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Agriculture Credit and Rural Economic Development

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Abstract

Agriculture credit plays a crucial role in shaping agricultural economy of any country. In this study, we establish that growth in agriculture credit is not limited to only agriculture economy but can have a multiplier effect on overall rural economy. Credit is an enabling factor and the impact on Agriculture Gross Domestic Product operates through its influences on the level of purchased inputs. To create demand for inputs, the entire value chain has to be strengthened which in turn generates income leading to overall rural economy growth. Punjab is clearly an example of how agriculture credit had a multiplier effect on the overall rural economy growth. The study suggests that by accelerating agriculture credit growth alone, the pace of growth towards rural prosperity can be fastened.

Keywords: *Agriculture Credit, Input Demand, Rural Growth.*

Introduction

Large literature exists on the relationship between development of financial sector and the rate of economic growth (Clarke et al., 2006; Levine, 2005; Rajan and Zingales, 1998). Agriculture economics is no exception. It has been empirically shown that production is at least 3% lower in credit constrained as compared to non-constrained farm household (Briggeman et al., 2009). Farm credit is not only necessitated by the limitations of self-finance, but also by uncertainty pertaining to the level of output and the time lag between input and output. (De Janvry and Sadoulet, 1995). With the rapid technological adoption and the need to improve farming operations, role of credit is agriculture has become even more crucial. Role of agriculture credit in rural economy is not only limited to agriculture growth. Recent theoretical and empirical study in Economics has established that credit market in developing countries infuse growth in the economic system in several ways. For instance, Zeller et al. (2001) found that in Bangladesh credit access had a significant and strong effect on both income and food consumption. Recognising, the importance of agriculture credit, Indian policy makers have time and again introduced several measures for easy access of agricultural credit to farm households. However, agriculture and rural financial markets remain constrained by geography. In this study, we evaluate the possible linkage between agriculture credit and rural economic growth in India using panel state level data for the period 1995-96 to 2018-19.

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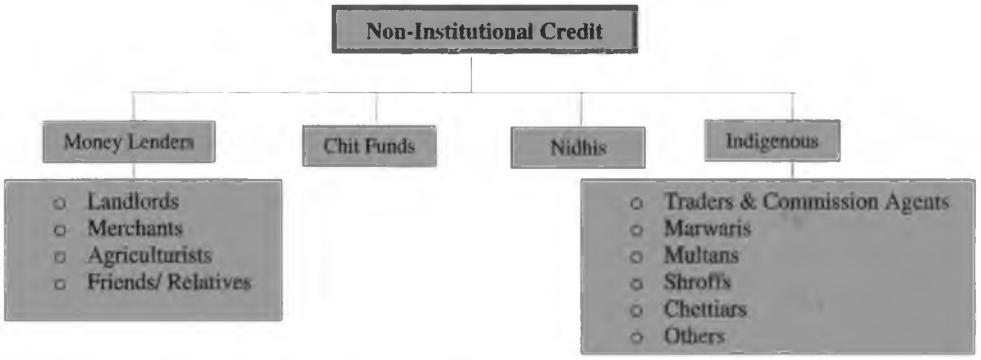
The study establishes that agriculture credit not only enhances agricultural growth but can have a multiplier effect on overall rural economy. The rest of the paper is organised as follows. Section 2 briefly describes the trend of agriculture credit and the credit policies that has enabled the transformation from non-institutional sources to institutional credit growth. Section 3 gives the econometric relationship between agriculture credit and its multiplier effect on rural economy. Section 4 concludes the paper.

Policy Led Formal Agriculture Credit Growth in India

Agriculture credit on the basis of purpose for which it is used are called productive or non-productive credit. Generally, it has been seen that farmers tend to select their source of credit based on the purpose of use and urgency of requirement. Broadly, the sources of credit are categorised as - institutional source and non-institutional source. The non-institutional sources of credit, like, traders and commission agents, money lenders many a times provide credit without completing legal formalities. Money lenders are most easily approachable at odd hours and give advances against promissory notes or land (Yadav, 2018). This makes the money lenders popular amongst the farmers to meet immediate requirements.

