Original Research Article

AN ECONOMIC ANALYSIS OF AGRICULTURAL CREDIT-LED AGRICULTURAL GROWTH IN INDIA

Abstract

Among all sectors, agriculture sectors will be the pillar stone for the sustainable economic growth. Agriculture credit shows the pivotal role for efficient agricultural transactions. The study investigates the role of agriculture credit in India's agricultural credit through various economic analysis. The data was collected from various government websites such as RBI, Ministry of Statistics and Programme Implementation of India, Economic Survey of India. The results observed that institutional credit has positive correlation with fertilizers consumed whereas consumption had negative correlation with agricultural produces. The results further stated the co-integration and the Johansen-Juselius maximum likelihood tests long-run positive association between the India's agricultural GDP and agricultural credit and increased Agricultural GDP drives agricultural credit. Finally, the policy implication on two perspectives as to encourage institutional credit arrangement to reach farmers with easy operational facilities across the nation and non-institutional credit need to marginalize the informal sources.

Keywords: Agriculture, credit, GDP, Growth and Farmers

Introduction

Agriculture sector lays foundation for the sustainable growth of other economic sectors. The agriculture sector's contribution to Indian GDP was approximately 52 per cent in 1950 – 51 whereas in 2018 – 19, it was approximately 14 per cent (Ministry of Statistics and Programme Implementation, 2019). This decrease of the agriculture sector's contribution to India's GDP is constant on a year-to-year basis, although the stream of credit to agriculture has expanded substantially. Primary roles of the agriculture sector in Indian economy are to promote inclusive growth, increase rural income, and provide sustainable food security. Approximately 60 per cent of the Indian population is dependent on the agriculture sector and it accounts for approximately 14 per cent of India's exports. Since independence, production of agriculture produces has witnessed a significant growth. Earlier, the prime objective was to

increase production, and extension activities were limited to providing physical inputs like fertilizers, seeds, etc. There is an extreme need for shifting from traditional subsistence agriculture to commercialization of the agriculture sector.

Agriculture credit is basic contribution alongside current innovations for higher efficiency in the agriculture segment. Availability of adequate and timely credit plays a crucial role in promoting growth of agriculture as the focus has shifted from providing physical inputs to educating farmers about market conditions and latest technologies that help them in deciding what to produce, how to produce, and how much to produce, for which credit awareness is necessary. Despite various efforts by central governments, state governments, and financial institutions, ampleness of credit and ideal accessibility of credit remain as the significant limitations for agriculture credit in India. 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. 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.

A well-established agriculture sector has the power to reduce the problems of poverty, unemployment and raw material supply. GDP growth originating in agriculture has been more successful in raising the income of the poorest 40 per cent of the population than rest of the economy. Agriculture sector further provides growth and sustainability to the rest of the sectors in the Indian economy. Globalization leads to the phenomenal demand growth of the agricultural produce. It improves the position of foreign exchange earnings. Starting from Pandit Jawaharlal Nehru's exhortation soon after independence that "everything else can wait, but not agriculture", agricultural growth has all along been central to India's efforts at poverty reduction.

Indian agriculture is struggling to get required liquidity since long. Generally, the vital flow of money is required at the time of pre-cultivation. Agriculture produces can be marketed after harvesting while the next cropping season demands further investment. There is a continuous time lag in getting return from cultivation practices. The decisions of purchase inputs, crop selection, land preparation, resource management depends upon the amount of liquidity in the hands of cultivator. The utilization of available money in the hands of cultivators is further faces shrinkages due to consumption expenditure, education, shelter, weddings etc. Farming can get higher yields by adopting suitable mechanization requires investment. They have option to diversified agricultural practices to increase income which is not possible without availability of surplus money. The dependency of agriculture on wind, precipitation, sunshine, heat, dryness, cloudiness and water reduces the chances of handsome normal return. Further, the almost regular occurrence of natural disasters is making the life more vulnerable for the community. So, providing credit to the farmers is the main concern for Indian government by empowering the farmers to manage risks and increase their income over time.

Indian farmers are mainly concerned for agriculture credit for purchasing key inputs which will be helpful for increasing their income over the years Borrowers of agriculture credit allocate more land to crops as compared to non-borrowers that leads to the significant increase in the income of the borrowers. Government policies are focusing to provide rural credit at low interest rates. The formal financial institutions are pioneering to reduce the influences of money lenders. Agriculture Credit schemes are helpful to increase agricultural production and farmers' income. The Government of India introduces different scheme and policies to improve the accessibility of credit to the farming community. These policies are intended to focus on providing timely and adequate credit support to farmers across the country. Separate schemes are floated for catering short term and long-term requirement of credits of the farming community. The challenges of credit repayments are handled with interest subvention and/or aggressive rebates are offered to the borrowers.

