INFORMATION AND COMMUNICATION TECHNOLOGY MANAGEMENT IN COOPERATIVE AND COMMERCIAL BANKS FOR IMPROVED AGRICULTURAL CREDIT: POTENTIALS AND CONSTRAINTS

A STUDY OF ANDHRA PRADESH

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in

MANAGEMENT

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LEENA PREM

D E C L A R A T I O N

I hereby declare that the thesis entitled **"Information and Communication Technology Management in Cooperative and Commercial Banks for Improved Agricultural Credit: Potentials and Constraints, A Study of Andhra Pradesh"**, being submitted at School of Management Studies, University of Hyderabad, is the result of my own work carried out at School of Management Studies, University of Hyderabad as a full-time researcher (*Reg. no.: 2KMBPH02*) and that, it has not been wholly or in part, been submitted for any other degree. Due acknowledgement for the sources referred has been made wherever applicable.

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C E R T I F I C A T E

This is to certify that the research work embodied in this thesis entitled **"Information and Communication Technology Management in Cooperative and Commercial Banks for Improved Agricultural Credit: Potentials and Constraints, A Study of Andhra Pradesh"**, submitted to School of Management Studies, University of Hyderabad, has been carried out by **Mr. Prem Syamsundar** (*Reg. no.: 2KMBPH02*), in total fulfillment for the award of the degree, Doctor of Philosophy in Management Studies, under my supervision for the full period under the Ph.D. ordinances of the University and to the best of my knowledge, the same has not been earlier submitted for the award of research degree of any University or Institute.

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ABBREVIATIONS AND GLOSSARY OF TERMS

A	-	Appendix
ADO	-	Agricultural Development Officer
AGM	-	Assistant General Manager
ALM	-	Asset Liability Management
AP	-	Andhra Pradesh
APCOB	-	Andhra Pradesh State Cooperative Bank Limited
APSFC	-	Andhra Pradesh State Finance Corporation
ARDC	-	Agricultural Refinance and Development Corporation
ATM	-	Automated Teller Machine
B2B	-	Business to Business
CBs	-	Commercial Banks
CCOMFar	-	Farmers Scores of Computerised Commercial
CCOMMar	-	Manager Scores of Computerised Commercial
CCOOPFar	-	Farmers Scores of Computerised Cooperative
CCOOPMar	-	Managers Scores of Computerised Cooperative
CH	-	Chittoor
CMC	-	Computer Maintenance Corporation
COMITSAPB	-	Ratings on computerised banking operations by Information Technology Staff/System Administrators of APCOB
COMITSCOP	-	Ratings on computerised banking operations by Information Technology Staff/System Administrators of Cooptions Technologies Limited
COMITSSBI	-	Ratings on computerised banking operations by Information Technology Staff/System Administrators of State Bank of India
COM OPS	-	Computerised Operations
COMTMAPB	-	Ratings on computerised banking operations by Top Management of APCOB
COMTMCOP	-	Ratings on computerised banking operations by Top Management of Cooptions Technologies Limited
COMTMSBI	-	Ratings on computerised banking operations by Top Management of State Bank of India
CRAFICARD	-	Committee to Review Arrangements for Institutional Credit for Agriculture and Rural Development
Crore	-	10 million
DCCB	-	District Central Cooperative Bank
DOS	-	Disk Operating System
District	-	Administrative unit having control on approximately 40 mandals in the state of Andhra Pradesh, India
DSS	-	Decision Support System
dt	-	District
DWCRA	-	Development of Women and Children in Rural Areas
EDP	-	Electronic Data Processing
EFT	-	Electronic Funds Transfer

EIS	-	Executive Information System
FMCG	-	Fast Moving Consumer Goods
FR subrating	-	Farmer Subrating
GCF	-	Gross Capital Formation
GDP	-	Gross Domestic Product
GOI	-	Government of India
Gram Panchayat		Village Committee
ha	-	Hectare
HDFC	-	Housing Development Finance Corporation
HO	-	Head Office
HRD	-	Human Resource Development
HSBC	-	Hong Kong and Shanghai Banking Corporation
HYV	-	High Yield Variety
IAY	-	Indira Awas Yojana
IBA	-	Indian Bank Association
ICAR	-	Indian Council of Agricultural Research
ICICI	-	Industrial Credit and Investment Corporation of India
ICT	-	Information and Communication Technology
IDRBT	-	Institute for Development and Research in Banking Technology
INFINET	-	Indian Financial Network
IRDP	-	Integrated Rural Development Programme
IT	-	Information Technology
ITS	-	Information Technology Staff/System Administrators
IT S / SA APCOB		Information Technology Staff / System Administrators' of APCOB
IT S / SA COP		Information Technology Staff / System Administrators' of Cooptions Technologies Limited
IT S / SA SBI	-	Information Technology Staff / System Administrators' (IT S / SA) of State Bank of India (SBI)
JRY	-	Jowahar Rojgar Yojana
k	-	One thousand
Kbps	-	Kilo bits per second
KCC	-	Kisan Credit Card
Kgs	-	Kilograms
Kharif	-	Crops are planted at the onset of southwest monsoon in June-July and harvested in September-October.
Lakh	-	1,00,000
LAN	-	Local Area Network
LSCS	-	Large Scale Cooperative Society
LT	-	Long Term
MAGR subrating		Manager Subrating
MANAGE	-	National Institute of Agricultural Extension Management
Mandal office	-	Administrative office having control on approximately 15 villages in the state of Andhra Pradesh, India
Mandi	-	Market place at Mandal/District level

MANITCOP	-	Ratings on manual banking operations by Information Technology Staff/System Administrators of Cooptions Technologies Limited
MANITSAPB	-	Ratings on manual banking operations by Information Technology Staff/System Administrators of APCOB
MANITSSBI	-	Ratings on manual banking operations by Information Technology Staff/System Administrators of State Bank of India
MAN OPS	-	Manual Operations
MANTMAPB	-	Ratings on manual operations by Top Management of APCOB
MANTMCOP	-	Ratings on manual operations by Top Management of Cooptions Technologies Limited
MANTMSBI	-	Ratings on manual operations by Top Management of State Bank of India
MCOMFar	-	Farmers Scores of Manual Commercial
MCOMMar	-	Manager scores of Manual Commercial
MCOOPFar	-	Farmers Scores of Manual Cooperative
MCOOPMar	-	Manager scores of Manual Cooperative
MFIs	-	Micro Finance Institutions
Million	-	10 Lakh
MIS	-	Management Information System
mm	-	Millimetres
MoU	-	Memorandum of Understanding
MT	-	Medium Term
MT	-	Metric Tonnes
NABARD	-	National Bank for Agriculture and Rural Development
NCBF	-	National Confederation of Bank Employees
NGO	-	Non-Governmental Organisation
NIBM	-	National Institute of Bank Management
NIC	-	National Informatics Center
NICNET	-	Nationwide ICT Network set up by NIC also termed as Government Network
NIIT	-	Renowned private Computer Institute
NIRD	-	National Institute of Rural Development
NPAs	-	Non-Performing Assets
NREP	-	National Rural Employment Programme
NZ	-	Nizamabad
Opts	-	Operations
PACS	-	Primary Agricultural Societies; lowest tier of Cooperative Banking System
PC	-	Personnel Computer
PDAs	-	Personal Digital Assistants
PSBs	-	Public Sector Banks
Rabi	-	Crops are planted in winter, usually between October and December and harvested in spring, between March and May

Raythu bazaar	-	market place where the farmers themselves sell their produce directly to the consumers
RBI	-	Reserve Bank of India
RCIB	-	Rural Credit Information Bureau
RFIs	-	Rural Financial Institutions
RIA	-	Rural Institutional Agencies
RIDF	-	Rural Infrastructure Development Fund
ROI	-	Return on Investment
RRB	-	Regional Rural Bank
SAMIS	-	Service Area Monitoring Information System
SBI	-	State Bank of India
SCBs	-	State Cooperatives Banks
SFAC	-	Small Farmers Agri-business Consortium
SKS	-	Swayam Krishi Sangam
SLBC	-	Sate Level Bankers Committee
sq. kms	-	Square kilometers
ST	-	Short Term
SWIFT	-	Society for Worldwide Interbank Financial Telecommunication
SW	-	Software
TFSBO	-	Total Farmers Scoring on Bank Operations
TITSSBO	-	Total Information Technology Staff/System Administrators Score on Bank Operations
TM	-	Top Management
TMC	-	Thousand million cubic meters
TMSBO	-	Total Bank Managers Score on Bank Operations
TPFRI	-	Total Perceived Farmer Rating Index
TPITSRI	-	Total Perceived Information Technology Staff / System Administrators' Rating Index
TPMRI	-	Total Perceived Manager Rating Index
TPTMARI	-	Total Perceived Top Management Rating Index
TRYSEM	-	Training of Rural Youth for Self Employment
TTMSBO	-	Total Top Management Score on Banking Operations
UHF	-	Ultra High Frequency
UPS	-	Uninterrupted Power Supply
USDA	-	United States Department of Agriculture
VFC	-	Virginia Flue Cured (related to Tobacco)
VRS	-	Voluntary Retirement Schemes
VSAT	-	Very Small Aperture Terminal
Vts	-	Visits
WAN	-	Wide Area Network
WG	-	West Godavari
WTO	-	World Trade Organisation
Zila Panchayat	-	District Council
ZO	-	Zonal Office
%	-	Percentage

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CHAPTER 1

INTRODUCTION

1.1. Introduction

Agriculture plays an important role in the Indian economy. It contributes 27 percent of the total GDP, provides employment to 65 percent of the total workforce and contributes to 21 percent of total exports (Planning Commission, 1999: 434). Agriculture supplies the bulk of wage goods required by the non-agricultural sector and raw materials for a large section of the industry in India

Agricultural sector is characterized by numerous challenges in terms of unpredictable weather/rainfall conditions, erratic power supply, substandard seeds, non-availability of the required quality and quantity of fertilizers/pesticides amongst others. The farmers also lack knowledge on the adequate application of fertilizers/pesticides and ignorant of the best farming practices. Most of the farmers are in need of adequate and timely credit to carry out various agricultural activities. Post harvest facilities like good storage godowns are lacking. Improper and inadequate transportation facilities lead to market inaccessibility. All these factors affect the agricultural productivity and thus the farmers' income.

The Indian government has initiated various policies and practices to help the farming and rural communities. It has established special departments and research institutes to look after the agricultural sector. It has also developed irrigation facilities, agricultural marketing, rural godowns, cold storage, etc. to support agriculture. With respect to rural financial institutions, the multi-agency approach was adopted to meet the credit requirements of the rural areas. Various private and non-governmental organizations too play a vital role to help the rural populations.

Despite these commendable efforts, gaps still exist in extending appropriate agricultural services and extensive work needs to be carried out to achieve progressive agricultural development. Information and Communication Technologies (ICT) based on their contribution in urban areas exhibit the potential to enable these organisations to provide improved services in rural areas. It needs to be examined how they can be

appropriately implemented and leveraged for rural connectivity and delivery of improved services to facilitate the development of rural population.

With this in view, in this chapter the significance of, agricultural development, credit in agriculture and of ICT in agricultural credit is brought out through a literature survey. This enables us to elicit the significance of proposed research in terms of credit gap, problems in agricultural credit and role of ICT in banks leading us to the research issues, objectives and hypotheses. This is followed by a discussion of the proposed research methodology for the study and its scope and limitations.

1.2. Review of Literature

Literature survey was carried out reviewing and analysing related articles collected from various sources like books, journals and electronic journals from libraries (A – 1.1: 'A' refers to Appendix) in Hyderabad, New Delhi and Bangalore. There exists quite extensive literature on rural credit in India, however, there is relatively less literature on the ICT aspect and its role in agricultural credit and development. The survey attempted here is more of illustrative nature than exhaustive and is intended to highlight the important aspects. Since, this is an interdisciplinary study involving agriculture, banking and ICT, the literature review too, is broadly classified into three broad sections, a) Significance of Agricultural Development b) Significance of Credit to Agriculture, and c) Significance of ICT in Agricultural Credit, as follows.

1.2.1. Significance of Agricultural Development

The significance of agricultural development is well elaborated by Misra and Puri (2004), who state that a) agriculture still contributes more than one-fourth of the GDP, b) Agriculture is largest employment providing sector. Millions of farmers, agricultural workers and others engaged in backward and forward linked sectors, c) Agriculture provides raw materials to the cotton textiles, jute, sugar and vanaspati industries which are of basic importance to the national economy. It provides the essential consumption commodities to the workers engaged in industries. It also provides market for the industrial products, d) Agricultural based exports of cotton textiles, jute, tea, horticulture, floriculture and agro-products, do contribute substantial export earnings of the country, and e) Per capita income being low in India, large part of income is spent on fulfilling basic consumption needs. It is observed that rural Indian population spends about 64 percent and the urban Indian population spends about 56 percent of the total expenditure

on food. Agriculture meets these demands, thus providing food security and self-reliance. f) Agriculture with appropriate policies and programmes can contribute to the preservation of bio-diversity, forests, water, soil and other natural resources.

The study by Thamarajakshi (2000: 3237 – 3240), explains that the performance of the economy is crucially dependent on that of the agriculture, which supplies major goods (food) and raw materials for the economy. Agriculture contributes to foreign exchange by way of exports and provides a market for non-agricultural products and services. On the significant role of agriculture, the study reiterates that 70 percent of the population is involved in agriculture, engages 60 percent of work force although its contribution to GDP has declined from 31.6 percent in 1987-88 to 26.8 percent in 1998-99, and contributes around 20 percent of exports.

While analysing the aspects on agricultural contribution to Indian economy, Ranganathan (2003), also illustrates that agriculture accounted for 38 percent of GDP in 1980 and is at a significant 27 percent, accounting for 62 percent of employment even in 1998. The Ninth Plan (Planning Commission, 1999) also states that agricultural growth reduces poverty much faster than growth in other sectors due to its employment effect and maintaining the prices of basic food products more or less stable.

Kumar (1992) states that the impact of performance, either good or bad, is not confined to agricultural sector alone but is felt in all the sectors of the economy. Further, for good performance massive investment is needed in agriculture. The study analyses that faster growth in GDP could be achieved by shifting of investment from agriculture to non-agriculture but highlights that there would be uneven growth across sectors. If such investment continues then large scale cereal imports may become necessary that would result in substantial price increases which would in turn affect the food grain production and the poor.

The importance of agriculture and its development for Indian population and economy is quite well highlighted in all the 5 – year plans of Government of India. The 5 – year plans in this chapter are appropriately divided among the three sections of the literature mentioned above, and reviewed in context of each of this section. It may be also noted that all the plans would be reviewed on the empirical, policy and agricultural development programme implementation aspects in the next chapter.

The First Five Year Plan (Planning Commission, 1952) the plan period from 1951 to 1956, states that though there is large population engaged in agriculture, the country is not self-sufficient in food and raw materials for industry. It is characterized by unbalanced occupational structure with about 68 percent of working population engaged in agriculture, about 14 percent in industry, 8 percent in trade and transport and the remaining 10 percent in professions and services. It gives topmost priority to agriculture, including irrigation and power reasoning that it would be impossible to sustain a higher tempo of industrial development without a substantial increase in the production of food and of raw materials for industry.

Second Five Year Plan (Planning Commission, 1956) the plan period from 1956 to 1961, although gave top priority to industry, it emphasises that production of food and raw materials will be required now and in future to sustain the demand for them with the rapid industrialisation and increase in income.

Third Five Year Plan (Planning Commission, 1961) the plan period 1961 to 1966, states that the rate of growth in agricultural production is one of the main limiting factors in the progress of the Indian economy. It further states that efforts will be made to strengthen agricultural administration in the states, and stress is being placed on the closest possible coordination between different agencies, notably, those concerned with agriculture, cooperatives, community development and irrigation.

As mentioned, each of the Five year plans would be discussed at appropriate sections ahead, however, it would be apt to highlight and analyse the agricultural development outlays during each of the plans in this section (Table 1.1).

Table 1.1: Development Outlays under each Five Year Plans

(Actuals) *(Rs. Crores)*

Sl. no.	Heads of Development	First Plan (1951-56)	Second Plan (1956-61)	Third Plan (1961-66)	Annual Plans (1966-69)	Fourth Plan (1969-74)	Fifth Plan (1974-79)	Sixth Plan (1980-85)	Seventh Plan (1985-90)	Eighth Plan (1992-97)*	Ninth Plan (1997-2002)	Tenth Plan (2002-2007)*
1	Agriculture and allied sectors	290	549	1089	1107	2320	4865	15201	12793	22467	37239	58,933
2	Total	1960	4672	8577	6625	15779	39426	109292	218730	434100	941041	1525639
3	1 as a percentage of 2	14.80	11.75	12.70	16.71	14.70	12.34	13.91	5.85	5.18	3.96	3.86

* Outlay

Source: Misra S.K. & Puri V.K. (2004): *Indian Economy - Its Development Experience*, Himalaya Publishing House, Mumbai.

It is observed that there has been increase in development outlay in absolute terms for Agriculture and allied sectors from an actual expenditure of Rs.290 crores in the First Five year plan to an outlay of Rs.58,933 crores in the Tenth Five year plan. However, it is a matter of concern that the percentage share of the total budget, received by Agriculture and allied sectors has been fluctuating and showing a decreasing trend from 14.8 percent in First plan to 3.86 percent in Tenth Plan. Overall, it can be observed that agriculture is regarded one of the most important sector for the Indian economy.

Thus, the above brief discussion clearly brings out the role, significance of agriculture in the Indian economy and the efforts carried out for agricultural development in India. Among the many inputs that the farmers employs in agriculture, credit forms a crucial input to carry out good agricultural activity which is discussed in the following section.

1.2.2. Significance of Credit in Agriculture

Credit is one of the most essential inputs in agricultural activities. It provides for two major needs of agriculturists. They are a) production needs, and b) consumption needs. The production needs can again be broadly classified as the fixed capital requirements and working capital requirements. The fixed capital requirements are for investments on land, agricultural implements, draft animals, storage godowns etc. while the working capital requirements are for investments on production inputs like the seeds, fertilisers, pesticides, labour, transport, etc. Credit for consumption needs is to meet the daily expenditures to sustain livelihood, for social activities, among others. Agriculturists' meagre income is insufficient to meet all the above expenditures and hence is highly dependent on credit to meet these expenses, so much so that, in many cases it forms the initiating point for all agricultural activities.

Credit for agriculture in India is provided both by organized and unorganized agencies. The organised agencies consist of cooperatives, commercial banks, RRBs and Government. The unorganised agencies consist of professional money-lenders, traders, relatives and friends, landlords and others (Narasaiah & Venkatasulu, 1999).

The All India Rural Credit Survey Committee (RBI, 1954) laid the foundation of the institutional framework for establishing a social credit delivery system for financing agriculture and allied activities. It felt that stimulating the flow of credit through suitable institutional framework for agricultural processing and marketing would enable the

agricultural borrower to secure fair price for his produce without which prompt repayment of production loan would not be possible. Overall, it made significant policy intervention and suggestions in the area of rural credit.

The All India Rural Credit Review Committee (RBI, 1969) pointed out that despite the support extended, cooperatives had begun to exhibit several weakness in the form of overdues and organizational ineffectiveness. And that, they were not fully geared to meet the growing needs of the agricultural sector emerging as a result of the application of modern technology and innovations related to production, processing and marketing. It therefore recommended a significantly enlarged role for commercial banks, which resulted in nationalization of major commercial banks in 1969. This followed the setting of Regional Rural Banks (RRBs) conceived as low-cost institutions for rural credit in 1975, which were expected to combine the local feel and familiarity of the rural problem with the professionalism of commercial banks. This institutional arrangement for providing credit in the rural areas is often described as the multi-agency approach.