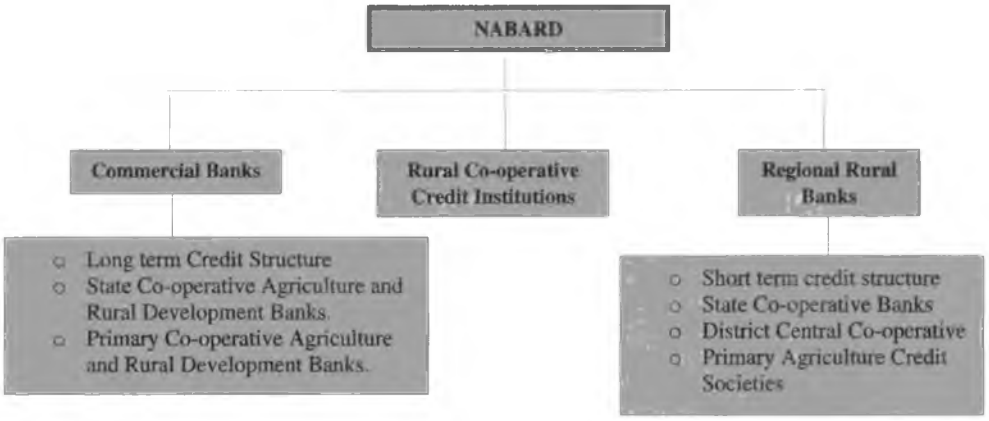
Figure. 1: Non – Institutional Sources of Credit



Source: Mamoria, C.B., Rural Credit in India, 1982.

Most of the non-institutional sources charge very high rate of interest as they take advantage of the urgency of the situation. This had resulted into high indebtedness among farmers leading to a debt trap. A Debt trap not only impacts the farm household income and expenses but disrupts the entire value chain in the agriculture system. As a result, there was an urgency to develop a progressive institutionalisation aimed at providing timely and adequate credit to farmers for increasing agriculture production and productivity. Providing better access to institutional credit for the small and marginal farmers and other sections to enable them to adopt modern technology and improved agricultural practices has been a major thrust of the policy. National Bank for Agriculture and Rural Development (NABARD) is an apex institution established in 1982 for rural credit in India. It not only directly finances farmers and other rural people but also grants assistance to them through the other rural credit institutions.

Figure. 2: Institutional Sources of Credit



Source: Mamoria, C.B., Rural Credit in India, 1982.

The RBIs internal committee report on agriculture credit, categorises the evolution of agriculture credit policies into three distinct phases. In the first phase (1951-1969) - the National Credit Council recognised financing agriculture as a 'national priority'. In 1969, when the first phase of nationalisation of banks took place, the RBI prescribed 1:3 ratio for opening of branches in urban and rural/semi-urban centre. The second phase (1970-1990) marked the introduction of Lead Bank Scheme and regulatory prescription of Priority Sector Lending. The Regional Rural Bank Act, 1976 was enacted to provide sufficient banking and credit facility for agriculture and other rural sectors. The National Bank for Agriculture and Rural Development (NABARD) came into existence in 1982, with the enactment of NABARD Act 1981, to promote agriculture and rural development. In 1989, the Reserve Bank introduced the Service Area Approach (SAA) and Annual Credit Plan (ACP) system as tools for reaching out to the rural areas. The third phase, 1991 was the period of real transformation. It started with the implementation of the first Narasimham Committee Report, i.e., emphasising financial soundness and operational efficiency of banks. Some of the key policy changes which had a long-lasting impact on the rural financial sector were the following:

The first major nationwide farm loan waiver was announced in 1990 and the cost to the national exchequer was around ?100 billion.

Establishment of Rural Infrastructure Development Fund (RIDF) with NABARD meant for funding of rural infrastructure projects which in turn were supposed to deepen the credit absorption capacity in a state by giving loans to state governments and state-owned corporations.

During 1992-93, NABARD started the pilot project on SHG-Bank Linkage programme - a partnership model involving SHGs, banks and NGOs.