In this study, the correct effect of institutional credit on the agriculture area of India will be analysed and addressing 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

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.

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.

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.

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.

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.

Comment [FK1]: this is not found in the bibliography,

Anwar or Anwer? Which one the best correct?

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.

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.

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 endeavour.

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.

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.

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.

Objectives of the study

- To study the major determinants of Gross Value Added (GVA) in agriculture sector.
- To analyse the association between Agricultural GDP and Agricultural Credit in India.

Database

Data collected (secondary) from Statistics of Indian Economy from 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 of India. Time series data from 1980-2018 were used for analysing the association between Agricultural GDP and Agricultural Credit in India.

Note:

- AGDP – Agricultural GDP
- CR – Institutional Credit disbursed (in crores)

Methodology

Compound Growth Rate

Growth rates are used to evaluate the past performance of the economic variables. Compound growth rate analysis was done using the following formula

$$Y_t = ab^t U_t$$

where, Y_t = Dependent variable for which growth rate has to be estimated (area, production, yield in year 't');

a=Intercept;

b=Regression coefficient;

t=Year which takes values 1, 2…. n;

U_t=Disturbance term in year 't'.

The equation is then transformed into log-linear and written as

$$\log Y_t = \log a + t \log b + \log Ut$$

This equation is then estimated using Ordinary Least Square (OLS) method.

The compound growth rate (g) was then estimated by the identity given in equation

$$g = (\text{antilog of } b - 1) \times 100$$

Where, g=Estimated compound growth rate per annum in per cent; b= coefficient value obtained from OLS

The statistical significance can be tested using 't'test

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, Cobb – Douglas function is used to understand and quantify the relationship between dependent and independent variables.

To analyse the relationship among gross value added (GVA) in agriculture sector and institutional credit:

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

$$\text{Ln } Y = \beta_0 + \beta_1 \text{Ln}X_1 + \beta_2 \text{Ln}X_2 + \beta_3 \text{Ln}X_3 + \beta_4 \text{Ln}X_4 + \mu$$

where,

β_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 tonnes).

Ln Y = 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 area cultivated for production of food grains and commercial crops (in lakh hectares)

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

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

$\beta_1, \beta_2, \beta_3, \beta_4$ = output elasticities

μ = Error term

Correlation Matrix

A correlation matrix is a table showing correlation coefficients between sets of variables. Each random variable (X_i) in the table is correlated with each of the other values in the table (X_j). This shows which pair of variables have the highest correlation. The diagonal of the table is always a set of ones, because the correlation between a variable and itself is always 1.

Cobb-Douglas Function

A Cobb-Douglas production function models the relationship between production output and production inputs (factors). It is used to calculate ratios of inputs to one another for efficient production and to estimate technological change in production methods.

The general form of a Cobb-Douglas production function for a set of n inputs is

$$Y=f(X_1, X_2..., Xn) = \gamma \prod_{i=1}^{n} x_i^{\alpha i}$$

where Y stands for output, x_i for input i, and γ and α_i are parameters determining the overall efficiency of production and the responsiveness of output to changes in the input quantities.

Augmented Dickey Fuller Test

In the time series analysis is to examine the stationarity of each individual time series selected. The Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979) is used to examine the stationarity. The test is conducted by augmenting the preceding three equations by adding the lagged values of the dependent variable.

The ADF test here consists of estimating the following regression;

$$\Delta Y_t = \alpha + \delta Y_{t-1} + Y_i \Sigma Y_{t-1} + et$$

$$H_0: \delta = 0\ (non - stationary\ series) H_1: \delta \neq 0\ (stationary)$$

Hypothesis of ADF test:

- H_0 : There is a unit root.
- H_1 : No unit root and the time series are stationary (or trend-stationary).

Johansen's Co-integration Method

Johansen and Juselius (1990) developed co-integration test for testing long-term relationship between the variables. It means even if two or more series are non-stationary. they are said to be cointegrated if there exists a stationary linear combination of them. After establishing that the time series were stationary at the level or at same order of differences, the maximum likelihood (ML) method of co-integration was applied to check to test number of cointegrating vectors. The null hypothesis of almost 'r' co-integrating vectors against a general alternative hypothesis of 'r-1'integrating vectors is tested by trace statistics (Johansen 1999).

