

Chapter I

Introduction

1.1 Statement of the Problem

The term “Development” is a value based and subjective concept which implies revealing untapped potential powers. In general terms, development means revealing favourable changes in a set of vector of desirable social objectives which does not diminish over time. Desirable societal objectives include increase in real per capita income, equity in income distribution, political freedom, access to education, health care, employment, justice as well as protection of life and property. Given these objectives, development is a universally cherished goal of individuals, communities and nations irrespective of time and spatial location. The term “rural development” is a subset that exposes the overall development of agriculture and allied activities, village and cottage industries, village crafts, physical infrastructure, community services, natural and human capital in rural areas. In particular terms, rural development involves helping downtrodden small scale farmers, tenants and the landless people to seek a livelihood in the rural areas so as to control fruits of rural development.

The rural economy of India is predominantly agrarian in character and therefore agricultural development is a prerequisite for rural development. The rural sector is composed of two subsectors i.e.; agricultural and non-agricultural subsector. The agricultural subsector comprises crop cultivation, animal husbandry, dairying, fishing, poultry and forestry whereas small-scale rural industries, rural business and services belong to non-agricultural subsector. Considering both subsectors, the rural stakeholders include farmers, rural labourers, artisans, traders, moneylenders and persons engaged with transport, communications, education, health, banking and extension services. As far as agriculture sector is concerned, India is self-sufficient in food grains production but poor persons hardly manage to get enough food to meet his/her daily nutritional requirements. However, during 2020-21 the agricultural sector contributed roughly twenty percent share of country’s GDP and provided employment to nearly fifty two percent of country’s total labour force. Moreover, the Indian agriculture sector is fraught with several difficulties such as low factor productivity, low capital-labour ratio, long gestation period, small uneconomic land holdings, high vulnerability and risks to natural calamities, non-remunerative prices of farm produce, poor post-harvest infrastructure, high incidence of poverty, prevalence of illiterate and unskilled workforce as well as lack of modern amenities.

In spite of drawbacks, during post-independence periods the agricultural sector witnessed an average annual growth rate of 2.6 per cent which is comparatively higher than 1.00 percent average annual growth rate observed during pre-independence period. Some major factors that contributed to high-level post-independence agricultural growth

are increased use of agricultural inputs, technological change and paradigm shift in institutional framework. It has been observed that for sustained high agricultural growth rate along with technological and institutional changes, a better combination of factor inputs are required for proper implementation. Among all factor inputs, capital is considered as the most vital input for agricultural and rural development. This is because capital in the form of credit is required not only for on-farm investments but also for construction of roads, communication, markets, storage, warehouses, education, training, research and extension services. Credit is also required for non-farm sector for creation of job opportunities through complementary machinery and equipment. Funds for rural development and investments in farm sector are sourced from domestic and foreign institutional sources respectively. Institutional domestic sources include government, PSUs, RBI, NABARD, scheduled commercial banks, RRBs, Cooperatives, trusts, private companies etc. Non-institutional sources envelope professional money lenders, traders, friends and relatives which play an important role in meeting credit requirements of farm sector. Foreign sources include FDI and grants assistance from IBRD, ADB, IMF MNCs, foreign banks, NRIs and foreign nationals. However, foreign sources through FDI route posit an inverse relation with agricultural sector due to applicable stringent regulations and other conditionality in addition to prevailing risks, uncertainties and existing challenges. Therefore, domestic sources have so far performed as dominant role in financing major capital requirements of farm sector in India.

Given the supply structure of agricultural finance, the need for agricultural finance is of paramount importance. In India, around 60 percent of rural households rely on agriculture as their primary source of income whereas 82 percent of them belong to small and marginal farmers (MoA&FW, 2022) category. These categories of farmers have very few capital of their own to invest in agriculture activities. The very small land holding owned by small and marginal farmers community are characterized by features such as preference for food crops cultivation, predominance of family labour, low marketable surplus, demand for consumption credit, lack of collateral and risk aversion attitude. Despite these drawbacks farmers do need institutional credit support from formal agencies due to high transaction costs and interest charges associated with informal sector. Therefore, institutional credit is not only a factor of farm production but it enables the farmer to remove financial constraint and have access to the resources. In fact, credit supplies the most needed liquidity to farmers who fail to match sufficient own capital for cultivation and invest in farming. In such backdrop, it is quite noteworthy that credit is not only required for short-term purposes as the same farmer-borrower may repeat credit requirements in future periods and demand may also arise from potential borrowers.

At national level, two events such as the introduction of new agricultural technology in the end of 1960's and nationalization of banks in 1969 led to a paradigm shift in credit disbursement mechanism through institutional channel. As far as new agricultural technology is concerned the need for adequate credit flow to needy farmers was largely felt. Following recommendations of the All India Rural Credit Review Committee (1969), the government directed the nationalized banks and later on private commercial banks to

supply cheap farm credit in order substantially raise agricultural growth rate in general. On the other hand, bank nationalization policy led to proliferation of social banking norms followed by establishment of Regional Rural Banks (1975) and vast rural network of cooperative credit institution which led to sharp rise in service branches in rural areas (A.Mahajan, 2011). Furthermore, declaration of mandatory priority sector lending by RBI during mid-1980's led to further growth of financial institutions in rural areas. However, proliferation of financial institutions and credit delivery mechanisms at rural areas suffered plethora of drawbacks which eventually diverted formal institutions from other social priorities. Such institutional drawbacks comprised factors as complicated administration procedures, inflexible lending methods, untimely and inadequate credit delivery, quantitative achievement in credit delivery, insistence on collateral, undue importance to feasibility of borrowers and higher transaction costs due to maintenance of small loan amounts for large number of borrowers. All the above drawbacks culminated in lower profit margins and subsequent operational losses which led to initiation of banking sector reforms in 1990's.

The financial sector reforms on Narasimham committee recommendation for deregulation and removal of concessional interest rates yielded adverse impacts on credit delivery to agriculture sector. Undeniably, the implementation of reform measures resulted in closure of loss-making branches in rural and semi-urban areas, decline of credit flow and squeeze on resource availability for agricultural activities due to strict implementation of Basel norms. The agrarian crisis in the first decade of 21st century has provoked policy makers to argue that institutional sector has focused much on off-farm consumer and services sectors whereas agricultural sector was strategically ignored. This situation further stimulated credit supply constraints leading to deceleration in agricultural growth, large-scale overdues and growing NPAs and over-dependence of farmers on non-institutional credit sources. As a consequence, Government interventions were made to increase farm lending through programmes of subsidized interest, interest/loan waivers and debt write-off schemes following periods of natural calamities and low farm prices. Thus, the policy of supply-oriented with directed and subsidized credit programmes acquired the status of dominant financial mechanism to accelerate agricultural growth since 1970s. Moreover, since inception of NEP (1991-92) financial institutions that were not actively involved in direct agricultural lending were statutorily required to disburse a targeted percentage of their total loans indirectly through specialized banks under the RIDF scheme (D.Rajsekhar, 2005). Specialized financial institutions could lend these accumulated compulsory funds on soft terms to State Governments under agriculture and rural development sector.

Based on such aspects of lending policy, some arguments can be made regarding specific features on agricultural credit policies and programmes. Firstly, the demand for credit was not estimated at the individual state or Agro-climatic zone level and credit supply was enhanced across the nation irrespective of zonal socio-economic and climatic conditions. Secondly, policy-makers at apex level virtually ignored that agricultural growth is being constrained by lack of timely capital and inadequate access to

institutional credit by small and marginal holders. Thirdly, on actual flow of credit viewed from the supply side the institutional lenders much favoured macro aspects like assessment of borrower's repayment capacity, deposit mobilization, bank-branch penetration, demographic deposit penetration, deposit-income ratio, cash-deposit ratio, and percentage of non-performing assets to total loan outstanding. Fourthly, institutional lenders at micro-level nearly disregarded lack of simultaneity between realization of farm income and act of expenditure, lumpiness of investment in fixed capital formation, irregular swings in short-term capital needs, financial literacy, banking habits, and alternative sources of credit. Therefore, policy interventions need to devise demand or market-driven programs in order to achieve the expected objectives and ensure that financial institutions at rural sector perform on sustainable basis in the longer term. In reality, the real net flow of credit depends not only upon institutional credit supply but also on the demand side factors. Hence, various aspects of disparities in agricultural credit flow across different regions or states, farm-size groups etc. should be critically explored at micro-level in terms of the relative strength of demand side explanatory variables vis-à-vis supply side factors. Given time and resource limitations as well as critical observations from existing literatures, the present study portray a humble effort to explore critical research objectives, hypotheses and questions in addition to provide an important contribution in the existing field of literature and thereby fill up gaps in research.

1.2 Conceptual Framework

The economy of India is necessarily an Agro-economy wherein the sector itself depends highly on the interconnected circular system of production, distribution and consumption. Through this circular systematic method, this sector provides huge opportunities for livelihood earnings for rural agricultural and non-agricultural workforce. Compared with developed nations of the world, India has about approximately 55 percent of the total population engaged with agricultural sector. In the financial year 1950-51, the agriculture and allied activities occupied a huge share of 59 percent of gross domestic product at current prices followed by gradual drop in sectoral share in successive years. However, the share of agriculture sector in GDP still holds a reasonable share of 18 percent (of GVA) which stands much higher than developed countries as such (MoF, 2020-21). Nearly three-fourth of total population live at rural sector and more than fifty percent of population earn livelihood from agriculture activities. Moreover, India being the second-most populous nation in the world there is always a regular need for food supply to feed the population and maintain food security arrangements in the event of natural calamities and external aggressions.

For sustained growth in manufacturing sector, the agriculture sector provides necessary raw materials which are produced in agricultural fields with commercial significance. According to official estimates (FAO, 2021), nearly fifty percent of gross value generated in manufacturing sector comes from the agricultural sector. Agriculture sector also bears immense significance in strengthening international trade with the rest of world. Agricultural products with commercial significance such as coffee, tea, sugar,

spices, fiber crops etc. together contribute nearly sixty percent of total export value and assist in accumulation of valuable foreign exchange reserves of the country. Among various types of contributions, the intricate association between economic planning and agriculture also offers dynamism to country's economic growth and development aspect. A successful agricultural season with good harvest yield better prospects for the macro business climate of the whole economy and so on. On the other hand, a worst agricultural harvest season yields virtual collapse of internal trade and commerce. Hence, better performance of the agricultural sector not only ensures general prosperity but also ascertain sectoral balance and regional development (NABARD, 2021). Therefore, agriculture occupies the central place in the achievement of balanced economic growth with commitment to fulfillment in socio-cultural and political objectives.

In Indian context, small and marginal farmers constitute the majority share of farming community and due to paucity of resources they constitute the poorest agent in the economy. This poorest group of farmers is also indulged in practice of traditional mode of agriculture. With the advent of globalization waves, modernization of production methods requires transition from traditional mode to modern capital intensive technology. The fact is that modern capital intensive technology requires huge capital investment for cultivation, harvesting and storage of crops for future sale in market. The large and medium class farmers arrange their own capital for investment in farming in the next season and earn cumulative profits. On contrary, due to paucity of resources small and marginal farmers are either forced to borrow or unable to repay loan and caught in debt trap due to crop failure, fall in prices and payment of high interest rates on credit borrowed from informal channels (S.Saini, 2021). Therefore, from general perspective and in the broader interest of economic development flow of adequate institutional credit at cheap rate is inevitable for welfare and prosperity.

In a developing country like India, the credit need of farmers is broadly divided into either directly productive or indirectly unproductive purposes. On matters of directly productive activities, credit is required to pay for short to medium term expenses on agricultural operations such as purchase of seeds, manures, implements, livestock, raw materials and long-term expenses like drainage, irrigation, land fencing and leveling etc. On indirectly unproductive purposes, credit meets expenses on personal social ceremonies, jewellery items, food stuffs, education, health, house repair, land revenue taxes, conduct of court processes and so on. Therefore, the need for credit is an indispensable and essential item for general welfare of rural sector.

Accessibility to institutional credit is a major concern among farmers. Accessibility to institutional credit sources for agricultural activities are either directly or indirectly influenced by multiple factors such as low profits, fluctuating prices, variability in farm production, high transaction costs, information asymmetry, cultural gap in banking habits, lack of collateral, illiteracy, long distance of bank branches from dwelling place, differential treatment between customers, farmers weak bargaining position, monopolistic rural market structure, etc. All these accessibility aspects help in demarcation of potential borrowers who would either eventually fail or succeed to access

of institutional credit. Given such multiplicity of factors, access to credit may be considered as a relative concept from the standpoint of institutional lender and farmer borrower. The batch of institutional lenders together constitute the supply-side dimension whereas on the other side, farmer borrowers form the virtual platform from which demand forces interact and project before the institutional lenders. Therefore, each credit transaction has two dimensions i.e.; supply side and demand side factors respectively. Actual access to credit depends on relative strength of lenders motivation vis-à-vis borrowers' attitude.