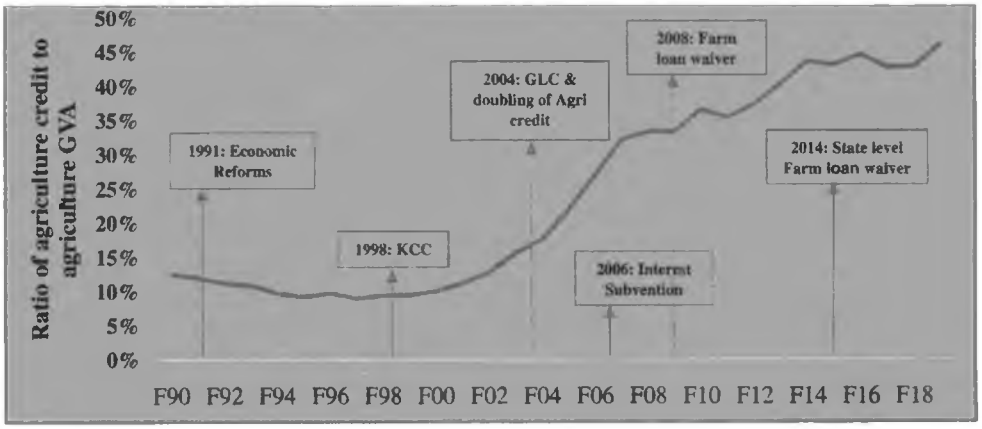
The Kisan Credit Card (KCC) was introduced as a financial product in 1998 to provide hassle free credit to farmers.

The Union Government introduced the Ground Level Credit (GLC) policy in year 2003-04. Under this policy, GoI announces GLC targets for agriculture and allied sector in the

Union budget every year which banks are required to achieve during the financial year. These targets are set region-wise, agency-wise (SCBs, RRBs & Cooperative banks) and loan category wise (crop and term loan).

- The year 2006 saw a host of developments. The Union Government introduced the interest subvention scheme (ISS) for short term crop loans to enable farmers to avail farm credit at reduced interest rates. NABARD introduced the Joint Liability Group (JLG) model, an extension of the earlier SHG model for reaching out to tenant farmers and sharecroppers with access to credit.
- Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS), 2008 announced by the Union Government involved waiving institutional debt for small farmers and a one-time settlement opportunity with 25 per cent rebate to other farmers.
- In 2009-10, the Government introduced the prompt repayment incentive (PRI) of 3 per cent under the ISS to bring down the effective rate of interest to 4 per cent to those farmers who repaid their loans on or before the due date to inculcate repayment habits.

Figure.3: Agriculture Credit Disbursement as a Proportion of Agriculture GDP in the Third Phase (Post Economic Reforms)



Source: RBI

Evident from the figure above, that several policy measures taken since 1991 has led to a significant improvement in agriculture credit disbursement through institutional sources. In the initial year's agriculture credit disbursement as a percentage of agriculture GDP dropped from 13% in F90 to 9% in F99. However, with the Kisan Credit Card Scheme in 1998, the revival was clearly, evident. Other policy measures, like, Ground Level Credit of 2004 and Interest Subvention Scheme of 2006 led agriculture credit as percentage of Agri GDP rise to 32% in F07. Fluctuating trends were evident following 2008 farm loan waiver which negatively impacted the repayment behaviour of borrowers and also made the banks averse to fresh lending. Nevertheless, the increasing trend of agriculture credit disbursement was obvious and F19 registered agriculture credit disbursement of 49% of Agriculture GDP.

With the progressive institutionalisation of agriculture credit, non-institutional sources of

credit that were dominant in 1950s accounting for 90% of outstanding debt declined sharply to 30% in 2015. (AIDIS Report 2013, NAFAIS 2016-17). Besides, the channel of agriculture credit disbursement has also increased. As per the NFAIS survey, in 2015, ~9% of agricultural households took loans from NBFCs, Financial companies, Financial Corporations, Provident Fund, Insurance etc. While a host of policy measures facilitated institutionalisation of agriculture credit, it is imperative to identify the impact it has created in the rural economic system.