Fourth Five Year Plan (Planning Commission, 1970) the plan period from 1969 to 1974, states that the growth of agricultural sector is largely dependent on intensive agriculture which involves a substantial increase in credit, inputs and services. Further, it states, following social control, the volume of agricultural finance outstanding from commercial banks increased from Rs. 5 crores during 1966-67 to Rs. 53 crores in 1968-69. It identifies Agricultural Refinance Corporation started in 1963 as one of the most significant institutions in the sphere of agricultural credit. The Lead Bank[1] scheme was also introduced in 1969, on recommendation of Gadgil Study Group and FKF Nariman Committee of Bankers.

Fifth Five Year Plan (Planning Commission, 1975) the plan period from 1974 to 1979, reiterates that it's objectives of removal of poverty and self-reliance can be achieved by accelerated pace of agricultural production, particularly foodgrains, exploitation and optimal use of available energy resources and production and distribution of critical raw material and wage goods.

[1] It is the duty of the Lead bank to survey the resources and potential for banking development in the adopted districts and offer advice to small borrowers – farmers particularly and assist the other primary lending agencies and maintain liaison with government and quasi-governmental agencies. The lead bank will also assume a major role in the development of banking in that district though it will not have a monopoly in the banking business in that district.

Sixth Five Year Plan (Planning Commission, 1981) the plan period from 1980 to 1985 states that it has been decided to increase the proportion of advances to the priority sectors, comprising agriculture, small scale industry, retail trade and small business, professional and self-employed persons etc. from 33 1/3 percent to total bank advances in 1979-80 to 40 percent by 1985. Further, out of the total advances to the priority sector at least 40 percent will be extended to the agricultural sector.

The plan stresses that the credit delivery systems of both cooperative and commercial banks will require considerable toning up, simplification of procedures, systematic identification of the most needy among the target group and preparation of appropriate investment projects for them. It also suggests the need for reorientation from security-based lending to project-based lending for improving the delivery system. One of its objectives is to bring about greater coordination between different credit institutions under the multi-agency system and improve the recovery of institutional loans to ensure continuous re-cycling of credit.

Sivaraman Committee to Review Arrangements for Institutional Credit for Agriculture and Rural Development – CRAFICARD (RBI, 1981) is the third in the series of the studies, RBI undertook in the field of agricultural credit. It states that there has been increased flow of credit, due to the recommendations of the previous committees but certain problems emerged related to the multi-agency approach. It suggested that proper identification of the beneficiaries, activity-wise and area-wise was necessary and then provide customised loans according to the needs of the specific areas and specific target groups. It also recommended an integrated approach to rural development.

The Khusro Agricultural Credit Review Committee (RBI, 1989 a) was the fourth committee in the area of agricultural credit set up by RBI, which submitted its report in August 1989. This committee recommended the merging of RRBs into the sponsor commercial banks in view of their intrinsic weakness and built-in non-viability. It also recommended the continuation of directed lending for agriculture but suggested that concessional interest rates should be applied only to small and marginal farmers and that the rates applicable to loans for other farmers be stepped up within the ceiling of 15.5 percent rate of interest.

The pattern of the effect of availability of the type of credit on agricultural production over certain period of years can be seen on Table 1.2. It is observed that in

1950-51 the institutional credit was negligible 24.23 crores as against the exploitative non-institutional credit which was 307.69 crores. The agricultural production was also very less to the extent of 50.82 million tonnes during the same period.

Table 1.2 Institutional and non-Institutional sources of Agricultural Credit and Agricultural Production

	Credit sources and Agricultural production	1950-51[c]	1960-61	1994-95
1	Institutional Credit (crores)	24.23[a]	214.35[a]	18773.1[b]
2	Non-Institutional Credit (crores) [c]	307.69	913.81	6595.95
3	Agricultural Production (million tonnes)[d]	50.82	82.02	191.5

Source:

[a] Table 3.9: http://planningcommission.nic.in/data/dataf.htm

[b] Table 52: Handbook of Statistics on The Indian Economy, Reserve Bank of India, 2003-2004

[c] Derived from Mathur B.L., (2001), "Institutional Agricultural Finance - Some Issues Analysed", *Agricultural Situation in India,* Publication Division, Directorate of Economics and Statistics, Dept. of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India, September, pp.271-277.

[d] Table 4.5 (a): Agricultural Statistics at a Glance, Government of India, August 2004.

However, after the various policy level and ground level initiatives discussed earlier, there was increased role of institutional agencies to provide agricultural credit to the farmers. This is evident from the amount of institutional credit to the tune of Rs.18,773 crores in 1994-95, with agricultural production during the same period touching to 191.5 million tonnes. Thus, institutional agricultural credit available at low interest rate is one important input among others for increased agricultural production. It is however, also observed that though the absolute value of non-institutional credit has increased, its percentage of the total credit has decreased to 26 percent in 1994-95 from 92.7 percent in 1950-51.

It would be apt to conclude this section quoting the Ninth Pan (Planning Commission, 1999; 293), which states that "…the sustainability of a high GDP growth of 8 percent or so in the next decade is contingent upon agriculture posting a growth of 4 percent, in sharp contrast to a growth rate of only 2 percent recorded in the Ninth Plan…such acceleration in agricultural growth needs to be supported by large flow of rural credit".

Thus, having an overview of the significance of credit for agricultural development, we examine the significance of ICT in Agricultural credit in the following section.

1.2.3. Significance of Information and Communication Technology in Agricultural Credit

Few major benefits envisaged by management of ICT in rural banks are;

1. Speedy and more accurate storage and retrieval of management information. Enhanced transparency, accountability and reliability of decision-making and hence more satisfying customer relations.
2. Improved management and more effective control over the credit advancement and recovery operations.
3. Increased responsiveness, effectiveness and efficiency by enhanced communication and coordination among interbank and intrabank managers, employees and customers.
4. Enhanced control over legitimate utilisation of credit.

In that direction, The Eight Five Year Plan (Planning Commission, 1992) the plan period from 1992 to 1997, highlights that the database and the exchange of information improve operations and management. The plan states that development of MIS would avoid multiple reports, reduce paper work, facilitate consistency checks and availability of online data. It will minimize delays as well as enable processing and faster analyses of data.

Ninth Five Year Plan (Planning Commission, 1999) the plan period of 1997 to 2002, identifies the reason for high NPAs as the lack of free flow of information within the financial system regarding the credit worthiness of borrowers and solvency of institutions. It therefore, recommends institutionalising such an information system or sharing information and developing early warning systems to reduce the occurrences of NPAs. In its strategy for the Ninth Plan, among others it stresses the need to generate reliable data and statistics right from the grassroots level and analyse and disseminate this reliable data to the policy makers, planners and managers for improving the quality of planning and decision-making. On improving the monitoring and to ensure timely feedback of the monitored information, the plan states computerised information network is required and for retrieval of information a databank be created. To make India a global IT superpower a National Task Force on IT Software Development has also been set up. The ICAR with its network of Institutes, Bureaus, National Research Centres, Project Directorate and through State Agricultural Universities among others, are working out detail design of network for National Agricultural Information System.

Choudhary (1998) analyses that the fund-rising and disbursing activities and the basic functions of bank have implication on cost and profitability. These are in turn primarily influenced by the staff, organisational methods, control and audit. To enable these functions to be carried out in an integrated manner, there is need for a MIS – a two way flow of information between the Head Office and Branch Management, accountability and control occurring in a continuous fashion as the operation take place. New systems are designed, organization structures and reporting relationships are reviewed and revised, and technological advancements are made use of, in providing branches with the state-of-the-art equipment in order to lighten their burden.

The Narasimham Report of the Committee on the Financial System (RBI, 1991) had initiated financial system reforms. The recommendations were given to develop an integrated, diversified, autonomous, transparent financial system. The reforms are in wake of liberalization, deregulation, marketisation, privatisation and globalization. Among others, the Committee recommended that the balance sheets of all financial institutions should be made transparent and full disclosures made in the balance sheets as recommended by the International Accounting Standards Committee. For early warning system, the off-site back up which was lacking on account of out-of-date information system was felt necessary as much as ex-post monitoring. Information system is also expected to be streamlined so that off-site analysis can be made to support on-site monitoring.

The Narasimham Report of the Committee on Banking Reforms (RBI, 1998) observes that bank automation needs to be coupled with process re-engineering and expedited. It states that banks should bring out revised operational manuals and update them regularly, keeping in the view the emerging needs and ensure adherence to the instructions, so that these operations are conducted in the best interest of the banks and with a view to promoting good customer service. These should form the basic documents of internal control systems.

The Vyas Report of the Expert Committee on Rural Credit (NABARD, 2001) was set to review the rural credit system and make recommendation for strengthening it to meet the existing and emerging challenges. It stated that lot could be achieved by RFIs by putting their house in order. It further states that the present reporting system is not standardised, characterised with lot of delay and information gaps, which prevents timely review and remedial actions. It recommends that RBI should make Service Area

Monitoring Information System (SAMIS) returns statutory for all banks for timely review of credit disbursement and any default in submission be viewed as violation of RBI instructions liable to penalty. It suggests that the reporting system be standardised and simplified to reduce workload at branch levels. The report states that in wake of economic and financial reforms the RFIs have to reduce the transaction cost and administrative overheads to survive. For better and alternative sources of income generation, the plan states that facilities for using IT at the level of Gram Panchayats or nodal villages need to be provided and that PACs should network with other societies and institutions of the region. The plan states to meet the requirements of staff by contracting out some labour intensive jobs (consolidation of branch returns, recommendation of inter-branch accounts etc.) and by computerisation.

On aspects of streamlining systems, the report recommends that manuals on conduct of business and maintenance of accounts need to be developed wherever they are presently absent in cooperatives and RRBs. It suggests that MIS also to be part of the manual and include aspects like delegation, accountability and professionalism. The wide diversity in books of account, systems and procedures etc. between different cooperatives in the same state are the bottlenecks for such computerisation. Hence, such systems would bring uniformity and ease state-wide computerisation of operation and MIS for cooperative. The back office and front office computerisation of commercial banks is also necessary. It further says that MIS apart from generating prompt and flow-free-control documents, such computerisation would relieve branch staff of the drudgery and save adequate time and energy for closer and frequent interaction with borrowers.

The Rangarajan Report of the Committee on Mechanisation in Banking Industry, (RBI, 1984) is the first blue print for computerisation/mechanisation in banking industry. It estimates that by the end of seventies, the banking industry had more than ten million customers with an estimated 3 million transactions and one million inter-branch transfers per day. Complex information systems for house-keeping audit and control by the internal management of banks were the result of their growth. Secondly, micro-level information was required for policy formulation and control by the RBI, government and others. The inputs for these information systems were in bank branches. It was getting cumbersome and creation of volume of out-dated and processed data, and scarcity of vital current data needed for the fine tuning of policy measures.

A number of Working Groups and Committees earlier recommended introduction of mechanisation/computerisation as an aid to generation of information systems. Due to the magnitude and complexity of the tasks before the banking systems, mechanisation was considered as inevitable for improving customer services, improving house-keeping and control over branch operations and generating specific policy-oriented information. Mechanisation/computerisation need to be aligned to the banking practices and procedures and formatting of books of accounts. Issues of security and secrecy need to be studied. The constraints could be in terms of availability of trained manpower, lack of network of bank branches etc. Other major issue hampering the process of computerisation was the stiff opposition by All India Banks Employees Association.

At the regional and HO levels, the purpose of mechanisation would be to store, analyse and retrieve the data received from branches, so as to generate speedy information for strengthening internal controls over branches and for policy formulation. At the branches, the main objectives of mechanisation ought to be improvement in customer service, quality of housekeeping in customer service and generation of data to meet the requirements of control and information systems. The branch level mechanisation is needed for expeditious posting and balancing of books of accounts and improving customer services. It provides two models on how to mechanise the branch and states either of the two models will considerably improve customer satisfaction. It states that apart from the functions to be mechanised and type of equipment needed, attention also need to be give to the problems associated with the transition from the old systems to the modern mechanised systems.

The Rangarajan Report of the Committee on Computerisation in Banks, (RBI, 1989 b) reiterated that the massive expansion and diversification of banking system had led to deteriorating customer service, neglect of housekeeping and control functions owing to business pressures etc. It states that the IBA groups report on savings bank, current accounts, cash credit and overdraft, term deposits and general ledger provided standards for software specifications, functional features, screen formats, codes for operations and systems and procedures to be followed by branches. CMC was requested to develop standard software packages, however banks were also given option of developing requisite software either in-house or procure it from any other agency. The report states that a telecommunication network of banks and financial institutions called ‘BANKNET’ would

be operationalised by early 1990, to facilitate funds transfer, message switching, access to common data base, electronic mail, MIS etc.

This committee reiterates that the purpose of computerisation for banking operations is to improve customer service, housekeeping, decision making, productivity and profitability of banks. Due to practical problem and constraints like the geographical spread, power supply, maintenance of computers, telecommunication links etc. it recommends to make concentrated attempt at select centres of high business activity to achieve demonstrable gains and make favourable impact by providing significant improvement in customer service. It was hence proposed to fully computerise branches with daily load of over 750 vouchers (current account/cash credit/over-draft/saving bank, clearing, demand drafts, bills, foreign exchange operations, bank-office operations etc.)

In absence of quick communication facilities, information regarding movement of funds reaches the destination late and results in inefficient use of funds, and data transmission by paper results in delay and high cost due to handling at several stages. Hence, "BANKNET", as mentioned earlier, would be setup and operated by banks and financial institutions on a cooperative basis within the country. This would also provide a convenient interface with the proposed SWIFT Regional Processor at Bombay. As per the previous Committees recommendation on standardisation of input-output formats etc., this report observes that efforts were made to pool the skills of bankers for development of software specifications. The specifications thus drawn up by IBA were circulated to banks and empanelled vendors. In conclusion the report states, "The objective of mechanisation is not to replace man with machines...The programme of computerisation envisaged will not result in any reduction of labour. Of course, there will be some reallocation of work. Infact, this will only reduce the drudgery involved in routine work."

The Vasudevan Report of the Committee on Technology Upgradation in the Bank Sector (RBI, 1999) states that technology implementation and absorption in Indian banking so far has been in retail banking and corporate banking. It emphasis on the integration of retail-corporate modes into the rural-urban co-development. It states that RBI decided to establish INFINET – Indian Financial Network, to enhance efficiency and productivity on the one hand and provide state-of-the-art customer services through innovative delivery channels such as internet banking, home banking etc. on the other. The sub-group on computerisation on government transaction mentions that various government organisations already have upgraded the computer system for government

transactions. It states that advanced tools of technology like data warehousing and data mining on the voluminous data generated, would enhance the decision making ability. Highlighting their importance it states "…significant cost benefits, time savings, productivity gains and process engineering opportunities are associated with the use of data warehousing for information processing….decision can be made quickly and with confidence that the data are both time relevant and accurate".

Padwal (1997) very aptly states that it is very essential to determine the relationship between the so-called information revolution and socio-economic development. If the objectives are quick and effective decision-making, followed by the need to improve the welfare of the society for development, then, it is imperative to introduce new IT in the Indian banking industry. He states that cost effective information processing and selection of appropriate technology at branch level where various transactions take place is necessary. The importance of training and education of employees at all levels for successful adoption of IT is also well emphasised.

D N (DN, 1990) provides an interesting perspective on computerisation of banking operations stating that banking is not a sector of production but is concerned with the cost of circulating, reducing costs involved in the transformation of goods into money and vice-versa. Reducing these costs will increase the proportion of the surplus that is available for reinvestment, but not increase the surplus itself. He claims that computerisation of the bank would lead to the rise in the cost due to equipment and reduction of costs on the wages, which perhaps would lead to overall reduction of banks costs. He argues that since computer equipment has more import content than the wages of employees displaced, bank computerisation would increase the outflow of foreign exchange. This he argues as, "the increase of profits might itself yield no benefit in terms of increased production, while entailing a real cost in pushing India further into the foreign debt trap. In such a situation the case against computerisation only becomes stronger". He states that computerisation of bank branches are the result of foreign banks operating, concentrating in the field of 'personal banking' extending service to upwardly mobile middle classes earning as much as 27 percent interest for the banks. He concludes stating that while increasing the profits of banks, computerisation is in the specific interests of the multinationals.

On the security and vigilance aspect, Vittal (1998) directs all banks to computerise 70 percent of their business before January 1st 2001, to improve vigilance administration.

Kumar (1998) states that in the absence of IT infrastructure, there is a possibility of mushrooming of small enclaves of information systems blossoming on their own and the lack of integration of information resulting in inconsistencies. The organization would suffer from the problems of unbalanced growth and underutilization. The IT infrastructure has the advantage that it encourages the non-enthusiastic majority of managers to make use of the facilities. The common IT infrastructure helps reduce the cost per user, increasing the likelihood of people making efforts to use it and sustain its use to bring success at a later stage when the user matures. Another advantage of IT infrastructure is that it cuts across the departmental, functional and even organisational boundaries to exchange information. This reduces inconsistencies and removes communication barriers created by the organization structure. It establishes cross functional links and improves inter-personal communication. IT infrastructure can offer shared services that are more cost effective in the long run due to standardization and economies of scale.

The above overview leads to discussion on the significance of research being undertaken.

1.3. Significance of Research

Based on the above review, what follows elicits the need for further research to help bridge the credit gap, address the problems in agricultural credit and understand how ICT can be introduced in banks to enable improved services to the rural populations.

1.3.1. The Credit Gap

Agricultural credit becomes a bottleneck to productivity if not available at the right time, in right quantities needed and in right institutional form (Rangarajan, 2000: 282). It would be apt to add 'at right place and at right price' to drive home its importance to agricultural productivity and development. The Narasimham Committee (RBI, 1991: 31) is of the view that easy and timely access to credit is far more important than its cost.

In 1989, the Khusro Committee Report on Review of the Agricultural Credit System in India (RBI, 1989 a) has indicated that by assuming a 5 percent increase in the credit requirement (based on 1984-85 prices) on account of increase in input prices, the credit requirement from commercial banks as of 1999 to 2000, would be Rs.64,037 crore, while at the same time the resources availability would be only Rs.57,035 crore (Vadamalai Media, 1993-1994: 47) - (A – 1.2). And against a target of Rs.16,500 crores in

1991-92, the total agricultural credit disbursement was around Rs.11,200 crores - a credit gap of Rs.5,300 crores (Rangarajan, 2000: 43). Aggravating the situation is the decline of agricultural credit as the percentage of net bank credit from 12.5 percent (absolute value - Rs.23,983 crores) as of March 31st 1995 to 11.1 percent (absolute value - Rs.44,318 crores) as of March 24th 2000 (RBI, 1996-97, 1998-99 and 1999-2000) (A – 1.3). This among other factors, contributed to a decline in food grains' production growth rate from 3.5 percent during 1980-90 to 1.8 percent during 1990-99 (Thamarajakshi, 2000: 3237-3240). The Economic Survey (Government of India, 1999-2000: 56) explains that though RFIs have played leading role in the provision of rural credit, the agriculture sector is still in need of more credit.

Mujumdar (2004) states that though the priority sector target has been attained during the last couple of years, the target for agriculture has not yet be attained. He states that the lending to agriculture is around 15 percent today as compared to the target of 18 percent of net bank credit. He also highlights that while corporate entities raise money from PSBs at interest rate as low as 6 percent to 7 percent, the small farmers are required to pay a rate of 12 percent.

1.3.2. Prominent Problems in Agricultural Credit

Literature review earlier discussed that Rao and Malya (1980) and Shekar (1997) in their research reveal that the farmers stress on the reduction of interest rates, being practical on insisting for repayment within the stipulated time, need for the standardisation and simplification of official procedures, need for reduction in administrative and managerial inefficiencies and delays in banks due to which they need to frequent bank offices taking valuable time off their farming activity.

Similarly, in the research done by Rao and Malya (1980) and Patel (1989) the bankers complain that they lack sufficient empowerment for both advancement and recovery of credit, lack control over the utilisation of credit advanced, presence of duplication of efforts resulting in multi-financing and tendency to merely fulfill the credit advancement targets within stipulated time as per their head office, rather than identifying and helping the right beneficiaries etc. Rao and Bala (1993: 220) in their research analyse and explain that bankers do not always identify the deserving beneficiaries due to political pressures, emphasis only on meeting credit advancement targets, dominance of few influential farmers over larger share of agricultural credit etc.