From general perspective, lenders motivation is influenced by factors like type of institution and financial performance, nature of credit, lending targets and credit disbursement methods. All these four factors influence motivation to lend credit. Here, type of institutions includes commercial banks, regional rural banks, cooperatives, micro-finance institutions, bank-self-help groups, informal lenders etc. By nature of credit, either the period of holding credit or purpose of credit use is important. Lending targets encompass factors such as rationalization of cost structure, revenue generation, selection of target group etc. The credit disbursement methods comprise selection of eligible borrower by looking at credit scores comprising statements of income, land title record, physical collateral, third part guarantor, credit history, ability to repay credit by assessing debt-to-income ratio and other conditions. Among other conditions, factors like tenure and purpose, financial condition, crop intensity, crop types, irrigation facility, soil fertility etc.; are duly considered before sanction is favoured.

As like demand for a commodity, demand for farm credit eventually depends upon borrowers' willingness, ability to repay credit, level of income, physical collateral valuation and close association with cultivation works at rural areas. The term borrowers' willingness is a subjective factor and necessarily depends upon availability of other eligible credit sources, cheap interest rates with affordable terms and conditions, low transaction costs, easy repayment options etc. In practice, at micro-level the capability of a farmer borrower in getting access to credit depends upon his/her willingness, income and repayment capacity backed by collateral asset and the responsiveness of lender agency to borrower farmer's attitude and financial condition respectively. Therefore, it is quite essential to conduct empirical research study to infer the relative strengths and significance of such factors that influence changes in credit flow and repercussions in demand attitude of farmers. In addition to measurement of explanatory factors, it is also necessary to measure the share of institutional credit flow to priority sector as well as agricultural sector at micro study area.

1.3 The Scope of Study

At macro-level institutional credit is a policy variable that helps in manifold increase in employment and output of the nation. Institutional credit policy directed to priority sector and especially to agriculture sector constitutes a section of selective method of credit control. The agrarian nature of Indian economy clearly indicates the huge share of people engaged with marginal and small scale farming as well as small-scale enterprises

but such underprivileged section eventually face exclusion from direct formal credit arrangements. After Independence, huge sectoral gaps were noticed in disbursement of credit to commerce, trade and industry sector. With adoption of heavy industry oriented development policy, secondary and tertiary sector obtained nearly sixty to eighty percent share of gross credit disbursement at national level. Whatever credit share was allocated in favour of agriculture and allied sector was diverted towards plantation and cash crop cultivation. The remaining part was diverted to agro-based industries for supply of essential inputs used in cultivation activities. In view of such skewed supply pattern, directed bank credit system followed by more concerted efforts was followed during the seventies and eighties accordingly.

In the 1990's and beginning years of twenty first century, the directed credit flow to priority sector especially in agriculture and allied activities registered a declining trend which was followed by phased revival packages in terms of growth in agri-credit volume and hike in rural service branches of commercial banks. However, credit revival packages witnessed procedural drawbacks and failed to support huge demand from rising population at rural sector. Moreover, the period after 1990s, the banking industry experienced gradual decline in share of rural branches, huge credit outlay from urban branches to agricultural operations, hike in agricultural credit to indirect operations as well as diversion from marginal and small farmers to commercial interests at non-rural sector.

At macro level, the period after 2004-05, there was gradual rise in rural and semi-rural bank branches accompanied by sharp rise in credit flow to agriculture sector. The ten year period from 2001 to 2011, witnessed agricultural credit growth at a rate of 17.6 percent per annum which stood much higher than previous decade and also higher than total bank credit growth. However, the macro-economy observed wide variations in institutional farm credit flows across states. Among all the 29 states in India, 17 major states from western, southern and northern India occupied major share of overall credit outstanding to agriculture between 2005 and 2015 period. On the other hand, in the eastern and north-eastern states the growth of credit outstanding to agricultural sector was negative in the 1990's followed by moderate rise after the 2000-01 period. In the central zone states, near stagnant growth in agricultural credit was observed during same time period. As of 2020-21 period, the southern states registered the highest share (44 per cent) in the institutional credit followed by northern, western, central, eastern and north-eastern region states. The eastern and north-eastern states had the lowest share of nearly 9 percent and 0.9 percent respectively. In contrast to developed states, eastern and north-eastern states contribute merely 2.7 percent and 17.4 percent of GDP whereas the eastern states account nearly 28 percent of country's population (Afroz, 2022).

The state of West Bengal acts as the nodal state for the entire eastern and north-eastern region states and the state alone contributes 40 percent of the entire region's GDP. The state comprising only 2.7 percent of India's geographical area is predominantly an agrarian state. The state is home for nearly 72 lakh farm families of whom 96 percent belongs to small and marginal farmers' category. The farmers in West

Bengal are less creditworthy than southern and northern states while wide inter-district variations exist in credit delivery status. Moreover, the credit-deposit ratio of the state is around 60 percent which stands below the national average of 74 percent (Rajakumar, 2023) meaning banks in the state provide less amount of credit than they mobilize savings deposits from the people. Thus, farmers are quite less creditworthy than their counterparts in southern, western and northern regions respectively.

In the context of this research study, a micro-level analysis on the basis of primary data has been conducted in the context of Jalpaiguri district of West Bengal. The district is located in the most northern part of the state and the economy is mainly based on agriculture and tea gardens. Tea industry provides large scale employment to unskilled workforce whereas rice mills, saw mills and oil mills constitute base of rural non-farm sector. Apart from tea industry sector, principle crops are paddy, wheat, maize, potato and jute respectively. However, cash crop cultivation was introduced but large scale commercial operations with local efforts were not observed. The majority number of people engaged in cultivation works belongs to small and marginal farmers' category with average holding size of 1.24 hectares only.

Before 1969, the district was served by only five banks with majority branches located at urban areas. After bank nationalization in 1969, the decade of 1970's and 1980's witnessed growth of bank branches at rural and semi-urban locations. The period followed by implementation of NEP-91 policy, saw limited additions to the number of service branches of commercial banks. However, the period beyond 2010-11 was marked by spread of bank branches at statutory and census towns to fulfill the needs and aspirations of needy farmers and small scale entrepreneurs. As on 31st March 2021, the total number of registered bank branches (including all types) stood at 330 wherein 220 branches were located at rural areas and the remaining at urban zones of the study district (NABARD PLP- Jalpaiguri, 21-22). The study district is served by PSB-SCBs (Commercial banks), RRB-UBKGB, Central Cooperative-JCCB, private commercial banks, PACs and numerous MFIs spread over interior locations of the district (NABARD PLP- Jalpaiguri, 21-22).

As far as the study district of Jalpaiguri is concerned, majority of the previous research studies emphasized on the operational efficiency of PSB-SCBs, Regional Rural Banks, performance of SHG-Bank linked micro-credit programme, rural poverty and unemployment issues, agrarian indebtedness etc. But, previous academic studies did not focus much in a systematic way into the issues on patterns of credit demand and supply in the farm sector of Jalpaiguri district. Therefore, during the course of research study, emphasis has been put on disaggregated trends of institutional farm credit flow at the national and state level, demand-side factors that account for variations in farmer's demand for credit and credit supply patterns from institutional agencies. The present research study has also dealt with various demand and supply side aspects of institutional and non-institutional credit markets with special emphasis in favour of farmers'

landholding patterns, farming practices, rural caste-structure and infrastructure set-up prevailing at sampled areas of study district.

1.4 Review of Literature:

Experts have put a lot of effort in the study on the pattern of rural society, their changing tastes and preferences as well as sector specific development requirements vis-à-vis the effectiveness of government farm-credit policies. Murray (1941) quotes agricultural finance in the following words, *“it is an economic study of borrowing funds by farmers, of the organization and operation of farm lending agencies, and of society’s interest in credit for agriculture.”* On the other hand, R.K.Tandon (1964) defined agricultural finance *“as a branch of agricultural economics, which deals with the provision, and management of bank services and financial resources related to individual farm units”*. According to Muniraj (1987); *“Farm finance is the money extended to the farmers to stimulate the productivity of the limited farm resource. It is not a mere loan or credit of advance; it is an instrument to promote the well-being of the society. Farm finance is not just a science to manage the money, but is an applied science of allocating scarce resources to derive the optimum output. It is a lever with forward and backward linkages to the economic development both at micro and macro levels”*. Literature review for the present research study is based on books, unpublished thesis works, articles in periodicals, Journals etc. The major topics of the review approach have been discussed in the following three sub-sections:

A) Theoretical/Development Perspective on the Research Problem

The technological break-through of the 60’s and 70’s revolutionised agricultural activities in developing countries and hence made it more capital intensive. It was found that most of the farmers are capital-starved necessitating the institutional agencies to provide the needed capital base through cheap and timely credit supply. Farmers need credit at the right time, at right doses from the right agency to derive maximum productivity out of it. This reflects farmer’s point of view. On the other hand, when a farmer approaches an institutional agency with a proposal for loan, the institution considers the economic viability of the proposed investment. Hence, a set of criteria is quite essential to follow for the formal institutions because each investment activity is different from the other in terms of agricultural production and productivity. As a result, various criteria on farm-credit and repayment plans etc. have been devised by national policy-planners. One notable criterion is the Economic feasibility test of Credit and Repayment Capability. In this aspect, three basic financial targets are assessed by the credit institutions. These are- (i) If the loan is advanced, will it generate return more than costs (ii) will the returns have sufficient surplus to repay the loan when it falls due (iii) will the farmers stand up to risk and uncertainty in farming practices. These three aspects are popularly known as “Three Rs. of Credit”-Returns from the investment, Repayment Capacity, Risk-bearing ability of the farmer–borrower (Singh, 1989).

Returns depend upon the decisions like what to grow, how to grow, how much to grow, when to sell, where to sell etc., which the farmers take in their production activities. The farmer's demand for credit can be accepted only when he will be able to generate returns that will enable him to tide over the costs. The main concern is that the farmer should be able to generate incremental income when they go for the additional returns from the borrowed funds. The Repayment Capacity means the ability of the farmer to clear-off the loan obtained for production purposes within the time stipulated by the bank. According to M.K.Jain (1989), the repayment capacity not only depends upon the returns but also on several other factors such as working expenses excluding crop loan, family living expenses, other loans due, miscellaneous expenditures etc.

Following Jain (2018), the causes of poor performance capacity are-small size of the land holdings, low productivity and production, low prices and fluctuations of prices for agricultural commodities, high family expenditure, using credit for unproductive purposes, low farmer's equity, lack of adoption of improved technology, poor management of farm resources.

Next to the "Three Rs" of credit, are the five Cs" of credit - Character, Capacity, Capital, Condition and Commonsense. The basis of credit transaction is the trust that the banker has on his borrowers (Pandey, 1990). People with good mental health and moral character have a good credit character. Capacity depends upon the income obtained in the farm business i.e. $C = f(Y)$ where $C =$ Capacity and $Y =$ Income. Capital implies the availability of money with the farm-borrower, whereas condition refers to the requirements needed for obtaining a loan from the financial institutions. Common sense means a perfect understanding between the lender and the borrower in credit transactions.

Apart from these criteria, a set of theoretical concepts say that ceiling on interest rate and cost of lending have serious implications on access to institutional credit. G.Vega (1985) has developed a conceptual framework on credit rationing and their impact on access to institutional credit with the help of non-price credit rationing by assuming a binding ceiling on interest rate is imposed on the banks. The Iron Law of Interest Rate Restrictions assumes that demand for credit is inversely related to the real rate of interest and the lender's marginal cost increases with loan size.

Rate of interest occupies an important role in the determination of supply of farm-credit. In general, the interest rate on agricultural loan is kept low to promote agricultural growth and assist the rural poor in developing countries. Several decades of experience on the impact of low interest rates indicates that cheap loans did not appear to have either increased agricultural output or reached the rural poor (Adams, 1986).

Tinnermeir (1977) argued that subsidized interest rates are major contributing factor on the part of borrower for credit diversion and low lender revenue and political intervention on the part of lender in the credit market. If the interest income is greater than or equal to the cost of lending (break-even condition), this may positively influence

the financial institutions in increasing the supply of agricultural credit. However, default rate plays an important role in determining the break-even level of interest rate for a financial institution. Higher the default rates, higher the break-even interest rate that has to be charged. But given the administrative interest rate, the banks cannot increase their lending rates irrespective of the default rate.

According to Connolly (1986) banks generally try to bring down the break even condition of lending rate to the economic criterion of rate of interest by reducing the default rate and the cost of lending. In order to reduce the default rate, banks can adopt the process of credit rationing. However, if there is rationing, there would exist an excess demand for credit than the size of loan sanctioned at the profit maximizing rate. Even in the absence of interest rates restrictions, as the probability of default risk increases due to imperfect information in the rural credit market, non-price credit rationing is widely accepted in most of the LDCs.

In general, low interest rate leads to low return and poor supervision-which may cause overdue and more risk to the financial institution. To avoid these problems, financial institutions prefer to concentrate on a few selected borrowers, those who have credit worthiness with excellent loan collateral and those who take large loan. Therefore, ceiling on interest rate and cost of lending have serious implications on access to institutional credit. Given the risks and transactions costs associated with lending, most of the formal financial institutions try to optimize the loan size to each class of borrowers by credit rationing devices (Guasch, 1989). Consequently, two outcomes occur in credit market. Firstly, financial institutions may concentrate on a select few, those having credit worthiness with excellent loan collateral. Secondly, access to credit and loan sizes are highly correlated with income level and assets and thereby large farmers and the well-to-do farming class benefit most from the cheap credit options.