Trace Statistic ($\lambda - trace = -T \sum_{i=r+1}^{n} \ln(1-\lambda)$)

Maximum Eigen Value Statistic ($\lambda - \max = -T \ln(1 - \lambda_i - 1)$)

λ_i are the estimated Eigen values obtained and T is the number of observations. The number of co-integrating vectors indicated by the tests is an important indicator of the extent of co-movement of GDP and agricultural credit. An increase in the number of co-integrating vectors implies increase in the strength and stability of its linkages.

Vector Error Correction Model for short-term relationship

The co-integration analysis reflects the long-run movement of two or more series, although in the short-run they may drift apart. Once the series are found to be co-integrated, then the next step is to find out the short run relationship along with the speed of adjustment towards equilibrium using error correction model., represented by equations

$$\Delta AGDP_t = \beta_0 + \Sigma_{j=1}^{M} \beta_{1j} \Delta CR_{t-j} + \Sigma_{j=1}^{N} \beta_{2j} \Delta AGDP_{t-j} + \alpha E_{t-1} + U_{1t}$$

$$\Delta CR_t = \delta_0 + \Sigma_{j=1}^{k} \delta_{1j} \Delta CR_{t-j} + \Sigma_{j=1}^{k} \delta_{2j} \Delta AGDP_{t-j} + \lambda C_{t-1} + U_{2t}$$

AGDP is Agricultural Domestic Product & CR is yearly agricultural credit disbursement

where, ECT_{t-1} is the lagged error correction term; X_t and Y_t, are the variables under consideration transformed through natural logarithm; X_{t-1} and Y_{t-1} are the lagged values of variables X and Y. The parameter γ is the error correction coefficient that measures the response of the regressor in each period to departures from equilibrium. The negative and statistically significant values of γ depict the speed of adjustment in restoring equilibrium after disequilibria and if it is positive and zero, the series diverges from equilibrium.

Granger causality test

In order to know the direction of causation between the markets, Granger causality test was employed (Granger, 1969). When co-integration relationship is present for two variables a Granger causality test can be used to analyse the direction of this co-movement relationship. Granger causality tests come in pairs, testing weather variable X_t, Granger-causes variable Y_t, and vice versa. All permutations are possible viz., univariate Granger causality from X, to Y, or from Y_t, to X_t. bivariate causality or absence of causality. The Granger causality test analyses weather the unrestricted equation:

$$\ln X_t = \sum_{i=1}^{m} lnX_{t-i} + \sum_{j=1}^{m} \beta_j lnY_{t-j} + \varepsilon_{1t}$$

$$\ln Y_t = \sum_{i=1}^{m} lnY_{t-i} + \sum_{j=1}^{m} \beta_j lnX_{t-j} + \varepsilon_{2t}$$

Where X_t and Y_t are two different market prices series, In stands for price series in logarithm form. t is the time trend variable. The subscript stands for the number of lags of both

variables in the system. The null hypothesis in both equations is a test that ln X_t, does not Granger cause ln Y_t. In each case, a rejection of the null hypothesis will imply that there is Granger causality between the variables. (Gujarati,2010).

Results and Discussion

Table 1: Correlation Matrix - Institutional credit and GVA

		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	1				
	Sig. (2-tailed)					
Area cultivated (Lakh ha)	Pearson Correlation	0.349	1			
	Sig. (2-tailed)	0.307				
Fertilizer consumed (Lakh tonnes)	Pearson Correlation	0.244	0.156	1		
	Sig. (2-tailed)	0.515	0.661			
Agriculture Production (Lakh tonnes)	Pearson Correlation	0.914**	0.266	-0.313	1	
	Sig. (2-tailed)	0.012	0.436	0.376		
GVA in Agriculture Sector (Lakh crores)	Pearson Correlation	0.984**	0.416	-0.248	0.874**	1
	Sig. (2-tailed)	0.008	0.228	0.487	0.001	

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

The outcomes show that all the factors are positively correlated with GVA from agriculture except the amount of fertilizer consumption. Institutional credit and production of agriculture produce has significant correlation coefficients, that is 0.984 (0.008) and 0.874

(0.001) at the 1 per cent level of significance, respectively with GVA in agricultural sector. Institutional credit also has positive correlation with production of agriculture produces with correlation coefficient of 0.914 (0.012) at 1 per cent level of significance. It is also observed that institutional credit has positive correlation with fertilizers consumed whereas fertilizer consumed have negative correlation with production of agricultural produces. This might be due to overuse of fertilizers leading to diminishing marginal returns.