The Narshimham Committee has recommended that the overall target for commercial banks credit to the 'priority sectors' should be reduced to the level of 10 percent from 40 percent. It also felt that mere fixation of sub targets has not helped to increase significantly the credit flow to agriculture because of variety of reasons such as inadequate development of infrastructure, poor credit discipline and weak credit delivery system. However, there is no decision taken in this context (Sadara; 1999).

1.3.3. Banks and Information and Communication Technology

The use of ICT in banks is in the evolutionary phase in the urban operations and almost nil in rural operations. One of the major constraints in rural operation is the high cost-benefit ratio, and the benefit component being largely intangible. It is envisaged that over a period of time, appropriate ICT enabled rural operations can be expected to become economically viable, technically feasible and beneficial to both the farmers and the bankers. This would contribute to the overall advancement of both the agricultural and the banking business.

In comparison to the co-operative banks and the RRBs, the commercial banks are relatively well computerised, though mostly in their urban operations. Hence, their expertise in computerised operations could be replicated and harnessed by appropriate re-orientation for rural operations. The use of ICT in banks by developed nations and, foreign banks and private banks in India like HDFC, ICICI, HSBC etc. have facilitated them to extend improved and good quality service to their customers at competitive and profitable rates. It is envisaged that motif can be drawn from such experiences and applied appropriately to the Indian rural banking operations for enhanced quality of service at reasonably economic rate.

Many innovations and developments in ICT in banking have changed the organisational structures and processes. Some ICT applications in banking business are Electronic Payment Systems, Expert Systems, Artificial Intelligence Programmes, Virtual Terminals etc. INFINET, would form a reliable communication backbone linking banks and financial institutions to improve decision making process and responsiveness (Padwal, 2000)

As per the Vasudevan Committee on Technology Upgradation in the Banking Sector (RBI, 1999) Data Warehousing and Data Mining systems should be developed and adopted. Computerised Database Management Systems and MIS can be particularly useful

for effective and efficient decision making and management of agricultural credit, in terms of identifying the characteristics and credentials of borrowers and thus the deserving beneficiary. Use of such ICT systems would also facilitate, streamline and simplify banking procedures. Milan (2000: 41) the President of Enablesoft states, "Effective datamining/moving technology enables employees to be more efficient because it provides them with timely information to make informed decisions and empowers them to keep information systems up-to-date and relevant. Finding and implementing a datamining/moving solution not only ease a banks operation expenses but it also will make it more competitive by helping staff 'get the right things done' ".

It should however be borne in mind that ICT, per se, cannot provide a complete solution and is not a panacea to any issue. ICT is rather a resource that needs to be managed and appropriately leveraged for increased productivity, quicker decisions and better customer service (Rangnathan, 2003).

1.4. Research Issues, Questions and Objectives

Thus, the issues arising prominently are how effective, efficient and transparent is the institutional credit advancement and recovery management system? Why are the unorganised credit sources still being preferred in most cases? Would the appropriate use and management of Information and Communication Technologies (ICT) in banks play a vital role in improving the agricultural credit operations, both from the farmers' as well as bankers' perspectives? Can ICT in RFIs enable to provide improved banking service which can also be extended to provide various business services to the rural population?

These led to the broad and specific objectives, hypotheses and research methodology followed to address them, as below.

The broad research objective is to explore the potentials and constraints in utilising and managing Information and Communication Technology in Cooperative and Commercial banks for effective and efficient flow of agricultural credit to attain balanced socio-economic agricultural development.

The specific objectives are;

1. To analyse the role of ICT in rural banks for improved banking service as perceived by the agricultural customers

2. To examine the bankers perspective on the contribution of ICT for improved rural bank management and facilitate enhanced banking service to agriculturists, in terms of quicker service, identifying the deserving beneficiaries, expediting the scrutiny of credit applications and advancements & recovery of agricultural credit.
3. To study the potential and constraints in implementing ICT in rural bank branches.

1.5. Hypotheses

The null hypotheses are;

$Ho_{(1)}$: Agricultural customers perceive that credit sanctioning and other banking services from computerised bank branches are not better than non-computerised bank branches.

$Ho_{(2)}$: The Bank Managers perceive the computerised bank branches working environment in terms of efficiency and effectiveness are not better than non-computerised bank branches.

$Ho_{(3)}$: The working environment in terms of efficiency and effectiveness in computerised bank branches are not perceived better than the non-computerised bank branches by the Information Technology Staff.

$Ho_{(4)}$: The Top Management perceive the working environment in terms of efficiency and effectiveness in computerised bank branches are not better than non-computerised bank branches.

The research hypotheses are;

$Hr_{(1)}$: Agricultural customers perceive that credit sanctioning and other banking services from computerised bank branches are better than non-computerised bank branches.

$Hr_{(2)}$: The Bank Managers perceive the computerised bank branches working environment in terms of efficiency and effectiveness are better than non-computerised bank branches.

$Hr_{(3)}$: The working environment in terms of efficiency and effectiveness in computerised bank branches are perceived better than the non-computerised bank branches by the Information Technology Staff.

$Hr_{(4)}$: The Top Management perceive the working environment in terms of efficiency and effectiveness in computerised bank branches are better than non-computerised bank branches.

1.6. Research Methodology

This research is an exploratory study of managerial issues relating to the introduction and management of ICT in cooperatives and commercial banks for improved agricultural credit and rural banking in general. It is carried out in three stages. In the first stage, secondary data is collected followed by primary data collection in the second stage. In the third stage the data analyses are performed using quantitative and qualitative methods.

1.6.1. Secondary Data

Literature survey was carried out, which primarily consisted of studying materials and developments in the area of agriculture, agriculture credit and ICT in banks from books and journals/magazines. To name a few, the journals/magazines are ‘Economic and Political Weekly’, 'Banking Systems + Technology', 'Banking Technology', 'Banking & Finance', 'International Journal of Information Management', ‘Journal of Information Technology for Development’, 'IT notes for Banking', 'Bank Quest’ - Journal of Indian Institute of Banking and Finance, 'Prajnan-Journal of Social and Management Sciences’ - NIBM publication, ‘Yojana’ – A development monthly, ‘Agricultural Situation in India’ - Department of Agriculture and Co-operation publication, NIRD publications etc. Other relevant statistics and secondary data are collected from RBI Bulletins, Annual reports of RBI and Banks, IBA Bulletin - Indian Bank Association Publications, Economic survey reports and Plan documents, NABARD publications on the state of AP, AP Department of Agriculture, National Informatics Centre in addition to information available at other online websites and libraries etc. The secondary data forms the information resource to identify the research gap, issues and objectives of the study. It also helps in fine-tuning the primary data collection process for the present study.

1.6.2. Primary Data

The primary data collection is based on the review of the secondary data and interactions with experts in the area of research. What follows explains the methodology adopted to collect the primary data in terms of sampling, the survey tool, the pilot study etc. The four sources of primary data are the farmers, concerned bank managers, information technology staff and top management.

1.6.2.1. Sampling Plan

Five stage Stratified Purposive Sampling Technique is employed in this study as depicted in A – 1.4. Three distinct physical regions can be identified in AP considering the contours in its topography, which are i) Telangana, ii) Rayalseema, and iii) Coastal Andhra. This stratification is also followed by Government of AP and hence, in the first stage the same stratification is followed in this research.

In the second stage, one representative district in each region is selected based on combination of two criteria's. The first criteria being, the district should have maximum off-take of agricultural credit from institutional agencies. The second being maximum rice production. Rice is chosen among all the food grains grown in AP, since it is the principal/major food crop in the state of AP (A – 1.5). This would ensure that there is good agricultural activity and financial transactions with the institutional agencies. Hence the respondents of these regions are expected to provide a better perspective to improve the banking service and also justify the cost of implementing any new strategies/technologies in banks.

Most banks are also concerned with the volume and number of transactions, which directly reflect on the profitability of their operations. High agricultural activities require higher finance among other vital inputs, leading to increased transactions with bank for credit. Hence, speed, efficiency and effectiveness needs to be achieved at these branches. The above procedure is followed since banks follow such logic to provide these branches with better facilities and infrastructure on priority basis. The results so obtained would be used to justify the need to implement such facilities/infrastructure at other branches too. Thus, a combination of the above two criteria are used to decide on the district in each region of AP, which are tabulated in A – 1.6 and A – 1.7.

A – 1.5, depicts the major foodgrain crops six-year average of Area, Productivity and Production in the state of AP with area under it to be 38.78 lakh hectares, productivity of 2,625.83 Kgs/hectare and production of 100.01 lakh tonnes. Rice accounts for 30.8 percent of total cropped area and 77.7 percent of total food grains production during 1999-2000.

A – 1.6, gives the ranking of each district, among all districts of Andhra Pradesh and among the districts within each region. The rankings are based on four-year average of a) Ground Level Credit (1997-2001) i.e. the off take of credit at grass root level (A – 1.6),

and b) Rice production (A – 1.7). On cross-examining both A – 1.6 & A – 1.7, West Godavari district (dt) in Coastal Andhra region, Chittoor district in Rayalseema region and Nizamabad district in Telangana region closely meet the above-mentioned criteria and hence are chosen for survey.

In the third stage of stratified purposive sampling in each of the above chosen district, one commercial bank and one cooperative bank are chosen for study. In the case of cooperatives, the PACS - the ground level tier, in direct touch with agriculturists are chosen for study. In the case of commercial bank, the respective lead banks for each of the identified district were first approached and explained the study. However, the concerned bank officials did not encourage the study attributing to certain organisational constraints and confidentiality requirements of the bank. State Bank of India (SBI), which is largest commercial bank in India and having good rural network even in AP, was positive and allowed to conduct the study. Hence, SBI was chosen for the study.

In the Fourth stage of stratified purposive sampling, in each of the district State Bank of India's one computerized branch and one non-computerised branch are chosen for the study. Similarly, in each district one computerised PACS and one non-computerised PACS are chosen for the study. These are identified based on their overall performance, expert opinion and advice of the General Managers of the bank at the respective district head quarters in case of commercial banks and General Manager of DCCB in case of cooperatives. Best performance is stressed so that the influence of political pressures and other inefficiencies could be largely avoided and the actual effect of computerization could be better studied. It needs to be noted that, when there are no computerised commercial rural branch then the survey is conducted at the computerised semi-urban branch having substantial agricultural clientele. It may also be noted that for ease of use the term cooperative bank has been used in the primary data analysis instead of PACS.

In the Fifth stage, in each of the computerised and non-computerised commercial branch and PACS, farmers based on their land holding size (large, medium and small) are chosen and questionnaire administered to them. The classification of farmers based on landholding as followed in the Report of the Agricultural Credit Review Committee (RBI, 1989a: 115) is broadly followed in this study viz. the small farmers are with landholdings upto 2.5 acres, the medium farmers are with landholdings of 2.5 acres to 5 acres and the large farmers are with landholdings above 5 acres.

The questionnaires are also administered to the rural branch managers and his deputies, working in the area of rural credit and to the system administrators (in computerised banks) there. Top management and system administrators are administered the questionnaire at their regional offices located in the state capital. It may be noted that the system administrators are also termed as IT staff in this report.

1.6.2.2. Sample Units

Respective questionnaires are administered to farmers' viz. large, medium and small farmers', bank managers' and his deputies working in the area of rural credit, system administrators' and top management of the respective banks as described in **1.6.2.1. Sampling Plan**.

1.6.2.3. Survey Tool

Structured questionnaire is administered personally to the sample units mentioned in **1.6.2.2 Sample Units**. Each of the sample unit has different questionnaire measuring various aspects of banking operations, to get a comparative and comprehensive feedback on the effect of computerization on the bank operations.

1.6.2.3.1. Questionnaire development: Phase I

After review of secondary data, the research design and research tool were evolved and the aspects that needed to be covered in the questionnaire were discussed. Four questionnaires were developed, one for farmer, second for bank manager in rural branches, third for system administrators and the fourth for the top management. These were then finalised after incorporating appropriate improvements for the Pilot study.

1.6.2.3.2. Pilot Study and Questionnaire Finalisation: Phase II

The pilot study was carried out at Puttaparthi, Anantpur District. 10 farmers of commercial and cooperative bank were interviewed with the questionnaire, with the intention to know whether the questions were clear and easy to understand and answer them. Questions that were felt difficult to understand and respond were altered, few unnecessary questions removed and necessary ones added, with the aim to make the questionnaires simpler to respond and comprehensive enough to meet the objectives of the study.

Thus, the questionnaires were fine-tuned for better response. In the process, several drafts were taken before it was finalized and sanctioned for full-fledged survey. The final version of the questionnaires administered for survey to farmers, banks managers, system administrators and top management could be referred at A – 1.8, A – 1.9, A – 1.10 and A – 1.11, respectively.

1.6.2.4. Sample Size

The total sample size of farmers' analysed in this research are 336 out of the planned 360. 116 farmers were analysed in West Godavari district, 116 farmers were analysed in Chitoor district and 104 farmers analysed in Nizamabad district. The shortfall in the number of farmers in respective categories used for analysis is due to reasons of their non-availability, inconsistency in their responses etc. Thus, responses from 93.3 percent of the respondents were used for analysis.

In all the three regions, in each of the four banks visited, the branch manager, the accountant and the field officer were interviewed. These three together would be henceforth referred to as bank managers. The common questionnaire developed termed 'bank managers questionnaire' is administered to all these three officials in the bank. Thus, three respondents each from manual cooperative bank, computerized cooperative bank, manual commercial bank and computerized commercial bank, formed a total of 12 respondents in West Godavari district. Similarly, 12 such respondents each from Chittoor district and Nizamabad district were interviewed, forming a total of 36 respondents for the three regions. Thus, the sample size of bank manager respondents of all the three regions put together forms a total of 36. The sample size being on the smaller side, however are expected to provide a good picture of the effect of computerization on banking operations and help achieve the second objective of the research activity.

In must be noted that in the case of ITS and TM the sample size are small but since each respondent rates on both manual and computerised banking operation, are expected to provide a good comparative picture of the effect of computerization on banking operations.

The ITS of all the three regions (rural/district office) and at respective head offices at Hyderabad put together formed a total sample size of 17. Most significantly their responses are expected to reinforce the finding of the farmers' and managers' responses. The Top Management (TM) at their head offices located in Hyderabad, formed a total

sample size of 15**.** Though fairly a small sample, their responses are expected to reinforce the finding of the farmers', managers' and also the ITS responses.

Thus, a holistic approach from the customers, to the service providers, to the implementers, to the policy makers is followed to seek their perception. The total sample size analysed for the research activity is 404. Other aspects of the above sample units are discussed in detail in the Chapter 4.

1.6.3. Data Analyses

The final stage is to comprehensively analyse the developments from secondary data/literature review and analysing the feedback of the primary data collection/survey with relevant statistical analyses. This would provide better understanding of the problems, solutions and expectations as perceived by the farmers, bankers, IT staff and top management, with respect to the ICT developments in rural banking. This would help to conjure the overall scenario of the agricultural banking system and help understand the issues in achieving the objective of the potential role of ICT to provide improved agricultural credit and banking services in general.

1.7. Scope and Limitations

The following are the limitations of the research;

a) The research is limited to the state of AP, it being one of the top agricultural producers and also one of the emerging IT trendsetters in India.

b) The research has been conducted with respect to Commercial banks and Cooperative banks only. Though RRBs form the third important financial institution in rural areas, they are not considered for this study for two reasons. First, they are sought of an extension of commercial banks since RRBs are sponsored by them and second, their contribution in the institutional flow of agricultural credit is considerably less. The average for 1994 to 1999 in A – 1.12 indicates that there is substantial flow of institutional credit from Co-operative banks and Commercial banks to the tune of Rs.12,374 crores and Rs.13,097 crores respectively. Whereas, its just Rs.1,730 crores in the case of RRBs.

c) Due to certain organisational constraints and confidentiality requirements of the respective district Lead banks, there was lack of encouragement from the concerned authorities approached. State Bank of India was then approached, which readily permitted to conduct the study in their banks in all the three districts.

d) The computerised commercial banks surveyed in West Godavari and Chittoor district are semi-urban branches, however having substantial agricultural lending/banking activities, since the rural commercial branches were not computerised as on date of survey. Whereas, during the last phase of research when the Nizamabad district was surveyed the rural commercial branches were being computerised. And hence, in the case of Nizamabad district the computerised rural commercial bank was surveyed.

e) The sample size of the ITS and TM is quite small, nevertheless do provide a good picture on the effect of the computerisation since they are at the helm of affairs and take decisions after sound technical and strategic study of various projects. Their analysis is primarily to reinforce the findings of the farmers and managers analyses.

f) An attempt was made to identify the maximum possible characteristics and their attributes of agricultural banking for obtaining the responses on the structured questionnaire and quantifying the intangible benefits of computerisation. These characteristics and attributes are extensive but not exhaustive.

1.8. Overview of the following Chapters

In what follows, Chapter 2 reviews concepts, plans, polices and empirical studies related to aspects of institutional credit, ICT and agricultural development. Chapter 3 briefly provides the banking, credit operations and socio-economic background, of India, Andhra Pradesh in general and in particular the districts in AP where the survey was conducted. Chapter 4 discusses the background/characteristics of the respondents.

Various relevant quantitative and qualitative analyses are performed. The quantitative analyses are divided into three chapters. The percentage analyses of banking transaction are discussed on Chapter 5. The banking service perception analyses of computerised banking transactions and manual banking transactions are performed by developing appropriate index in Chapter 6. The computerised and manual banking service comparative analyses are carried out by Scoring and Median Chi-square Hypotheses Testing in Chapter 7. The Chapter 8 deals with the qualitative analyses wherein the responses to various open ended questions in terms of potentials, constraints of computerisation and improvement in rural banking services, including agricultural credit are analysed. Finally, the summary of major findings, recommendations and scope for further research form Chapter 9.

CHAPTER 2

AGRICULTURAL DEVELOPMENT, INSTITUTIONAL CREDIT AND INFORMATION AND COMMUNICATION TECHNOLOGY:

A REVIEW OF CONCEPTS, PLANS, POLICIES AND EMPIRICAL STUDIES

2.1. Introduction

The Report of the Agricultural Credit Review Committee (RBI, 1989: 69) states that agriculture still remains the foundation of Indian economy. In good agricultural years, the total economy becomes buoyant. Food is adequate in relation to effective demand, prices remain stable, agro-business and industries look up, employment improves and rural poverty somewhat recedes. It states that a sustained high growth rate in agricultural output is not only a strong anti-inflationary force but also makes a favourable impact on industrial growth.

Thus, agriculture sector being very important to India, an attempt has been made in the next section to broadly conceptualise the linkages between the agricultural activities and banking activities, which is further extended to explore the role of ICT in rural financial institutions, it being the focus of this research study. This is followed by analysis of the empirical studies, in terms of 1) Role of Agriculture in Indian Economy, 2) Highlights of Agricultural Credit and Policies, 3) Trends in Agricultural Credit and 4) ICT in Agricultural Credit and Management of RFIs. The limitations of the existing literature are then enumerated before concluding the chapter.

2.2. Agricultural Activities, Rural Banking Activities and Role of ICT: A Conceptual Framework

One of the most essential pre-requisites for good growth of agriculture sector, *ceterus paribus,* is finance. Capital is indispensable for acquiring production assets and inputs, and it is most essential for agricultural development. Joshi (1985: 22) states that the farmers' primary source of income is from the agricultural produce. To sustain himself and his family he needs to invest and reinvest more capital in his farm and farm related activities. However, his meagre income/returns make borrowing an essential activity in farming.

On the significant role of credit and the effect that the absence of credit has on production, the USAID Report on Farm Finance (1971: 303-304) states that, the output of agricultural production would have continued to be as in the primitive period if credit was absent. Credit not only has made increased production possible but also enabled those who do not posses their own funds to participate in the production function with the help of loan.

