AN EMPIRICAL ANALYSIS OF AGRICULTURAL FINANCE PROVIDED BY SCHEDULED PUBLIC AND PRIVATE SECTOR BANKS IN INDIA IN THE POST REFORM ERA (1991-2014)

A SUMMARY OF THESIS SUBMITTED TO
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1. Introduction

The agricultural sector is vital to all regions of the globe. Agriculture is an important sector of the economy. A large size of population depends on agriculture for food, raw materials for industries and employment. Throughout the world, agriculture has been recognized as an essential industry for food production as well as raw materials for industries etc. Other sectors also use agricultural materials in their production, besides feeding themselves. The agriculture sector contributes less than 20 percent to India's Gross Domestic Product yet it continues to employ more than half of the workforce. In light of the rapid rise of the population, there has been an unprecedented increase in the number of people engaged in agriculture in recent years. A rise in agricultural activity has been a consequence of increased growth over time. For low income people, the susceptible and the poor in society, agricultural activities remain an important source of livelihood and it plays a substantial role in diminishment of poverty. Food demand is increasing hastily in developing countries as a result of heavy population pressure. In these countries, because of the way everything is set up, food consumption is extremely low in volume and with a slight increase in per capita income, the demand for food in these countries increase sharply. As a result, the agriculture sector is limited in its ability to increase marketable surpluses of food grains. There is no sustainable way of producing surplus food using the same inputs and resources. Agriculture is influenced by climate conditions. It is the climate that determines whether an agricultural operation succeeds or fails. Current circumstances indicate that the agricultural sector's decline is not only due to climate conditions but is also due to increasing poverty, which is difficult to realize and very challenging to eradicate. Due to chronic poverty and the crushing debt burden of the Indian farmers, agricultural productivity suffered in turn results in low levels of production, which aggravates the poverty and debt burdens of the peasants. The Indian peasantry continues to suffer from chronic poverty and crushing debt. The existence of poverty among India's rural populations is one of the most distinctive features of rural economy.

In the era of economic reforms, the government commences various initiatives to increase the credit flow towards the agricultural sector. The government started programs like special Agricultural Credit Plans (1994), Kisan Credit Card Scheme (1998) and Self-Help group bank linkage. During 2004, the Government of India initiated the Double Rural Credit Scheme to improve agricultural credit. There was also a government initiative in the sphere of agricultural credit in the year 2008 known as the Agricultural Debt Waiver and Debt Relief

Scheme. For the first time since 1990, a large scale Debt Relief Program was created. The main purpose behind the commencement of programs like Kisan Credit Card scheme in 1998 was to fulfil short term credit needs of farmers for cultivation of seasonal crops, harvest expenses and marketing expenses. This scheme provides adequate and timely short –term credit facilities at low cost to the farmers. However, the performance of the scheme was not same across different regions of the country; it was dismal in the northeastern region. The Kisan Credit Card scheme was revised in the year 2012. Under this revision, all banking institutions were suggested to issue smart cards to all farmers. Agency wise distribution of total cards issued from 1998 to 2014 was about 49 percent issued by commercial banks followed by 35 percent by cooperative banks and 16 percent by regional rural banks (Gyanendra Mani, 2016).

A Subvention Scheme for interest was implemented by the Government of India in the year 2006. Through this scheme, the government tried to provide concessional crop loan to farmers up to Rs. 3 lakhs at seven percent rate of interest per annum. It also provides an additional subvention of 3 percent for prompt repayment of loans within a period of one year from the date of advance. For use of own funds, this scheme is granted to public sector banks, private sector banks, cooperative banks and regional rural banks, as well as by NABARD for refinancing of both cooperative banks and regional rural banks (Economic survey,2017-18).

2. Need for the Study

Based on the review of the published literature, it appears that several studies have been conducted at International, National, and State-level perspective on different facets of agricultural finance. Despite the fact that these studies carry great importance, there are still many important aspects of agricultural finance that are lacking, specifically whether financial institutions influenced agricultural growth to the intended degree. Considering the previous studies, a more in-depth analysis is required. In this context, the aim of this study is to determine the extent to which, if at all, growing short-term, medium-term and long-term credit by commercial banks to agriculture contributes to the growth of the agricultural sector. Having said that, how does it support agriculture and by what means?