Another line of theoretical views primarily focus on the poor access to institutional credit on behalf of borrowers from the supply-side perspective. However, analysis on access to institutional farm-credit may not be sufficient without taking into account the demand-side story. G.I.Nehman (1979) points to the fact that small and medium class borrowers remain indifferent between formal and informal sources of loan because they feel that their total cost of acquiring a loan from either source are similar. Most poor do not seek formal credit due to lack of profitable investment opportunities and poor idea of credit use.

According to Aiyer (1984), higher borrowing costs incurred by small and potential borrowers as compared to large borrowers discourage the former to approach the formal credit institutions. Franz (1993) mentions that poor rural people do not approach institutional credit agencies simply because they value the risk associated with indebtedness to be higher than the possible return on investment.

J.R.Ladman, (1984) provides a theoretical framework on demand for credit based on the relationship between average costs (AC) and average revenue (AR) of debt

financed investment avenues. He explains that, with a given set of technology, the farmer, who relies upon credit derives demand schedule of loan from the value of marginal product by using successive loan units.

To obtain a loan a farmer has to go through the procedures that are required by the lenders' credit delivery system (R.C.Vogel, 1986). This filtration system results in borrowing costs. The borrowing costs (BC) by the prospective borrower may include nominal interest payments made to the lender, additional loan transaction costs, and the changes in the purchasing power of the money over the loan period. Since loan application procedures and paper works are independent, the average fixed cost declines with loan size.

The borrowing cost also depends on the frequency of meeting bank staffs, information of fund's investment, credit worthiness and the number of time that a farm household obtained loan from the institutional sector. The loan transaction costs appear to be much less important for large size borrowers. However, loan transaction costs make up a very large part of borrowing costs for many small and medium size borrowers (G.L.Nehman, 1979).

Larger the borrower's transaction cost, the higher will be the average borrowing cost and vice-versa. For any given binding interest rate, it is the borrower's transaction cost that determines the demand for credit. Many are of the view that differential borrowing cost strongly affects the willingness of the rural poor to seek loan from the formal sector. Kinnon (1973) and Shaw (1973) are of the opinion that the ceilings on interest rates do not permit banks to incorporate the additional administrative costs necessary in advancing small loans and supervise them. Hence, in an attempt to reduce transaction cost which is high for servicing small borrowers, formal lenders basically ration credit to them. Consequently, banks advance loan to those who offer lower risk and better security (Khambata,1985). According to A.Sillers (1983), formal credit is invariably rationed in terms of the ability to offer collateral. However, a typical borrower in unorganized credit market has no access to organized credit market because of the collateral that he offers is not acceptable in the organized credit market (K.Sarap, 1991).

Realizing the importance of credit in changing the composition and distribution of production in favour of deficit producers and use of improved variety of inputs, the Indian policy-planners prescribed the supply-led approach to agricultural finance. Various primary and secondary data shows that actual and potential demand for credit exceeds the credit supply (A. Kumar, 2015). Consequently, during 80's and 90's banks were directed to expand the share of net bank credit to agriculture sector. In the directed credit policy, importance was given to the reach the grassroot farmers and neglecting the quality and cost of lending. According to Swaminathan (2001) advances made in the countryside increased substantially but such an increase was uneven as was the case with green revolution across regions, crops and classes.

D.Rajasekhar (1993) explained that financial institutions did not help small and marginal farmers, landless labourers for whom they are primarily set-up. Although money lenders became less important after independence through directed credit lending policies, they still played an important role largely due to the poor quality of institutional credit. In fact, low lending rates set for farm-sector as compared to commercial and industrial rates are one of the important facts for poor allocation and disbursal of farm-credit.

S.Bhattacharyya (2005) analyzed terms and conditions of rural credit system with differentiated interest structure in the era of state centric regulatory mechanism. He admits about the existence of a systematic association between interest rate and value as well as marketability of collateral assets. In contrast to such observation, Gupta (1996) opined that delay in disbursement of formal credit and bribing by farmer to reduce the delay affects informal credit market interest rate. Moreover, agriculture price and credit subsidy policy play a decisive role in raising the interest in informal credit market.

Since 1990's, the policy thrust shifted to make agricultural credit operations a viable activity. Importance was given to achieving quantitative target without neglecting the viability of the financial institutions. The assumption of cross-subsidization of agricultural credit was relaxed and the lending rate to the ultimate borrowers was rationalized in terms of reduction in the number of concessional slabs and enhancement of some rates. Given the rationalization initiative, there is a need to initiate a nationwide major mission programme for different segments of agriculture in a regionally disaggregated package mode. The packages have to be different for each activities and each agro climatic zone focusing on the relevant activities there (Mohan, 2004).

B. Related Studies in the Literature:

A plethora of research papers have been noticed which are related to agricultural credit system in state of West Bengal, other parts of India and world. In India, between bank rationalization in 1969 and the onset of financial liberalization in 1990, bank branches were opened in over 30,000 unbanked rural locations. Since, liberalization (1990-91) the share of bank credit and savings which was accounted for by rural branches which rose from 1.5 and 3 percent respectively to 15 percent each (Pande, 2005). The branch expansion programme of 80's and 90's was an integral part of India's social banking experiment which sought to improve the access of the cheap formal credit in favour of rural poor.

R. Mohan (2006) in a detailed paper examined the overall growth of agriculture and the role of institutional credit. On agreeing to the fact that the overall supply of credit to farm sector as a percentage of total disbursal of credit is going down, he states that the share of formal credit out of agricultural GDP is growing.

However, the research study by Golait (2007) shows that credit delivery to the agriculture sector is quite inadequate. It appears that the banking system is still hesitant on various grounds to purvey credit to small and marginal farmers. Therefore, concerted

efforts are necessary to augment the flow of credit to agriculture aided by new innovations in product design and methods of delivery through better use of technology and related processes.

Sriram (2007) argues that increased supply and administered pricing of credit improve agricultural productivity and the well-being of agriculturists. However, mere increase in supply of credit is not sufficient to solve the problem of productivity, unless it is accompanied by investments in other input support services.

Abhiman Das (2009) argued that direct agricultural credit has a positive and statistically significant impact on agricultural output and its effect is immediate. There are several gaps in the present institutional credit delivery system like inadequate provision of credit to small and marginal farmers, paucity of medium and long-term lending, limited deposit mobilization and heavy dependence on borrowed funds. In spite of drawbacks, agricultural credit is still playing a critical role in India.

Modern agriculture is essential for economic development. Many developed countries recognize the benefits of using modern farm technology. In UDCs, credit is essential for relief from distress and for purchasing seed, fertilizers, cattle and implements (M.Yusuf, 1984). Easy and cheap credit is the quickest way for boosting agricultural production (Abedullah, 2009). In many UDCs, use of modern technology increased demand for credit and hiked agricultural productivity of small farmers (S.Abdul, 2009).

M.L.Dantwala (1989) estimated demand and supply-side factors of credit and their role in poverty alleviation in India. He emphasized supply-side factors of credit and their role in poverty alleviation in India. On the other hand, it has been reported by scholars (Baluch, 2004) that credit-flow to farmers has increased demand for inputs and crop production. They predicted that elasticity of credit amounts, number of tractors, irrigation, use of chemical fertilizer and pesticides etc. with respect to dependant variable agricultural income indicated that credit (production credit) impacted positively and significantly at 95 percent confidence level.

W. Akram (2008) conducted research on Agricultural Credit Constraints and borrowing behavior of Farmers in Rural Punjab (Pakistan). An important aspect of agricultural finance has been credit constraint-that exists when demand for credit exceeds its supply at the prevailing interest rate. He found collateral and high mark-up act as major constraint in getting credit. The coefficient of transitory income, education level and interest rate etc. significantly influence the borrowing behavior.

Abedullah (2009) studied 300 (randomly selected) households in Punjab province of Pakistan. His empirical works indicate that age, gender, education, income level and degree of awareness etc. are significant factors that influence credit accessibility by small holder farmers.

Z.Xi (2010) studied the relationship between the ownership of land, level of education, occupation and accessibility to the credit facility. Farmers face problems due to lack of information, administrative system high interest rates etc.

Oluwasola (2008) analysed factors determining the demand for and supply of agricultural credit among small-scale farmers in Nigeria. The study reveals that farmers who receive credit are younger and own farm land on average 3.8 ha which is larger than the national average. The statistical models show that the interest rate, farm expenditure, amount borrowed from alternative sources, farm size and savings are the main determinants of credit demand. On the other side interest rate, the savings of respondents, the amount of loan-demand and properties of previous loan repaid are the major determinants of credit supply. In order to improve the agriculture sector, formal lending institutions should target younger farmers, including women, use community/social assets as collateral rather than physical assets, charge commercial interest rates, mobilize savings through their rural outposts and give medium-term rather than short-term loan.

P.Mpuga (2010) conducted an excellent research work on “Demand for credit in Rural Uganda.” Using probit, tobit and multinomial logit model estimations on Uganda household surveys, he observed that educated and the young farmers were more likely to demand for credit.

A study conducted by S.Ibrahim (2011) with respect to agricultural credit in Nigerian farm economy found interesting results. They used exploratory cross sectional model and showed that income level, collateral, education, marital status have significant positive impact on farmer’s access to credit while interest rate and transaction costs impact it negatively.

Using same methodology A.Ghosh, (2013) found that borrowers from formal sector have better access to electricity and irrigation facilities. Moreover, such borrowers belong to upper caste and have better access to infrastructure facilities. With respect to use based classification, Reddy (2012) observed that borrowings from formal sector are for longer duration and required for productive purpose only.

The study on financial inclusion in India (Chattopdhyay, 2011) seeks to examine the extent of financial inclusion in West Bengal. The study shows that although there has been an improvement in outreach activity in the banking sector, the achievement is not significant enough. Money lenders are still dominant source of rural finance despite wide presence of banks in rural areas. Supply side factors are not only responsible rather demand side factors are also equally responsible for this exclusion.

A regional level study regarding Jalpaiguri District of North Bengal by (Chatterjee, 2013) points that credit availability at the right time with right doses and at a minimum cost is very important for smooth conduct of any economic activity. Undue delay in granting credit, frequent visits by the borrowers to bank premises and credit deficiency seriously affect the development activities. In fact, sanctioning of loan is a time

consuming process. Marginal farmers are most victims of long delay in sanctioning of loan by rural banks owing to lengthy procedures. Due to information asymmetry, high borrowing cost, bad customer service etc, small and marginal farmers face limited access to formal credit. He concludes that credit disbursal by banks are inadequate for the activities undertaken by the farmer borrower.

Another regional level field-survey (Ghosh, 2016) upholds that rural farm-based population is financially weak and sufficiently lags behind in the introduction of modern technologies. Survey result shows that institutional credit agencies are expanding and credit-deposit ratios are also increasing. But their business performances are not satisfactory enough. PACs are not protecting and uplifting the rural farm-based population. Most of the farmers are devoid of banking behavior as a result of their illiteracy. The repayment attitude is not good because there are chances of loan being written off by the government. Informal lenders have much importance in rural credit market and they contribute considerably to the growth of agriculture in spite of allegation put against them.

A regional level study (Hazra, 2014) conducted in West Bengal points to the fact that phase-wise withdrawal of directed lending (since 1990-91) created vacuum in the rural credit market. Given such instance, micro-finance could not fill-up vacuum generated by the contraction of priority sector lending. So, micro credit is not an alternative rather can be complementary to institutional credit.

C. Spatially and Contextually Relevant Empirical Studies

Since the mid 1980s, there has been a paradigm shift in financial policy from supply-led subsidized policy to demand driven credit policy (A.Kamel,1998). Supply-led theories emphasized the role of supply of credit in prior to the creation of demand (T.Patrick, 1966). The old paradigm of sector directed supply-led and subsidized credit had been based on faulty assumptions about the willingness and ability of poor farmers and other entrepreneurs to pay for financial services which led to faulty policy design and implementation. The new paradigm focuses on building sustainable financial institutions and systems.

Flaws in supply-led financial policies had been pointed out by J.K.Galbraith (1984) and later by L.Sonne (2010). They stressed that farmers should reach a certain level of development before they can use the credit productively. Demand-led theories came into vogue in 1980s. These theories advocated need-based rather than targeted credit oriented.

The new paradigm recognizes high transactions costs and other risks that partly result from information asymmetries and moral hazard problems (Weiss,1981) for both financial intermediaries and clients. These factors are thought to be some of the root causes working behind the gap between demand and supply.

The new paradigm in contrast sees financial market liberalization as a necessary but not sufficient condition for deepening financial systems. Given the long gestation

periods required in building sustainable institution, public investment in institution building requires long-term planning horizons with operational flexibility in instruments and timing. However, the new paradigm recognizes the possibility of market as well as government failure and goes against the proponents of market liberalization that a “financial system which is not repressed would by itself function optimally” (Krahn, 1994).

In Bangladesh, micro-finance as a market-driven initiative emerged as a viable way to reach the poor after initiated the Grameen Bank Model (GBM). GBM got the patronage of the World Bank/IBRD and it was quickly replicated in other parts of the world (Bayulgen, 2008). Across countries of the world, a variety of models emerged. In India, the SHG-Bank linkage programme became more prevalent. This model is more like a government-run subsidized credit programme offering need-based credit. In Indonesia, individual lending models became more popular. In Latin America, micro financial institution model (MFI) became more popular (R.Servin Juarez, 2012).