Narasaiah and Venkatasulu (1999) on aspects of credit states that, "…the basic function of credit, whether provided by the banks or by other sources, is to enable individuals and business enterprises to purchase goods and service ahead of their ability or desire to play. Demand for credit arises because of the time consuming nature of the productive and distributive process. Consumers' demand credit to acquire goods in advance for which they pay in future time". Similarly, Joshi (1985) states that credit can be regarded as a condition which enables a person to extend his control on resources as distinct from ownership of them. It indicates the borrowing power of the individual who wants to make use of the resources during certain period through temporary control and promise to return them along with the price for using them temporarily. In a way, credit is very important device for facilitating the temporary transfer of purchasing power from those who have surplus of it to those who are in need of it.

However, for finance to play a major role in agricultural development, the study highlights that it must be available in adequate quantity at appropriate time to those farmers who require it. Broadly, there are two sources of finance for a farmer viz. his own endowments and borrowings. It is also noted that the endowments as well as savings of most of the farmers in all under-developed economy are so meagre, that they have to depend mainly upon borrowings for financing the agricultural activities. The income from farm operations is quite insufficient to provide the minimum necessities of life (food, clothing and shelter).

Agriculture is also subjected to vagaries of weather which affect the agricultural produce and hence the farmers return on investment. Finally, when the produce is taken to the market, they are again exploited by the middlemen who pay very less for the actual value of the agricultural produce. On the other hand, the farmers also need to repay the credit procured. All these factors make farming a challenging activity and farmers are always pressurised and ceaselessly struggle to overcome them.

Depending on its use, credit can roughly be classified into two broad categories; *production credit* and *consumption credit*. In agriculture, *production credit*, based on the purpose and the repayment period, can again in a broad sense be categorized into four different types, as discussed below.

a) **Long-term** credit with a period of repayment greater than 5 years is needed for purchasing land, pumpsets, tractors, making permanent improvements on land, land reclamation, drainage, sinking of new tube wells etc.

b) **Medium- term** credit with a period of repayment greater than one year and less than 5 years is required for purchasing of livestock, implements, machinery and also for deepening wells, installation of pump sets, dairy, poultry, plantations etc.

c) **Short-term** credit with a period of repayment of less than one year. It forms the working capital required for purchasing seeds, manure, fertilizers, pesticides and fungicides, repair and maintenance, and also for meeting the current expenses on land. In addition, marketing finance is needed for imparting holding power to the farmers in order to enable him wait for a better price for their produce.

d) Lastly, finance is occasionally required for the purpose of **relief and rehabilitation** following crop failures due to climatic conditions, plant diseases, natural calamities, soil erosion etc. In such cases of gross disasters, credit so extended is generally written off and many national taskforce committees also recommend it. However, these committees are very strongly against writing off of the above 3 types of credit defaults, under normal conditions due to political pressures etc. which result in increase in the NPAs' and hence the cost of credit.

In addition to the borrowing for agricultural purposes, farmers frequently seek credit for their personal consumption and unforeseen expenses, such as serious illness, death ceremonies, marriages, festivals, celebrations and other non-agricultural activities. This forms the *consumption credit* and is a characteristic phenomenon with the low income, small and marginal cultivators.

Joshi (1985), further elaborates that, credit is not only essential for agriculture but it is also imperative that it should be cheap and safe. In predominantly agricultural country like India, it is the duty of state to take precautions that agricultural credit should be accessible, cheap, safe and productive. It may not be necessarily by 'direct provision' but certainly by creating conditions in which a proper institutional system of agricultural

finance will have reasonable chances of success as a complete substitute for the exploitative system of private finance by the 'notorious money lenders' who still do dominate the scene of rural credit in most parts of the country.

Thus, it is a prerequisite that both the production and consumption credit be easily, cheaply and readily available, with minimum formalities and delays for the credit to form a good support system for the farmers. Various institutions in India have attempted to provide such credit so that there is reduced exploitation of farmers by moneylenders, if not eliminate such exploitation. In this direction GoI and RBI undertook various policy level measures and set up specific institutions to make formal credit available to the rural population and relieve them from the exploitative private credit sources.

Thus, given the above background on credit and agricultural activities, an attempt is made to broadly develop a framework illustrating the linkages of banking activities and agricultural activities, as seen in Fig. 2.1. The focus of the research on the expected role of ICT to foster agricultural development is also depicted in the figure.

It is observed that agricultural activities involve three major aspects. The first relates to the various variables and inputs that contribute to a remunerative agricultural production activity. These are good seeds & soil, appropriate amount of water, sunlight and climatic conditions, right type and appropriate application of fertilizers, agricultural credit, tools and equipment, among others. These have an overwhelming influence on the other two activities too. The second aspect relates to the process of agricultural production, wherein crops are grown and nurtured. The outcome of this activity are the crops and other unprocessed food products. The farmers production depends on fixed production assets, access to variable inputs and technology broadly defined. The access to these inputs in turn depends on precious tangible and intangible accumulations and access to gross credit. The final aspect deals with the activity of transportation and sales of the agricultural produce. The farmers' income depends on proceeds from sale of agricultural outputs (which depends on time of sale), non-agricultural income and wage income and net credit repayments.

To carry out all these activities, finance is very important. Most of the agriculturists are poor with very less savings and depend on the present crop to generate income to support them until the next crop. Added to this, is the effect of the climate, rainfall, pests etc. which may destroy their produce. This puts the farmers in a very

precarious position with no money, which forces him to totally depend on external borrowings to carry out any further activities. Thus, credit plays an important role in determining the farmer's production as well as income levels. It may be noted that the problem of agricultural finance is not only to meet credit requirements of the farmers on reasonable covenants, but it also involves setting up of an effective and efficient institutional structure, which would lead to an integrated development of the agriculture sector.

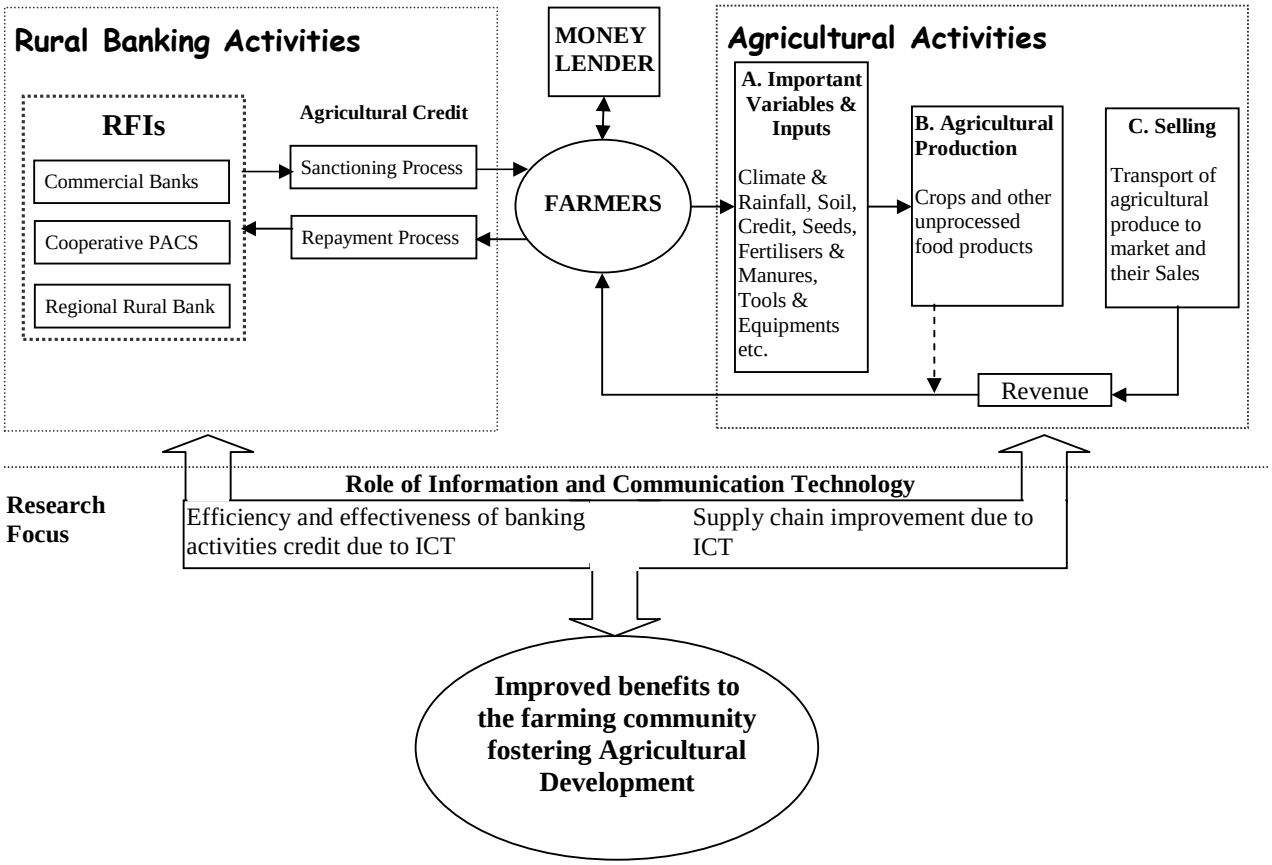

Fig. 2.1 Conceptual framework linking Agricultural activities, Banking activities and expected role of ICT leading to accelerated Agricultural Development

In that direction, Narasaiah and Venkatasulu (1999) discuss that there are two major sources of credit, institutional and non-institutional. The non-institutional sources consist of money lenders, traders, relatives and friends, landlords and others. While, the institutional sources are Commercial, Cooperative and Regional Rural Banks. To meet their credit needs, the farmers frequently approach the money lenders, although exploitative, due to the non-availability of alternative source of easy credit, quick grant, among others. However, after nationalisation of banks, multi-agency approach and priority

sector allocation by the GoI, there has been substantial penetration of institutional sources of credit thus increasing the access to institutional credit in rural India. Nevertheless, these institutions also have variety of problems associated with them. The credit sanctioning process involves often lengthy official formalities and submission of many supporting documents, slow sanctioning process etc. delaying the credit delivery (Rao and Malya, 1980). These form the rural banking activities shown in the figure.

It is expected that the ICT implementation in RFIs can address these problems by enabling improved decision making, speeding up the sanctioning process, increasing transparency, among others. It also needs to be explored how ICT can help enable an improved agricultural supply chain. This would have a catalytic effect on the agricultural sector as a whole fuelling its growth and development.

Information and Communications Technology (UNDP, 2001) are basically information-handling tools which consist of set of variety of goods, applications and services that are used to produce, store, process, distribute and exchange information. On the development aspects of ICTs, the study states that the ICTs potential lies in the ability to connect vast networks of individuals and organisations across globe at little cost. This has made ICTs the enablers of globalisation, facilitating world-wide flows of information, capital, idea, people and products. The study while mentioning about the G8 summit at Okinawa in July 2000, states that "….given the right enabling environment, ICTs can be leveraged by poor countries, communities and individuals to 'leap-frog' into a more empowered, equitable and prosperous future".

In that direction, the Vision 2010 (IBA, 2004) states that technology would be the key to the competitiveness of banking and finance system. Technology would make flow of information much faster, more accurate and enable quicker analysis of data received, which would result in efficient and faster decision making. It further states that this would also enable the development of appraisal and monitoring tools which would make credit management much more effective. This shall reduce transaction costs, and the benefits of which would be shared between the banks and customers.

The Computerized Database Management Systems and Management Information Systems can be particularly useful for effective and efficient decision making and management of agricultural credit, in terms of identifying the characteristics and credentials of borrowers and thus the deserving beneficiaries. Use of such ICT system

would facilitate streamlining and simplifying the banking procedures. As Milan (2000) the President of Enablesoft has stated, “Effective Data Mining Technology enables employees to be more efficient because it provides them the timely information to make informed decisions and empowers them to keep information systems up-to-date and relevant. Finding and implementing a Data Mining/Moving solution not only ease a bank’s operation expenses but it also will make it more competitive by helping staff ‘get the right things done’”.

The benefits of the use of ICT are quite well discussed by Wen and Sylla (1999) which reinforce the earlier cited benefits as listed below.

1. *Effort and Operating Process Performance*: The major benefits are that there is bound to be an increase in systems’ effectiveness and efficiency, cycle time reductions, head count reductions, reduction in communication time and related printing costs, increased income from product/service quality improvements, timeliness and accessibility of data, activity based on cost improvements, operating process improvements relative to industrial benchmark, transformation of data into information, distribution of information, transforming information into desired outcomes and growth without corresponding increase in overheads.
2. *Management Support*: Improves decision time and quality, improves communications, standardization, responds quickly to changes in laws, brings about better control, increased flexibility, compatibility with customers’ systems etc.
3. *Competitive Advantage*: Creates improved operating margins relative to competitors’, increased market share, differentiation in the new products and services, etc.
4. *Business Transformation*: Allows business process redesign, assisting business network redesign, facilitating flatter organizational structure, altering the organizations’ boundaries to allow new forms of cooperation such as teams and work groups without geographic restriction.

However, due to the difficulty in measuring these qualitative benefits of ICT implementation may result in under-funding their ICT budgets by employing cost-benefit method for budgeting. Though there are methods to evaluate the intangible benefits, they are subjective in nature and are heavily dependent on the opinions of experts and senior executives.

Thus, the above provides a useful insight on the potential role of ICT to enable an efficient and effective banking system in RFIs, for improved flow of agricultural credit to the deserving beneficiaries. Following the above discussion on the conceptual framework on agricultural activities, banking activities and the role of ICT, the empirical aspects of them are discussed in the next section.

2.3. Agricultural Activities, Rural Banking Activities and Role of ICT: An Empirical Analysis

Realising the importance of agriculture to Indian economy, the Government of India (GoI) has undertaken various policy level interventions to improve the agricultural situation, which are discussed in the next two sections. This is followed by discussion on the trends in agricultural credit in terms of the trends in total institutional and non-institutional credit, trends in the credit flow by various RFIs etc. and the problems in agricultural credit. Finally, the aspects of ICT management in RFIs for improved agricultural credit management are discussed, wherein the technology adoption trends and issues are analysed.

2.3.1. Role of Agriculture in Indian Economy

As seen in Table 2.1, agricultural growth rate has reached a peak in the year 1980-90, which was the period just after the Green Revolution, but since than it is showing a declining trend. The percentage share of agriculture to GDP is drastically reduced, from 45.8 percent in 1950-70 to 21.3 percent in 2000-2003, which is not a good sign for the economy. Such a trend cannot be neglected since India is an agricultural country providing livelihood to large percent of country's population - to almost 68 percent in 1951 which is presently a good 58 percent in 2004 (Planning Commission, 1952; 29 & 2004, pg. 170).

Table 2.1: Growth rates of Agriculture & GDP and Percentage Share of Agriculture in GDP

Period	Average Growth Rate of Agriculture	Average Growth rate of GDP	Average Percentage share of Agriculture to GDP
1950-70	2.7	3.8	45.8
1970-80	1.4	2.9	37.7
1980-90	4.7	5.8	33.1
1990-95	3.6	5.0	28.6
1995-2000	2.6	6.5	24.7
2000-2003	0.1	4.7	21.3

Source: 1. 1970-71 to 2003-04 (at 1993-94 base prices): http://www.rbi.org.in/sec7/56323.pdf, http://agricoop.nic.in/statatglance2004/EcoIndicator.pdf and Central Statistical Organisation.
2) 1961-62 to 1992-93 (at 1993-94 base prices): http://mospi.nic.in/rept%20_%20pubn/back_series/s05.pdf and CSO (accessed on 30/12/2004)

The Economic survey (2004), states that "Over the years, the agricultural sector has not received as much attention as other sectors in services and manufacturing." The GDP growth rate hence shows lesser fluctuations due to the increasing contribution of manufacturing and services. The growth in the national income, however, has largely been determined by the trends in agricultural production.

The empirical, policy and implementation of various agricultural development programme aspects during each of the 5 – year plans are discussed as follows.

The First Five Year Plan (Planning Commission, 1952) accorded top most priority to agriculture with an objective of getting substantial increase in the production of foodgrains and raw materials. Agricultural sector including irrigation received the highest priority with the allocation of 31 percent of total public sector outlay of Rs.1,960 crores. It states that, due to favourable weather conditions and the initiatives during the First plan, the food grain production targets were well achieved.

In the Second Five Year Plan (Planning Commission, 1956; 51-53) there has been a perceptible shift in priorities towards industrialisation, especially for the development of industry and the necessary ancillaries like transport. Agriculture including irrigation, thus received only 20 percent of the total outlay of Rs.4,600 crores. Though there was increase in food grain production to 80 million in 1960-61 as compared to 66 milllion in 1955-56, it was inadequate to the rising demand of growing population. Hence, Intensive Agriculture District Programme (IADP) was launched in selected districts to increase food grain production.

The First and Second plans (Planning Commission, 1957; 36) also worked towards reorganisation of the agrarian structure in terms of abolition of intermediaries, such as zamindars and jagirdars, protection and improvement of tenancy rights, imposition of ceilings on land holdings and encouraged consolidation of holdings**.**

The Third Five Year Plan (Planning Commission, 1961-1966: 304-305) shows increased attention to agriculture, with an outlay of about Rs.1280 crores as compared to Rs.667 crores in second plan, on production programmes in agriculture, including large and small irrigation schemes, soil conservation and cooperation. The approach adopted under IADP was extended to more areas under Intensive Agriculture Area Programme (IAAP). This was followed by High Yield Varieties (HYV) programme of using scientifically improved seeds. Agriculture development including irrigation received 21

percent of the total outlay of Rs. 8,600 crores. A number of new institutions like the National Seed Corporation, Food Corporation of India, Fertiliser Corporation of India, Agricultural Prices Commission and Agricultural Refinance and Development Corporation were established to provide support to farmers. However, due to severe drought in 1965 and 1966, agricultural production was adversely affected with the reduction of food grain and cotton production compared to the output of Second Plan.

There were three annual plans during 1966 to 1969, during which agricultural strategy based on technological innovations was adopted. The farmers adopted HVYs on large scale due to the provision of minimum support prices, easy availability of agricultural inputs such as fertilizer, pesticides and credit.

In the Fourth Five Year Plan (Planning Commission, 1970), an improved role of technology was envisaged for increasing the agricultural production. 23.3 percent of the total outlay of Rs. 15,780 crores of this plan was spent on agriculture and irrigation. The measures adopted for increasing the agricultural production were; expansion of irrigation facilities, increasing the supply of fertilizers, pesticides and improving credit, marketing etc. with focus on intensive cultivation. A Small Farmers Development Agency (SFDA) was setup to adopt improved agricultural technology by small farmers. The land reform measures were strengthened and new laws on land ceiling were introduced. Then, the surplus land too was distributed to the landless and marginal farmers. An important organisation called Command Area Development Authority (CADA) was setup in the command areas of major irrigation projects to improve the utilization of existing irrigation by land leveling, construction of field channels etc. In 1964-65, which was a year of favourable weather conditions, a record harvest was raised. However, agricultural production fell sharply in the subsequent two years due to widespread drought conditions. In 1967-68, however, a sharp recovery took place as a combined result of the establishment of new varieties of cereal seeds, the incentive of higher prices, increased use of fertilisers, pesticides and water and favourable weather conditions.

The Fifth Plan (Planning Commission, 1975), had two objectives, self-reliance in food production and removal of poverty. The measures undertaken to increase the agricultural production were to bring more area under HYV seeds, creation of additional irrigation potential and increase in fertilizer consumption, strengthening of agricultural extension and administration, and expansion in agricultural credit. Out of the total outlay

of Rs. 39,430 crores, 22.1 percent was spent on development, and agriculture and irrigation.

During the Fifth and Sixth Five Year Plans, Indian economy was hard hit by inflation, rise in petroleum prices, almost static price of raw materials, deteriorating balance of payments, other political and economic tensions and international confrontations.