This study uses time-series data to examine specific questions: Are institutional credits productive in the agricultural sector? What has been the compounded and instantaneous growth rate of direct institutional credit since 1991? What is the impact of commercial bank credit on capital formation in the agriculture sector? Using detailed time series data for the

period 1991-2014, this study empirically analyze the impact of agricultural finance on agricultural output and input demand.

The distinguishing feature of this study is that, it developed an econometric model that attempts to identify the impact of credit provided by commercial Banks on capital formation and growth in agricultural sector in India. Moreover, this study examines the growth and performance of agricultural finance by scheduled commercial banks, as well as the impact of deposits, branch expansion and inputs on agricultural credit supply.

3. Objectives of Study

The general objective of this study, therefore, is to conduct a study of finance provided by scheduled public and private sector commercial banks to the farmers of the agricultural sector in India. Subsumed in this general objective are the following specific objectives:

I. To examine the growth and impact of agricultural credit on agricultural output and input.
II. To identify the major determinants of agricultural credit.
III. To study the impact of commercial banks loan policies on the economic stability of agriculture.
IV. To examine the impact of long term agricultural credit on capital formation in the agricultural sector.
V. To evaluate the challenges of agricultural finance in India.

4. Hypotheses of the Study

The present study is guided by testing of the following Hypotheses

1. There is a significant impact of credit on output and input of the agricultural sector.

2. There is a significant growth of credit provided to the agriculture sector by commercial banks.

3. There is a significant relationship between the growth of deposits and credit provided to the agriculture sector by commercial banks.

4. There is a significant impact of interest rate on the supply of agriculture credit.

5. Main Divergence of the Present Study

The study analyzed the data on the credit provided by the Scheduled commercial banks under the public and private sector both, to the agricultural sector in India. In addition, this study empirically examined the impact of credit flows in the agricultural sector by commercial banks on agricultural productivity and inputs demand.

Time Span: The period of empirical analysis is from 1991 to 2014.

6. Sources of Data

Descriptive approaches were used in this study. This is the research work about, how commercial banks (Public and Private sector) play an important role in agricultural development by providing finance to the farmers. This study depends on quantitative research design because quantitative research is an excellent way of finalizing results and proving or disproving the hypothesis. The present study is depending exclusively on secondary data. To access different aspects and characteristics of commercial Banks and Agricultural credit, this study utilizes secondary data, published by various government agencies.

Especially secondary data will be collected from various reports and publications of Reserve Bank of India. RBI annual Published data related to Banks, among these main publications and statistical tables related to Banks in India, Data Based reports of RBI, Report on trend and progress of banking in India, Basic statistical returns of scheduled commercial banks, financial stability reports, Handbook of Statistics, Rural development statistics and the various issue of Economic Survey of India.

In order to achieve the objectives of the study a time series data on the relevant indicators is collected.

7. Data description

When describing variables in this study, commercial banks are referred to as public and private sector scheduled commercial banks excluding foreign banks. The agricultural credit variable includes direct and indirect credit provided by both public and private sector commercial banks. Total deposits refer to the time deposits and demand deposits of public and private sector commercial banks.

8. Analytical Model

In order to achieve the objectives of the study, time-series data on relevant indicators have been collected. The appropriate methodology employed is based on the objectives of the study.

- **To calculate the Growth rate of different parameters** at aggregate and disaggregate level two functional specification of growth rate will be used i.e. linear and exponential model:

  Model: Agricultural credit $_t = \alpha_0 + \alpha_1 time + \mu_t$

  Dependent Variable: Agricultural Credit by commercial Banks

  Independent Variable: Time

- **To find Agricultural credit Function the following model will be use:**

  Model: Agricultural credit $= \alpha_0 + \alpha_1$ ***(Investment in Securities)*** $+ \alpha_2$ ***(rural coverage of Banks)*** $+ \alpha_3$ ***(Lending rate of agricultural credit)*** $+ \alpha_4$ ***(interest subsidy)*** $+ \mu$

  Dependent Variable: Agricultural credit

  Independent Variable: Investment in Securities, Rural coverage of Banks, Lending rate of agricultural credit, interest subsidy.