Section 3: Agriculture Credit and Rural Economy: Econometric Analysis

Agriculture credit disbursement since the last 30 year have annually grown at a double-digit growth barring few years, like, F15, F17. However, there is very little evidence to show whether the rapid growth of institutional credit has had the intended impact on agriculture growth. The two major components of agriculture credit are - (a) Crop loans or short-term loans and (b) Investment loans or long-term loans. Short term crop loans meet the seasonal production credit demand of farmers, investment loans contribute to capital formation.

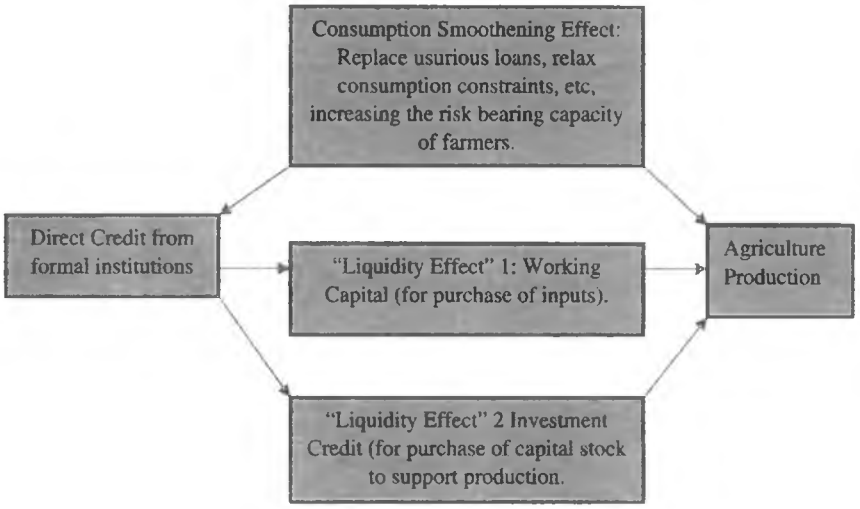
Existing commentaries focussing on agriculture credit disbursement and agriculture growth point out poor correlation between the two (Chavan and Ramakumar, 2007), while some point out the spill over effects to other sector in rural economy (Chavan, 2009; Burgess and Pande, 2005 and Binswanger and Khandker, 1992). The fundamental attribute of credit implies that it serves as an intermediate input and does not directly enter as an input into agriculture production. Narayan (2015) elaborates the pathway in which formal credit can help growth in agriculture sector. Literature suggests impact of agriculture credit on agriculture production, efficiency and productivity potentially occur through multiple channels. The first two channel through which formal credit is used to purchase inputs in the short run or investment in the long run is termed as 'Liquidity Effect' (Binswanger and Khandkher, 1992) since they relieve a farmer's credit constraint and enables purchase of critical inputs to support production.

First, formal credit can be used to purchase inputs over the cropping season, enabling a farmer to maximise the yield from the cultivated area, given a level of capital stock. This channel represents a direct and within season impact on production.

Second, formal credit can be used to make investments in irrigation facilities, machines and draught animals that represent the use of credit for building capital stock to support agriculture production. This channel impacts production with a time lag.

Third, formal credit is used to replace informal credit associated with high interest burden. Existing economic literature on wealth effects and risk aversion suggests that this often enables farmers to make decisions that increase profitability and efficiency. Even when formal credit is diverted to consumption, there could be an implicit wealth effect that impacts farmer's production decisions. This channel incorporates 'Consumption Smoothing Effect'.

Figure.4: Schematic Representation of Pathways



Source: Narayanan (2015), "Productivity Agriculture Credit in India" IGIDR

The most widely referred study of the impact of formal rural credit in the context of India is byinswanger and Khandkher (1992) who found that rural credit has a measurable positive effect on agricultural output. This study is motivated by the Pathway approach that works on three stages - credit market, input demand functions and value of GDP functions estimated in Seemingly Unrelated Regression Equations (SURE) framework for panels and incorporating the control variables used in the study by Narayanan (2015). In this study, we have used state level data for the time period 1995-96 to 2018-19 to estimate the relevant parameters of interest. To measure the impact of agriculture credit we looked at two set of a model:

a. **Input Demand Function:** Panel data set of 20 states and 20 years is used to measure the effects of agriculture credit on input demand factors over time

b. **Overall Rural Development-** Multi-level maximum likelihood regression model is used to measure effect of agriculture credit on overall rural development.