Anggraeni (2009) in his study tries to calculate the probability of being credit constrained for SHG groups in Indonesia. The study finds that the participation in the lending programme is influenced by group and individual characteristics. Health, transitory consumption requirements and debt-income ratio in the previous year significantly affects the probability of being credit constrained whereas debt-income ratio negatively influenced it.

H.Chang (2006) uses a large rural household survey of four provinces in China to test for the demand side factors affecting outreach of Grameen style lending. His study reveals factors like household incomes, education level of female borrowers and access to other sources of formal lending affect outreach of such programmes. Opportunities from off-farm investments significantly determine demand for such loans. The study further points out that the demand for credit is negatively correlated with wage income of poor households who do not have any investments opportunities in off-farm activities. This is especially true for households with migrant workers, who move to coastal regions and smoothes their consumption through increases in wage income.

R. Swain (2002) in her research paper uses data on a rural credit market survey in Puri district. The demand side variables used in this study is interest rate, number of male working members, financial assets, family-size etc. The supply side variables are related to the cost and amount of rainfall. His model predicted significant credit rationing to the amount of 60 % and above on an average basis.

M. Lodh (2012) conducted study to investigate into factors that changes the demand for credit in farm-sector of Pakistan. Study shows agricultural credit demand is highly elastic to climate change and weather extremes. Uncertain occurrences like floods and rainfall, crop diseases have negative effects on agricultural productivity and credit demand. Apart from climatic factors education has been considered an important aspect. Low educational standards decrease chances of access to credit and vice-versa.

Interest rate performs an intellectual function of allocating limited supply of credit among different competing demand (Greenwood & Jovanovic, 2005). According to Katchova (2005) high interest rate affect the lending capacity of banks, money circulation and investment. Nwankwo (2013) opined that banks should more efficiently allocate loans because high interest rate exhibit shortness of money resources. So, it becomes difficult for farmers to get credit due to limited granting capacity of banks.

According to A.Weiss (1981), high interest rate affects loan advancement and hence affects loan repayment capacity. Hike in interest rate consequently increase production costs and diminish profit. If profit decreases in any activity for which loan has been taken the loan default will increase (Coate, 1995). Since banks are more sensitive to high credit risk, they use more effective ways to distribute loans among farmers (Anderson, 2003).

One major reason of credit gap between lenders and borrowers is information gap. Rural people have faith in rural money lenders and that's due to quick approach, flexible terms etc. (A.Schoombee, 2007). In Uganda, seventy nine percent of rural people obtain loan from informal institutions including village money lenders, relatives and local credit providers.

During 1970's and 1980's rules of fixed rate of interest were applied and most of the banks were controlled directly by African government. Also, there were other criteria like income of borrowers, non-availability of financial institute in specific geographic area, demand for security against loan, flexibility in terms and need for least amount of balance (Mpuga, 2004).

The demand for credit in informal sector could be decreased if debtors easily approach the funds from govt. institutions. Study made by (Mpuga, 2004) shows that distance and credit demand are inversely related. Another relevant study proved that customers face difficulties to understand proper credit use due to two reasons-one is "lack of transparency" and another is "low level of education to borrowers" (K.Hoff, 1998).

Now-a-days credit is extensively used as an alternative to money. At the time of inflationary pressure tax rate is more on money and so farming class often prefer credit to fulfill needs. A person who receives credit need to fulfill certain repayment obligations and hence the expectation of the farmer for profit diminishes. But if the bank puts limit on the amount of loan given and also fix the interest rate on it, then credit demand will increase (Webb, 2003).

The multi-agency institutional credit system have played important role in the development of agriculture sector in India. Institutional credit flows over past several decades have enabled farmers to purchase necessary inputs in the form of seeds, fertilizers, irrigation, machinery etc. A study conducted by G. Ahangar (2013) pointed out to the need for institutional credit in rural development. He favoured the role for term

credit in creation of farm assets including irrigation systems which is capable in enhancing cropping intensity in farm land.

Chaudhuri (2001) using Nash equilibrium method studied the relation between formal sector credit subsidy policy and interest rate prevailing at informal credit market. He is of the opinion that an increase in formal sector gross credit supply and keeping interest rate at a fixed rate would eventually lower informal sector interest rate and improves general welfare of farming class. An increase in general welfare would materialize through increase in farm production and productivity.

Financial institutions require that borrowers should pledge his assets to borrow loan. This factor reduces credit demand in rural areas. Instead government should organize special credit programme and develop specific rules and regulations if borrower has less credit worthiness and don't have capability to pledge their assets (T. Hassan, 2012).

In India, Kisan Credit Card Scheme (KCC) came into existence in 1998-99. This scheme allowed farmers the required financial liquidity and avail credit when it was absolutely needed as well as providing flexibility, timeliness, cost effectiveness and hassle free services to the farmers. According to M.S.Kallur (2005), the scheme gives farmers sufficient freedom to decide how to use their credit along with a set of repayment schedule.

In developing countries, rural credit system is suffering from a number of weaknesses like limited outreach, skewnesses in the availability of credit in different regions, sectors and sections of the farming community, lower recovery of loans and growing non-performing assets, loss making institutions etc. P.D.Jeromi (2000) recommends 3 ways to get rid of this problem and these are- i) Increase the formal credit outreach to the small and marginal farmers. (ii) Progressively link SGHs with formal credit institutions. (ii) Continuation of credit targeting for ensuring adequacy of farm-credit.

S. Morvant (2014) established the link between the contribution of rural and agricultural sectors to the economy and financial inclusion. Drawing data from the FAO in its 2006 report the authors crossed financial inclusion data for each country with other variables like rural population, contribution of agriculture to GDP and the portion of population working in agriculture. The result is a negative correlation between access to financial services and other variables. The higher the proportion of the rural agricultural population, the greater the contribution of the agriculture in the GDP and lower the rates of financial inclusion.

On the basis of data from Latin America, Meyer (2011) conducted a country by country analysis. The authors observe that of the total amount of credit-supply only a small amount is used to finance agricultural activities. Authors reach a consensus that credit-supply is still insufficient, despite innovations in agricultural finance.

In Nepal, a study conducted by G.Koirala (1981) examined the relation between credit and productivity of crops. The researcher found that a significant positive relationship existed between credit and improved production of rice and wheat crops. He was of the viewpoint that with successive additions of credit, net profits and total crop production attained significant increase.

In the Indian context, M.V.Gadgil (1986) examined the relative efficiency between long-term loan versus short-term loan. He is of the opinion that total amount of interest for short-term loan becomes much higher than what is to be paid in case of long-term loan. Moreover, transactions costs for issue and maintenance of short tenure loan increases vis-à-vis long-term loans.

In a research study conducted by Singh (1988) found that nearly fifty percent increase in loan funds to farmers in a study area over the sanctioned loan limits have in turn, facilitated adoption of new farming technology as well as about fifty percent increase in net profits over costs incurred.

The cross-relation between institutional credit and agricultural employment as well as other inputs especially fertilizers and physical capitals was experimentally judged by S. Khandker, (1992). He is of the opinion that an increase in institutional credit to the higher level eventually leads to sharp increase in expenses on fertilizer inputs and investment in physical capital but modest increase in gross crop output.

A detailed assessment on effectiveness of short-term loan was conducted by D. Bhupati (1999). He is of the view that mobilization of deposits from rural mass should be given priority and such deposits should be fully utilized for short-term loans only after detailed assessment of credit requirements. No portion of such deposits should be made available to other unproductive channels accordingly.

A regional level study (S.DeB, 1998) conducted in the state of West Bengal reveals that marginal and small farmers are much inclined to informal credit options in spite of existence of cheap formal credit market. Consequently, such categories of farmers fetch the risk of perennial indebtedness to informal lenders. The researcher urged for cooperative and dedicated effort on behalf of marginal and small farmers from institutional agencies operating in rural areas.

In the context of India, B.P.Rao (2016) observed the performance of RRBs in India. They observed that RRBs had the ability to mobilize small savings of the rural sector but they were relatively less successful in enhancing the credit flow to the targeted rural poor community. They suggested that for survival of RRBs, they should have adequate technology to provide efficient service to their customers.

A need for cooperation between RRBs and Cooperatives was highlighted by Indian scholar T.K.Pal (2017). He argued that RRBs should not only confine their business to small entrepreneurs, village and cottage industries and small farmers. They should aim at removal of non-transparency in their operation in order to remove unequal relationship

between banker and customer. In fact, RRBs should establish proper coordination with cooperative banks, commercial banks and other institutional agencies to enhance their capability. Moreover, they favour speedy, qualitative and secure banking services to retain customers and attract new customers.

The study conducted by K.V.N.Prasad (2011) assessed the performance of RRBs in India. Their study showed that RRBs penetrated every corner of the country and extended a helping hand in the growth of the economy. However, despite achievement of performance at quantitative level, they did not exhibit sound financial management with higher productivity.

R.L.Godhra (2014) examined various issues and concerns in agricultural credit delivery systems in India. They used both primary and secondary data from the beneficiaries of six banks of three districts of Haryana. Their analysis suggests that credit delivery to the agriculture sector continues to be insufficient. Moreover, their analytical approach suggests that formal institutional system is hesitant to provide credit to small and marginal farmers. They argued that post-financial sector liberalization era could not establish an equitable and efficient delivery of agricultural credit systems India.

As regards performance of institutional credit delivery system during economic reform period, Gandhimathi (2012) observed that during pre-reform period cooperative banks had highest share in total agricultural credit disbursement which got reversed after economic liberalization in 1990's. He showed that rural cooperative banking system achieved quantitative progress in credit delivery mechanism and virtually neglected qualitative aspects.

Study conducted by Gambhir (2012) in Indian context shows that farmers of all size classes have been managed tactfully to avail high interest backed credit through cumbersome procedure. Their judgement goes in favour of provision for cheap credit backed by simplified procedures with target group being the marginal and small farmers category.

Dhar (2015) conducted study on trends and growth of credit flow to agriculture sector after 1991 period in India. His study is based on secondary sources of data which reveals that state run commercial banks have emerged as a major source of institutional credit supply to agriculture sector in India. He is of the view that share of farm investment credit observed a declining tendency during recent years and such a situation would constrain sustainable growth in agriculture sector India.

A. Jaynal (2010) conducted an empirical study regarding bank financing of agriculture and allied sector in the reform in a less developed district viz., Karimganj district of Assam. He compared credit targets and achievements in order to judge the credit performance in agricultural sector of the study district. Moreover, lending capacity vis-à-vis recovery of loans by banks has been studied. As regards the statistical technique, researcher applied multiple regression model (OLS) to measure the determinants of credit supply. Study indicates that with the expansion of total bank credit

are highly influenced by mounting overdues, interest rate, credit-deposit ratio, branch expansion and volume of business.

In India, over the past several years there has been a striking increase in the credit intensity of agriculture. The first phase (early 1970s to the mid 1980s) saw a moderate increase in the credit intensity. The second phase (mid 1980s to late 1990s) saw a declining trend. Third phase starting from 2000, witnessed a marked increase in the credit intensity of agriculture. During the period, the demand–supply gap in total institutional credit was estimated to be around 14 percent. To address this gap, efforts were attempted from all the three institutional segments i.e.; PSB-SCBs (commercial banks), RRBs and co-operatives. Commercial Banks were entrusted with the assignment to discover innovative ways of reaching out to farmers. On the other hand, RRBs were restructured to leverage on their comparative advantage while another segment i.e; Co-operatives were required to improve their governance structure.

1.5 Research Questions:

The present research study seeks to find out conditions of development at rural sector and demand-supply patterns of agricultural credit market at study district. On the basis of such research theme, the present study has the following major objectives-

- i) What is the condition of occupational structure and demographic composition in the study district?
- ii) Do farmers dwelling in the study region experience satisfactory access to irrigation, banking and rural market infrastructure facilities?
- iii) What is the pattern of cropping prevailing in the study area? Is the cropping pattern influenced by topographic and agro-climatic conditions of study district?
- iv) What are the patterns of household expenditure as experienced by sample farmer?
- v) What is the type of expenditure on farming activities?
- vi) What is the status of indebtedness and credit utilization patterns among farmers dwelling in the study region?
- vii) Do patterns of household expenditure and credit utilization affect the demand for farm credit?
- viii) What factors influence farmers on demand for agricultural credit sourced from institutional sector?
- ix) What is the relative position of advances sourced from scheduled commercial banks to the priority sector in the study region?
- x) What is the state of credit supply with respect to deposit mobilisation from institutional sources in the study region?
- xi) What are the determinant factors that impact credit supply from institutional sources to needy farming class in the study region?
- xii) Do financial institutions sanction credit to needy farmers who has previous history of debt obligations?