- **To find credit elasticity of Agricultural output (Agricultural GDP)**

  Method: *Cobb-Douglus Production Function*

  Dependent Variable: Agricultural Output (Different Crops, Agricultural GDP)

  Independent Variable: Agricultural Credit

- **To find Credit Elasticity of Inputs**

  Method: *Bivariate and multivariate regression model.*

  Dependent Variable: Agricultural Inputs Demand

  (Fertilizers, Electricity consumption, Seeds, Tractors etc.)

  Independent Variable: Agricultural Credit

- **To find relation b/w Growth of Deposits & Credit in Agriculture**

Model: Agricultural credit $_t = \alpha_0 + \alpha_1$ ***(Growth of Bank Deposits)*** $+ \mu_t$

Dependent Variable: Agricultural Credit

Independent Variable: Growth of Bank Deposits

α is the parameters of the intercept and slopes of the coefficients, while μ represents other variables that could have lent further explanation to explained variables but not included in the model.

Besides these methods, correlation, ratios, percentages and growth rates are used for analysis. The shares have been calculated in percentage terms.

9. Definitions of selected variables

- **Agricultural Credit by Commercial Banks**: refers to the total amount of direct and indirect outstanding credit provided to the agricultural sector by public and private sector commercial banks. The amount is expressed in rupees crores.
- **Investment in Securities*:*** Specifically, refers to commercial banks' investment in both central and state government securities. There is a possibility of banks having less loanable funds available due to high investments in securities. Rupees crores are used to express the value. The amount of investments in government securities is considered in this study to be the percentage of total bank deposits.
- **Rural Coverage of Banks**: refers to the number of rural bank branches of scheduled commercial banks in comparison to total number of bank branches. The values are expressed in numbers.
- **Lending Interest Rate of agricultural credit:** refers to the lending rate or interest rate charged by commercial banks on agricultural credit. In order to analyze the interest rate, it is expressed as percent. Here the interest rate is calculated as a weighted average of the annual rate.
- **Interest Subsidy (IS):** refers to the subsidies granted by the central government to commercial banks on agricultural loans. Values are expressed in rupees crore.
- **Agricultural GDP:** is the Gross Domestic Product (GDP) derived from the agricultural sector. Values are expressed in rupees crore.
- **Agricultural Inputs Demand:** defined as the use of Fertilizers, Chemicals, Number of Tractors, Number of power tillers, Labor etc.

- **Growth of Bank Deposits:** refers to the deposits made to commercial banks in the form of time deposits, demand deposits and other saving deposits. Values are expressed in rupees crore.

10. Scope and Significance of the Study

An analysis of how an improved financial system and healthy institutional credit growth can lead to improved agricultural performance is presented. In this regard, it would seem fair to conclude that the study's findings would prove useful to policymakers when planning future programs and the findings would also be helpful to banks when deciding on credit facilities to agricultural sector.

11. Limitations of the Study

There are a few limitations to the study, particularly the fact that it covers only the post-reform period and focuses only on private and public sector commercial banks. Furthermore, foreign commercial banks were excluded from the study. Despite the limitations discussed, the research on this topic may prove useful to commercial banks and financial institutions.

12. Chapter Design

The present study is classified into eight chapters. Chapter one of the thesis gives introductory information of the agricultural sector, agricultural finance and some historical background of commercial banks in India. Chapter two highlights the various published studies conducted at national and international level regarding the agricultural finance. Chapter three gives the details of research methodology used in the study and various sources of secondary data collection. It also gives an insight regarding the details of various variables. Chapter four estimates growth and performance of agricultural finance by schedules commercial banks. Chapter five examines empirical estimation of the impact of agricultural finance on agricultural output and input demand. Chapter six analysed the linkages between interest rate, interest subsidy and supply of agriculture finance by commercial banks. Chapter seven focuses on impact of agriculture credit on capital formation in the agriculture sector and chapter eight concludes with major findings and policy recommendations.