Under these challenging circumstances, the strategy of the Sixth Plan was to simultaneously strengthen the infrastructure for both agriculture and industry. Out of the total public sector outlay of Rs. 97,500 crores, energy sector got the highest allocation of 28 percent followed by agriculture including irrigation and flood control with 25 percent of the total outlay. It states that there was increased agricultural production and productivity per hectare of land due to the increased irrigation potential, increased use of fertilisers and pesticides, better crop varieties and quality seeds, and higher levels of production technology for major cereals, cotton, sugarcane etc. Employment generation was given higher focus and in that direction Integrated Rural Development Programme (IRDP) was launched for families below the poverty line who would be assisted for economic upliftment through a package of activities. In 1979-80, however, there was a steep decline of food grain production to about 109 million tonnes due to severe drought experienced in the Kharif season.

The Seventh Plan (Planning Commission, 1985) focus has been to increase irrigation, use of fertilizers, attention to watershed management, research and extension, credit institutions, agriculture price policy, intensive soil and water conservation, reduce poverty, unemployment and regional disparities, among others. In the total plan outlay, energy again received the highest priority with 30.5 percent, while agriculture including irrigation and flood control received 22 percent of the resource allocation. The average level of annual production of food grains during the Seventh Plan was around 155 million tons compared to 138 millions tons in the Sixth Plan.

The Eighth Plan (Planning Commission, 1992-97: 4) states that agricultural output fluctuated from year-to-year due to weather. However, wherever there was availability of irrigation and power, agriculture has shown a remarkable performance in terms of its response to the high-yielding varieties, intensity and diversification. It states that in 1987-88, India witnessed a severe drought with food grain production plummeting to 140.35

million tons and with favourable weather conditions achieved 176.22 million tons in 1990-91. Energy received the highest allocation of 26.6 percent of the total public sector outlay followed by agriculture including irrigation and flood control with 22.2 percent. This plan envisaged the continuation of IRDP and Jowahar Rojgar Yojana (JRY). The Small Farmers Agri-business Consortium (SFAC) was set up to increase the employment opportunities and raise the income levels in rural areas.

The Ninth Plan (Planning Commission, 1997-2002: 97) observed that there has been a significant shortfall in public sector investment in agriculture in the Eighth Plan, which cannot be allowed if a growth rate of 4.5 percent has to be achieved. The Ninth Plan gave priority to agriculture and rural development to generate adequate productive employment and eradication of poverty, envisaged to accelerate the growth rate of economy, ensure food and nutritional security for all, empowerment of women and socially disadvantaged groups, promote and develop people's participatory institutions like Panchayat Raj institutions, cooperatives and self-help groups. Efforts will also be made to improve rural development programmes such as JRY, Indira Awas Yojana (IAY), Area Development Programmes of DPAP and DDP.

The National Agricultural Policy focuses on the optimal use of land, water and genetic resources in a sustainable manner. It includes leasing of land, consolidation of land, the use of 80 million hectares of marginal and waste lands and community lands for agro-forestry and improvement of rural marketing infrastructure. It also indicates the creation of cold storage and processing facilities close to production centers in rural areas.

2.3.2. Highlights of Role of Agricultural Credit and Policies

A brief description on various policies, committees and relevant institutional setup to develop and strengthen rural economy is provided below. The effect of these measures on agricultural banking in India is discussed in the next section.

Nilakantha (2002: 1323-1329) states that the legal framework for cooperatives as an institution was laid in 1904 based on Nicholson's report in the 1899 of the 19th century. Under this scheme, an official in every region was designated as the registrar of cooperative societies. An Agricultural Finance Sub-Committee of the Agricultural Policy Committee of the GOI was set up in 1944, chaired by D.R. Gadgil for post-war reconstruction plans. It stated that the increased credit needs of agriculturalists cannot be met by regulating but by encouraging the cooperatives. It recommended the creation of a

number of semi-State Agricultural State Credit Corporations. The genesis was that the exploitative and monopolistic moneylenders could be counteracted only by providing a competing source of credit for the creditworthy farmers. In the mean time, the Bombay Provincial Cooperative in 1948, under the leadership of its Managing Director, Vaikunthalal Mehta, reorganized its entire cooperative structure from the primary to the apex level. And so were the methods of assessment of credit need, advancing of loan to recovery of loans from credit worthy farmers in a manner that would facilitate a planned expansion of rural credit.

During the First Five Year Plan, RBI which has special responsibility related to rural credit, initiated the Rural Credit Survey under a Committee of Direction consisting of A.D. Gorwala as its Chairman. The committee rejected the recommendation of the earlier Agricultural Sub-Committee of 1945 and recommended that the pattern of reorganized cooperative societies like that of Bombay Provincial Cooperative Bank be adopted. The three-tier cooperative structure, with the primary credit (or multipurpose) society at the village level, the central cooperative bank at the district level and the provincial or state cooperative bank at the apex level was suggested for universal application.

The RBI was to provide the short-term production credit to this three-tier system. Long and medium-term finance would be provided by the Land Development Banks following the same three-tier system. The loans were to be assessed on the basis of production performance and not on the basis of security of fixed assets like land. The loans were to be distributed during the Kharif and Rabi seasons with the recovery being scheduled within a relatively short period after the post-harvest marketing season began. Postponement of repayment due to poor harvest caused by adverse weather or widespread pest attacks was also provided for. Moreover, the committee also recommended the creation of central fund for writing off difficult loans due to prolonged crop failure. Since the implementation of the recommendations of the Rural Credit Survey Committee, there was a significant growth in agricultural production due to the inflow of production credit through this reorganized cooperative credit structure.

However, only cooperative institution per se was not able to cover the large Indian rural population. The assessment of the performance of cooperatives by the All India Rural Credit Survey Committee (RBI, 1954) brought out that the volume of credit supplied by the cooperative movement was insignificant. It was felt that Commercial Banks (CBs) also need to take active part in rural credit market. Its recommendation led to

the conversion of 'Imperial Bank' into the State Bank of India (SBI), the setting up of National Cooperative Development Corporation, National and State Warehousing Corporation, National Cooperative Development Corporation and cooperative training institutions. In 1963, the Agricultural Refinance Corporation was established to provide refinancing facilities to land development banks and commercial banks for the financing schemes of agricultural development. Due to these, there has been significant increase in the use of agricultural inputs and volume of cooperative credit. (Planning Commission, 1970; 114)

Thus, SBI was formed on 1st July 1955 by taking over the entire assets and liabilities of the Imperial Bank of India. In the beginning 8 banks viz. State Bank of Saurashtra, State Bank of Patiala, State Bank of Bikaneer, State Bank of Jaipur, State Bank of Indore, State Bank of Mysore, State Bank of Hyderabad and the State Bank of Travancore were associated with the SBI. But, due to the amalgamation of State Bank of Bikaneer and State Bank of Jaipur on January 1, 1963 as State Bank of Bikaneer and Jaipur, the SBI associates reduced to seven. 14 major commercial banks viz. Allahabad Bank Ltd, Bank of Baroda Ltd, Bank of India Ltd, Bank of Maharashtra Ltd, Canara Bank Ltd, Central Bank Ltd, Dena Bank Ltd, Indian Bank Ltd, Indian Overseas Bank Ltd, Punjab National Bank Ltd, Syndicate Bank Ltd, Union Bank of India Ltd, United Bank of India Ltd. and United Commercial Bank Ltd. were nationalized on July 19th 1969. On April 15, 1980, six more banks viz. Andhra Bank Ltd, Punjab and Sindh Bank Ltd, New Bank of India Ltd, Vijay Bank Ltd, Corporation Bank Ltd and the Oriential Bank of Commerce Ltd were included in the list of nationalised banks.

The All India Rural Credit Review Committee (RBI, 1969) observed that there were weaknesses in the cooperatives and they are not geared to the growing demand of agricultural sector. The committee therefore, recommended a significantly enlarged role for commercial banks. This resulted in the nationalization of major commercial banks in 1969, as has been mentioned earlier.

Thus, the nationalization of SBI in 1955, 'social control' of banks in 1968 and the nationalization of 14 major banks in 1969 and 6 banks in 1980 were the major steps taken by GOI and RBI, to improve the availability and accessibility of finance for rural population. Lead Bank Scheme was also introduced in 1969.

Joshi (1985: 75-95) provides another important perspective that earlier to the policy of 'social control' and 'nationalization', the commercial banks were being controlled by large industrial houses as could be inferred from the pattern of ownership, organizational setup of commercial banks and the high proportion of short-term finance being provided to trade and well established industries. As a result, there was mass misuse of public deposits for private profits and total neglect of investment in rural and priority sectors like agriculture and small scale industries.

It was in this background that the policy of 'social control' of the CBs came to be introduced in 1967. Under the policy of 'social control' the National Credit Council was setup in February 1963, with the objective of maximizing the use of financial resources while determining and providing for various priority sectors of the economy viz. agriculture, small scale industries, self-employment persons, artisans etc. Ahmad (1998: 1) also reiterates that with the intention of saving the weaker sections of the rural society from the clutches of the private moneylenders, the GOI nationalized 14 major commercial banks in 1969. It was expected that these banks would spread their branches in rural areas to disburse loans to rural masses for agricultural development and other allied activities.

Similarly, Ammannaya (1979) states that prior to the nationalization of the major banks, the banks were lending more to persons in whom the bank directors were interested. But since then, banks' lending has undergone a tremendous change particularly regarding to the attitude in lending. Lending by them is no longer restricted to one area where the bank is located. There is shift of the centre of gravity of banking development from the urban to the rural area and deficit state. The shift was in favour of priority sectors like agriculture and allied activities, small-scale industries, exports etc. The application of the concept of performance budgeting to the commercial banking and linkage between bank credit planning and development plans are some of the important reforms of the recent times.

Pandey (1968: 80) explains that presently the banks' major responsibilities are to mobilize the rural and urban savings from the small pockets of the people and divert these into productive outlets. If the loans of banks are not channellised in proper directions, they will not only adversely affect the economic activities in the country but would also endanger the safety of deposits and existence of banks themselves. Hence, RBI directed the scheduled commercial banks to achieve a target, to deploy 60 percent of the deposits mobilized by them from the rural areas into productive activities in these areas itself. The

scheduled commercial banks should also ensure that not less than one-third of the total outstanding credit should be lent to the priority sector by March 1979. The James Raj Report of the Committee on the Functioning of the Public Sector Banks (RBI, 1978) stressed that the banks should be asked to aim at a higher target of 40 percent lending to the priority sectors in the next 3 year.

The government then decided to divert the banking trend towards rapid branch expansion with a rural bias, preferential financing to the priority sectors and accepting the challenges in promoting economic growth through the banking industry.

In that direction, Ahmad (1998) states that the banking commission appointed in 1969, headed by Khusro A.M., submitted its report in 1972, which indicated doubts on the capabilities of commercial banks for extending banking facilities to rural areas in the near future. Hence, the establishment of a new class of rural banks was suggested in two alternative ways i.e. (i) some selected viable PACS could be converted into rural cooperative banks and (ii) by establishing subsidiaries of commercial banks in rural areas or by organizing PACS as subsidiary of commercial banks. The recommendation of the commission, however, couldn't be implemented by the GOI until 1975 when Prime Minister Mrs. Indira Gandhi announced a 20-point economic programme which included a point related to the issue of rural indebtness. Later, the government with an intention to obtain suggestions for providing institutional credit to landless labourers, rural artisans, small and marginal farmers appointed a working committee under the chairmanship of Narasimham M. in July 1975. The committee suggested the setting up of RRBs with the main objective of spreading the banking facilities in rural areas so as to provide institutional credit to the weaker sections of rural society.

Thus, RRBs are envisaged to be rural oriented commercial banks which would blend the rural touch, local feel with the rural problems and low cost profile which cooperative possessed. The role of this new institution would be to supplement and not supplant the existing financial institutions in the area. It is an attempt to hybridise commercial banking culture with the rural ethos. RRBs would cover primarily the small and marginal farmers, landless labourers, rural artisans, small traders and other weaker sections of rural society for their productive credit needs and to a limited extent the consumption credit needs.

In 1989, the Khusro Agricultural Credit Review Committee (RBI, 1989 a) recommended the merging of RRBs into the sponsor commercial banks in view of their intrinsic weakness and built-in non-viability and creation of national cooperative bank. It also suggested that concessional interest rates should be applied only to small and marginal farmers and for other farmers stepped upto a maximum of 15.5 percent.

The Sivaraman Committee to Review Arrangements for Institutional Credit for Agriculture and Rural Development – CRAFICARD (RBI, 1981) stated that there had been increased flow of credit. On its recommendation NABARD was formed in July 1982 by separating Agriculture Credit Department from the RBI and merging it with Agricultural Refinance and Development Corporation.

The Narasimham Committee (RBI, 1997) states that there is need to redefine the concept of 'Priority Sector Advances'. As part of the banking sector reforms, it recommended that the overall target to the priority sector advances should be reduced to the level of 10 percent from the 40 percent. The Committee reasons that due to various reasons such as inadequate development of infrastructure, poor credit discipline and weak delivery system, the sub targets fixation has not helped to increase the credit flow to agriculture significantly. However, no decision has been taken on this. The Committee also suggested for a redefinition of the priority sector to include small and marginal farmers, tiny industry, small business, cottage industry, rural artisans and other weaker sections, and refixation of credit target for this group at 10 percent of aggregate bank credit. It further recommended a review at the end of three years to see if the directed credit programme as well as the concessional interest rate to the redefined priority sector can be eliminated eventually.

The Report of the Expert Committee on Rural Credit (NABARD, 2001) recommended that the interest rates of Rural Infrastructure Fund need to be cut upto the level just enough to cover the interest cost of deposits, so that it would be an incentive for commercial banks to lend to agriculture. RBI should make the Service Area Monitoring Information System statutory for all banks and the short-term and long-term credit need to be brought under Kisan Credit Card. The committee encourages microfinance through SHGs, stresses the need to improve recovery of loans thereby helping credit institutions enhance the flow of credit, stresses the urgent need for improvements in internal controls and housekeeping in cooperative banks and RRBs, among others.

2.3.3. Trends in Agricultural Credit

The Indian banking system is introduced followed by discussion on the trends in total institutional and non-institutional credit in section **2.3.3.1.** This section also discusses the trends in the ground level credit flow from various RFIs. This is followed by discussion on the problems in agricultural credit in section **2.3.3.2.**

2.3.3.1. Banking in India and Total Institutional & Non-institutional Credit

In India, accepting deposits of money from the public and lending or investing the deposits have been assumed as two major functions of a commercial bank, as per the Banking Regulation Act, 1949. The banks in India are classified into scheduled and non-scheduled banks. The scheduled banks are classified as scheduled commercial banks and scheduled cooperative banks, and RBI is the apex governing body. The banks included in the 'second schedule' of the RBI Act 1934 are known as scheduled commercial banks. Banks which a) have paid-up capital and reserve of not less than Rs.5 lakhs, b) are either State Cooperative banks or cooperatives or companies incorporated by or under any law in force in any place outside India or institution notified by the central government in this behalf, and c) satisfy RBI that their efforts are not being conducted in a manner detrimental to the interests of their depositors, are eligible for inclusion in the second schedule of the RBI Act, 1934. Banks not falling under these categories are termed as non-scheduled banks.

Further, the minimum demand and time liabilities that a cooperative bank should have, to qualify for inclusion in second schedule has been enhanced to Rs.250 crore from Rs.100 crore through the GOI notification dated October 30, 2003. Thus, there are 55 scheduled Urban Cooperative Banks (UCBs) by the end of March 2004 (RBI, 2004: 100), and there are 16 scheduled State Co-operative Banks as on March 31, 2003 (Indian Banks Association, 2004). It may also be noted that under the Banking Regulation Act, 1949 only Urban Cooperative Banks, State Cooperative Banks and Central Cooperative Banks are qualified to be called as banks in the cooperative sector (RBI, 2004).

The structure of Indian banking system is depicted in Fig. 2.2.

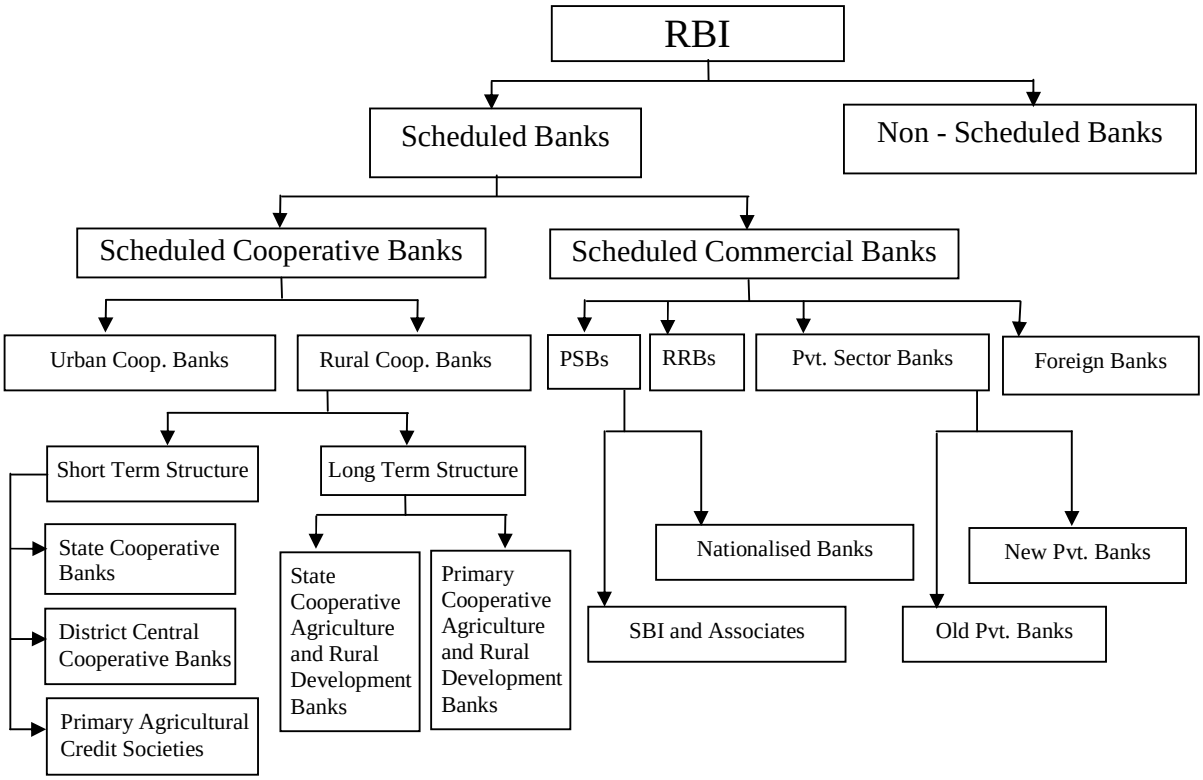

Fig. 2.2 Indian Banking System

***Source*:** RBI, 2004 and Indian Bank Association, 2004

As of March 31, 2003, the Public sector banks are 27 in total, with SBI and its 7 subsidiary banks, 14 major commercial banks nationalized on July 19, 1969 and six commercial banks nationalised on April 15, 1980 (later two banks merged and so total to 19). The RRBs which were established in 1975 form a total of 196 banks. The private sector banks form a total of 30, with Old private sector banks 21 and New private sector banks 9. The Foreign banks in India total to 36 (Indian Banks Association, 2004).

Before the nationalization of banks and the multi-agency approach followed by the banks, during 1951-52, the informal sources of finance formed almost 89.4 percent of the total sources while the formal sources were just 7.3 percent, as seen in Table 2.2.