a. **Agriculture Credit & Input Demand Function**

If credit is an enabling factor, impact on agriculture GDP operates through its influences on the level of purchased inputs. In the first model we have used Input demand function to measure the effect of credit. The analysis is done for two sub-periods -, i.e., 1995-96 to 2003-04 and 2004-05 to 2015-16. The inputs used in the model are fertilizers (total of nitrogen, phosphate, and potassic fertilizers), pesticides, tractors sold, labour and animal power intensity and tube wells used for irrigation.

Table 1: Input Demand System: The Credit Elasticity of Input Demand from Fixed Effect Model

	1995-96 to 2018-19	1995-96 to 2003-04	2004-05 to 2018-19
Fertilizers	0.15*	0.33*	0.06*
Pesticides	0.51*		
Tractors sold	1.08***	0.10	1.67***
Area irrigated under canals	0.68	0.34	0.94
Labour hours per hectare	-0.20**	-0.28	-0.16**
Animal hours per hectare	0.18	-0.07	-0.04
Machine hours per hectare	-0.67**	-1.13	-0.17

Note: (i) Log transformed dependent and independent variables used in the model. To allow for heterogeneity across states, Fixed Effect Model is used based on Hausman Specification Test. The model is fitted at: P>[z] <5%.

The findings of this analysis conform with earlier findings that input use is sensitive to credit flow. The results suggest that over the entire period, a 10% increase in credit flow in nominal terms can lead to an increase in fertilizer consumption by 1.5% and 10.8 % increase in tractor purchase. Disaggregated time period analysis suggests that in the first phase, i.e., during 1995-96 to 2003-04 institutional credit channelled into purchase of variable inputs, such as, fertilizers, pesticides. While in the 2nd phase, i.e., 2004-05 to 2015-16, flow of institutional credit growth led to purchase of tractors. Clearly, this conforms the popular notion that in the recent years, labour shortage is leading to farm mechanisation and credit disbursement is aiding the growth. Further, intensity of labour use or machine use decreases with the increase in flow of credit. Both labour per hour and machine per hour is negatively correlated to agriculture credit. Use of canals for irrigation is estimated to increase by 6.8% with a 10% increase in agriculture credit.

b. Agriculture Credit & Overall Rural Development

Agriculture credit as a proportion of agriculture GDP has increased over the years. To estimate the magnitude of agriculture GDP growth along with the spill over effects on post-harvest infrastructure and household expenditure, we have used mixed effects maximum likelihood regression model. Rural infrastructure index is derived by aggregating indicators like, (i) regulated market per lakh gross cropped area; (ii) Registered factories in food processing sector (iii) Storage capacity per food grain/ oilseeds production (iv) Percentage of households electrified (v) No. of FPOs promoted by SFAC.

Table 2: Rural Development: Regression Coefficients from Mixed Effect ML Regression Model

Dep Var = Agriculture Credit	Coefficients
Agriculture GDP Per Household	0.277***
Household expenditure Per Household	0.616**
Rural infrastructure Index	0.695**

Note: (i) Log transformed dependent and independent variables used in the model. The P-Value for each independent variable =0.000 indicating statistically significant.

Evident from the above table, 10% increase in agriculture credit can lead to an increase in agriculture GDP by 2.7 % and is statistically significant. However, the analysis suggests that the magnitude of impact in rural expenditure and rural infrastructure can be much larger, i.e., by 6.2% and 6.9% respectively. The lower impact on agriculture GDP as compared to overall rural development is possible because the push of agriculture credit to create input demand may not always lead to the optimum usage of inputs and therefore output growth may be constrained.

On the other hand, credit flow supporting the growth in input demand function requires infrastructure support. For instance, higher usage of fertilizers and pesticides would require larger number of fertilizer and pesticide dealers, larger agriculture input market accessibility etc. Further, farmers willingness to invest in agriculture input for mechanisation also depend on the stability of farm revenue. Stability of farm revenue measured in terms Agri GDP growth has a direct and high correlation with rural infrastructure. Higher, the number of regulated markets, storage capacity, food processing unit, higher is the stability in income. Clearly, effect of agriculture credit growth spills over entire rural infrastructure growth which in turns generates higher income and therefore higher household expenditure.