13. Results

The first chapter of this study presents an introduction to the agricultural sector, agricultural finance, and some historical background of Indian commercial banks. Brief description of agriculture finance and the evolution of agriculture finance in India is presented in this chapter. The chapter discusses pre-reform and post-reform phases of agricultural institutional finance. A section of this chapter discusses cooperative credit and institutional financing. Furthermore, it gives a brief overview of sources of Agricultural credit in India and patterns of bank lending. The chapter provides brief details about different institutional agencies that offer agricultural credit. This chapter provides a brief overview of the size-wise distribution of direct finance from scheduled commercial banks to farmers and the proportion of small and marginal farmers receiving the credit from scheduled commercial banks. A brief overview of the role of various institutions in the provision of credit to the agriculture sector is also included in this chapter.

Chapter two highlighted the various published studies conducted at the national and international level regarding the agricultural finance. As seen in the review of published literature, several studies on different aspects of agricultural finance have been conducted from a national, regional, state and international perspective. These studies are of great importance, however many crucial aspects of agricultural finance remain unexplored, such as whether financial institutions had the intended effect on agricultural growth.

In chapter three, the methodology and database of the study are discussed. In this chapter, we discussed the sources of data, selected variables, time period, and data analysis techniques used in this study, as well as the limitations of the present study.

Chapter four estimated the growth and performance of agricultural finance by scheduled commercial banks. The purpose of this chapter was to examine the expansion of branch network, deposits, and advances by public and private sector commercial banks during the period 1991 to 2014.

The results of this chapter revealed that a higher proportion of commercial banks' total deposits come from deposits of public sector commercial banks than from private sector commercial banks. Increase in public sector commercial bank deposits lead to an increase in scheduled commercial bank total deposits, and similarly, increase in private sector commercial bank deposits contribute to increased commercial bank total deposits. Time deposits of commercial banks are more concentrated in public sector banks than in private

sector banks. Further, Results of this chapter suggest that increased time deposits at public sector commercial banks contributed to the increase in commercial bank total time deposits as well. Accordingly, increased private sector commercial bank time deposits reflected the increase in commercial bank total time deposits. Public sector commercial banks make a larger contribution to the total demand deposit share of commercial banks than private sector commercial banks. Increased demand deposits for public sector commercial banks, as well as demand deposits for private sector commercial banks, resulted in increased demand deposits for commercial banks. Time deposits account for a greater share of total commercial bank deposits than demand deposits. The total amount of deposits at public sector commercial banks increased due to the growth in demand deposits and time deposits. As a percentage of total deposits at private sector commercial banks, time deposits represented a greater share than demand deposits. The growth of total deposits at private sector commercial banks has been attributed to a rise in demand deposits and time deposits. The results indicate that there has been a significant change in the proportion of demand and time deposits during the study period. Public and private schedule commercial banks have increased the share of time deposits in their total deposits significantly. A number of factors have contributed to this change, including the increased proportion of households as depositors, the easing of policies for the withdrawal of deposits and the expansion of banking facilities.

Public sector commercial banks' increased agricultural advances have a significant impact on total advances by public sector commercial banks; public sector commercial banks' increased agricultural advances boost total advances by public sector commercial banks. An increased number of agricultural advances lead to higher total advances by the private sector commercial banks as well. The total advances of public sector commercial banks led to an increase in total advances of scheduled commercial banks, and similarly, the advances of private sector commercial banks led to increases in scheduled commercial bank total advances. Agricultural advances from public and private sector commercial banks have contributed to the growth in scheduled commercial bank advances.

According to regression estimates, the rural branches of public sector commercial banks in India are positively and significantly related to the rural branches of scheduled commercial banks. Rural branches of private sector commercial banks are also positively related to rural branches of scheduled commercial banks, but not significantly. It is evident from the results of the regression estimates that the number of total branches of public sector commercial banks has a higher statistically significant positive effect on the number of scheduled

commercial banks' branches than the private sector commercial banks' branches. Based on the results, public sector commercial banks' urban branches have a higher positive influence on the total number of scheduled commercial banks' urban branches than private sector commercial banks' urban branches. Results of the study showed that public sector commercial banks' metropolitan branches have a more positive impact on the total number of scheduled commercial banks' metropolitan branches than private sector commercial banks. The study indicates that private sector banks' semi-urban branches have a weaker but positive effect on all scheduled commercial banks' branches than public sector banks' branches in semi-urban areas.