- xiii) Does experience on cultivation works and banking habits influence credit supply from institutional sources?
- xiv) Is there any gender bias that work against female members with respect to demand for agricultural credit sourced from institutional sector?
- xv) Does level of education attainment influence demand for farm credit from institutional sources?
- xvi) Does area devoted for cultivation of various major crops influence the supply of credit from institutional agencies?
- xvii) Do non-institutional moneylenders conduct credit lending business in the study region? If yes, then what are the reasons for association between non-institutional moneylenders and sampled farmer respondents?
- xviii) Do informal lenders provide credit to needy farmers having previous history of debt obligations?
- xix) Is there any procedural simplification or relaxation in repayment of credit to informal lenders as compared with institutional lenders?
- xx) Do interlinked transactions exist between informal credit market and other factor markets in the study region? If yes, then what is the nature of such tied transactions?
- xxi) Do non-institutional lenders favour non-marketable collateral asset from borrower farmers? If yes, then what is the nature of such collateral asset?

1.6 Research Hypotheses

In the context of the research questions, the present research study aims to justify the following hypotheses (Chapter 5 and 6) with the help of standard statistical methods -

- i) Small and Marginal farmers favourably decide to adopt institutional credit and exhibit non-repayment or defaulter behaviour
- ii) Standard irrigation coverage in farm land exhibit advantage on behalf of farmer's decision to demand institutional credit
- iii) Perception on high interest burden yield unfavourable influence on farmer's decision to borrow institutional credit
- iv) Attainment of educational standards with the ability to read and write exhibit positive association with the decision to adopt institutional credit
- v) Long years of association with farming activities yield favourable influence on the decision to adopt institutional credit
- vi) Female farmers exhibit inverse association with the decision to adopt institutional credit
- vii) Upper caste farmers exhibit inverse association with the decision to adopt institutional credit
- viii) High cumbersome procedures disfavours farmers on the decision to opt institutional credit
- ix) High amount of annual savings positively influence farmers on the decision to opt institutional credit

- x) Diversion of borrowed credit exhibit positive influence on the decision to borrow institutional credit
- xi) Marginal and small farmers express unwillingness to repay loan within the maturity period
- xii) High interest burden yield unfavourable influence on farmers and exhibit unwillingness to full repayment within stipulated time
- xiii) Large amount of credit yield unfavourable influence on farmers and exhibit unwillingness to full repayment within the stipulated time
- xiv) Farmers engaged with large share of cash crop cultivation express willingness to repay credit within the stipulated time
- xv) Application for large amount of credit are less favoured by the institutional lenders
- xvi) Long years of farming experience positively influence institutional lenders on the decision to approve institutional credit
- xvii) Previous history of outstanding debt obligations discourage institutional lenders on the decision to approve institutional credit
- xviii) Large size of land to be kept in mortgage improves the supply of credit from institutional lenders
- xix) Farmers' good banking habit improve the supply of credit from institutional lenders
- xx) Cultivation of dry grain crops improve chances of credit supply from institutional lenders
- xxi) Cultivation of cash crops yield good chances of credit supply from institutional lenders
- xxii) Cultivation of horticulture crops attract good chances of credit supply from formal lenders
- xxiii) Institutional agencies disfavor credit supply to the cultivation of fibre crops
- xxiv) Pisciculture and Animal husbandry activities improve chances of credit supply from institutional agencies

1.7 Research Objectives

The present research study attempts to deal with following objectives as mentioned below-

- i) To study caste and gender composition of population in the study area.
- ii) To identify distribution of population in study district with respect to main, marginal and non-workers category as well as distribution among various main category of workers.
- iii) To study topography, climate and soil texture profile suitable for cultivation of crops in study district.
- iv) To analyze drainage patterns and ground water resources for spread of natural irrigation facilities in the district under study.

- v) To identify and evaluate production patterns of major dry crops and horticulture crops in study district.
- vi) To identify the nature and spread of social infrastructure and other rural input support services of the study district.
- vii) To examine the network of non-farm activities that support livelihood mechanisms in study district.
- viii) To evaluate the nature of farmer households (HHs) demand behavior with respect to institutional credit sources.

- ix) To identify and evaluate defaulting behaviour patterns of sampled farmer HHs vis-a-vis institutional agencies.
- x) To examine diversion of credit funds from agricultural to non-agricultural purposes at sampled areas of study.
- xi) To evaluate the role of institutional agencies in disbursement of credit to priority sector at study areas.
- xii) To evaluate influence of factors like farmer's land holding size and land property as mortgage on supply of institutional credit from selected bank branches.
- xiii) To examine the situation of credit supply to agricultural sector from institutional sources at study area.
- xiv) To examine the nature of credit supply from BL-SHGs and JLGs in the study district
- xv) To examine factors like gender bias and level of education with respect to demand for institutional credit for agricultural activities.
- xvi) To examine factors like farmers long association with cultivation works, frequency of bank visits and perception on interest burden with respect to demand for institutional credit for agricultural activities.
- xvii) To examine the nature of crop-specific credit flows to needy farmers from institutional credit agencies.
- xviii) To find out probable reasons for presence of informal lenders in credit lending business with sampled farmer households.
- xix) To evaluate the nature and spread of interlocked credit market with other factor markets in the study area.
- xx) To examine the composition and importance of collateral assets that non-institutional lenders favour from borrower farmers in study area.
- xxi) To examine reasons for non-involvement in interlocked transactions between informal credit and other factor markets

1.8 Research Design

The Research Design is based on secondary data sourced from various issues and publications of government and financial institutions. The other part of this research design is based on primary data sourced from field survey on the basis of pre-structured suitable questionnaire. The sources of secondary data which have been collected, processed and applied for this analytical study are given below:

- i. Various issues of District Human Development Report, Government of West Bengal.
- ii. Various issues of District Statistical Handbook, Government of West Bengal.
- iii. Various publications of Annual Report, Government of West Bengal.
- iv. Economic Census of West Bengal issued by Government of West Bengal.
- v. Various Annual Reports of West Bengal State Co-operative Bank Ltd.
- vi. Annual Reports of Uttarbanga Kshetriya Gramin Bank.
- vii. The NSS 59th, 60th, 73rd, and 75th Round Reports of MoSPI, Govt. of India.
- viii. Annual Reports of RBI
- ix. Annual Reports of NABARD
- x. NABARD Report on Key Statistics and Financial Statements of RRBs
- xi. NABARD Report on Key Statistics of Cooperatives (Short-Term Credit Structure)
- xii. Annual Reports of Ministry of Agriculture and Farmers Welfare, Govt. of India.
- xiii. Central Library, University of North Bengal.
- xiv. Office Reports, DPRDO Section of D.M office, Jalpaiguri.
- xv. Office Reports, Irrigation and Waterways Department, Jalpaiguri.
- xvi. Office Reports, Zilla Parishad of Jalpaiguri.
- xvii. Annual Reports, Krishi Vigyan Kendra of Jalpaiguri.
- xviii. District Lead Bank Head Office, Jalpaiguri.
- xix. Branch Managers of scheduled commercial banks at sampled villages.
- xx. Branch Managers of RRB-UBKGB and JCCB at sampled villages.
- xxi. Official informations of different Panchayat Samities and Gram Panchayats.

As regards, the other part of this research design, the emphasis has been given on sample survey for collection of primary data on the basis of pre-structured questionnaire. The objective of sample survey is to collect both qualitative and quantitative inputs from respondent farmer households and bank branch officials located at areas of study. The framework of field survey design is composed of three distinct steps such as: Pre-field planning, Field works and Post-field analytical interpretation of primary data.

In the pre-field planning stage, the research endeavour focused upon preparation of questionnaire, a pilot test covering aspects of fieldwork logistics, supervision and data entry procedure. In this stage, extensive review of literature has been conducted to supplement research objectives and questions as well as further improvement in survey questionnaire. Data collected on pilot survey basis has been tested to perform a quick analysis in order to check for any problems that might otherwise be overlooked.

During field work, actual and extensive survey work has been carried out through rigorous field survey at rural household level with the help of modified questionnaire and direct personal communication with villagers. The field survey was also carried out through rigorous personal interviews with bank officials, business correspondents for

collection of data on credit flows to farm sector at micro level. In fact, the objective is to collect actual data from ground level in order to understand the provisions of rural infrastructural facilities, credit flows to farm sector and farmers demand behaviour on behalf of credit.

In the post-field work stage, the prime motive involved data tabulation and preparation of charts, tables, bar diagrams and application of econometric techniques for proper interpretation of raw data and finally writing of research report and drawing suitable conclusions. These suitable conclusions are quite helpful for prescription of corrective measures comprising development of the study area.

1.8.1 Universe of the Study: For the purpose of analytical research the study universe is confined to the Jalpaiguri District of West Bengal.

1.8.2 Sampling Frame

Rural households dwelling at rural sector of community development blocks in Jalpaiguri district

1.8.3 Sampling Procedure

In the context of diverse demographic and administrative set-up of Jalpaiguri district, a prudent attempt has been applied to collect relevant quantitative and qualitative primary information. In order to ensure a better representation of the aspects relating to rural development and agricultural credit market transactions at micro-level, representative primary informations are collected on the basis of stratified and purposive sampling method. For such purpose, in the first stage 9 CD Blocks of Jalpaiguri district has been considered as an independent sampling unit for research study. These blocks are subsequently stratified into three strata on the basis of percentage share of working population engaged with cultivation occupation. These three strata represent three distinct characteristic features such as high engagement, moderate engagement and least engagement with cultivation works. This type of stratification is done in order to better understand the influence of demand-side factors that account for variations in farmer's want for credit as well as situations of rural development in the dwelling place of sampled farmers considered under the present research study.

The Table 1.1 represents the structure of occupations (in percent) spread over all nine distinct blocks of the Jalpaiguri district. The Table 1.2 depicts list of CD Blocks falling under each distinct stratum. From Table 1.2 it is clear that CD Blocks under third stratum depict least engagement (in percentage share) of population with cultivation works. From the point of research pursuit, these CD Blocks have been omitted from field survey design and has not been included in methodical analysis of primary informations. Therefore, whole methodical analysis of primary informations in the present research essentially deals with the remaining two strata (total six blocks) accordingly.

Table 1.1: Occupational composition in rural sector of nine C.D. Blocks of Jalpaiguri district

CD Blocks	Cultivator	Agricultural Labour	Household Industry	Other Workers	Non-Workers
Rajganj	6.21	8.71	0.17	16.84	68.13
Jalpaiguri Sadar	12.42	10.63	0.52	19.41	57.08
Maynaguri	14.65	13.81	0.43	6.53	64.67
Dhupguri	11.31	13.73	0.09	11.32	63.61
Banarhat	1.85	2.13	0.29	11.74	84.06
Mal	1.92	1.89	0.18	11.91	83.93
Kranti	8.91	7.41	0.28	9.72	73.72
Matiali	2.07	1.78	0.21	33.71	62.24
Nagrakata	9.62	7.61	0.32	9.35	73.18

Source: District Census, 2011 and office reports, DPRDO section of D.M office, Jalpaiguri

Table 1.2: Distribution of C.D blocks w.r.t share of people following cultivation as main occupation

Category of C.D Blocks: Level of engagement with cultivation as main occupation	C.D Blocks	Cultivators (%)
High Engagement (Tier-I)	Jalpaiguri Sadar	12.4
	Maynaguri	14.6
	Dhupguri	11.3
Moderate Engagement (Tier-II)	Nagrakata	9.6
	Kranti	8.9
	Rajganj	6.2
Least Engagement (Tier-III)	Banarhat	1.85
	Matiali	2.03
	Mal	1.9

Source: District Census, 2011 and office reports, DPRDO section of D.M office, Jalpaiguri

In the next phase, for the purpose of sample survey at field level three sample villages from each CD block under each stratum have been chosen. Given diverse patterns of land utilization, villages located under dense forest cover and tea garden belts have not been considered for sample survey. Priority has been given for those villages where cultivation is one of the major occupations and farmers of all land size classes are found to exist. List of all such randomly selected villages from each CD Block are given in Table 1.3.

Table 1.3: Distribution of C.D. Blocks and corresponding sample villages for field survey

C.D Blocks	Gram Panchayat (G.P)	Sample villages for field survey
Jalpaiguri Sadar	Patkata	Patkata
	Mandalghat	Mandalghat
	Belacoba	Bhelakoba
Maynaguri	Madhabdanga-I	Uttar Madhavdanga
	Domohoni-II	Singimari
	Domohoni-I	Kanthalbari
Dhupguri	Magurmari-I	Purba Magurmari
	Gadong - II	Khalaigram
	Sakoajhora-II	Dakshin Gosairhat
Nagrakata	Sulka para	Sulka para
	Sulka para	Khairbari
	Sulka para	Sukhanibasti
Kranti	Lataguri	Uttar Matiali
	Moulani	Dakshin Chak Maulani
	Kranti	Uttar Saripakuri
Rajganj	Panikauri	Kismat Sukani
	Panikauri	Pani Kauri
	Binnaguri	Kamarbhita

Source: District Census, 2011 and DPRDO section of D.M Office, Jalpaiguri

The following Table 1.4 depicts patterns of occupation at sample villages spread over different C.D blocks selected for study. Essentially all these fall under the administrative jurisdiction of the Jalpaiguri district. The structure of occupation is divided into three types such as cultivator, agricultural labour, household industry workers and other workers respectively. The Location of all sample villages at respective C.D blocks is clearly shown with aid of maps drawn from official website link of Jalpaiguri D.M office (jalpaiguri.gov.in).