The graph below elucidates the relationship between agriculture credit with rural infrastructure, household expenditure and agriculture GDP at the state level. Punjab is clearly an example of agriculture disbursement leading to input demand growth, generating overall rural development in the state. States like, Madhya Pradesh and Gujarat are high in agriculture GDP per household but low in terms of rural infrastructure index and household expenditure per household. Agriculture credit per household currently is below average in these states. Increase in credit disbursement can have a multiplier effect on overall rural economy.

Figure.5: Correlation between Agriculture Credit Per Household and Rural Infrastructure Index

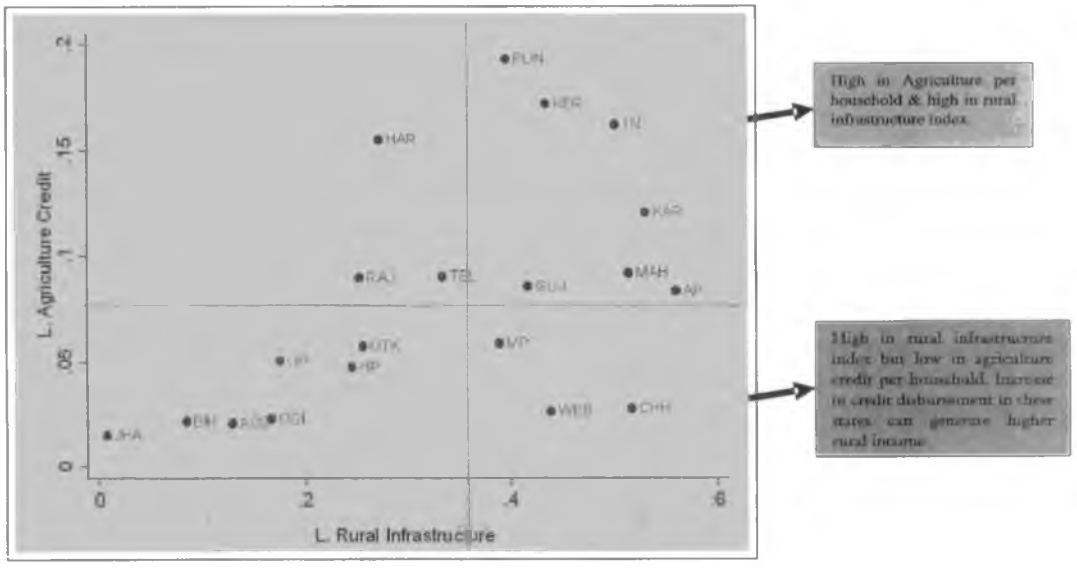


Figure.6: Correlation between Agriculture Credit Per Household and Rural Household Expenditure