From 1991 to 2014, the growth rate of demand deposits at public sector commercial banks in India increased at a rate of 11.22 percent per annum. During the study period, demand deposits of private sector commercial banks showed a significant increase. The results indicate that demand deposits of private sector commercial banks increased by 21.92 percent per year. Over the period 1991-2014, demand deposits at scheduled commercial banks grew at a rate of 13.13 percent per annum. The growth of demand deposits of scheduled commercial banks has been trending upwards during the entire study period. A positive trend can be seen in the growth rate of time deposits of public sector commercial banks. The regression estimates depicts that the rate of increase in time deposits of public sector commercial banks has been 15.88 percent per year. The growth rate of time deposits in private sector commercial banks from 1991 to 2014 showed a significant positive trend. The growth rate of time deposits in private sector commercial banks increased by 22.28 percent annually. Further, a 16.32 percent annual growth rate is registered by time deposits of scheduled commercial banks during the period under consideration, indicating that time deposits at scheduled commercial banks have been trending upwards. Growth rate of total deposits at public sector banks exhibited a positive trend during the period 1991-2014. Total deposits at public sector commercial banks grew by 15.35 percent annually during the period 1991 to 2014. The total deposits of private sector commercial banks increased during the study period. The results indicate a 22.41 percent increase annually in total deposits of private sector commercial banks. There has been a consistent upward trend in total deposits of scheduled commercial banks throughout the study period, total deposits at scheduled commercial banks increased by 16.10 percent per annum. The result shows that during 1991 to 2014, public sector commercial banks lost a significant share of their deposits in commercial banks.

Agricultural advances of public sector scheduled commercial banks have increased by 17.12 percent annually over the study period. Robust growth of 27.96 percent was recorded by the agricultural advances of the private sector commercial banks during 1991-2014, which is higher than public sector banks agricultural advances during the same period.

Considering the results of this study, it is clear that there was a sharp decline in rural bank branches of all commercial banks between 1991 and 2014. This decline was led by public sector commercial banks. The growth rate of branch expansion of public sector banks in rural areas is lower than that of private sector banks.

Results of this chapter demonstrate that rural branches of public sector commercial banks have increased at a rate of 0.70 percent per year. In addition, the urban branches of public sector commercial banks experienced a significant increase of 3.33 percent per annum over the study period. Semi urban branches of public sector commercial banks grew by 3.01 percent annually. The result shows that there is a noticeable positive trend in the growth rate of metropolitan branches of public sector commercial banks in India during the study period, it increased by 4.54 percent per annum. The total number of public sector commercial banks over the study period increased by 2.31 percent annually. The growth rate of private sector commercial banks total branches has shown a positive trend. From 1991 to 2014, the number of private sector branches has increased by 6.15 percent per annum. Rural branches of private sector commercial banks increased by 1.65 percent annually. There was a 7.19 percent annual increase in urban branches of private sector commercial banks between 1991 and 2014. The growth of private sector commercial banks branches in semi-urban areas increased by 5.77 percent per annum. Metropolitan branches of private sector commercial banks have grown significantly over the study period by 9.92 percent annually. According to the results of the study, the number of scheduled commercial bank branches in India over the period 1991-2014 has only moderately increased. Urban, semi-urban, and rural areas have witnessed branch expansion at a much slower rate than metropolitan areas. Public sector banks have increased their branch network in metropolitan areas whereas growth in rural areas has been low. During the study period, private sector banks experienced high branch network growth in metropolitan areas, but branch network expansion has been minimal in rural areas. Therefore, in this chapter through empirical analysis, it was found that there is a significant growth of credit provided to the agriculture sector by commercial banks and also there is a significant relationship between the growth of deposits and credit expansion to the agriculture sector by commercial banks.

Chapter five examines empirical estimation of the impact of agricultural finance on agricultural output and input demand. Commercial bank credit for the agricultural sector is strongly correlated with all agricultural inputs i.e., fertilizers, seeds, power tillers and tractors. Clearly, these five inputs are strongly correlated with total direct credit based on the correlation matrix. The regression analysis indicates that tractors used by the agricultural sector are positively related to the amount of direct agricultural credit lent by commercial to farmers. Due to this, the use of tractors increased in agriculture sector as a result of direct agricultural credit. In the agricultural sector, seed consumption is impacted positively and significantly by commercial banks direct credit to agriculture. The study found that the use of high variety seeds increased as the availability of direct agricultural credit increased. In the agricultural sector, direct credit lent for agricultural purposes led to an increase in fertilizer consumption. The amount of fertilizer utilized for agricultural purposes increased along with the amount of direct agricultural credit disbursed. As the amount of agricultural direct credit increased the amount of electricity consumed for agricultural purposes also increased. Direct credit from commercial banks increased the use of electricity for agricultural purposes, which helped in improvement of agricultural productivity. The role of direct agricultural credit in influencing the use of power tillers in agriculture is both significant and positive. With an increase in commercial bank direct agricultural credit, farmers have increasingly used power tillers in agriculture.