Table 2.2: Sources of Agricultural Credit *(Percent)*

S.no.	Source	1951-1952	1960-1961	1994-1995
1	Money lender	69.7	49.2	7
2	Trader	5.5	8.8	5
3	Relatives	14.2	8.8	3
4	Co-operatives	3.1	15.5	34
5	Government	3.3	2.6	5
6	Commercial and RRBs	0.9	0.9	35
7	Others	3.3	14.2	11
		100	100	100

Source: Mathur B.L., (2001), "Institutional Agricultural Finance - Some Issues Analysed", *Agricultural Situation in India,* Publication Division, Directorate of Economics and Statistics, Dept. of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India, September, pp.271-277.

As discussed earlier, to reduce the exploitation of the farmers by the informal agencies, the government nationalised banks in 1969 and 1980, set up RRBs in 1975 and introduced multi-agency approach. In effect, the sources of credit almost showed a reversal in their share of the total credit. In 1994 - 1995 it is thus, observed that the share of informal sources of credit has declined to 15 percent, while that of formal institutions has increased to about 74 percent.

As seen in Table 2.3, the average of the total loan issued during the period 1970-80 by all agencies was Rs. 1687 crores, which has risen substantially to an average of Rs. 39,977.6 crores in 2000-02. It can also be observed that cooperatives societies were already working in rural areas and have contributed almost an average of Rs. 1,189 crores in the period 1970-80, while commercial banks and RRBs just started out in rural areas after their nationalization in 1969 and RRBs being setup in 1975 have issued loans only to an average of Rs. 461.6 crores.

Table 2.3: Direct Institutional Credit for Agriculture and Allied Activities – Total (short-term and long-term) *(Rs. Crores)*

Year Period	Loans issued (avg. for the period)				Loans outstanding (avg. for the period)			
	Cooperatives	SCBs	RRBs	**Total**	Cooperatives	SCBs	RRBs	**Total**
1970-80	1189.0	420.6	41	**1687.0**	2559	995	168	**3572**
1980-90	3568.2	2598.5	377	**6757.9**	6912.5	7993.8	867.7	**15773.9**
1990-95	7091.8	5449.8	692.7	**13608.2**	13720.3	18466.7	2302.4	**33355.6**
1995-2000	14222.0	12499.8	2146.4	**29472.2**	21289.2	28292.1	4713.5	**54294.7**
2000-2002	17718.5	17538.6	4256.0	**39977.6**	24779.0	41688.0	7767.5	**74234.7**

***Source*:** RBI (2004), "Handbook of Statistics on The Indian Economy", Table 52.

Later, the commercial banks have shown high involvement in rural areas wherein their average loans in addition to that of RRBs, for the year period of 2000-02 were to the tune of Rs. 21,794.6 crores. Whereas, the cooperatives were trailing with an average for the same period with Rs. 17,718.5 crores.

The increased role can also be noted in Table 2.4, which shows the network of ground level credit flow from RFIs, as of 2000. The number of PACs are 92,000 and branches of SCARDBs and PCARDBS total to 1,908. The rural and semi-urban branches of scheduled commercial banks are to the tune of 32,962 branches and the branches of RRBs are 14,485.

Table 2.4: Network of Ground Level Credit Flow from Important RFIs

Rural Financial Institutions		No. of banks	No. of branches	Ground Level Credit *(Rs. crores)*		
				1997-98	**1998-99**	**1999-2000 (P)**
I. Cooperative						
Short-term						
	StCBs	29	832	10,895	12,571	14,648
	DCCBs	367	12,407			
	PACs	92,000	92,000#			
Long-term						
	SCARDBs	19	1,219	3,190	3,386	3,781
	PCARDBs	755	689			
II. Scheduled Commercial Banks		59	32,962*	15,831	18,443	22,854
III. Regional Rural Banks		196	14,485	2,040	2,460	3,329
Total			**1,54,594**	**31,956**	**36,860**	**44,612**

StCBs – State Cooperative Bank

Not available

* Rural and Semi-urban

(P) Provisional

Source: Report of the Expert Committee on Rural Credit, NABARD, 2001, pg.3

This huge banking infrastructure in rural India is trying to help the rural population to receive better institutional financial support. This has indeed helped the rural population in carrying out improved agricultural activities and reduced the dependence on informal financial sources, as seen earlier in Table 2.2.

The Report of the Expert Committee on Rural Credit (NABARD, 2001; 2-4) states that banks were to open more branches in rural areas, and a large expansion programme resulted in reducing the average population per bank from 65,000 in 1969 to 17,000 in 1980. As on 2000, a branch of scheduled commercial bank serves the population of 15,000 on an average, which falls to just 4,700 in rural areas if credit cooperatives are included.

All the information mentioned above clearly indicates the massive penetration of formal institutions in rural India over a period of time, since their nationalization. However, it needs to be noted that though there has been increased involvement of formal institutions in rural credit and increase in funding in absolute terms, there has been a decreasing trend in the agriculture sector credit as a percent of Net Bank Credit. As seen in Table 2.5, there has been a decrease from 12.5 percent in March 1995 to 11.1 percent in March 2000.

TABLE 2.5: Sectoral Deployment of Gross Bank Credit by Major Sectors

Rs. Crores

Sectors	Outstanding as on					
	March 31st 1995	March 29th 1996	March 28th 1997	March 27th 1998	March 26th 1999	March 24th 2000
Gross Bank Credit	196, 185	231, 860	258, 991	300, 283	342, 012	400, 818
Agriculture	23, 983	27, 044	31, 442	34, 869	39, 634	44, 381
Agricultural Sector credit as a % of Net Bank Credit	12.5	11.9	12.8	11.7	11.7	11.1

Source: derived from A – 1.2, T-1.2

Agriculture being a livelihood to majority of Indian population and given the variety of challenges they face, even 1 percent decrease can make a huge impact on their lives. As discussed earlier, there has been substantial impact of agricultural performance on the performance of Indian economy as a whole.

2.3.3.2. Problems in Agricultural Credit

The RFIs are fraught with several problems, in which the poor loan recovery tops the list of the problems in ensuring the long term viability of their lending operations (Narayana, 1992: A122-A127). The study states that wilful defaults which are on the rise need to be drastically curbed.

Krishna (2001) observes that there is tremendous increase in the loans outstanding and overdues, "…the loans outstanding have increased by 9759.30 times in State Cooperatives Banks (SCBs) from 1951-52 to 1997-98, while in the case of District Central Cooperative Banks (DCCBs) they have increased by 821.02 times in the period mentioned above and in the case of Primary Agricultural Cooperative Societies (PACS) loans outstanding have jumped by 387.52 times from 1951-52 to 1994-95. Overdues increased by 380 times in SCBs from 1951-52 to 1997-98, in DCCBs they hiked by 1018.80 times in the same period and in the case of PACS they increased 402.88 times from 1951-52 to 1994-95 in India". Similar problem is observed in loans outstanding and overdues in commercial banks and RRBs. The percentage of overdues in relation to demand was as high as 41 percent in cooperatives, 51 percent in RRBs and 43 percent in commercial banks (Kahlan, 1991: 243 - 246).

Apart from the problems of loans outstanding and overdues, Rao and Malya (1980) and Patel (1989) in their research found that the bankers complain that they lack sufficient empowerment for advancement and recovery of credit, lack control over the utilization of credit advanced, inability to curb farmers attempting to get credit from two or more financial institutions due to lack of relevant information and the tendency to merely fulfill

the credit advancement targets within stipulated time as per their head office rather than identifying and helping the right beneficiaries.

Still other loop holes in rural financing have been elaborated by Rao and Bala (1993: 220) in their research. They explain that the bankers don't always identify the deserving beneficiaries due to political pressures, emphasis only on meeting credit advancement targets, dominance of a few influential farmers over a large share of agricultural credit etc.

On the other hand, the farmers also experience hardships while dealing with financial institutions. Rao and Malya (1980) and Shekar (1997), in their research, reveal that the farmers' stress on the reduction of interest rates and being practicable on insisting for repayment within the stipulated time. They point out the need for the standardisation and simplification of official procedures, need for reduction in administrative and managerial inefficiencies and delays in banks due to which they need to frequent bank offices taking valuable time off their farming activities.

A study conducted by Ministry of Agricultural – GOI (www.agricoop.nic.in/study8.htm), entitled 'Recovery Performance of Institutional Farm Credit in Rajasthan and Andhra Pradesh', with 1993-94 as reference year, states that the recovery position among all the formal credit institutions has averaged to almost 50 percent and is seriously threatening the basic viability of these institutions. They find that priority is given to repay the loan of private moneylenders compared to public institutions, due to constant pressure and their exorbitant rate of interest which they cannot afford to prolong. Moreover, if not paid in cash they need to pay in kind during harvest.

The reasons identified for default in repayment in Rajasthan are; low cultivation income due to uneven and low rainfall during that year, lax supervision by bank employees, unproductive asset creation using the loan, diversion of loan for other purposes, inconvenient loan repayment schedule, inadequacy of availed loan, which prompts them to use it for other purposes and income diverted to repay debt from other agencies.

The problems faced by institutions in recovering the loans in Andhra Pradesh identified are; lack of adequate field staff for follow-up supervision, while the existing filed staff are heavily burdened since they have to cover large number of villages for loan recovery programme, unwillingness of staff to go to rural areas due to lack of adequate educational and medical facilities, existing staff in rural areas lacking motivation to serve

these areas, interference of local politicians in the working of cooperatives, frequent crop failures due to which the income is not sufficient to repay the loan and priority given to the repayment of private loans has also affected the repayments to the RFIs. It also states that the absence of any statutory powers in banks to induce prompt repayment is hampering the recovery performance. “Statutes like the ‘Revenue Recovery Act’ which empowered the co-operatives to recover the loans would have gone a long way in improving the recovery performance of banks”.

Various committees and researchers studied the above problems and suggested various means for the improvement of the situation. However, these problems still persist. Increased rural deposits need to be mobilized if the motivation of the rural banking staffs is to be further improved, and the rural banking infrastructure needs to be defined in a wider sense, if plan targets for agriculture and rural development are to be ensured. Shivamaggi (1997) states that, target-wise approach and quantitative approach has brought about an unprecedented expansion of branch banking, but he questions the quality, efficiency and effectiveness of this spread. The banking infrastructure is also presently measured narrowly as number of branches explained in terms of a simple arithmetic average of population per branch, number of villages per branch, etc.

The study states that full-fledged banking infrastructure for the rural sector would include adequate premises for the branches with appropriate equipment for adopting new technology for modern banking in big rural and semi-urban branches, strong rooms, godowns, transport to ensure mobility of staff to serve the villages within its jurisdiction, residential quarters for the branch staff, training for banking and supporting technical staff with prospects of climbing the carrier ladder of promotion comparable to that available to other staff. It becomes desirable to ensure competitive banking for the rural areas so that farmers will have a choice of alternative banking channels and low-cost, efficient and flexible services. In fact, this was the main scenario envisaged while following the ‘multi-agency’ approach in banking. However, this approach till now meant the presence of many banks in the same area without any competition in the real sense except one bank snatching away from another bank good and big borrower.

These are the plethora of issues/problems that the rural financial institutions are confronted with. Of all these, we would now focus on the computerization of rural banks so that some issues like the efficiency and effectiveness of disbursement of agricultural credit to the deserving beneficiary, recovery performance etc. could be addressed.

The Report of the Expert Committee on Rural Credit (NABARD, 2001; 4) identifies certain areas of concern. It states that RFIs are not able to reach a large number of rural poor, are inadequate to support hi-tech, high value agriculture in an era of globalisation, lack desired linkages with supportive systems etc., for example; research, extension, input supply, processing and marketing have not been developed, financial and organisational strength of a large number of RFIs have weakened and the legal and regulatory mechanism are inadequate.

The below are the summary of the problems discussed;

- Poor recovery and inadequate follow-up supervision for repayment
- Crop failures
- Political interference in banking activities, especially in cooperatives
- Lack of sufficient empowerment of bank staff for advancement and recovery of credit
- Lack of control on over the utilisation of credit advanced
- Multi-financing
- Lack of identification of deserving beneficiaries and dominance of few influential farmers
- Administrative and managerial inefficiencies with no standard and simple banking procedures
- Lack of required infrastructure such as godowns, power, roads, transportation etc.

2.4. ICT in Agricultural Credit and Management of Rural Financial Institutions

It may be reiterated that ICT is not a panacea for all problems. ICT is rather a resource, that needs to be managed and appropriately leveraged for increased productivity, quicker decisions and better customer service (RBI, 2000 b: 1). I that direction, Section 2.4.1 discusses the aspects of ICT for better management of RFI leading to improved organisational efficiency and thus better agricultural credit management and ICT trends in banking industry. This is followed by the issues of ICT in Indian banking system and RFIs in Section 2.4.2.

2.4.1. Trends in Management of ICT in RFIs

When discussed on a strategic and national level, President of India Abdul Kalam and Rajan (1998) state that technology, if deployed in the right direction, is the highest wealth generator in the shortest possible period. It strengthens the political, economic and security structure of the nation. They further state that technology can help transform

multiple areas such as education and training, agriculture and food processing, strategic industries and infrastructure in various fields.

Implementation and management of ICT in banks to handle their huge data and appropriate application in all other banking activities has improved their efficiency and enabled them to provide improved service. There will be much faster on-line access to relevant information for decision-making, monitoring, evaluation of operations and transactions. The use of ICT in banks by developed nations, and foreign banks and private banks in India like HDFC, ICICI, HSBC etc. have facilitated them to extend improved and good quality services to their customers at competitive and profitable rates. In fact, many Public Sector Banks (PSBs) are speedily implementing ICT to better compete and sustain themselves in the market.

Many innovations and developments in ICTs have changed and/or improved the organizational structure and processes. Some prominent ICT applications in bank businesses are; Electronic Payment Systems, Expert Systems, Artificial Intelligence Programs, Virtual Terminals etc. Indian Financial Network (INFINET) managed by Institute for Development and Research in Banking Technology (IDRBT) would form a reliable communication backbone linking banks and financial institutions to improve decision making process and responsiveness (Padwal, 2000). As per the Report of the Committee on Technology Upgradation in the Banking Sector (RBI, 1999) Data Warehousing and Data Mining Systems should be developed and adopted.

Muhammad (2002) states that MIS acts as a supportive and decision making factor for all levels of management i.e. frontline management, middle management and top management, by providing routine reports of different branches, departments/divisions of the bank. Data of these reports are generally derived from the transaction processing system at the operational level to meet the need for information, as depicted in Fig. 2.3.

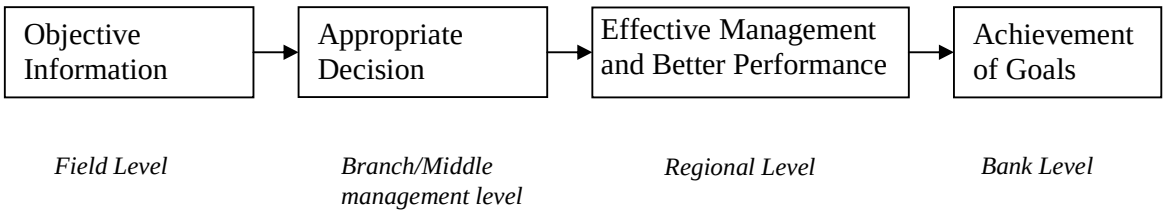

Fig. 2.3 MIS – Flow of information in banking organisation

MIS can aid proper bank management through assembling, analysing, monitoring and managing the items to meet the bank's commitments towards the stake

holders'/customers of the bank, and also to assess its' competitors' activities and strategies so that the bank management can take realistic decisions and achieve its objectives. MIS may be computer based for the economy of cost, speedy flow of information, timely, accurate and for quick decision-making. This can be achieved within banks having good applications and networks of personal computers that are linked to one-another.

The study proposes that an integrated MIS is needed for banking sector in Bangladesh because MIS not only helps the internal management of the bank, but also assists the Ministry of Finance, Bank of Bangladesh, government and private organizations, NGOs, inter-bank transactions, donor agencies etc. MIS can also be used to analyse the psychology of the value customers. The study indicates that MIS in a bank can handle the functions such as formulating the banking business policy, interpreting the banking business policy and implementing the banking business policy.

Computer aids the method of processing and analyzing data and can also provide information in a manner that enhances decision making. The study states that MIS can create an opportunity for lowering of expenditure by making available higher quality and more relevant information regarding customer and business prospects. On the basis of the information, top level management can play a significant role in the efficient management of financial products. The study emphasizes that the fundamental objective of the MIS is to sustain unilateral control over the decision making process, while properly utilizing the existing manpower to adopt changes. MIS can motivate bank personnel to render better services to the banks internally and customers externally.

Padwal (1999-2000) states that the management would need to have databases of costing and pricing of various services and products offered in different market segments on one hand and preferences of customers provided by the marketing information system on the other, to plan and monitor the profitability function of the bank. On ability to profit and enhance productivity with cost reduction, the study states that IT should be applied in crucial functional areas such as, a) Credit management – private sector has been able to provide quick delivery of credit with attractive interest rates vis-à-vis public sector banks, due to IT. IT is used for quick disposal of credit proposals of customers, better identification of "good" customers and for better recovery management, b) Asset Liability Management (ALM) - in the market-driven business, ALM is very important for interest rate sensitive banks, since IT has given easy access for assessing options and helping the investors make the optimum choice, c) International, forex and NRI deposit business –

which need effective and secured telecommunication network, d) Investment Portfolio management - which uses computerised modelling management, e) Non-fund based services - such as EFTs, credit cards etc. which are based on IT-based innovations in products and service, and f) New Portfolios – Software venture capital financing, financing software exports etc. which need latest information system, among others. The study also very clearly states, "IT products and services have ensured the development of MIS/DSS/EIS for improved managerial effectiveness, efficiency and productivity leading to better profitability".

These being the benefits, it is apt to analyse and understand the Return on Investment (ROI) and Cost-Benefit Analysis for implementation and use of ICT in banks.

Bhanu (2001: 281-288) states that banking, being a service-oriented industry, is characterized mostly by a series of intangible activities to offer better financial products and customer service. And so are the payoffs from investment in ICT, which have a high content of intangibles, and are generally long term and strategic in nature. The work on ICT investment payoff to a large extent is an attempt to put a value on the benefits from the ICT, though these values are not always expressed in monetary terms. Lot of ICT benefits like innovation and coordination is strategic in nature and a firm's success is a function of its information and use of ICT.

However, it is difficult to justify the expenditure on ICT systems. ROI in other traditional assets can be measured by hard and quantifiable rupee benefits that will appear on the firms' income statement. But for measuring investments in ICT the focus shifts to measuring indirect, diffuse, qualitative and the contingent impacts that are difficult to quantify. The reason for this is the characteristic of the ICT itself. The study states that implementation of ICT and benefits accruing from it are a continuous process, where the end results are not apparent at earlier stages, and the way the system takes shape is often different from what was anticipated.

Muhammad (2002) describes four different methods to evaluate the benefits of ICT investment.

1. *Multi-Objective, Multi-Criteria:* Here the general measure of utility, which is defined as the satisfaction of individual's preferences is employed. Preference weights are applied to rank each of the goals for which they are satisfied and which is/are closest to their desired outcome.

2. *Value Analysis:* This method emphasises values rather than cost as it assumes that most successful innovations are based on enhancing value added rather than on cost savings.
3. *Critical Success Factor:* It tries to explore the factors which in the opinion of the executives are critical to the success of the business and in particular, the factors that are important for the functions and the activities for which the executives are responsible. These factors are ranked in terms of the levels of importance. It involves comprehensive interviews of key managers to obtain their views about business mission, objectives and current problems. After the interviews, the managers' opinion are cross-tabulated, compared and agreement about system investment priorities emerged.
4. *The User Satisfaction Method:* This method measures the extent to which the users believe the information system available to them meets their information requirements. The decision to install an information system necessitates a choice of mechanisms to determine whether it is needed, and once implemented, whether it is functioning properly.

Bhanu (2001) very aptly states that the problem of capturing intangible benefits from ICT could be tackled to some extent by proper definition of benefits and development of proper unit-of-measure.