Table 1.4: Occupational composition (in percentage) of sample villages and corresponding C.D. blocks of the Jalpaiguri district

C.D Blocks	Sample villages	Cultivator	Agricultural Labour	Household Industry Worker	Other Workers
Jalpaiguri Sadar	Patkata	12.38	16.87	1.11	69.64
	Mandalghat	27.34	30.71	0.27	41.68
	Bhelakoba	25.32	45.02	0.67	28.99
Maynaguri	Uttar Madhavdanga	17.87	29.15	1.83	51.15
	Singimari	31.43	24.48	8.76	35.33

	Kanthalbari	20.87	23.24	0.67	55.22
Dhupguri	Purba Magurmari	14.86	34.92	2.27	47.95
	Khalaiagram	28.07	38.93	0.25	32.75
	Dakshin Gosairhat	25.51	38.91	0.24	35.34
Nagrakata	Sulka para	13.72	29.4	3.05	53.83
	Khairbari	15.28	43.47	0.20	41.05
	Sukhanibasti	8.25	2.12	1.99	87.64
Kranti	Uttar Matiali	16.15	49.12	3.32	31.41
	Dakshin Chak Maulani	31.62	27.54	6.04	34.80
	Uttar Saripakuri	33.84	22.24	1.53	42.39
Rajganj	Kismat Sukani	16.17	21.04	1.65	61.14
	Pani Kauri	22.39	40.83	1.92	34.86
	Kamarbhita	21.43	12.64	0.19	65.74

Source: District Census, 2011 and DPRDO section of D.M office, Jalpaiguri

In the third phase, from each village 35 cultivator-farm households are randomly selected for field survey at micro level. Therefore, a total of $6 \times 3 \times 35 = 630$ farmer-cultivator households are randomly selected for the purpose of field investigation. In other words, within each of Tier-I and Tier-II blocks, a total of $3 \times 3 \times 35 = 315$ farmer-cultivator households are randomly selected for field survey as well as collection and compilation of primary data. During survey works, utmost care has been taken to note all valuable informations as reported by respondents subject to the structured questionnaire (Appendix -I) placed before them.

As regards the establishment of study objectives, sampled villages (18 nos.) and nearby locations (within 6 k.ms) are intensively surveyed in order to select sample service branches of SCBs, RRB-UBKGB and JCCB Ltd. Keeping in mind the proximity issue (within 6 k.ms) with regard to service branches from dwelling places of sample farmer HHs, a total of 27 service branches has been randomly selected for collection of primary data to study the nature of credit supply (priority and farm sector) at micro-level.

From each PSB-SCB sample branch, 03 branch staffs and 01 bank mitra/B.C are being interviewed. Similar type investigation has been conducted in case of RRB-UGKGB and JCCB Ltd. branches but with only 03 branch staff engaged with banking operations. In each case, respondents engaged with each service branch (PSB-SCB/RRB/JCCB) are interviewed through structured questionnaire schedule (Appendix-II) and consequently a total of 98 ($17 \times 4 + 5 \times 3 + 5 \times 3$) sample responses have been recorded for further processing.

1.8.4 Sample Size

From theoretical perspective, a unit of observation or unit of analysis is the entity in primary survey which is observed, verified and information is systematically collected through suitable questionnaire. In the present research study, from agri-credit demand perspective the unit of analysis is cultivator or farm households whereas from agri-credit supply perspective the unit of analysis is service branch (PSB-SCB/RRB/JCCB). As regards farm households, the process of sampling procedure has given rise to a total sample size of 630 farm households for field survey. On the other hand, given the spread of service branches within six k.ms radius from dwelling places of sampled farmers, a total of 27 sampled service branches with total 98 respondents have been investigated to deal study objectives and test hypotheses respectively.

1.8.5 Time period for primary data collection

All primary data are obtained by means of questionnaire method and the same have been collected through field visit to farmer households in sampled dwelling places. Two prime cropping seasons have been chosen for sample primary data collections. These are Rabi and Kharif seasons respectively. For Rabi season field data collection duration begins from sowing to that of harvesting periods i.e; beginning from the third week of November 2022 and upto second week of April 2023. With regard to Kharif season field data collection period also comprises both sowing and harvesting periods in the sampled areas. Such data collection with regard to sampled farmer households began from second week of June 2022 and upto third week of October 2022. Therefore, taking into account total number of months (except February'22 and August'22), nearly seven months were utilised for primary data collection from sampled farmer households. During field level survey, each respondent farmer has been demarcated to represent corresponding sampled farmer household (HH) respectively.

As regards credit supply aspects from sampled branches, these were visited during both popular seasons i.e; Rabi (2022-23) and Kharif (2022-23) in order to apprehend nature of crop specific credit flows as well as pre and post-harvest credit supply respectively.

1.8.6 Data Processing with Statistical Tools and Techniques

This stage occurs after collection of primary data from field survey. In general, this stage involves a statistical method of data manipulation which implies converting raw data into meaningful information. Three prime stages of data processing are data input, data manipulation, data storage and data output. In the present research study both simple and sophisticated statistical techniques are used to infer the ground realities. The methodologies concerning data processing that have been applied for research work are as follows-sex Ratio, density of population, growth rate of population, literacy rate (male and female), arithmetic Mean, compound annual growth rate, standard deviation, pearson's correlation coefficient, coefficient of variation, multivariate linear regression, time-series trend line and ML-Binary Logit and Probit regression analysis respectively.

Regression techniques of Logit and Probit Model essentially deal with binary outcome variables subject to a set of explanatory (continuous/categorical) variables. Besides statistical tools and techniques for drawing inferences diagrammatic methods such as percentage bar diagrams, multiple bar diagram, line diagram etc have been applied for analytical representation of data-set pertaining to this present research study. All such statistical tools and techniques are described as follows:

1. Arithmetic Mean (A.M):

For a given set of observations, A.M is defined as summation of such observations divided by the number of observations. A.M calculated in such a way gives a single value to express the entire data.

$$\text{Symbolically, A.M. } (\bar{X}) = \frac{\sum x}{n}$$

2. Growth Rate (percent value):

The growth rate = $\frac{q_t - q_{t-1}}{q_{t-1}} \times 100$, t and t-1 refers to time period of present and immediate previous period.

3. Compound Annual Growth Rate: Compound annual growth rate (CAGR) depicts the cumulative performance of a particular variable over a significant period of time and is used to measure the relative profitability of businesses. The compounded annual growth rate (CAGR) is one of the most accurate ways to calculate and determine returns for anything that can rise or fall in value over time. It measures a smoothed rate of return (www.investopedia.com).

$$\text{CAGR} = \left[\left\{ \frac{EV}{BV} \right\}^{1/n} - 1 \right] \times 100$$

Where,

EV= Ending value

BV= Beginning value

n = number of years

4. Sex-ratio: Sex ratio is defined as the number of females per 1000 males in a given population.

$$\text{Sex-Ratio} = \frac{\text{Number of females}}{\text{Number of males}} * 1000$$

5. Density of Population: Population density is calculated as the number of persons per unit area.

$$\text{Population Density} = \frac{\text{Total Rural Population}}{\text{Total Rural Area}}$$

6. Population Growth rate: The population growth rate refers to the change in the number of individuals over a specific period of time.

$$\text{Population Growth rate} = \frac{\text{Population}(t) - \text{Population}(t-1)}{\text{Population}(t-1)} * 100$$

7. Literacy rate: It is defined as the total percentage of the population of an area at a particular time aged seven years or above who can read and write with understanding. Formally expressed as,

$$\text{Literacy rate} = \frac{\text{Number of literate persons aged 7 years and above}}{\text{Population aged 7 years and above}} * 100$$

8. Standard Deviation: First suggested by Karl Pearson and usually denoted by σ . It is defined as positive square root of the arithmetic mean of the squares of the deviations of the given observations from their arithmetic mean. The formula for standard deviation is as follows,

$$\sigma = \left\{ \frac{1}{n} \cdot \sum (x - \bar{x})^2 \right\}^{1/2}, \text{ where } \bar{x} \text{ is the A.M of the given set of}$$

observations such as x_1, x_2, x_3, \dots are set of n observations.

9. Coefficient of Variation: The relative measure of dispersion based on standard deviation is called the coefficient of standard deviation. Hundred times the coefficient of dispersion based on standard deviation is called the coefficient of variation. This is given by,

$$\text{C.V} = 100 * \left(\frac{\sigma}{\bar{x}} \right)$$

10. Karl Pearson's Coefficient of Correlation:

The correlation coefficient is a statistical measure of the strength of a linear relationship between two variables. Its values can range from -1 to 1. A correlation coefficient of -1 describes a perfect negative, or inverse, correlation, with values in one series rising as those in the other decline, and vice versa (Gupta, 1997).

As regards two variables x and y , the formula is as follows,

$$r(x,y) = \frac{\frac{1}{n} [\sum (x-\bar{x})(y-\bar{y})]}{[1/n \sum (x-\bar{x})^2 \cdot 1/n \sum (y-\bar{y})^2]^{1/2}}$$

11. Linear trend line of time series data (principle of least squares):

The principle of least squares provides us an analytical or mathematical device to obtain an objective fit to the trend of the time series data. This technique can be used to fit linear as well as non-linear trends. If linear trend is fitted then such trend equation is given by,

$$y = a + bt \text{ ----- (i)}$$

$$\text{or, } y = a + bx \text{ ----- (ii)}$$

Where, x is obtained from t by change of origin such that $\sum x = 0$, then for the yearly data, the annual rate of growth is b or $2b$ according as the number of years is odd or even respectively. In general, two techniques available for conversion of t into x such as,

$$\frac{t - \text{middle time period}}{\text{Interval between two successive time periods}} \text{ ----- (iii)}$$

Where, total numbers of time series values are odd, and another technique is given by,

$$\frac{t - \text{Arithmetic mean of two middle values}}{\text{Interval between two successive time periods}} \text{ ----- (iv)}$$

Where, total number of time series values ($= n$) are even respectively.

For the linear trend equation (i) and according as odd or even number of time series values, the normal equations for estimating a and b is given by:

$$\sum y = na + b\sum x \quad \text{and} \quad \sum xy = a\sum x + b\sum x^2 \text{ ----- (v)}$$

Such that, $a = \frac{\sum y}{n}$ and $b = \frac{\sum xy}{\sum x^2}$ ----- (vi)

12. Binary-Logit regression model:

The Logistic Regression Technique or Logit Model is applied for analytical study of dichotomous variables (Gujarati, 2012). This is because of its simplicity in calculation and assuming bounded range of the probability falling within range between 0 and 1. In Logistic Regression Model, the regressand or dependent variable is a dichotomous dummy variable and Maximum-Likelihood (ML) method is applied after transforming the dependent into a logit variable to estimate the parameters. The logit or logit model is obtained as follows-

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = z_i = \beta_1 + \beta_2 x_i \text{ (vii)}$$

Where, $x_i =$ explanatory variable and $i = n$ observations

$L_i =$ Is the log of the odds ratio

$L_i =$ Is linear in x_i as well as parameters of β_1 and β_2

P_i refers to the probability of occurrence of x_i and $(1 - P_i)$ is the probability of non-occurrence of x_i

For estimation of coefficients (i.e.; β_1, β_2), the relation (vii) can be expressed as follows:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 x_i + u_i \text{ (viii)}$$

Where, L_i, x_i, β_1 and β_2 hold as usual mentioned in equation (vii) and u_i is the stochastic error term.

13. **Binary-Probit Regression Model:** The expression for Binary-Probit Model is as follows,

$$I_i = F^{-1}(I_i) = F^{-1}(P_i) = \beta_1 + \beta_2 X_i \dots\dots\dots (ix)$$

where, utility index I_i is expressed as $I_i = \beta_1 + \beta_2 X_i \dots\dots\dots(x)$

β_1, β_2 are coefficients and X_i is explanatory variable such that

$$P_i = P(Y = 1|X) = P(Z_i \leq \beta_1 + \beta_2 X_i) = F(\beta_1 + \beta_2 X_i)$$

where, $P(Y = 1|X)$ means the probability that an event occurs given the values(s) of the

and regressor (s) and Z_i is standard normal variable such that $Z_i \sim N(0, \sigma^2)$.

14. Coefficient of Determination:

Usually denoted by R^2 measures the proportion or percentage of the total variation in dependent variable as explained by the regression model. It is a non-negative quantity and its limits are $0 \leq R^2 \leq 1$. An $R^2=1$ means a perfect fit. $R^2=0$ means there is no relationship between the regressand and regressor. It is generally expressed as $R^2 = \frac{ESS}{TSS}$, where ESS is explained sum of squares and TSS is total sum of squares. $TSS=ESS+RSS$, where RSS is residual sum of squares.

1.8.7 Limitations of the Study: The present research study is based on both primary and secondary data. These two different types of data are obtained from both field survey and publications from government and non-government sources.

i) Secondary source data are subject to non-availability from reliable sources. Data pertaining to crop production, input support services etc. at state and district level have been obtained from multiple secondary sources. Therefore, mismatches of secondary informations have been observed. Moreover, such data are available up to 2017-18 or 2019-20 period with periodic non-availability respectively.