Results of this chapter indicate that indirect credit favours tractor usage in the Indian agricultural sector in a significant and positive way. An increase in the use of power tillers was also observed with the increase of indirect credit flow by commercial banks to the agricultural sector from 1991 to 2014. Agricultural indirect credit offered by banks enhanced agricultural production in India by expanding access to high-yield seeds. Indirect credit is found to have a significant positive effect on seeds utilized in agriculture. Therefore, the use of high yield seeds increased as indirect credit provided by commercial banks increased. The consumption of fertilizer in agriculture is positively impacted by the indirect credit lent by commercial banks for agricultural purposes. This implies greater use of fertilizer following more disbursements of indirect agricultural credit. The increase in indirect agriculture credit leads to an increase in the use of electricity for agricultural purposes. Indirect credit provided by commercial banks leads to higher electricity consumption in agricultural processes, potentially impacting agricultural productivity.

A rise in direct credit has been proven to lead to an increase in agricultural output. Consequently, an increase in commercial bank indirect agricultural credits leads to a rise in agricultural output. It appears that total direct credit impacts agricultural output more than total indirect credit. According to these results, indirect credit has limited potential to raise agricultural production. The pattern indicates that the increase in indirect credit of the previous year is associated with the increase in agricultural output of the present year. By examining indirect agriculture credit and its first lag, it is apparent that agriculture output differs significantly when it comes to indirect agriculture credit. Interestingly, both the public sector and private sector banks' lending towards the agricultural sector has a positive influence on the variation in agriculture output, but the intervention of public sector banks on agricultural credit is a major contributor to the improvement in agriculture output. Net cultivated land area and agricultural output have a positive relationship, it suggested that increased cultivated land area resulted in an increase in agricultural output. Keeping all other inputs constant, the increased number of workers increased agricultural production. A change in the credit in agriculture positively affected agricultural output; therefore, changing credit as an input will positively impact agricultural production. Through empirical results in this chapter, it was found that there is a significant impact of credit on output and input of the agricultural sector.

Chapter six analyzed the linkages between interest rate, interest subsidy and supply of agriculture finance by commercial banks. This chapter examined the growth of investment in securities by commercial banks, borrowing from RBI, Interest subsidy to farmers on short term credit, branch expansion in rural areas by commercial banks, time deposits and demand deposits of commercial banks. It also assessed the major determinants of agriculture lending by commercial banks. During the period 1991 to 2014, investment by scheduled commercial banks in government securities grew significantly by 16.01 percent. Banks' investment in Other Approved Securities declined over the period 1991 to 2014. As depicted by the results commercial banks shifted their investments from Other Approved Securities to government securities, their participation in other approved securities declined by 12.58 percent per year. Most of the investments made by commercial banks are in government securities. The result indicates that total investment in securities by commercial banks has increased significantly during the period under consideration by 14.54 percent per year. There is a significant positive trend of commercial bank borrowing from Reserve Bank of India during the study period. The compound annual growth rate for commercial bank borrowings from

