Analyzing the Impact of Institutional Credit on the Growth of Agriculture Sector of India

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Abstract

In terms of highest population, India lately passed China and took first spot. In its study, Reserve Bank of India reaffirmed that India will stay at fifth place among economies in 2023. It also claimed that India's GDP in 2023 will reach USD 3.7 trillion. However, it is also evident that the proportion of agriculture in Indian GDP has dropped across time. The Ministry of Statistics & Program Implementation (MoSPI) projects that the Gross Value Added (GVA) of agriculture and associated sectors in 2020–21 was 20.1%; in 2021–22 it was 19%; and in 2022–23 it once more dropped to 18.3%. The issues India would have to satisfy the food demand from its growing population are easily understandable. Moreover, a poor agricultural exhibition might affect the general state of affairs in agriculture all around. Indian government is acting in several ways to revive the agricultural sector. One such action is institutional financing accessible for the allied industry including agriculture. This research looks at the function institutional credit serves in the agricultural industry. Analyzed are time series data on the institutional credit and other criteria.

Key Terms: Agriculture Credit, Gross Value Added, Fertiliser, Agriclture Production
JEL Code: O13, Q14, Q11,

I. Introduction

Agriculture is a backbone of any economy. In India agriculture sector has always been an economic sector that lays foundation for the sustainable growth of other economic sectors (Moahn, 2004). Agriculture sector's contribution in India's GDP was approx 52% in 1950-51 and in 2019-18 it is approx 14% (First Advance Estimates of National Income 2018-19, 2019). This decrease of agriculture sector's contribution in India's GDP is constant on year to year basis, although stream of credit to agriculture area has expanded substantially (Narayanan, 2015). Primary roles of agriculture sector in Indian economy are to promote inclusive growth, increase in rural income and sustainable food security. Approx 60% of Indian population is dependent on agriculture sector and it accounts for approx 14% of India's export.

Since independence production of agriculture produces have witnessed significant growth. There is extreme need of shifting from traditional subsistence nature of agriculture to commercialization of agriculture sector. Earlier prime objective was to increase production and extension activities are limited to providing physical inputs like fertilizers, seeds etc. Now focus has been shifted from providing physical inputs to educating farmers about market conditions and latest technologies that helps them in deciding what to produce, how to produce and how much to produce.

Availability of adequate and timely credit plays crucial role in promoting growth of agriculture. Despite various efforts of central governments, state governments and financial institutions, ampleness 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 agriculture segment. Since 1951 credit plays 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 i.e. commercial banks, co-operative societies and micro financial institutions (Das, Senapati, & John, 2009).

Since last couple of decades it has been tough time of agriculture sector in India. Commitment of agriculture division in GDP is diminishing and benefit of agriculture area is declining. There was immediate pressure on policy makers to

reframe policies for agriculture sector. Institutional credit is the most important concern that attracts special attention of policy makers while drafting policies.

In this present study, correctly effect of institutional credit on the agriculture area of India is analyzed. We are trying to address the question whether growing institutional credit will result in improvement of agriculture sector in India or not. This research comprises of five sections. Sector 2 is the brief review of literature. Section 3 provides objective of the study, database and methods applied for data analysis. Section 4 is the analysis of data and section 5 is the summary of findings and conclusions.

II. 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 also been done with respect to effect of institutional credit on allied sector of agriculture, small farmers, provincial region farmers and issues in dissemination of credit to agriculture area in India and world.