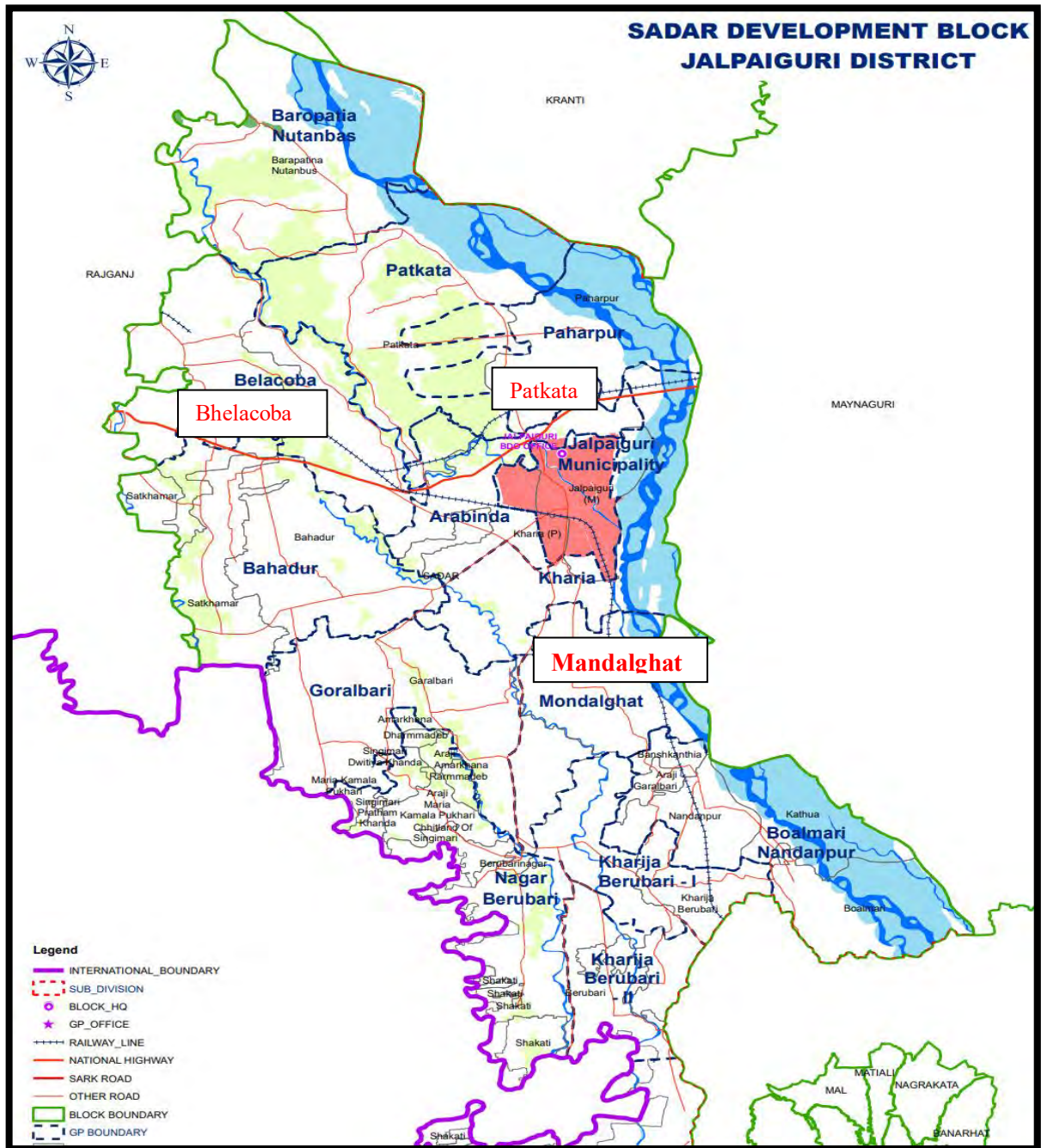
iii) Data on C.D ratio, NPA ratio and institutional credit supply data to priority sector at micro level are subject to limited availability with periodic gaps.

iv) As far the collection of primary data are concerned these are subject to time-consuming matter and fraught with disruptive responses during field-visit. All these have affected in matters of collection regarding relevant primary informations.

v) Primary data collected at field level have been caught with personal issues and bias factor.

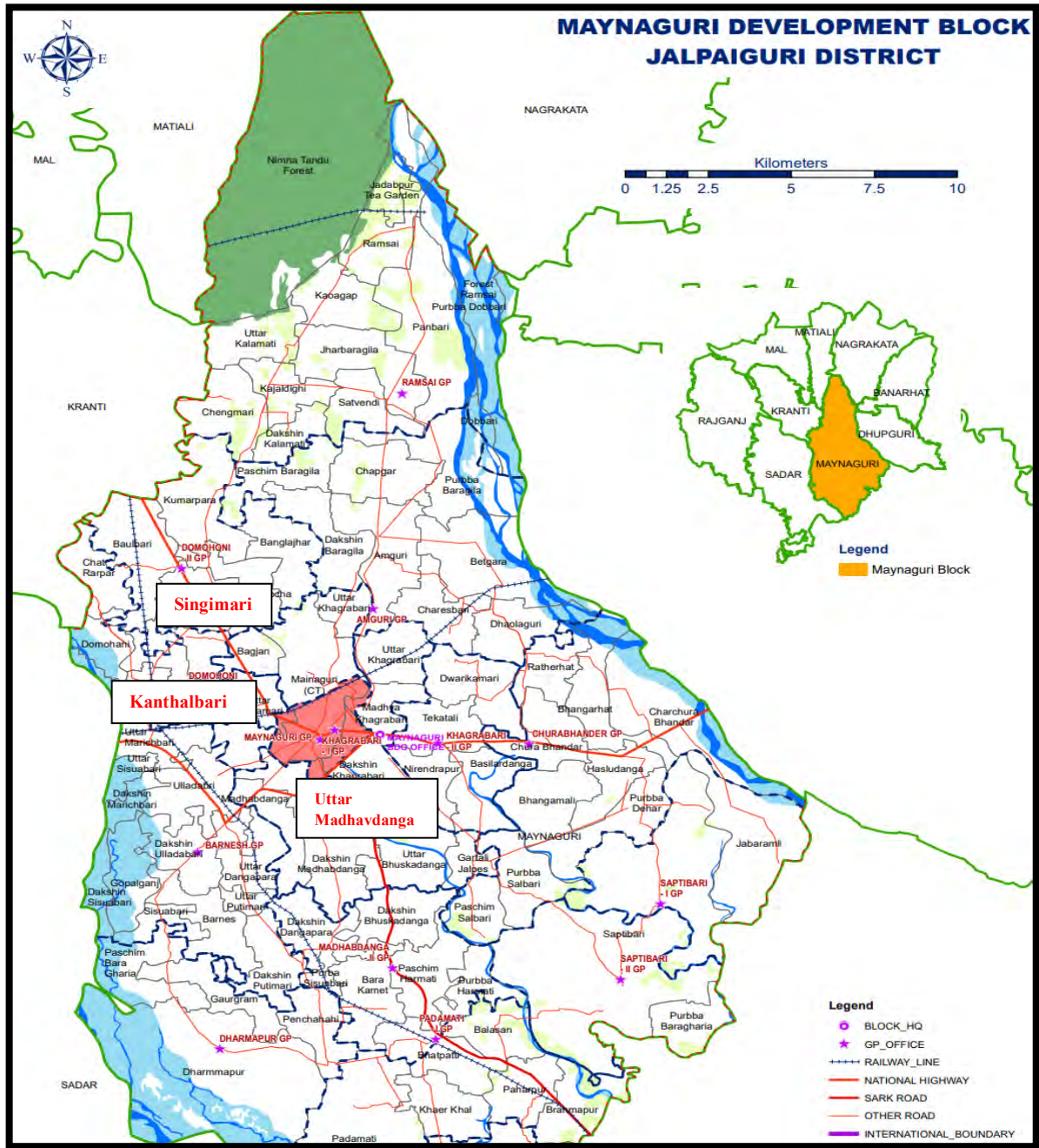
vi) Primary data collection at field level covers nearly seven months long duration. During such period, tastes and preferences of respondents might be affected on account of external factors. Such effects have been ignored.

Map 1.1: Jalpaiguri Sadar Development Block, District of Jalpaiguri



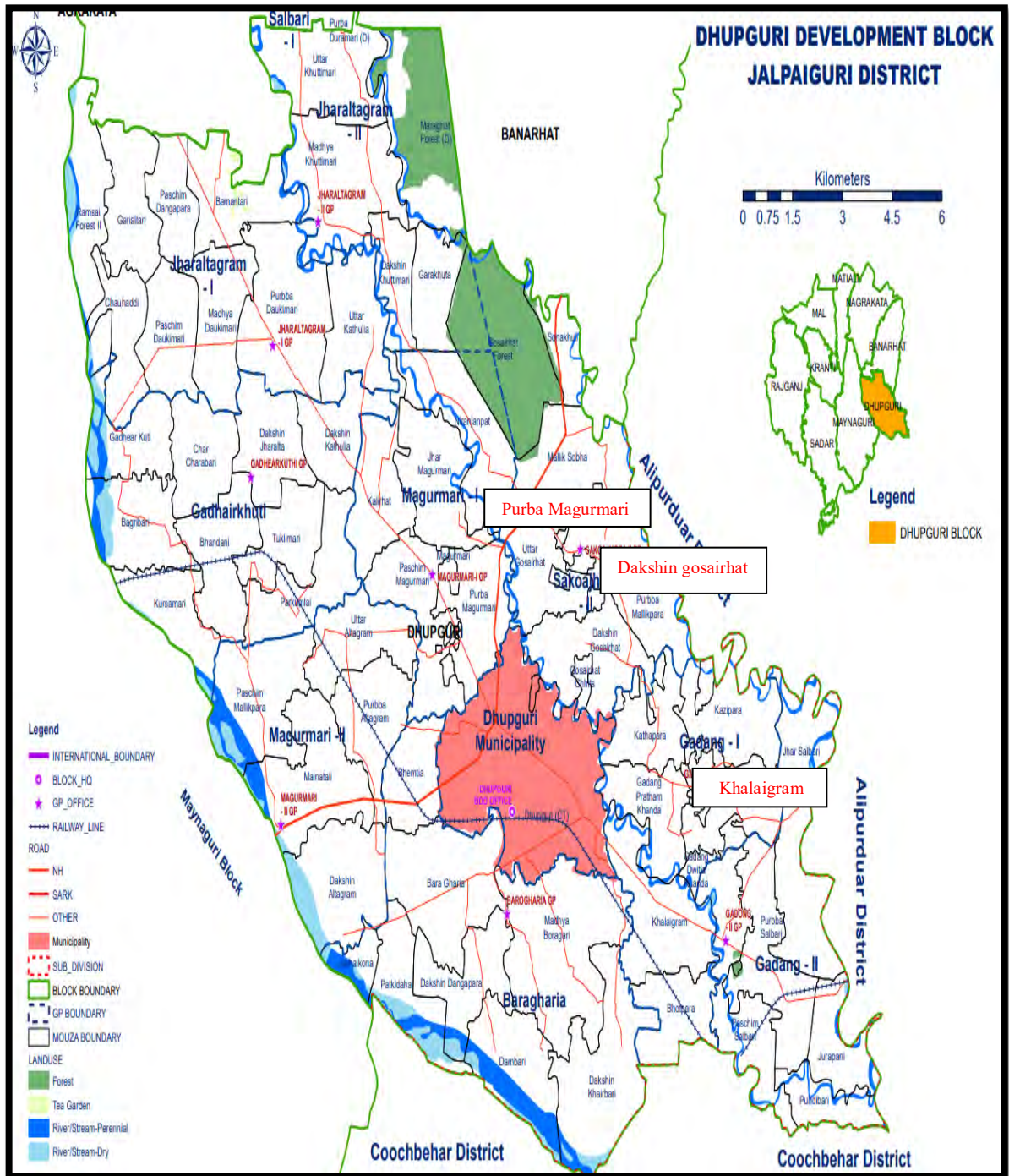
Source: Official Website of District Magistrate Office, Jalpaiguri (WB)