the Reserve Bank of India stands at 11.30 percent. Moreover, this study shows that reserve bank borrowings by commercial banks grew at a rate of 10.70 percent annually. Agricultural loans have received average interest rates from banks that are lower than the average lending rates to all other sectors during most of the period under consideration. For some years between 2000 and 2002 and 2006-2007, average interest rates charged by commercial banks to the agriculture sector were higher than average interest rates for all sectors. The interest rates for direct agricultural loans offered by commercial banks are usually lower than those for indirect agricultural loans. Interest subsidies to agriculture have increased at a significant rate of 20.22 percent per year. Commercial banks' branch expansion in rural areas exhibits a fluctuating pattern. The expansion of rural branches of scheduled commercial banks has been declining for some years. From 1991 to 1993 the commercial bank branches in rural areas increased by 183 branches, Nevertheless, from 1994 to 2006, the number of rural bank branches declined annually, and there were around 7178 fewer rural banks in that period. The number of rural branches of commercial banks declined for some years due to mergers, swapping, and other alternative delivery mechanisms of financial services. In the rural areas, 6689 new commercial banks were opened during the entire study period. Commercial banks opened 13666 new branches between 2007 and 2014. One of the most popular types of deposits is the fixed deposit. Increases in commercial banks' total deposits were primarily driven by increases in fixed deposits. Over the study period, time deposits at commercial banks increased by 16.61 percent annually and demand deposits at commercial banks have increased by 13.86 percent per year. There is a negative relationship between credit to agriculture and bank investments in securities. A similar pattern is observed in relation to interest subsidies. Hence, the proportion of investment in central and state government securities from total bank deposits is negatively related to agriculture sector bank credit. An increase in interest subsidies could decrease agricultural credit supply. The association between interest subsidies and agricultural credit supply is negative. Interest rate is positive and significant which indicates that if the interest rate increases, it leads to more supply of agricultural credit. Rate of interest positively affect the supply of agricultural credit. This indicates that as interest rate increases, the supply of agricultural credit will rise. It implies that by increasing interest rate, commercial banks will be encouraged to lend more to agriculture. A decrease in the interest rate on agricultural credit, on the other hand, would lead to a decrease in the volume of agricultural credit provided by commercial banks. A rise in time deposits at scheduled commercial banks leads to an increase in agricultural credit, that is, an increased supply of agricultural credit is also stimulated by time deposits. Through

empirical evidence presented in this chapter, it was found that there is a significant impact of interest rate on the supply of agriculture credit.

Chapter seven of this study focused on impact of agriculture credit on capital formation in the agriculture sector. This chapter also investigated the growth of Long term direct credit, Short term direct credit and total direct credit supplied to the agricultural sector by scheduled commercial banks in India. The result highlighted the growth of the selected variables for the entire study period and sub-period. During the entire study period, both private capital formation and public capital formation have recorded positive growth. However, private capital formation witnessed higher growth as compared to public capital formation. From 1991 to 2000, public capital formation recorded negative growth, while private capital formation recorded positive growth during the same period. Even though the level of public sector investment in agriculture sector declined, the trend in private capital formation has improved. Public capital formation and private capital formation are complementary to each other, as proved by the findings of this study for the time period 2000 to 2010. The study reveals that during this period with the rise in public capital formation, private capital formation also increased. The results indicate that public and private capital formation cannot be considered substitutes for each other. From the results of the study, it may be concluded that previous year's public capital formation has a positive and significant impact on current year's private capital formation. It is also revealed by the results in this chapter, supply of long term direct credit was highest during the period 2000 to 2010 and during the same period, private capital formation witnessed the highest growth rate. This implies that long term direct credit to the agricultural sector has a positive and significant impact on private capital formation in the agriculture sector. It was observed that the share of short term direct credit is higher than long term direct credit in total direct credit to the agricultural sector during 1991 to 2014. Results of this study revealed that private capital formation accounted highest share in total capital formation than public capital formation in agriculture sector.

14. Policy Recommendations

Based on Empirical analysis, this study concludes with a set of policy implications for commercial banks in India for further improving agricultural finance

I. As part of an efficient financial system, commercial banks should not limit themselves to short-term crop loans to agriculture. In addition to crops, commercial banks should offer loans for agribusinesses, livestock, and agri-industry because all

these are critical to the sustainability of the entire agricultural system. Additionally, commercial banks should provide loans for processing agricultural produce, marketing, and warehouse development in addition to lending for agricultural inputs. Commercial banks in rural areas could benefit from diversifying their loan portfolio, by approving both short and long-term loans.

II. It is crucial that additional borrowing by farmers be kept to a minimum, giving due consideration to the limited ability of farmers to repay their debts. Moreover, commercial banks should prioritize investments in agricultural sectors that are productive, while avoiding excessive borrowing by farmers.