Results of Cobb- Douglas Function

Table 2: Regression analysis indicating the determinants of Agricultural GDP

	Co-efficients	**Standard Error**	**t-stat**	**P-value**
Intercept	-0.316120048	7.122965545	-0.44380398	0.964685368
Institutional credit (crores)	0.632548227	0.103341415	6.120955737	0.001661438
Area cultivated (Lakh ha)	0.443209923	0.784413517	0.5650207619	0.592276209
Fertiliser Consumed (Lakh tonnes)	0.024528964	0.417993862	0.0586822593	0.954567881
Production (Lakh tonnes)	-0.844176824	0.525833622	-1.605406708	0.171381638

Table 3 . Statistical test results

Multiple R	0.98
R-Square	0.94
Adjusted R-Square	0.94
Observations	38
F-Statistics	50.3422053

The value of the R-square is 0.94 which is high showing that 94 per cent of the total change in the GVA in agriculture sector of India can be explained by the four variables that are selected for the study. The calculated value of the F-statistics is 50.3422053, which is highly significant. This may be interpreted that the independent variables of the model significantly influence GVA in the agriculture sector.

The results further show that institutional credit and area cultivated for production of food grains and commercial crops are positive and significant. Institutional credit, as the main variable, indicates that its coefficient is 0.632548227, which means that a 1 per cent change in institutional credit will result in 0.63255 per cent change in GVA from agriculture sector of India. Area cultivated indicates that its coefficient is 0.443209923, which means that a 1 per cent change in area cultivated for production of agriculture produces will result in 0.44321 per cent change in GVA in the agriculture sector of India. The coefficient of fertilizers consumed and total production of agriculture products is 0.024528964 and -0.844176824, respectively. Impact of production of agriculture produces is insignificant and negative.

Augmented Dickey Fuller Test:

ADF test results have been presented in the table below. Stationarity has been checked with constant and no time trend as well as with a constant and time trend. It can be seen from the table that all the series are non-stationary at level but agricultural credit is stationary at first difference and agricultural GDP is stationary at second difference. Now both series agricultural gross domestic product (AGDP) and agricultural credit (CR) are integrated on different order.

Table 4 .ADF test result

ADF TEST	**LAGDP**		**LCR**	
	Intercept	**Trend and Intercept**	**Intercept**	**Trend and Intercept**
At Level	2.484	3.262	6.978	2.156
At First Difference	0.4401	-3.118	-1.135	-4.173*
At Second Difference	- 8.146*	- 8.342*	-	-

** Stationary at 0.05 critical level*

Johannsen's Cointegration Test:

Johansen co-integration test was used to analyse the integration among agricultural GDP and Credit and the estimated results has been presented in the table below. Unrestricted

co-integration rank test (Eigen value and trace statistic) indicated the presence of at least one co-integrating equation at 5% level of significance.

Table 5 . Johannsen's Cointegration Test

Hypothesized No. of CE(s)	Trace Statistic	5 per cent Critical Value	Max-Eigen Statistic	5 per cent Critical Value
None (r=0) *	24.297	15.495	22.436	14.264
At most 1	1.861	3.841	1.861	3.261

** denotes rejection of the hypothesis at the 0.05 level*

Note: Trace and Max-Eigen Statistic value indicate that there is one co –integration equation

The appropriate lag selection can be obtained by using tests like Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Final Prediction Error (FPE) and Hannan Quinn Information Criterion (HQ), etc. Tests of FPE, AIC and HQ are indicating that optimum lags are 3 while SC shows 2 lags. The lag criteria were taken using optimum lag suggested by FPE, AIC and HQ tests. The Trace statistic (24.297) and Max-Eigen statistics (22.436) value is more than the critical values thus the null hypothesis (r = 0) is rejected. It implies that there is an existence of co-integration equation (CE) between the variables. Hence, there exists a long-term association between Agricultural gross Domestic Product and Agricultural Credit.

Vector Error Correction Model for short-term relationship

From Table below, it is found that error correction term is negative which indicate that there is convergence between the variables and existence of long run causality. It means that if there is any deviation in the long run relationship among variables then there is error correction mechanism and negative sign express that the system will go back to the long run equilibrium with 0.7% speed.