A study by **Das *et al.* (2009)** suggests that in the recent couple of years institutional credit to agriculture division has expanded but on the other hand share of agriculture segment in GDP has diminished. The study also concluded that one of the issues in disbursement of institutional credit is unequal regional distribution. Agriculture sector credit through formal channel and inputs of agriculture have positive relationship, whereas relationship between credit to agriculture sector and contribution of agriculture sector in India's GDP is negative **(Narayanan, 2005)**. **Pederson *et al.* (2012)** found the relationship between credit to small farmers and income of small farmers is less than proportionate elasticity. Credit helps in maintaining liquidity for beginning and low resource farmers. Also, agriculture credit and agriculture inputs have high elasticity but overall impact on agriculture produce is not effective. One of the primary reasons of credit has positive impact on agriculture input but negative impact on agriculture contribution on GDP is price of agriculture outputs (Narayanan, 2005). **Dong *et al.* (2012)** in their study found that one of the reasons for low productivity of small farmers is credit constraints. Due to this problem, even young farmers would not be able to completely leverage physical farm capability. It is also seen that farmers having no credit constraints have high agriculture productivity. The credit constraint also becomes the main reason that farmers are forced to migrate from rural area to urban area. **Akoijam (2013)** in his study suggests that rural credit system is most important to strengthen agriculture and farmers' economical position in rural area. For improving 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 can be done through responsive rural credit. For making rural area attractive an environment should be created where agriculture is considered vibrant and responsive.

Bashir *et al.* (2009) in their study concluded that credit has positive correlation on agriculture produce with special reference to production of wheat. Credit by commercial banks to agriculture sector is also improving the living of standard of people in rural area. A study by **Mamatzakis and Staikouras (2020)** suggests that providing investment funds to agriculture sector helps farmers increasing their income, on the other hand direct payment of subsidies to farmers will have negative impact on the their income.

Bharti (2018) in the study found that in most of the developing countries including India major economic activity is agriculture. Prime motive of developing countries is to develop a profitable agriculture sector. For developing a profitable agriculture sector major constraint is absence of access to finance. It is important to develop self reliant model rather providing subsidies or grants. Accessibility of moderate and fitting credit will assist with changing over agriculture into beneficial endeavor. **Raifu and Aminu (2019)** suggested that financial sector plays pivotal role in development of various sector of any economy. Development of financial sector and agriculture sector has positive relationship. **Maia *et al.* (2019)** in their research concluded that farmers who are educated, employ farm technology, and do large scale agriculture activity with intensive commercial farming have more access to farm credit than those who lack these characteristics. A study by **Nordjo and Adjasi (2019)** suggested that "Small farmers who have access to credit have higher level of farm productivity".

Saqib *et al.* (2017) in their study found that "age, education, household size, proportion of own land, experience and total land holding of farmers influence access and adequacy of credit". Farmers with higher land holding have more access to formal wellspring of acknowledge and farmers for lower land holding have more access to casual wellspring of credit. **Fowowe (2020)** in his study suggests that financial inclusions of farmers have positive and huge effect on agriculture productivity. Strategies should be framed by central bank of intensive financial inclusion of farmers that will result in increased agriculture productivity. **Mohan (2017)** proposed that India credit stream to agriculture segment has expanded generously that further upheld the agriculture creation. Indian agriculture currently needs new policy that concentrates on inputs such as technology, better infrastructure, supply of power at subsidize rate, supply of fertilizers, seeds, tractors, last and most important credit to agriculture sector through formal sources of credit. Sustainable economic development of any economy depends of sustainable development of agriculture sector of that economy. Commercialization and modernization of agriculture sector is need of the hour for its growth (**Anwar *et al*, 2015**).

III. Objectives, database and methods

3.1 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 i.e. institutional credit to agriculture sector, consumption of fertilizers in food grain & commercial crops production, land cultivated for production of food grain & commercial crops and, total production of agriculture produces.

3.2 Database

The present work is depending 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 & Produces Food Products Export Development Authority etc. Time series data from 2009-2010 to 2018- 2019 has been analyzed for dependent and independent variables.

3.3 Methods

In order to explore the relationship among Gross Value Added (GVA) in Agriculture sector as dependent variable and four independent variables, Equation 1 has been used:

$$Y = AX_1^{\beta 1} . X_2^{\beta 2} . X_3^{\beta 3} . X_4^{\beta 4} \tag{1}$$

Using the natural logarithm of above equation and considering four independent variables, above equation will be converted into the Equation 2:

$$LnY = \beta_0 + \beta_1 LnX_1 + \beta_2 LnX_2 + \beta_3 LnX_3 + \beta_4 LnX_4 + \mu \tag{2}$$

Where:

β_0 = Natural log of intercept A

LnY = Natural log of Gross Value Added to Agriculture sector

LnX_1 = Natural log of total institutional credit sanction to agriculture sector (in crores)

LnX_2 = Natural log of to area cultivated for production of food grains and commercial crops (in lakh hectare)

LnX_3 = Natural log of total fertilizers consumed for production of food grains and commercial crops (in lakh tones)

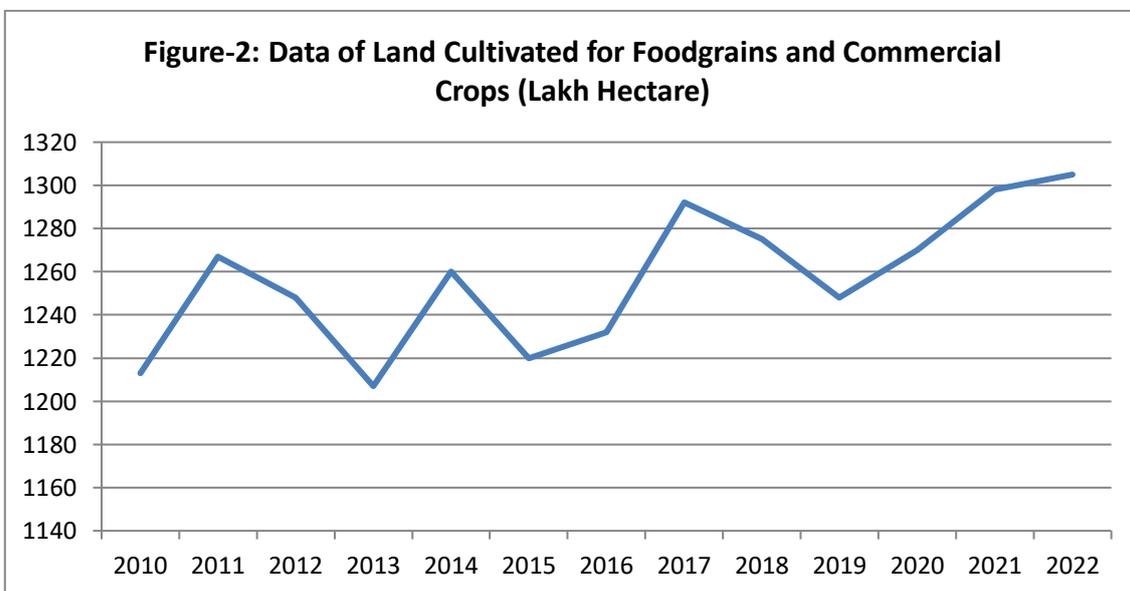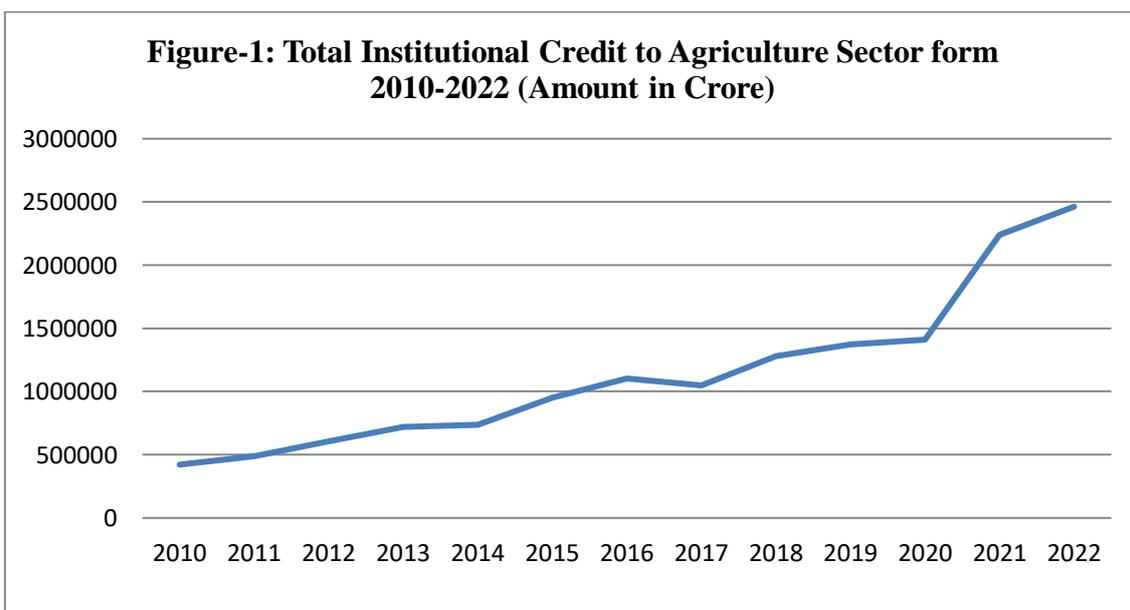LnX_4 = Natural log of production of agriculture produces (in lakh tones)