Map 1.2: Maynaguri Development Block, Jalpaiguri District



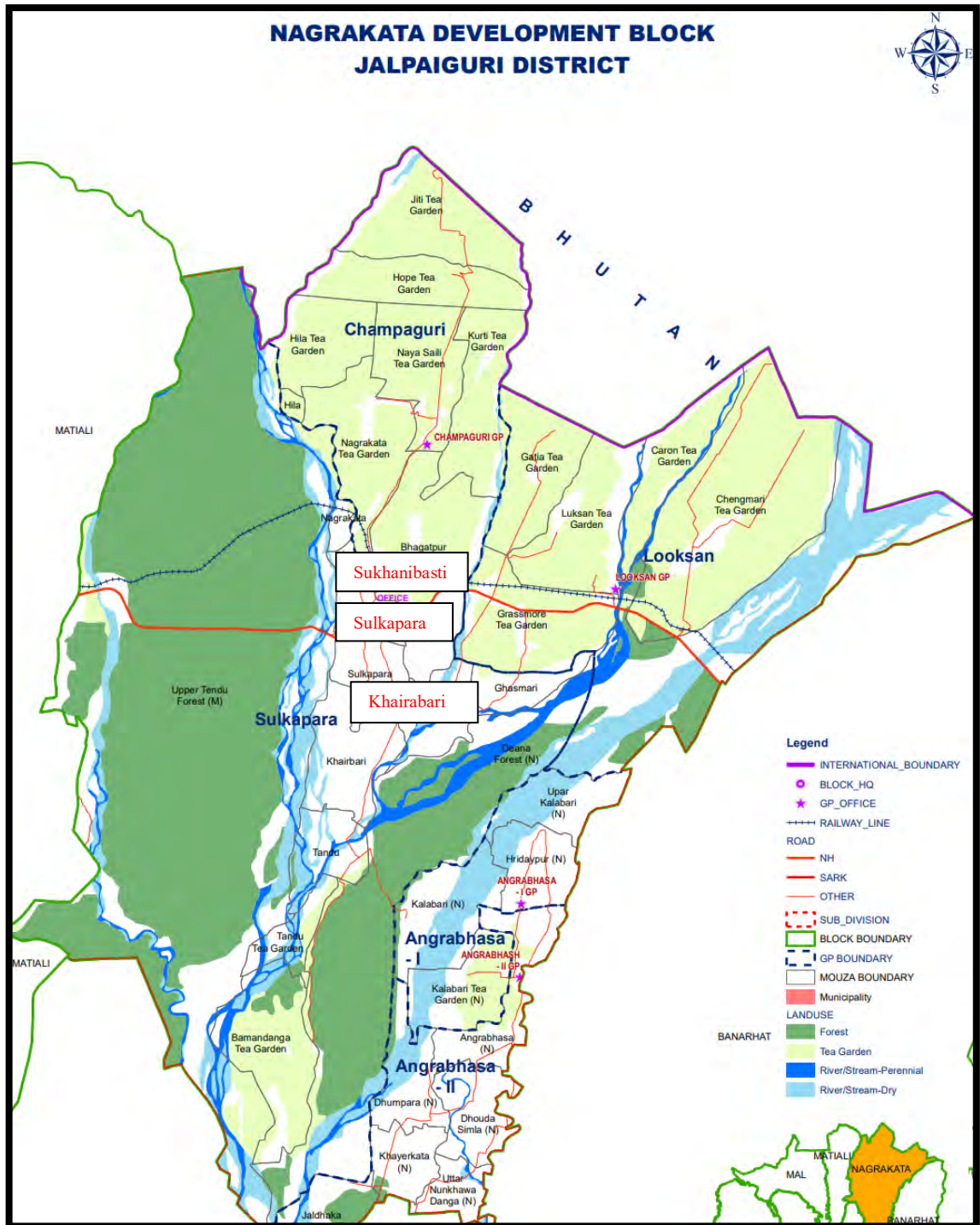
Source: Official Website of District Magistrate Office, Jalpaiguri (WB)

Map 1.3: Dhupguri Development Block, Jalpaiguri District



Source: Official Website of District Magistrate Office, Jalpaiguri (WB)

Map 1.4: Nagrakata Development Block, Jalpaiguri District



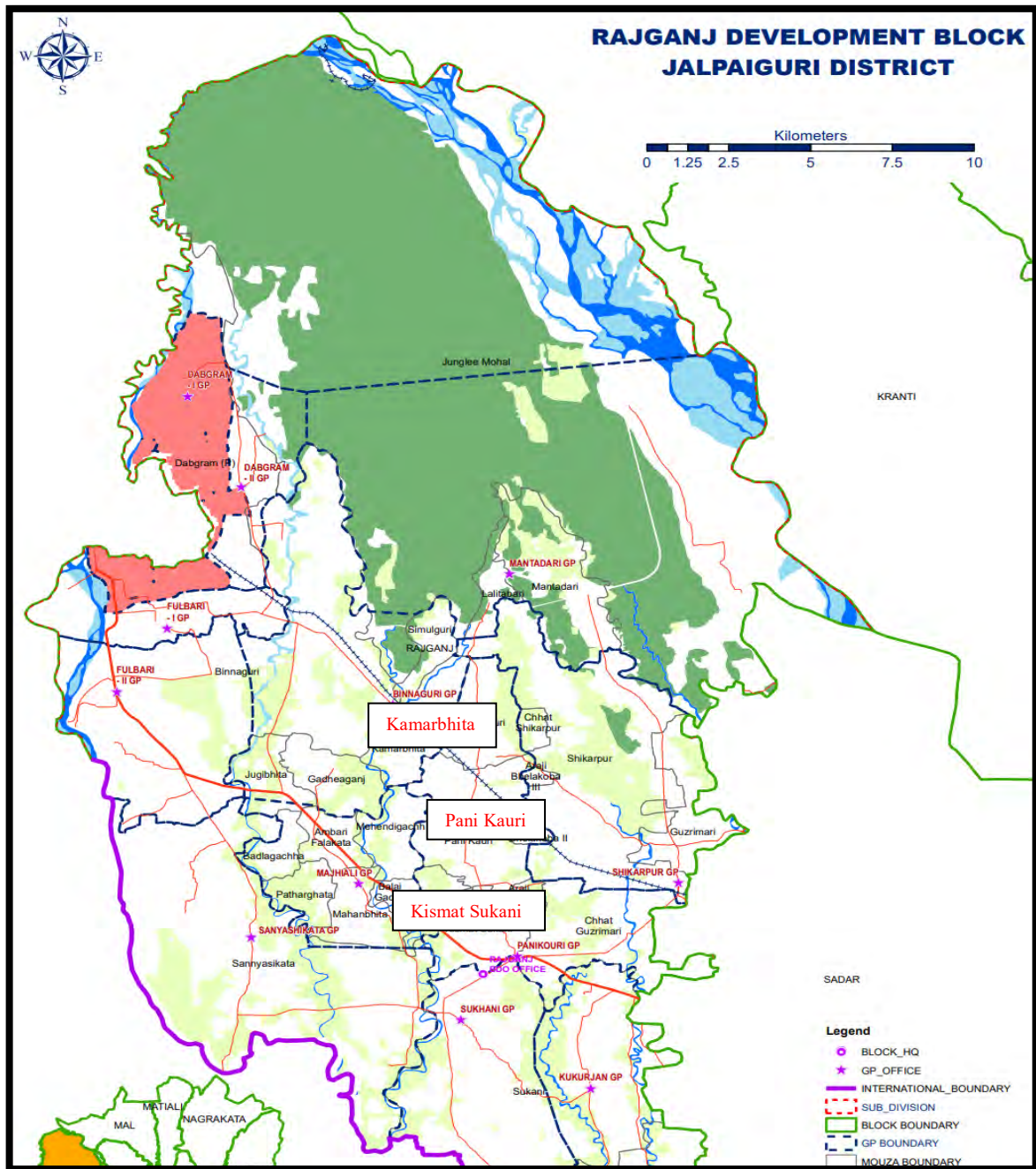
Source: Official Website of District Magistrate Office, Jalpaiguri (WB)

Map 1.5: Kranti Development Block, Jalpaiguri District



Source: Official Website of District Magistrate Office, Jalpaiguri

Map 1.6: Rajganj Development Block, Jalpaiguri District



Source: Official Website of District Magistrate office, Jalpaiguri (WB)

1.9 Chapterisation

Keeping in view research questions, objectives and scope of present study the whole research work has been designed and framed into the following eight chapters in order to evaluate the nature of institutional credit flow to agricultural sector at national and state level, situation of rural development as well as patterns of credit transactions (demand and supply) in micro study area. A detailed lay-out of the whole research framework in the form of chapters has been presented below:

Chapter I: Introduction

This chapter aims to deal with the introductory part of the entire research endeavour. This chapter portrays a brief description of conceptual framework, statement of the problem and the scope of present research study. In view of research problem, this chapter presents a brief review of research oriented literature under the framework of theoretical perspective, directly related studies and contextually relevant empirical studies. In order to materialize the conceptual framework keeping in view issues and scope of study, this chapter outlines research objectives, questions, hypotheses, sampling frame, sample size, data sources and data processing techniques for the conduct of entire research work.

Chapter II: Institutional Credit Flow to Farm Sector: A National Perspective

This chapter pertains to various aspects such as agricultural credit flow in percentage of GDP, regional disparity in farm credit flow, inter-state variations in share of agricultural credit (o/s), gross value additions in crop production and trends in institutional credit flow to small and marginal farmers throughout the length and breadth of nation. Moreover, this chapter throws light upon activities and performances of various institutional agencies that offer dedicated institutional credit supply in terms of short-term and long-term credit needs of individual farmers as well as refinance support mechanisms on behalf of SFCs, NBFCs, MFIs and infrastructure development in agriculture sector.

Chapter III: Aspects of Topography, Population Distribution, Economic Development, Agricultural Land Holding and Crop Production Patterns in the State of West Bengal

This chapter sheds light upon physiographic, demographic and agro-climatic features of the state. Moreover, this chapter presents in brief some aspects of rural physical infrastructure development in conjunction with profile of crop production, agricultural land holding and input-use patterns. In this chapter, special emphasis has also been made to depict the situation of rural indebtedness concerning needy farmers and agricultural labourers those found unable to repay the credit borrowed and

accumulated over a period of time in the agricultural sector of the state. The basic aim is to portray the relative position of study district in aforementioned matters with respect to similar achievements in other districts of the state.

Chapter IV: Aspects of Physiography, Climate, Population Distribution, Agricultural and Non-Farm Activities in the Jalpaiguri District

This chapter portrays in brief the origin of district and gives a general description on administrative structure, profile of topography, climate, drainage patterns, demographic attributes, land-use distribution with respect to forest cover, crop production, irrigation, surface transportation and non-farm activities available within the territory of study district. As far as agriculture profile is concerned, this chapter specifically deals with analytical description on diverse patterns of crop production, spread of various mode of irrigation and existence of multiple input support services available in the study district. In brief, this chapter attempts to establish the situations of socio-cultural, physiographic, administrative and economic structure upon which agricultural activities are organized in the district.

Chapter V: A Micro-Level Study regarding Farmer's Behaviour on Credit Demand and Reimbursement of borrowed Credit at Sampled Villages of Study District

This chapter highlights nature of farmer's demand for credit either on the basis of use or for a pre-specified duration of time. In fact, the chapter intends to establish that at macro-level whatever being the category of farm credit requirements, a significant relationship have been witnessed between demand for agricultural credit and high yield in farm productivity. This chapter solely deals with analytical study based on primary data collected from field investigation at micro-level. Priority has been accorded to investigate into local factors contributing in diverse patterns of institutional credit demand for agricultural activities. For analytical purpose, a pre-structured questionnaire with competent statistical tools and techniques has been applied for methodical analysis of field data.

Chapter VI: A Micro-Level Analysis of Features, Patterns and Prospects of Institutional Agricultural Finance

In this chapter, a holistic attempt has been carried out to explore patterns of institutional credit flow to priority sector with particular emphasis on agricultural sector at sampled villages of the study district. The beginning sections throw light upon local occupational structure and evolution of financial institutions at the Jalpaiguri District. With regard to institutional agencies, consideration is made in favour of service branches of regional rural bank and various scheduled commercial banks that are found operational at a short distance from dwelling places of sampled farmer households. The major objective of this chapter is to portray the share of credit supply from sample branches of financial institutions towards agricultural sector. This chapter also aims at

analytical understanding on significance of factors that influence institutional credit supply from selected bank branches towards sampled farmers in the study area.

Chapter VII: The Nature of Informal Credit Market and Relationship with Other Input Markets: A Micro-Level Study

This chapter sheds focus on nature, role and characteristic features of informal sources of finance on the basis of primary data obtained through field survey at study area. In fact, primary data obtained through field survey sheds light on the causes and attitudes of sampled farmers responsible for the spread and growth of informal finance at study area. Moreover, in this chapter a holistic attempt has been made to evaluate the nature of interlocked relationship between informal credit market and other input markets prevailing at sampled villages of study district. An attempt has also been made to demarcate causes for non-participation in interlocked factor market transactions at micro level.

Chapter VIII: Summery, Conclusions and Suggested Measures

This chapter provides a summery analysis of the findings of the whole research study. Based on synthesis of facts obtained through secondary data and primary field survey data, an analytical conclusion has been drawn with suitable feedbacks that can be adopted in formulation of development policy for future development of the study district.

1.10 Conclusion

The present research work is a dedicated attempt in order to explore multiple aspects of rural development and transactions in farm credit market at Jalpaiguri district which is predominantly an agrarian economy. Development is a subjective matter and no general consensus can be reached about its proper meaning. In simple words, the term development implies desirable changes with unfolding of potential capabilities. The term rural development is a component of the broader term development and such a term imply the overall development of rural areas encompassing agriculture, allied activities and non-farm sector. This research study aims at critical analysis on various aspects of agriculture and rural development of Jalpaiguri district. The main objective of this research study has been to identify the existing institutional and physical infrastructure facilities at rural areas and their potentialities for the future development of rural sector in Jalpaiguri district. The present research study has also been carried out with application of different statistical tools and techniques to portray patterns of institutional credit flow to farm sector and farmer's demand behaviour on credit sourced from both institutional and non-institutional sectors. With the application of such statistical tools and techniques on cross-section and time-series data obtained at micro level, suitable conclusion with suggested measures has been drawn which can be applied for holistic improvement of rural sector in the study area.

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