III. The commercial banks must be given a competitive environment so they can set loan rates that are enough to cover the transaction costs associated with rural lending. Consequently, high-net-worth individuals and rural residents will receive better banking services from commercial banks.

IV. Commercial banks should not offer agricultural credit at rates below market rates, as this would encourage wealthy and influential people to divert the funds to alternative uses. Commercial banks need to determine the ability of their borrowers to repay their loans on time. Commercial banks need to select borrowers who repay their loans on time and earn income from the borrowed funds.

V. It is imperative that the RBI supervise private and public sector commercial banks extending financial services to agriculture and rural areas in the context of economic stability by ensuring financial inclusion of rural and agricultural lending into equitable development. Subsidies should be transparent, clearly targeted at reducing financial & institutional costs, and phased out gradually. In addition to providing access to money, commercial banks should also facilitate the process by which individuals become more bankable.

VI. The lack of rural branches has resulted in an institutional void in rural credit. Strengthening commercial banks is a relevant strategy since they are able to do so due to the resources they have. Regulations should be introduced to include a specific expansion program for commercial banks in rural areas. The relationship between the rural economy and the credit system will improve when commercial banks in rural areas will be able to easily establish branch networks if an incentive system is in place for branch licensing.

VII. Public and private sector commercial banks need to collaborate with local institutions in order to be able to reach out to farmers in remote areas without incurring high transaction costs.

VIII. In addition to granting credit to farmers who do not have access to other sources of finance, commercial banks should also provide credit to those who are heavily in debt from noninstitutional sources. In order to enhance financial inclusion, more branches need to be opened, the credit architecture must be revamped, deposit ratios in underdeveloped regions must be increased, and recommendations from the working group need to be implemented to improve credit delivery for farmers.

IX. Commercial banks can offer small farmers the services they need and customize credit channels that suit their particular needs, as well as offer exclusive extension services to small and marginal farmers.

X. A percent of agricultural lending targets could be allocated to commercial banks by RBI for loans aimed at agricultural development, thereby enabling them to effectively contribute to their own developments. Furthermore, the RBI can encourage commercial banks to lend more to smaller and medium-sized individual growers to promote agricultural growth.

XI. Government has offered generous yields on public securities, thus preventing potential private borrowers from getting credit due to the involvement of commercial banks in the stock and bond markets. Investing large amounts of money in the capital markets by commercial banks can lead to an unstable market, causing asset prices to rise and causing market bubbles. Economic growth and private investment would be hampered as a result of falling private lending in the country and the region. The increased investments by commercial banks in the capital markets negatively affect the availability of private credit. Increased exposure to capital markets exposes banks to other factors that may affect other assets. Supervisory and prudential frameworks should also be strengthened in order to safeguard against excessive exposure of commercial banks to capital markets.

XII. Regulatory governance needs to be improved in Scheduled Commercial Banks. Commercial bank branches need to be managed and held accountable for their actions and the metro centric concentration of banks needs to be reevaluated.

XIII. Financial regulations will need to be more flexible to accommodate business operations in rural areas so that the individual bank's regulations can be amended

more easily, and they can adapt to changing circumstances more easily than those imposed by the RBI.

XIV. The government should establish a credit guarantee fund for the agriculture sector since banks are not covered by any guarantee schemes to protect them from default risk.

XV. In an Agriculture credit system, a single database is required to track all credit issued, all operations, all defaults, etc. In order to process agricultural credit within a stipulated timeframe, commercial banks will need this monitoring system.

XVI. Banking institutions can reduce shortfalls in farming credit by handling direct and indirect finance data separately, enabling them to evaluate each activity separately.

XVII. If the commercial banks intend to successfully penetrate and grow their share of the agricultural sectors organized finance, they must adopt innovative and customer oriented strategies.

XVIII. In the case of lending to the agricultural sector, bank managers must change their marketing approach in order to attract customers. Customer-focused strategies and tactics should be identified, implemented, and evaluated, rather than trying to influence them toward a goal that suits the business.

XIX. The agricultural industry can be made credit-worthy by providing agricultural industry deposits to meet their own credit needs. By reducing unnecessary expenses and increasing farmer savings, a two-stage approach may be implemented. Most villagers spend a large amount of money on social obligations and other expenses. Banks should take advantage of the mass media to dissuade them from such unnecessary spending and encourage them to save.