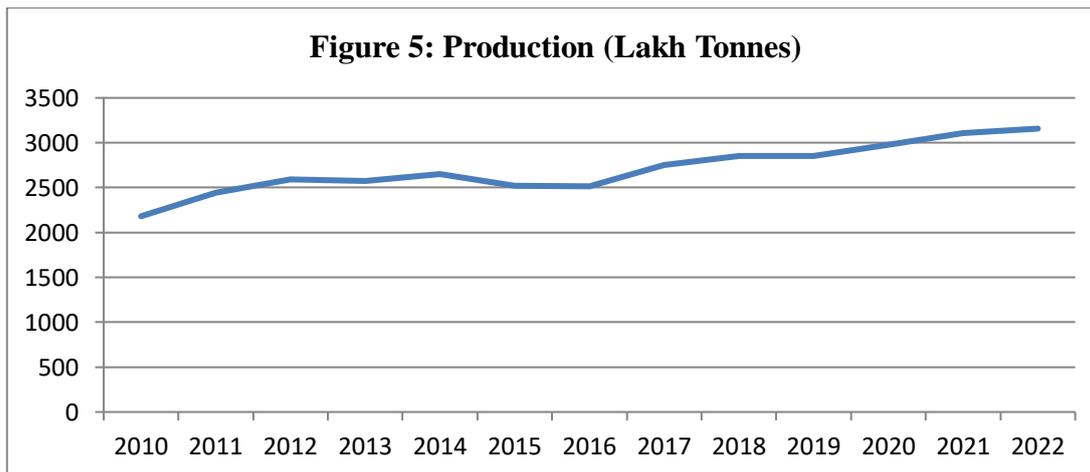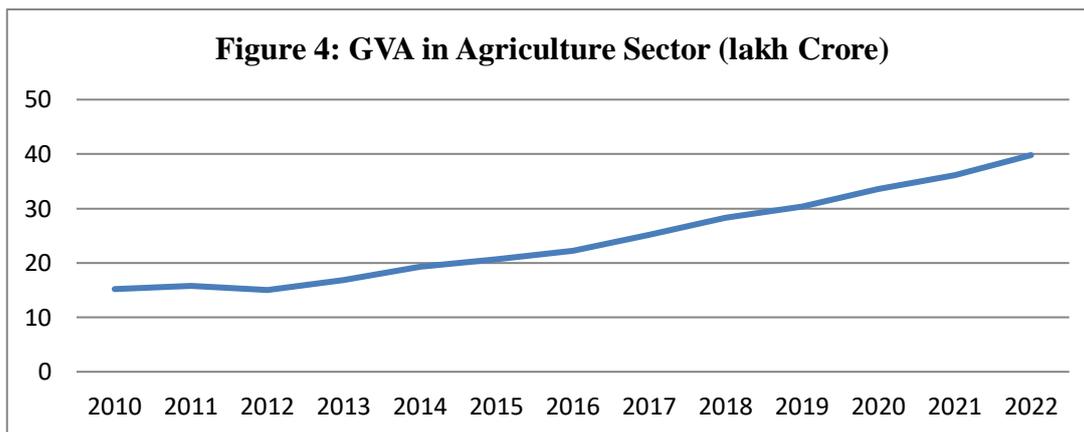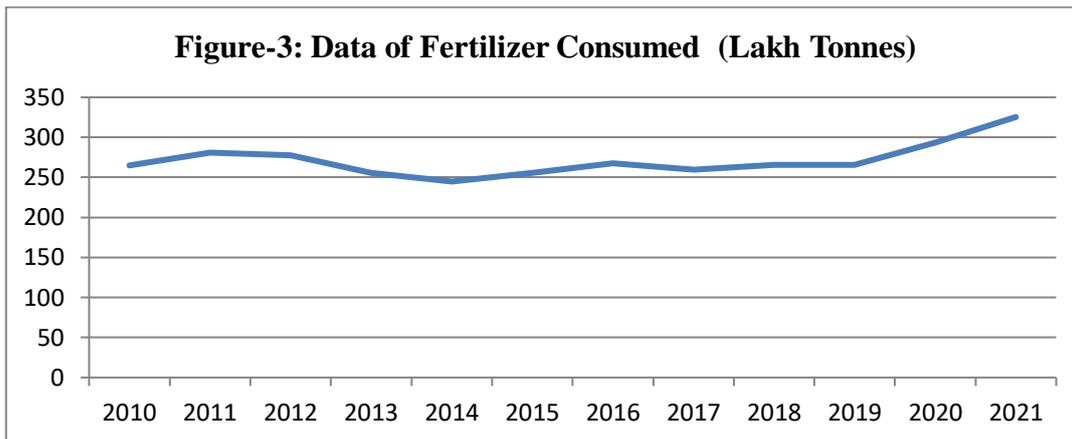$\beta_1, \beta_2, \beta_2, \beta_4$ = Output elasticities

