

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \mu \quad \text{.....(2)}$$

where,

$\beta_0$  = Natural log of intercept A.

$X_1$  = Total institutional credit sanction to agriculture sector (in crores).

$X_2$  = Area cultivated for production of food grains and commercial crops (in lakh hectares).

$X_3$  = Total fertilizers consumed for production of food grains and commercial crops (in lakh tones).

$X_4$  = Production of agriculture produces (in lakh tones).

$\ln Y$  = Natural log of gross value added to agriculture sector.

$\ln X_1$  = Natural log of total institutional credit sanction to agriculture sector (in crores).

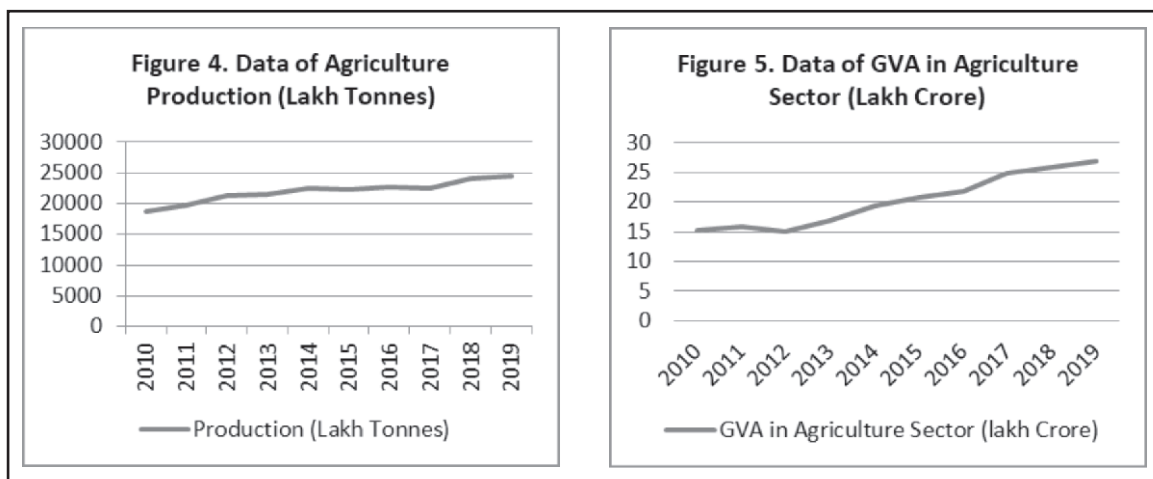
$\ln X_2$  = Natural log of area cultivated for production of food grains and commercial crops (in lakh hectares).

$\ln X_3$  = Natural log of total fertilizers consumed for production of food grains and commercial crops (in lakh tones).

$\ln X_4$  = Natural log of production of agriculture produces (in lakh tones).

$\beta_1, \beta_2, \beta_3, \beta_4$  = Output elasticities.

$\mu$  = Error term.



For analysis of data, three methods have been employed. First, matrix correlation analysis to measure the degree of variables' movement in relation to each other. Second, Philips – Perron (P – P) unit root test is used to check the stationarity of time series data. Third, Cobb – Douglas function is used to understand and quantify the association (relationship) between dependent and independent variables.

## Data Analysis and Results

This study analyzes the impact of institutional credit, area cultivated for production of agriculture produces, fertilizers consumed for production of agriculture produces, and production of agriculture produces on gross value added (GVA) in agriculture sector of India. Table 1 shows the descriptive statistics. The mean for institutional credit is ₹ 9.45 lakh crores with minimum of ₹ 4.63 lakh crores and maximum of ₹ 15.81 lakh crores. The mean for area cultivated is 1245.30 lakh hectares, with minimum of 1207 lakh hectares and maximum of 1292 lakh hectares. The average of fertilizers consumed is 263.78 lakh tones, with minimum of 244.8 lakh tones and maximum of 1292 lakh tones. The average for production of agriculture produces is 21978.25 lakh tones, with minimum of 18746 lakh tones and maximum of 24512.2 lakh tones. The mean for GVA in agriculture sector is ₹ 20.23 lakh crores with minimum of ₹ 15.02 lakh crores and maximum of ₹ 26.92 lakh crores.