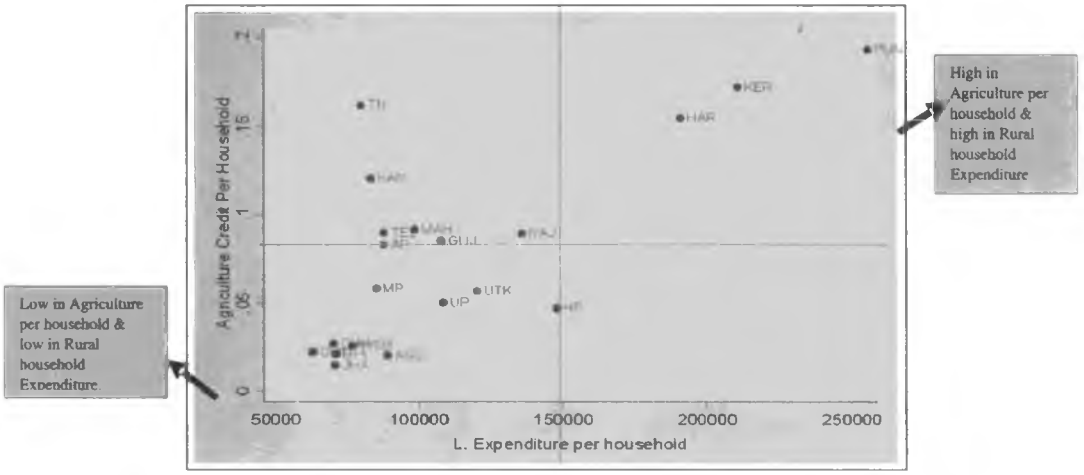
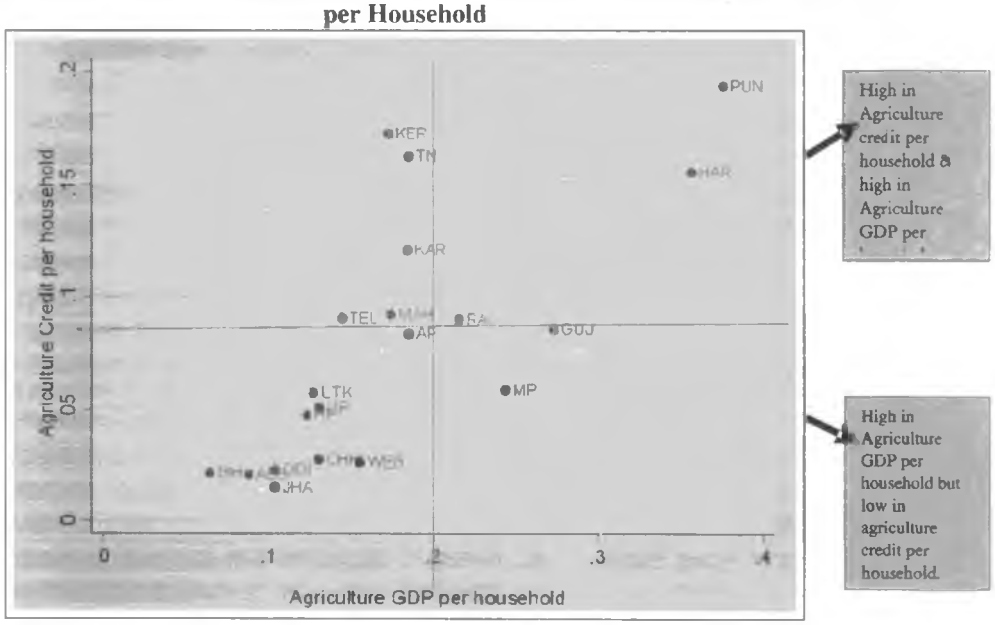


Figure.7: Correlation between Agriculture Credit Per Household and Agriculture GDP per Household



Conclusion

Agriculture credit is an essential part of the process of uplifting agriculture growth. In India, since long, farming had high dependency on credit. During 1950s, about 90% of the credit was sourced from money lenders or non-institutional sources which has come down significantly to 30% in 2015. This has been possible because of several policies taken by the

government to boost agriculture credit. Credit is an enabling factor and the impact on agriculture GDP operates through its influences on the level of purchased inputs. The impact of agriculture credit growth on input demand is studied for two time periods. In the first phase, i.e., 1995-96 to 2003-04, growth in agriculture credit led to higher growth in fertilizers, pesticides etc. i.e., to meet the short- term requirement of the farmers. In the second phase, i.e., 2004-05 to 2008-19, growth in agriculture credit aided increase in investment, i.e., tractor purchase. Increase in agriculture credit also have a strong impact on agriculture GDP growth. However, our analysis suggests that the magnitude of impact in rural expenditure and rural infrastructure can be much larger. This is because the push of agriculture credit to create input demand may not always lead to optimum usage of inputs and therefore output growth may be constrained. On the other hand, to create demand for input, the entire value chain has to be strengthened which in turn generates income leading to overall rural economy growth. Punjab is clearly an example of how agriculture credit had multiplier effect on the overall rural economy growth. Gujarat and Madhya Pradesh are also in the path of high agriculture GDP and high rural infrastructure index. Yet rural expenditure per household is still lower than average. Thus, boost to agriculture credit is one of effective measure of enhancing rural development.