The Report on Trends and Progress of Banking in India (RBI, 2000 a: 34) states that "IT has wide ramifications for an entire gamut of issues concerning the banking sector…The switchover from manual operations to reliable and time-saving operations has to be rendered possible through appropriate application of IT…And all this is expected to give rise to efficiency advantage over a period of time and to act as a driving force for gradually reducing the digital divide between the rural and urban segments of the society."

The Rangarajan's Committee I and II on Computerization and Mechanization of Banks in 1983 and 1989 (RBI, 1983 & 1989) emphasized that computerization is a must for Indian banks and needed to be introduced at branch, regional, zonal and HO levels. Apart from that, the use of BANKNET – 1991 was also recommended for several intra-bank and inter-bank applications like fund transfer, credit and authentication. The use of cash dispensers, ATM at strategic locations like airport & railway stations was also recommended. The Narasimham Committee (RBI, 1991) also endorsed the views of Rangarajan Committee that there was an urgent need for a greater use of computerised systems in Indian banks. Computerisation is an indispensable tool for the improvement of customer services, and it is an essential requirement for banks to function effectively and profitably in increasingly complex and competitive environment.

However, it would be interesting to note that the World Bank Review Team during its visit in February 2001 had observed that the computerisation efforts of the public banks had largely gone into house keeping areas like book-keeping and reconciliation. The computerisation aspects was mostly focussed on hardware installation and not fully reflected in productivity. It was observed that there was lack of integration of the public banks IT strategy to their business strategies and hence recommended that RBI take a lead role to integrate them (RBI, 2003).

Gulati (2001) very lucidly tabulates the various important committees in the area of banking technology, highlighting the focus area of each of them, as shown in Table 2.6.

Table 2.6: Important Committees in the area of Banking Technology in India

Sl. no.	Year	Name of Committee	Focus Area
1	1985	Rangarajan Committee (I)	Customer service and developed two models of branch automation which were implemented
2	1988	Rangarajan Committee (II)	Detailed plan for computerisation of banks and also extend automation to areas like e-mail, funds transfer, BANKNET, SWIFT, ATMs etc.
3	1982	Damle Committee	MICR/OCR technology introduced for cheque processing
4	1987	Committee on communication network for banks and SWIFT implementation	Setting up packet switching network, BANKNET and implementation of SWIFT
5	1994	Committee on technology issues relating to Payment system, cheque clearing and securities settlement in the Banking Industry	Introduction of MICR clearing at all centers, establishment of EFT with BANKNET communications network as its carrier, etc.
6	1995	Committee proposing legislation on EFT and other electronic payments	Felt the need for new regulation for regulating, defining and determining the rights and obligations of the EFT.
7	1994	Saraf Committee	Introduction of MICR clearing at all centers with more than 100 bank branches.
8	1998	Committee on Technology Upgradation in the Banking Sector	Communication infrastructure and usage of INFINET, standardisation and security, computerisation of government transactions, outsourcing of technologies and services, Data Warehousing, data mining and MIS, legal framework for e-banking, etc.

On aspects of returns on ICT investments, Padwal (2001) has very clearly elaborated in his comparisons of Level of IT and Return on Investment. The study has stated that ROI is maximized when it is used not only for routine operations of Electronic Data Processing (EDP) resulting in efficiency improvements, but also for decision making, resulting in improving effectiveness of the organizations and ascertaining complimentary

role of IT. Further, it should be used for R&D functions, innovating new products and services, meeting emerging demand, thus encouraging innovative role of IT.

Consequent to Central Vigilance Commissioner's (Vittal, 1998) communication of 1998 that 70 percent of the banks business activities need to be carried out through computers, most of the banks have speeded up their implementation of ICT to meet the above target and thus, to gear up to the increasing market competition.

Singh (2002) states that the innovations of e-banking products like Internet banking, Telebanking, Electronic funds transfer, Credit cards, Debit cards, Smart cards, ATM and Cash management services etc. have made delivery channels efficient leading to customer satisfaction and delight. The study further states that ICT have enabled banks to be more customer oriented, but points out that the focus has been only in metro and urban customers neglecting the rural clientele. The study also provides the status of the adoption of information technology by the Indian banking system as of 30th September 2001. This is compared to that as of 30th September 1998 (NIBSCM, 1999) as seen in Table 2.7.

Table 2.7 Comparison of status of IT adoption in Indian banking industry

Sl. No.	Items	As of 30th September 1998 (Nos)	As of 30th September 2001 (Nos)
1	Total number of branches (excluding RRB's)	45,439	46,426
2	Partial computerisation at branch level (ALPMs/Electronic Accounting Machines/PCs)	6,961	13,218
3	Number of fully computerised branches	3,668	9,777
4	Total ATMs installed	194	895
5	On-line terminals at corporate sites installed	840	3,354
6	Credit cards issued	8,59,223	8,75,788
7	Smart cards issued	323	8,097
8	Debit cards (as ATM cards) issued	32,115	2,19,058
9	Branches covered by RBI EFT Scheme	3,011	3,536
10	Branches connected to other networks	970	2,335
11	Nodes on VSAT Network for Industry	54	2,023
12	Nodes on RBINET in banks	148	109
13	Branches connected to SWIFT	568	869

Source: www.indianbanksassociation.org

The number of computerised branches has increased by almost 166 percent from 3,668 in 1998 to 9,777 in 2001. Similarly, the total ATMs installed have also increased by 360 percent from 194 in 1998 to 895 in 2001. It can thus be seen that Information Technology has crept in nearly 50 percent of the branches in commercial banks as of 30th

September 1998. However, various e-banking products like ATM, credit cards, debit cards, smart cards, branches connected to EFT etc. are insignificant when compared to the size of Indian banking system. There is a clear indication that there has been increased use and role of IT in the Indian banking sector but more is needed.

Syamali (2004) in her survey of 60 bankers in various banks viz. SBI, IOB, ICICI, UTI, GTM etc. in the city of Tiruchirapalli has found that 65 percent opine that the technology has increased the customer base. 62 percent state that the main criteria for success is customer relations as against only 23 percent attributing to technology innovation and 51 percent state that on-line banking is essential to maintain customer relations. This indicates that the customer relations are very important for success and technology is enabling better customer relationship management. On the reasons for offering on-line services, 39 percent attribute the reason to satisfy existing customers and 38 percent attribute to win over competitors. 41 percent state that on-line service has reduced the personal visits of the customers. Thus, technology is found to be beneficial to the bankers.

However, the above computerization has been mostly in urban areas. Customers of these banks are now benefited in terms of ease, flexibility and better services due to computerization of banks. It needs to be noted however, that the transition period from the earlier manual operations to computerized systems has affected the banking services leading to delays etc. This is due to a variety of factors like the need of trained staff to use the computers, need of technical staff to maintain the computers, need for appropriate qualified personnel as executives, and unlearning the old and relearning aspects of performing banking activities with the use of new computer systems, among others. These issues are broadly discussed in the following section.

2.4.2. Issues of ICT in Indian Banking System and Rural Financial Institutions

Bandyopadhyay (NIBM, 1997; 323-362) discussing the evolution of ICT in banking states that the process of IT application was delayed in Indian commercial banks due to objections from unions. There was complete mistrust between the management and the staff due to which agreements were the results of bargaining rather than understanding of mutual needs and potential benefits. They did not allow for redeployment of staff from the computerised branches and that led to overstaffing in computerised branches. On the other hand, the bank management didn't utilise the released time due to computerisation of

the staff well for the growth of business, improvement of customer service. Majority of the people working in banks have very little understanding of computers and benefits of IT. There is severe lack of motivation to make IT effective. Thus, among others, he states that there is need for proper training and orientation.

The Report of the Expert Committee on Rural Credit (NABARD, 2001) states that RFIs suffer from poorly motivated and inadequately trained staff. The selection of the bank leaders (cooperative CEOs, lead bank managers or RRB chairman), motivating and training of personnel, incentives and provision of modern tools and facilities are the areas in need of greater attention to help improve their functioning and effectiveness. It states that operating units of cooperatives and RRBs need to follow uniform practices and should computerise their back office operations. To overcome the shortage of staff, the committee recommends contracting out labour intensive jobs and computerisation. The committee states that the rural branches are manned by inadequately motivated staffs who unwillingly serve out of sheer necessity of completing the minimum term of rural posting. Interestingly, it is of the opinion that due to the lack of computer literate staff, RRBs should not go for large scale computerisation of its branch operations.

Singh (2002) very lucidly lists the various issues concerning the computerisation of RFIs. They are; high capital expenditure, high cost of transaction, the rural banking considered as unviable, the business levels are low, the staff productivity is low, the staff lack skills to deal with technology, lack of infrastructure such as power, telecom facilities, lack of service support for e-banking solutions and the customers are illiterate and ignorant.

Shastri (2003) states that the expansion of banks into remote areas of the country, where the logistics continue to be handicaped, proved to be one major stumbling block. Another major problem that the banks face is their inability to retain the trained and talented personnel. Technology has also brought up ‘security’ concerns and he suggests that banks ought to have in place a well-documented security policy including network security and internal security.

On the Human Resource aspects, the Vision 2010 (IBA, 2004) states that since the Indian banking industry is witnessing a paradigm shift in systems, processes and strategies, it is imperative that the new competencies and capabilities need to be created on an on-going basis. Hence, an environment of continuous learning would have to be created so as to enhance knowledge and skills. It states that the present reward and compensation is

not linked to skills and performance, and suggests that it should be such that it attracts, recognises and retains the talent, and which is commensurate with performance.

Apart from identifying power and telecommunication as major challenges for ICT in rural areas, Shroff (2004) states that the approach towards IT infrastructure in the rural areas may have to be different from the one being adopted for cities. The study further suggests that "Conglomeration of facilities, such as computers, smart cards facilities etc, at kiosks – possibly at telephone kiosk - could be thought as feasible options with the participation of the educated unemployed rural youth in the setting up of such facilities."

Thus, although the costs are high and returns intangible, there is the need to implement ICT in rural banks to gear up to the global competition in the era of globalization and liberalization in general, and to improve management, disbursement and recovery of agricultural credit in particular. It may be reiterated that Indian economy is dependent on agricultural performance wherein, *ceteris paribus*, credit forms a vital input among others, which was briefly discussed in Chapter 1 for deriving the objectives of the study. Hence, it is imperative that agricultural credit, by appropriate management of ICT in banks, is made available to the deserving beneficiaries at right time, right place, in right quantity, at right cost and in right institutional form.

2.5. Limitations of the existing Literature

The following are some of the limitations and gaps in the existing literature as may be observed from the above survey.

1. The importance of agricultural credit for agricultural growth and development has been well brought out in the above literature. However, there has been inadequate attention to the means of improving the flow of agricultural credit and monitoring the same for timely delivery of agricultural credit fostering accelerated agricultural development.
2. The problems in agricultural credit, both from the bankers as well as from the farmers perspective has been analysed above. It needs to be however studied how these can be addressed by appropriately clearing the bottlenecks in the banking transaction processes and improving the various rural banking functions.
3. Though the need and significance of implementing ICT in urban banks is strongly felt for the benefit of the bank, the same is inadequately felt in the case of RFIs. It

thus need to be studied how ICT can play a important role to evolve a system which can improve and speed up the process of agricultural credit sanctioning and recovery.

Thus, there seems no significant study performed on the use, management and benefits of ICT specifically in RFIs that has come to light during the literature survey. Hence, there is need for a study which not only understands the beneficial role of ICT in urban areas, but also draw motifs from them for appropriate implementation and management in RFIs. It needs to be examined whether such implementation and management of ICT in RFIs has beneficial effect on its operations as well as deliver improves services to the rural populations.

Hence, this study is an attempt to examine the potentials and constraints of implementing ICT in RFIs, especially Cooperative and Commercial banks. It attempts to understand the role of ICT and its management for effective and efficient flow of agricultural credit for the development of farming community and the rural populations at large.

2.6. Conclusion

Agricultural performance forms a very important constituent for the overall growth of Indian economy. Realising this, massive policy and ground level initiatives were undertaken by GoI and RBI to place needed infrastructure for rural development. Many RFIs have expanded extensively in rural areas to offer affordable credit to the agriculturists and free them from the exploitative private financial sources. Though these initiatives are commendable, they are inadequate and fraught with many problems.

RFIs need effective management of the existing resources and they should be capable enough to handle future challenges and resources more efficiently and effectively. Additional financial support with measures to ensure it reaches the right beneficiary at right time in right quantities, along with the strengthening of the existing rural infrastructure can stimulate growth in the rural economy. Appropriate implementation and use of ICT in RFIs can enable them to achieve the same.

Drawing motifs from the urban banks for providing improved banking services, implementation of ICT in rural financial institutions could also improve their functioning, efficiency and effectiveness. It also involves an extra effort to maintain the rural customers' database and analyse their banking activities, which would prove very

supportive to identify the right beneficiary, offer timely credit, increase the chances of repayment, introduce innovative incentives and evolve attractive schemes. Thus, ICT could help the bank managers to take the right decisions so that only deserving agriculturists are extended the credit facility, and the wilful defaulter and other fraudulent activities could be avoided. It can thus be observed that the ICT implementation in RFIs is not only beneficial to the banks but also enables their rural customers to take active part in rural economy, leading to their empowerment and overall rural development.

With the above conceptual and empirical background, this research broadly addresses the role and management of ICT in RFIs. As discussed in Chapter 1, primary data is collected from the customers of selected RFIs, the bank mangers, the ITS and the TM. The demographic, socio-economic, geographic profile and network of rural banking in the districts of AP, where the primary data was collected, is discussed in the next chapter.

CHAPTER 3

PROFILE OF COUNTRY, STATE, DISTRICTS AND THEIR BANKING & CREDIT OPERATIONS

3.1. Introduction

This chapter provides a broad profile of India, Andhra Pradesh in general and the districts in AP where the survey is conducted, in particular. AP is geographically divided into three regions viz. Coastal Andhra, Rayalseema and Telangana. Chapter I discussed the rationale for choosing the representative districts in the each of this region for the study. Thus, the study is conducted in the West Godavari district of Coastal Andhra region, Chittoor district of Rayalseema region and Nizamabad district of Telangana region. The profiles of these districts are also broadly compared towards the end of the chapter.

Thus, this chapter provides a perspective of the area where the research is conducted and the outcome of the study needs to be analysed in light of the discussed demographic, socio-economic, and geographic characteristics of the region.

3.2. India (GoI, 2002)

3.2.1. Introduction

Over a period of 54 years from its Independence, India has become self-sufficient in agricultural production and is now the tenth industrialised country in the world and the sixth nation to have gone into outer space to conquer nature for the benefits of the people. As the seventh largest country in the world, India stands apart from the rest of Asia, marked off as it is by the mountains and the sea, which give the country a distinct geographical entity. The map of India can be referred in A – 3.1.

3.2.2. Area, Climate, Rainfall, Rivers, Forest and Population

India covers an area of 32,87,263 sq. kms. extending from the snow-covered Himalayan heights to the tropical rain forests of the south. The climate of India may be broadly described as tropical monsoon type with four seasons; a) Winter from January to February, b) Hot weather summer from March to May, c) Rainy south-western monsoon from June to September and d) Post-monsoon, also known as north-east monsoon in the

southern Peninsula from October to December. This could be attributed, among others to rains due to two seasonal winds – the north-east monsoon and the south-west monsoon.

Rivers in India may be classified as; a) Himalayan rivers, b) Peninsular rivers, c) Coastal rivers and d) Rivers of the inland drainage basin. The Himalayan rivers are perennial as they are generally snow-fed and have reasonable flow throughout the year. The pennisular rivers are generally rain-fed and therefore, fluctuate in volume. The coastal streams, especially on the west coast, are short in length and have limited catchment areas.

The streams of the inland drainage basin of western Rajasthan are very few and far between. The Ganga sub-basin which is a part of the large Ganga-Brahmaputra-Meghana basin is the largest in India receiving waters from an area which comprises about one-quarter of the total area of the country. The Godavari in the southern Pennisula has the second largest river basin covering 10 percent of the area of India. Next is the Krishna basin, followed by the Mahanadi basin in terms of their size. The basin of the Narmada in the uplands of the Deccan flowing to the Arabian Sea and of the Kaveri in the south falling into the Bay of Bengal are about the same size, though with different character and shape. Two other river systems, which are small but agriculturally important, are those of Tapti in the north and Pennar in the south. These west-coast rivers are of great importance as they contain as much as 11 percent of the land area.

The total forest cover which includes dense forests, open forest and mangrove is estimated to be 63.73 million ha. This constitutes 19.39 percent of country's geographic area. Out of this, the dense forests accounts to 11.48 percent, open forests represent 7.76 percent while mangrove forests 0.15 percent and shrubs are 1.58 percent. There has been an increase of 3,890 sq. km. of forest cover between 1997 and 1999 assessment.

India's population as on 1st March 2001 stood at 1,027 million, comprising of 531.1 million males and 495.7 million females. India accounts for a meager 2.4 percent of the world’s surface area of 135.79 million sq. kms. yet it supports & sustains a whopping 16.7 percent of the world population. The population density of India in 2001 is 324 per sq. km.

3.2.3. Land Utilisation / Cultivation, Cropping Pattern and Banking System

According to land use statistics available from states, area under forests had increased from 404.8 lakh ha. in 1950-51 to 688.5 lakh ha. in 1997-98. Net sown area increased from 1,187.5 lakh ha. to 1,420.2 lakh ha. during the same period. Broad cropping pattern indicates that though foodgrains have preponderance in gross cropped

area as compared to non-foodgrains, their relative share came down from 76.7 percent during 1950-51 to 66 percent during 1997-98.

The three main crop seasons are kharif, rabi and summer. Major kharif crops are rice, jowar, bajra, maize, cotton, sugarcane, sesame and groundnut. Major rabi crops are wheat, jowar, barley, gram, linseed, rapeseed and mustard. Rice, maize and groundnut are grown in summer season also.

Commercial Banking system in India consisted of 297 scheduled banks (including foreign banks) as on December 2000. Over the period of March 1999 to March 2000, the number of scheduled banks decreased by four. Among all the scheduled commercial banks, 223 are in public sector and these account for about 82 percent of the deposits of all scheduled commercial banks. There are 196 Regional Rural Banks (RRBs), specially set up to increase the flow of credit to small borrowers in the rural areas. The remaining 27 banks in the public sector are regular commercial banks and transact all types of commercial banking business.

3.3. **Andhra Pradesh** (NABARD, 2004)

3.3.1. Introduction

The state lies in the tropical region bounded by the Bay of Bengal on the East with a coastline of 974 kms., the states of Maharashtra and Karnataka on the West, the states of Maharashtra, Orissa and Chattisgarh on the North and Tamilnadu in the South. AP is the fourth largest state in the Indian Union in terms of area and fifth largest in terms of population. Three distinct physical regions can be identified considering the contours in the states's topography. The coastal plains consist of the best agricultural lands covering about 35 percent of the area of the state and comprising reverine and coastal alluvium and red soils with the altitude rising upto 150 m above mean sea level. The peninsular plateau covering 52 percent of the state's area is lying within an altitude of 150 to 600 m comprising numerous hills, seasonal streams and tanks. The Eastern Ghats account for 13 percent of the area with altitudes ranging between 600 and 900 m covered by forests and a series of broken hills and ridges. AP has 23 districts classified under 3 regions, viz. Telangana (10 districts), coastal Andhra (9 districts) and Rayalseema (4 districts). The map of Andhra Pradesh can be referred in A – 3.2.

3.3.2. Area, Climate, Rainfall, Rivers & Irrigation, Soils and Forest

Andhra Pradesh has an area of 2.75 lakh sq. kms., forming 8.4 percent of total geographical area of the country. The state has the second longest coastline of 974 kms. among all the coastal states of India.

It has a tropical to sub-tropical climate. Humid to semi-humid conditions prevail in the coastal area while in the interiors of the state, the climate is arid to semi-arid. The interior plateau areas have hot summers with relatively pleasant winters. The rainfall received in AP during the South-West monsoon in 2002-03 was 412 mm against the normal rainfall of 634 mm (-35 percent). During 2003-04, all the 22 rural districts except Adilabad received deficient to scanty rainfall. The North East monsoon gave excess rains in Mahaboobnagar, Ranga Reddy and Kurnool districts, and normal rains in Nellore, Cuddapah, Chittoor, Medak, Nalgonda and Prakasam districts. Remaining 13 districts recorded deficient rainfall.