**Table 1. Descriptive Statistics**

Variables	N	Min.	Max.	Mean	SE
Institutional Credit	10	4.63	15.81	9.45	12.41
Area Cultivated (Lakh Hectares)	10	1207	1292	1245.30	8.897
Fertilizer Consumed (Lakh Tonnes)	10	244.8	281.2	263.78	3.3930
Production of Agriculture Produces (Lakh Tonnes)	10	18746.0	24512.2	21978.25	563.71
GVA in Agriculture Sector (Lakh Crore)	10	15.02	26.92	20.23	1.43689

**Note.** SE = Standard Error

## Correlation Matrix

The result of matrix (correlation) between various variables has been presented in Table 2. The outcomes show that all the factors have positive connection with GVA in agriculture part of India aside from manures

**Table 2. Correlation Matrix**

		Institutional Credit	Area Cultivated (Lakh Hectares)	Fertilizers Consumed (Lakh Tonnes)	Production of Agriculture Produces (Lakh Tonnes)	GVA in Agriculture Sector (Lakh Crores)
Institutional Credit	Pearson Correlation Sig. (2-tailed)	1				
Area Cultivated (Lakh Hectares)	Pearson Correlation Sig. (2-tailed)	.359 .309	1			
Fertilizer Consumed (Lakh Tonnes)	Pearson Correlation Sig. (2-tailed)	-.234 .515	.158 .662	1		
Production of Agriculture Produces (Lakh Tonnes)	Pearson Correlation Sig. (2-tailed)	.916** .000	.277 .438	-.314 .378	1	
GVA in Agriculture Sector (Lakh Crores)	Pearson Correlation Sig. (2-tailed)	.986** .000	.418 .229	-.249 .488	.875** .001	1

**Note.** \*\*. Correlation is significant at the 0.01 level (2-tailed).

expended. However, institutional credit and production of agriculture produce has significant correlation coefficients, that is, 0.986 (.000) and 0.875 (.001) at the 1% level of significance, respectively with GVA in agriculture sector. Institutional credit also has positive correlation with production of agriculture produces with correlation coefficient of 0.916 (.000) at 1% level of significance. Surprisingly, institutional credit has negative correlation with fertilizers consumed, and fertilizers consumed have negative correlation with production of agriculture produces.

### **Results of Philip – Perron (P – P) Unit Root Test**

Phillips – Perron (P – P) test is conducted to assess the stationarity of the series. P – P unit root test has null hypothesis that variables have unit root, which means variables are not stationary at level. With the results of unit root test, Table 3 shows that all the variables are not stationary at level, but after taking difference of  $I(1)$ , the variable becomes stationary. Values of test statistics and critical values at 10% level of significance are shown in Table 3.

**Table 3. Results of Philips – Perron (P – P) Unit Root Test**

Variables	Adjusted t-Stat	Critical Value	Significance Level	Order of Integration
GVA in Agriculture Sector	-2.9067	-2.81685	10%	$I(1)$
Institutional Credit	-4.5259	-2.81685	10%	$I(1)$
Area Cultivated	-6.1709	-2.81685	10%	$I(1)$
Production of Agriculture Produces	-3.3382	-2.81685	10%	$I(1)$

### **Results of Cobb – Douglas Function**

The results of the Cobb – Douglas function have been reported in Table 4. The value of the  $R$ -square is 0.972505935, which is high, showing that about 98% of the total change in the GVA in agriculture sector of India can be explained by the four variables chosen and analyzed in this study. The calculated value of the  $F$ -statistic is 49.1652917, which is highly significant. This may be interpreted that the independent variables included in the