References

Narayanan, Sudha (2015), "The Productivity of Agriculture Credit in India", Indira Gandhi Institute of Development Research, Mumbai.

Chavan, P. (2009). "How Rural is India's Agricultural Credit". The Hindu.

Binswanger, Hans.P. and Shahidur Khandker (1992): 'The Impact of Formal Finance on Rural Economy of India', World Bank, Working Paper No. 949. (also appeared in The Journal of Development Studies Volume 32, Issue 2, 1995)

Ramakumar, R. and Chavan, P. (2007). "Revival of agricultural credit in the 2000s: An Explanation". Economic and Political Weekly, 57-63.

Clarke, G., Xu, L. C., and Zou, H. F. (2006). "Finance and income inequality: what do the data tell us?" Southern Economic Journal 72: 578-596.

Levine, R. (2005) "Finance and growth: theory and evidence". In: Aghion, P., and Durlauf, S., (Eds.), Handbook of Economic Growth. Elsevier Science, Netherlands.

Rajan, R. G. and Zingales, L. (1998) "Financial dependence and growth," American Economic Review 88: 559-587.

Briggeman, B.C., Towe, C.A., and Morehart, M.J. "Credit constraints: Their existence, determinants, and implications for U.S. farm and nonfarm sole proprietorships." American Journal of Agricultural Economics 91(2009): 275-289.

De Janvry, A. and E. Sadoulet, (1995). "Rural poverty and differentiated rural development programs". Rev. Econ., 18: 3-36.

Zeller, M., M. Sharma, A. Ahmed and V. Rashid, (2002). Group based financial institutions for the rural poor in Bangladesh: An institutional and household level analysis. Research Report No. 120, International Food Policy Research Institute, Washington, DC., USA.

Yadav, Sunil (2017), "Sources of Agriculture Credit in India-A Conceptual Study of Indian Agriculture Credit", Shodh Drishti, Vol-8, No-3, April-June

Mamoria, C. B (1982). "Rural credit in India (1st ed). Kitab Mahal, Allahabad [India]

Ministry of Agriculture and Farmer's Welfare (2017), "Report on the Committee of Doubling Farmers Income", Vol-IV -Post- Production Interventions: Agriculture Marketing

RBI (2019), "Report of the Internal Working Group to Review Agriculture Credit"

Appendix

Table A.1: Data Sources

Data used	Sources
Agriculture Credit	Reserve Bank of India
Fertilizer Consumption	Fertilizer Association of India
Pesticides Consumption	Ministry of Agriculture, Directorate of plant protection and quarantine
Tractor Sales	Tractor Manufacturing Association
Labour hrs per hour	Ministry of Agriculture, Cost of Cultivation Studies
Animal hrs per hour	Ministry of Agriculture, Cost of Cultivation Studies
Machine hrs per hour	Ministry of Agriculture, Cost of Cultivation Studies
Canal irrigated area	Ministry of Agriculture
Agriculture GDP	National Accounts Statistics
Rural household Expenditure	NSSO-68th Round, National Accounts Statistics
Regulated market per lakh gross cropped area	Report on Doubling Farmers Income
Registered factories in food processing sector	Report on Doubling Farmers Income
% of households electrified	EPWRF time series
No. of FPOs promoted by SFAC	Report on Doubling Farmers Income
Storage capacity per '000 production	Report on Doubling Farmers Income

Table A.2: Abbreviations used in Figure 2-7

Abbreviated Form	
AP	Andhra Pradesh
ASS	Assam
BIH	Bihar
CHH	Chhattisgarh
GUJ	Gujarat
HAR	Haryana
HP	Himachal Pradesh
JHA	Jharkhand
KAR	Karnataka
KER	Kerala
MP	Madhya Pradesh
MAH	Maharashtra
ODI	Odisha
PUN	Punjab
RAJ	Rajasthan
TN	Tamil Nadu
TEL	Telangana
UP	Uttar Pradesh
UTK	Uttarakhand
WEB	West Bengal