Table 6 . – Long run causality and error correction term

	β	S.E.	t-statistic
ECT	-0.0743	0.020	-3.6952
GDP-(1)	-4.84 X 10-8	1.8 X 10-8	-2.729
GDP-(2)	-2.29 X 10-8	1.4 X 10-8	-1.682
CR-(1)	0.0174	0.1735	0.100
CR-(2)	0.1832	0.159	1.153
Intercept	39106.17	10358.0	3.77547

Granger Causality

Granger Causality test has been conducted to check for causality among the agricultural credit and agricultural GDP in short run. The results reveal that agricultural Credit Granger causes agricultural gross domestic product. It is significant at 1 per cent level. At the same time, agricultural Gross Domestic Product Also Granger causes changes in

agricultural credit. Therefore, it can be concluded that a bidirectional causality between

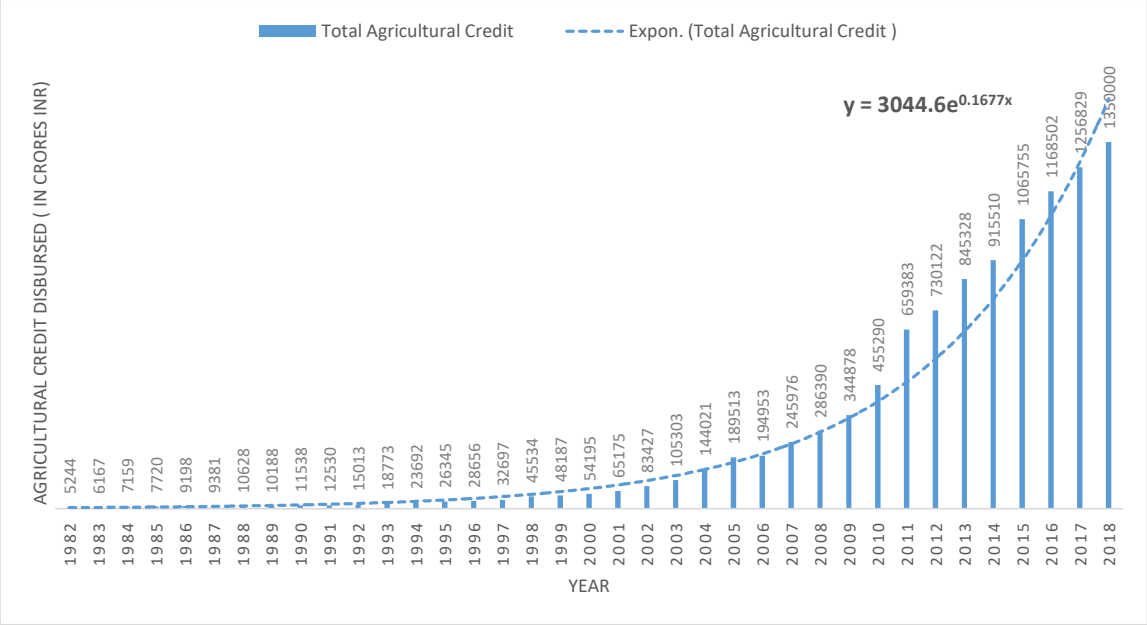
agricultural credit and agricultural gross domestic product is found.

Null Hypothesis	P-value	Conclusion
D (LCR) does not Granger cause of D (LAGDP)	0.0172*	Causality
D (LAGDP) does not Granger cause of D (LCR)	0.0024**	Causality

Table 7 . Null Hypothesis

Compound annual growth rate

Figure 1 .Total Agricultural credit Disbursed in India (1982-2018)



From the above figure 1 , it is perusal that exponential growth in Direct Institutional Credit for Agriculture and Allied Activities from 1980 to 2018 had been 16 %. From the graph it can be seen that in the decade of 1980's and 1990's there was no much yearly increment in the agricultural credit disbursement. But after 2000 there was sharp increment in the disbursement of institutional credit because government and commercial bank gave too much emphasis on agricultural lending. In 2004, the Government of India announced that it intended to double the flow of credit to agriculture over a period of three years (Ministry of Agriculture 2007). A "comprehensive credit policy" was announced in June 2004. It included promises to raise agricultural credit by 30 per cent a year; to finance 100 farmers per bank branch (fifty lakhs, farmers in a year)

Summary and Conclusion

In this study, we have empirically investigated the nature of the causal relationship between the India's agricultural GDP and agricultural credit using the Granger causality test through the Vector Error-Correction Model over the period 1980 to 2018. The co-integration and the Johansen-Juselius maximum likelihood tests show that there is a long-run positive association between the India's agricultural GDP and agricultural credit. It is also observed that in the short run, the agricultural credit Granger-causes agricultural growth in India. At the same time, the increased Agricultural GDP drives agricultural credit. In other words, there is an evidence of a bidirectional Granger causality running from agriculture credit to agricultural growth. This insight lends a general support to the credit-led growth hypothesis. We can conclude that agricultural credit has potential to play a role similar to that of other drivers of agricultural growth, particularly for developing countries, lends support to who argue that increasing agricultural credit leads to increasing economic growth, and that the credit-led growth from agriculture may represent the optimal allocation of resources to get maximum productivity or production.