μ = Error term

For analysis of data three methods have been employed First, Matrix Correlation Analysis to measure the degree of variables movements in relation to each other. Second, Philips-Perron (P – P) unit root test was implemented to check the stationarity of time series data. Third, Cobb Douglas Function was employed to understand and quantify association (relationship) between

IV. Data Analysis

Figure 1 to Figure 5 shows total institutional credit (in crores) sanctioned to agriculture sector by co-operative societies, rural regional banks and scheduled commercial banks from 2009-2010 to 2021-2022, area cultivated (in lakh tones) for production of food grains and commercial crops from 2009-2010 to 2021-2022, total fertilizers consumed (in lakh tones) for production of food grains and commercial crops from 2009-2010 to 2021-2022, total production of agriculture produces (in lakh tones) from 2009-2010 to 2021-2022 and gross value added (GVA) to agriculture sector from 2009-2010 to 2021-2022 respectively.

Figure-1: Total Institutional Credit to Agriculture Sector form 2010-2022 (Amount in Crore)

Figure-2: Data of Land Cultivated for Foodgrains and Commercial Crops (Lakh Hectare)

Figure-3: Data of Fertilizer Consumed (Lakh Tonnes)

Figure 4: GVA in Agriculture Sector (lakh Crore)

Figure 5: Production (Lakh Tonnes)

The trend of various parameters is visible from the figures.

The study is intended to analyze 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 I shows descriptive statistics. The mean for institutional credit is Rs. 11.41 lakh crore with minimum of Rs. 4.22 lakh crore and maximum of Rs. 24.62 lakh crore. The means for area cultivated is 1256.53 lakh hectare with minimum of 1207 lakh hectare and maximum of 1305 lakh hectare. The average of fertilizers consumed is 271.5 lakh tones with minimum of 244.8 lakh tones and maximum of 325.4 lakh tones. The average for production of agriculture produces is 2705.31 lakh tones with minimum of 2181.1 lakh tones and maximum of 3157.2 lakh tones. The mean for GVA in agriculture sector is Rs. 24.29 lakh crore with minimum of Rs. 15.02 lakh crore and maximum of Rs. 39.8 lakh crore.