**Table 4. Regression Analysis**

Multiple R	0.987525157			
R-Square	0.975205935			
Adjusted R-Square	0.955370684			
Observations	10			
F-Statistics	49.1652917			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t - Stat</i>	<i>P-value</i>
Intercept	-0.336120047	7.222965546	-0.046534909	0.964685368
Institutional Credit (Crores)	0.641548227	0.104441415	6.142661212	0.001661438
Area Cultivated (Lakh Hectares)	0.454209923	0.794513517	0.571683066	0.592276209
Fertilizer Consumed (Lakh Tonnes)	-0.025629964	0.427993862	-0.059883953	0.954567881
Production (Lakh Tonnes)	-0.855176824	0.535833622	-1.595974551	0.171381638

study significantly influence GVA in the agriculture sector.

The results further show that the variables – institutional credit and land cultivated for production of food grains and commercial crops are positive and significant. Institutional credit, as the main variable, indicates that its coefficient is 0.641548227, which means that a 1% change in institutional credit will result in 0.64155% change in GVA in agriculture sector of India. Area cultivated indicates that its coefficient is 0.454209923, which means that a 1% change in area cultivated for production of agriculture produces will result in 0.45421% change in GVA in the agriculture sector of India. The coefficient of fertilizers consumed and total production of agriculture products is -0.025629964 and -0.855176824, respectively. Impact of consumption of fertilizers and production of agriculture produces is insignificant and negative. The analysis represents that the independent variables have a significant and positive influence on GVA in the agriculture sector of India.

## Conclusion and Policy Implications

The agriculture sector is one of the essential and priority based sectors in India. From the results, it is evident that institutional credit assumes an important job in the development and improvement of agriculture sector in India as it has a positive and significant impact on GVA of the agriculture sector in India. Besides institutional loan, land cultivated also has a positive and significant impact on the agriculture sector. Consumption of fertilizers has an insignificant and negative impact on GVA by agriculture sector in India, and production of agriculture produces has a negative and significant impact on agriculture sector. On the basis of this study, few suggestions for policy implications for improvement of role of institutional credit and area cultivated in agriculture sector have been listed below :

- ↪ The government should promote institutional credit to agriculture sector not only through regional rural banks, cooperative societies, and scheduled banks that mainly include public sector banks, but also through the private sector banks.
- ↪ The agriculture sector should be promoted as a business venture that has immense scope for revenue generation, and investment should be attracted from private equity.
- ↪ The government should launch farmers' education policy that could educate farmers about farm management and technological update of agriculture instruments so that productivity of area cultivated could be improved.

## Limitations of the Study and Scope for Further Research

The present study has taken a time frame for only 10 years, that is, from 2009 – 10 to 2018 – 19 and only four independent variables, that is, institutional credit to agriculture sector, consumption of fertilizers, area cultivated for production of agriculture produces, and total production of agriculture produces are examined with gross value added by agriculture sector in India. There is further scope to extend the time period and include more independent variables from the production and supply chain processes of agriculture products.

## Authors' Contribution

Dr. Prateek Gupta conceived the idea and developed qualitative and quantitative design to undertake the study and verified the analytical methods and supervised the study. Rahul Singhal extracted research papers with high repute, filtered these based on keywords, and conducted numerical computations using SPSS 23.0 and R Studio. Both the authors equally contributed in writing of the manuscript.

## Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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## About the Authors

**Rahul Singhal** is working as an Assistant Professor with Ajay Kumar Garg Institute of Management. He has more than 12 years of academic and industry experience. His areas of research interests are corporate compliance, corporate governance, and agriculture finance.

**Dr. Prateek Gupta** is presently an Associate Professor at the School of Management, KIET Group of Institutions, Delhi-NCR. He is an MBA, M.Com, PGDIBO, UGC-NET (Commerce), UGC-NET (Mgmt), and Ph.D. with significant experience of 18 years in academics and research. He has completed four sponsored research projects funded by reputed organizations like ICSSR, IIPA, New Delhi etc., and also received a funded consultancy. He has contributed 51 papers in reputed journals and presented 41 papers in international and national conferences. He has three books, two monographs, and two copyrights under his credit.