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 a significant and positive impact on GVA by agriculture sector in India, and production of agriculture produces has a negative and significant impact on agriculture sector.

The policy implication needs to emphasize on two perspectives. Firstly, it will encourage institutional credit arrangement with operational ease, reachability and credit literacy among farmers across the nation. Lastly, non-institutional credit sources need to marginalize. It could be in the form of putting restrictions on selling hypothecated land or agricultural produces by informal sources. The Credit Grievance Redressal forum at district level may decrease the credit stress among farmers. Shifting agricultural support from non-market to market-based approach is right step towards achieving sustainable growth. If the supply side could be an area for future research, then we may find customer credit assessment, credit risk mitigation and credit usage decisions would base on quantitative or/and qualitative models. In the absence of optimal decision assessment model for customer

credit risk evaluation and credit decision by commercial banks, the institutional lenders are reluctant to involve in agricultural credit. Finally, it can be concluded that Agricultural credit is a necessary input for inclusive agricultural sector growth. For financial and social inclusion government should take strong steps to disburse credit for agricultural sector, because agricultural credit can lead to agricultural growth. 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.

References

- Das, Abhiman & Senapati, Manjusha & John, Joice. (2009). Impact of agricultural credit on agriculture production: an empirical analysis in India. Reserve Bank of India Occasional Papers. 30. 75-107.
- Bashir, Muhammad Khalid & Mehmood, Yasir & Hassan, Sarfraz. (2010). Impact of Agricultural Credit on Productivity of Wheat Crop: Evidence from Lahore, Punjab, Pakistan. Pakistan Journal of Agricultural Sciences. 47. 403-407.
- Feng Xia Dong; Jing Lu and Allen Featherstone, (2012), Effects of credit constraints on household productivity in rural China, Agricultural Finance Review, 72, (3), 402-415.
- Akoijam, Sunildro. (2012). Rural credit: A source of sustainable livelihood of rural India. International Journal of Social Economics. 40. 10.1108/03068291311283454.
- Sudha Narayanan, 2015. "The Productivity of Agricultural Credit in India," Working Papers ID:6428, eSocialSciences.
- Anwer, M., Saba Farooqi, and Yahya Qureshi. "Agriculture sector performance: An analysis through the role of agriculture sector share in GDP." Journal of Agricultural Economics, Extension and Rural Development 3, no. 3 (2015): 270-275.
- Ponnarasu, S., and P. Mohanraj. "A study on institutional credit to agriculture sector in India." International Journal of Humanities & Social Science Studies 3, no. 4 (2017): 82-90.
- Saqib, Shahab E., John KM Kuwornu, Sanaullah Panezia, and Ubaid Ali. "Factors determining subsistence farmers' access to agricultural credit in flood-prone areas of Pakistan." Kasetsart Journal of Social Sciences 39, no. 2 (2018): 262-268.

Comment [FK2]: Check correct references writing

Comment [FK3]: Check correct references writing

Comment [FK4]: Anwar or Anwer? Which one?

- Bharti, Nisha. "Evolution of agriculture finance in India: a historical perspective." Agricultural Finance Review (2018).
- Maia, Alexandre Gori, Gabriela dos Santos Eusébio, and Rodrigo Lanna Franco da Silveira. "Can credit help small family farming? Evidence from Brazil." Agricultural Finance Review (2019).
- Nordjo, Ralph Essem, and Charles KD Adjasi. "The impact of credit on productivity of smallholder farmers in Ghana." Agricultural Finance Review (2019).
- Mamatzakis, E. C., and C. Staikouras. "Testing for the effects of credit crunch on agriculture investment in the EU." Bulletin of Economic Research 72, no. 4 (2020): 434-450.
- Fowowe, Babajide. "The effects of financial inclusion on agricultural productivity in Nigeria." Journal of Economics and Development (2020).

Comment [FK5]: for refernces it should be written sequentially by alphabetical (from A to Z)