Table I: Descriptive Statistics

Variables	N	Min.	Max.	Mean	SE
Institutional Credit	13	4.22	24.62	11.41	17.4
Area Cultivated (Lakh Hectare)	13	1207	1305	1256.53	8.91
Fertilizer Consumed (Lakh Tonnes)	13	244.8	325.4	271.5	5.92
Production of Agriculture Produces (Lakh Tonnes)	13	2181.1	3157.2	2705.31	77.21
GVA in Agriculture Sector (lakh Crore)	13	15.02	39.8	24.49	2.34

Note: SE= Standard Error

4.1 Correlation Matrix

The result of matrix (correlation) between various variables has been presented in Table II. The outcomes show that all the factors have positive connection with GVA in agriculture part of India aside from manures expended. However, institutional credit and production of agriculture produces has significant correlation coefficients 0.986 (.000) and 0.875 (.001) at 1% level of significance respectively with GVA in agriculture sector. Institutional credit also has positive correlation with production of agriculture produces with correlation coefficients 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.

Table II: Correlation Matrix

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

*Note: **. Correlation is significant at the 0.01 level (2-tailed).*
Computed by Author

4.2 Result of Philip-Perron (P - P) unit root test

Phillips- Perron (P - P) test was conducted to assess the stationarity of the series. P-P unit root test has null hypothesis that variables has unit root, means variables are not stationary at level. With the result of Unit Root Test. Table 3 shows that all the variables are not stationary at level but after taking difference of I (1) variable become stationary. Value of Test Statistics and critical value at 10% level of significance is shown in Table III.

Table III: 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)

Computed by Author

4.3 Result of Cobb Douglas Function

Table IV: Regression Analysis

Multiple R	0.987525157
R Square	0.975205935
Adjusted R Square	0.955370684
Observations	10
F-Statistics	49.1652917

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.336120047	7.222965546	-0.046534909	0.964685368
Institutional Credit (Crores)	0.641548227	0.104441415	6.142661212	0.001661438
Area Cultivated (Lakh Hectare)	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

Computed by Author

The results of the Cobb Douglas function have been reported in Table IV. 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 study significantly influenced GVA in agriculture sector.

Result further shows that institutional credit and land cultivated for production of food grains and commercial crops are positive and significant. Institutional credit as main variable indicate that its coefficient is 0.641548227, this means that 1% change in institutional credit will result in 0.64155% changes in GVA in agriculture sector of India. Area cultivated indicates that its coefficient is 0. 454209923, this means 1% change in area cultivated for production of agriculture produces will result in 0.45421% change in GVA in agriculture sector of India. The coefficients 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. Analysis represents that independent variables has significant and positive influence on GVA in agriculture sector of India.

V. Conclusion

Agriculture sector is one of the essential and priority based sector in India. Greater part of Indian populace is subject to agriculture sector. From the above examination it has been evident that institutional credit assume important role in the development and improvement of agriculture sector in India. Besides institutional loan, land cultivated also has direct impact on the agriculture sector. Based on the findings, few suggestions for improvement of role of institutional credit have been listed below:

- Government should promote institutional credit not only through Regional Rural Banks, Co-operative societies and public sector banks but also through private sector banks.
- Agriculture sector should be promoted as business venture that has immense scope for revenue generation and investment should be attracted from private equity.
- Farmers should be educated about farms management so that land cultivation has more than proportionate impact on growth of agriculture sector.

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Appendix: 1

Year	Institutional Credit (lakh Crore)	Area Cultivated (Lakh Hectare)	Fertilizer Consumed (Lakh Tonnes)	Production of Agriculture Produces (Lakh Tonnes)	GVA in Agriculture Sector (lakh Crore)
2010	4.63321	1213	264.9	18746	15.2
2011	5.07176	1267	281.2	19617.7	15.78
2012	5.83343	1248	277.9	21327.1	15.02
2013	6.45433	1207	255.4	21557.5	16.81
2014	8.92067	1260	244.8	22409.9	19.33
2015	9.70575	1220	255.8	22368.9	20.68
2016	11.73098	1232	267.5	22666.5	21.73
2017	12.6525	1292	259.5	22478.4	24.84
2018	13.69456	1275	265.9	24098.3	25.94
2019	15.80568	1239	264.9	24512.2	26.92