Andhra Pradesh has many rivers, the most important being the Godavari, Krishna, Vamsadhara and Pennar. The state's share of dependable flows is estimated at 2,746 tmc. The gross irrigated area during 2000-01 was 59.16 lakh ha. as compared to 57.45 lakh ha. in 1999-2000. The net area irrigated also increased to 45.28 lakh ha. in 2000-01 from 43.84 lakh ha. in 1999-2000, the increase being 3.3 percent of net irrigated area to net cultivated area. The ground water potential available for irrigation is estimated to irrigate 41.96 lakh ha. The present exploitation level is 64 percent irrigating 26.93 lakh ha. There are more than 20 lakh agricultural pumpsets operating in the state.

AP is endowed with a variety of soils ranging from highly fertile and productive delta alluvial to black and red soil. The red soils cover over 66 percent of the state mainly in the Rayalseema region. This type of soil has a low nutrient content. The black soils cover another 25 percent of the area which are ill-drained. Deep black cotton soils are found in the Telangana region. The alluvial loamy clay soils found in Krishna and Godavari deltas cover 5 percent of the land. The coastal sands occupy 3 percent. The laterite soils are just 1 percent and are seen only in certain pockets.

The forest cover is 63,827 sq. kms., which is only 23.20 percent of the total geographic area of AP. Teak and sal forests cover 9145 sq. kms. and 47 sq. kms. respectively and balance 54,635 sq. kms. is classified as other broad leaved forests.

3.3.3. Land Utilisation / Cultivation, Cropping Pattern and Population

The net area sown in AP was 111.15 lakh ha. (40.5 percent of geographical area) in 2000-01 as against 106.10 lakh ha. in 1999-2000 showing an increase of 4.8 percent. During 2000-01 the gross cropped area was 135.45 lakh ha as against 130.23 lakh ha in 1999-2000. This was due to increase in area under foodgrains and oilseeds. Of this, area under food crops was 76.73 lakh ha. and the rest under non-food crops. The cropping intensity was 122 percent.

The area under foodgrain crop in 2000-01 increased to 76.73 lakh ha. from 71.40 lakh ha. in 1999-2000. Rice and jowar are the staple foodgrain crops accounting for about two thirds of total area under foodgrain crops. The area under foodgrains in kharif 2001-02 was 41.31 lakh ha. as against 50.35 lakh ha. in 2000-2001 showing a decrease of 18 percent.

The state with a population of 757.27 lakh as per 2001 census is the fifth largest state in the Indian Union. It is the largest among the states in the southern region in terms of area and population. The state has registered a growth rate of 13.8 percent in population between 1991 and 2001 which is lower than the national growth rate of 19.5 percent. The population density of AP is 275 persons per sq. km. (2001 census).

3.3.4. Banking Network and Review of Ground Level Credit

AP is served by 48 Commercial Banks with 3984 branches, 16 RRBs with 1149 branches, 1 State cooperative Bank with 24 branches, 22 District Central Cooperative Banks (DCCBs) with 575 branches, and two Local Area Banks with 11 branches. As on 31st March 2002, there were 5743 bank branches (excluding Urban Cooperative Banks) of which 2811 branches are operating in rural area, where as 1296 are operating in semi-urban area and the remaining 1636 are urban/metropolitan branches. Besides these, the A.P.State Finance Corporation with 22 branches and one Girijan Cooperative Corporation with 13 branches are also functioning in the State. As per census 2001, the average coverage of population per branch is about 15,000 people.

The ground level credit flow for the last 5 years is given in Table 3.1.

Table 3.1: Ground level credit flow from 1997 to 2002 – Andhra Pradesh

S.no.	Year	CBs	Cooperatives	RRBs	APSFC	Total	Growth rate (%)
1	1997-98	2,900.80	1,502.74	512.94	87.69	5,004.17	11.69
2	1998-99	4,128.58	1,672.86	551.24	138.32	6,491.00	29.72
3	1999-00 #	4,586.29	2,941.53	841.10	*	8,368.92	45.29
4	2000-01 #	4,097.11	2,909.40	964.33	*	7,970.84	(-) 4.76
5	2001-02 #	7,792.19	2,694.06	1,216.49	301.58	12,004.32	50.59

* APSFC separately not available and clubbed with CBs
# ***Source*:** Sate Level Bankers Committee, AP, Andhra Bank, 2002-03.

It shows an increasing percentage of growth of ground level credit from 11.69 percent in 1997-98 to 45.29 percent in 1999-2000. However, there was a negative growth rate of 4.76 percent in 2000-2001, followed by an increased growth rate of 50 percent in 2001-2002.

3.4. West Godavari district in Coastal Andhra region of AP (NABARD, 2003&2004 a)

3.4.1. Introduction

West Godavari district is one of the coastal regions of Andhra Pradesh, which lies in between the Godavari Western delta and Krishna Eastern delta. The district is surrounded by river Godavari on the East, Khammam district on the West and North, and Krishna district and Bay of Bengal on the South. It constitutes 46 mandals, of which 22 are in delta area and 887 are inhabited villages. It is a premier district in agricultural production accounting for 11 percent in area and 14.6 percent in rice production in the state of AP. The map of West Godavari district can be referred in A – 3.3.

3.4.2. Area, Climate, Rainfall, Rivers & Irrigation, Soils and Forest

West Godavari district has a geographical area of 7796 sq. kms. This is divided into 46 mandals of which 22 are in delta area. There are 887 inhabited villages.

The climate condition of the district is an extreme type under tropical zone with high to very high temperatures in summer to an extent of 48^{o} C. While its fairly cool climate towards hilly area of Polavaram and adjoining parts of Bay of Bengal in southern part of the district. The normal rainfall of the district is 1153mm of which the South West monsoon contributes to an extent of 69 percent, North Eastern monsoon 24 percent besides winter and hot weather period of 7 percent. The district however is prone to the constant threats of cyclones & droughts, making the crop yield prospect critical. During rabi 2001 more than 50 percent of the mandals were severely affected by drought and

during kharif 2002 the district administration has declared 17 mandals as affected by drought.

Godavari is an important perennial river with its branches, Gowthami Godavari and Vasist Godavari covering 36 sq. kms. passing through Polavaram, Talapudi, Kovvuru, Changalu, Nidavole, Undrajavaram, Pervalli, Penugonda Achanta, Yallamanchalli and Narasapuram mandals. Tammileru passes through Lingapalem and Pedavagi mandals. Another river Upputeru passes through Akiveedu, Kaila, Bhimavaram and Mogaltur mandals.

The entire irrigated area in the district is being covered by Godavari Western delta and Krishna Eastern delta (85 percent of the cultivated land), besides dependable bore well and filter points (15 percent of the cultivated land) with copious underground water potential. About 80 percent of the net cropped area is under irrigation. Apart from the existing facilities, Kovvadkvalva, medium irrigation project, Thootigunta and Polavaram, lift irrigation schemes through RIDF are being implemented to bring more area under irrigation command.

The soils are richly fertile alluvial black regur and red ferrugenous besides small belt of arenaceous sandy soils along the coastal belt. The alluvial soils are contributing for higher production. The district has a forest cover of 812 sq.kms. of the total geographical area of 7796 sq.kms. forming 10.48 percent of the total area.

3.4.3. Land Utilisation / Cultivation, Land Holdings, Cropping Pattern and Population

The average cultivated area is 4.10 lakhs ha. as against the geographical area of 7.80 lakhs ha. The cultivated area works out to 53 percent as against the state average of 37 percent. This is mainly because of higher irrigation potential created through canal irrigation from Godavari river, through bore wells and irrigation tanks.

There are 4,58,295 land holdings of which 77,648 are less than one ha. and 3,13,410 are between one ha. and 2 ha. and 67,237 above 2 ha. accounting for 21 percent, 28 percent and 51 percent of the land respectively.

The total cultivated area is 4.50 lakh ha., of which 2.50 lakh ha. is sown more than once. Thus the gross cropped area is 7.0 lakh ha. Paddy is the major crop with a normal area of 2.63 lakh ha in kharif and 1.96 lakh ha. in rabi, followed by sugarcane 0.30 lakh ha., tobacco (VFC) 0.15 lakh ha, maize 0.10 lakh ha and cotton, chillies, green gram,

groundnut etc. in the remaining area. Table 3.2, gives the average area under various crops in 2003-04.

Table 3.2: Average Area under Various Crops (2003-2004) – West Godavari district

Sl. no.	Crops	Kharif (ha)	Rabi (ha)	Total (ha)
I. Food Crops	Paddy	2,63,566	1,95,820	4,59,386
	Maize		9,997	9,997
	Sub Total	**2,63,566**	**2,05,817**	**4,69,383**
II. Pulses	Red Gram	476		476
	Green Gram	123	2,779	2,902
	Udad	232	4,565	4,797
	Sub Total	**831**	**7,344**	**8,175**
III. Oil Seeds	Ground nut	877	4,069	4,946
	Sun flower		450	450
	Sub Total	**877**	**4,519**	**5,396**
IV. Others	Sugarcane	29,789	0	29,789
	Chillies		5,556	5556
	Tobacco (local)		8,797	8,797
	Tobacco (Virginia)		14,282	14,282
	Sub Total	**877**	**4,519**	**5,396**
	Grand Total	**2,95,063**	**2,46,315**	**5,41,378**

As per the 2001 census, the population of the West Godavari district was 37.96 lakhs of which 19.06 lakhs were males and 18.90 lakhs females. The literacy level was 73.95 percent. The literacy level among the male was 78.43 percent as against 69.45 percent in females.

3.4.4. Banking Network and Review of Ground Level Credit

There are 22 Commercial Banks, one RRB and one Cooperative Bank with a branch network of 255, 17 and 32 respectively, operating in the district. Of the total branches 168 are in rural area, 90 are in semi-urban and 46 are in urban area. All the three agencies present in the district are providing loans to farmers for production activities and investment activities. Andhra bank is the Lead Bank. The achievement under the Credit Plan was 82 percent and recovery over 70 percent. The DCCB of West Godavari district is DCCB Eluru and is earning continuously profit for the last three years which is classified under 'A' audit classification. The DCCB Eluru has 665 affiliated cooperative societies out of which 265 are PACS and 27 PWCS. Table 3.3, provides the performance indicators of the credit delivery system in West Godavari district.

Table 3.3: Performance Indicators of the Credit Delivery System - Key Banking Statistics – West Godavari district

(Rs. Lakhs)

Sl. no	Items	Cooperatives	RRBs	CBs	Total
1	No. of banks	1	1	22	24
2	No. of branches				
	Rural	18	16	134	168
	Semi-urban	8	--	82	90
	Urban	6	1	39	46
	Total	**32**	**17**	**255**	**304**
3	No. of staff per branch/society	9	5	5	
4	No. of loan accounts	2,10,541	55,041	2,54,268	5,19,850
5	No. of loan accounts per branch	6,579	3,238	997	1,710
6	Average population per branch	1,18,630	2,23,303	14,887	12,487
7	Average no. of villages covered per branch/per society	27	51	4	3
8	Total deposits as on 31st March 2002	21,765	3,400	1,95,426	2,20,591
9	Average deposits per branch	680	200	766	726
10	Growth in deposits				
	a) 2002 over 2001	2	12	36	31
	b) 2001 over 2000	24	19	-10	-6
11	Total loans outstanding as on 31st March 2002	44,312	3,283	1,42,315	1,89,910
12	% increase in loans outstanding				
	a) 2002 over 2001	12%	41%	34%	34%
	b) 2001 over 2000	-2%	-3%	-47%	-39%
13	Loan Outstanding per account	0.21	0.06	0.56	0.36
14	Loan Outstanding per branch	1,385	193	558	625
15	ST / MT / LT loans per ha.	0.43	0.37	0.42	0.42
16	% of agricultural advance to total advance	49%	52%	43%	42%
17	CD Ratio	204	97	73	90
18	% of recoveries of loans to demand thereof				
	As on 30 June 2002	91%	68%	74%	89%
	As on 30 June 2001	89%	69%	70%	87%
	As on 30 June 2000	91%	63%	70%	86%
19	Percentage of overdues to loan outstandings	5	8	7	7
20	% of net NPAs to total assets	2.94	7.61	-	-
21	Brief information relating to performance of credit agencies	The percentage of term loans and other priority sector increased considerably. The overall performance of Eluru DCCB was very good. It has won the Best Performance Award instituted by NABARD for its working during 1999-2000 and also a special prize for the year 2000-2001			

The production credit disbursement for the last 5 years is provided in Table 3.4 below;

Table 3.4: Flow of credit in 1998 to 2003: West Godavari District *(lakhs)*

Years	1998-99	1999-2000	2000-01	2001-02	2002-03
Flow of credit	41,215	60,125	42,493	51,458.98	72,982

3.4.5. West Godavari District Profile at a Glance as of 31st March 2002

The West Godavari district profile at a glance is provided in Table 3.5, as below;

Table 3.5: West Godavari District Profile at a Glance as of 31st March 2002

Sl. no	Items	Values
1	**Geographical Area**	**7.80 lakhs ha**
1.a	No. of blocks / talukas	46
1.b	No. of villages inhabited	887
1.c	No. of villages electrified	876
1.d	No. of villages connected by all weather roads	826
3	**Rainfall (mm)**	**Normal Actual** **1153** *2000-01*: **854** *2001-02*: **833**
4	**Agro climatic region and zone**	**Krishna Godavari zone**
5	**Population**	**(in '000)**
5.a	Total	3,796
5.b	Population density per sq. km.	487
5.c	Population below poverty line	1,188
6	**Classification of workers**	
6.a	Cultivators	458,295
6.b	Of (6.a) Small and Marginal farmers	391,058
6.c	Agricultural Labourers	806,226
6.d	Household Cottage Industries	22,100
6.e	Allied Agro-activities	56,712
6.f	Other workers	379,386
7	**Land Utilisation**	**area in ha**
7.a	Geographical area	7,79,564
7.b	Net sown area	449,679
7.c	Forest	81,186
7.d	Fallow Land	62,525
7.e	Land not available for cultivation	45,035
7.f	Cropping intensity (%)	184 %
7.g	Area brought under high yield variety seeds	3,17,301
8	**Size of Land Holdings**	**Area (ha) %**
8.a	Less than 1 ha	1,10,453 21
8.b	Between 1 and 2 ha	1,39,721 27
8.c	Above 2 ha	2,75,649 52
	Total	**5,25,823 100**
9	**Irrigation**	**ha.**
9.a	Net irrigated area	3,64,000
9.b	By canals	2,20,000
9.c	By wells	1,00,000
9.d	By other sources	44,000
10	**Consumption of organic and chemical fertilizers and pesticides (per ha.)**	**230.55 kg**
11	**Agriculture and support facilities**	
11.a	Seed / Fertilisers / pesticides depots (nos)	1,898
11.b	Rural markets / mandies (nos)	16
11.c	Rural godowns (nos / total capacity)	62 / 2,83,882 MT
11.d	Cold storage (nos / total capacity)	4 / 20,000 MT
12	**Animal Husbandry**	
12.a	Plough animals	87,635
12.b	Dairy animals	6,67,381
12.c	Sheep/Goat	1,75,000
12.d	Poultry (source: Animal Husbandry)	76,61,000

3.5. District profile of Chittoor district in Rayalseema region of Andhra Pradesh (NABARD, 2003 & 2004 c)

3.5.1. Introduction

Chittoor has been identified as an Agri-export zone. Kuppam was identified for setting up food park. The map of Chittoor can be referred in A - 3.4.

3.5.2. Area, Climate, Rainfall, Rivers & Irrigation and Forest

Chittoor district has a geographical area of 15,150 sq kms. This is divided into 16 mandals. There are 1,500 inhabited villages. The Chittoor district is categorized under southern agro climatic zone of Andhra Pradesh based on soil type, rainfall and altitude. The average rainfall received by the district is 908mm. The district lies in the rain shadow area of South West monsoon and hence in most of the mandals the water is not sufficient for second crop. There has been low cropping intensity in the year 2001-02 on account of scanty rainfall during south west monsoon.

The net irrigated area is 1,64,009 ha., of which 955 ha. is by channels, 1,44,477 ha. is by wells and 29, 153 ha. by other sources. The district has a forest cover of 4.22 lakh ha. of the total geographical area of 15.15 lakh ha. forming 28 percent of the total area.

3.5.3. Land Utilisation / Cultivation, Land Holdings, Cropping Pattern and Population

The net sown area was 4,22,636 ha., which is 29 percent of Chittoor districts geographic area of 1,515,000 ha. The remaining is forest area of 4,52,018 ha., follow land of 1,55,000 ha. and the land not available for cultivation is 4,75,546 ha. There are 5,28,514 land holdings of which 3,06,538 are less than one ha. and 1,21,558 are between one ha. and 2 ha. and 1,00,418 above 2 ha. accounting for 58 percent, 23 percent and 19 percent of the land respectively. Major crops that are cultivated are groundnut, sugarcane, paddy, jowar, pulses and other cash crops. Floriculture is also gaining importance in Madanapalli, Palamaner and Kuppam areas.

The reason for drop in cultivated area was on account of successive drought conditions. The cultivated area under major crops for the previous 5 years is shown in the following Table 3.6.

Table 3.6: Average Area under Various Crops (1997-98 to 2001-02) – Chittoor dt

	Crop	Area in Lakh ha				
S.no		1997-98	1998-99	1999-2000	2000-01	2001-02 (SAP)
1	Paddy	0.872	0.947	0.750	0.150	0.127
2	Groundnut	2.508	2.625	2.154	1.609	1.551
3	Sugarcane	0.463	0.502	0.699	0.283	0.321
4	Others	0.370	0.357	0.267	0.130	0.140
5	Total	4.213	4.431	3.870	2.178	2.128

As per the 2001 census, the population of the district was 37.37 lakhs of which 18.85 lakhs were males and 18.52 lakhs females.

3.5.4. Banking Network and Review of Ground Level Credit

There are 27 Commercial Banks, 1 RRB and 1 Cooperative Bank with a branch network of 179, 75 and 24 respectively, operating in Chittoor district. Of the total branches, 134 are in rural area, 71 in semi-urban area and 73 in urban area. Indian Bank is the Lead Bank. Table 3.7, provides the performance indicators of the credit delivery system in Chittoor district.

Table 3.7: Performance Indicators of the Credit Delivery System – Key Banking Statistics – Chittoor district

as on 31/03/2002 (Rs. Lakhs)

S no	Items	Cooperatives	RRBs	CBs	Total
1	No. of banks	1	1	27	29
2	No. of branches				
	Rural	11	58	65	134
	Semi-urban	7	11	53	71
	Urban	6	6	61	73
	Total	**24**	**75**	**179**	**278**
3	No. of staff per branch/society	12	6	9	
4	No. of loan accounts	33,088	97,136	1,60,973	2,91,197
5	No. of loan accounts per branch	1,504	1,313	914	1,070
6	Average population per branch	--	--	--	--
7	Average no. of villages covered per branch/per society	63	20	8	91
8	Total deposits as on 31st March 2002	10,063	27,380	2,50,196	2,87,628
9	Average deposits per branch	419	296	1,175	1,845
10	Growth in deposits				
	a) 2002 over 2001	14%	23%	15%	20%
	b) 2001 over 2000	12%	26%	25%	25%
11	Total loans outstanding as on 31st March 2002	35,451	18,111	98,930	1,52,492
12	% increase in loans outstanding				
	a) 2002 over 2001	- 0.3%	19%	7%	(-) 1.7%
	b) 2001 over 2000	12%	21%	14%	18%

Table 3.7 (contd)					
S no	**Items**	**Cooperatives**	**RRBs**	**CBs**	**Total**
13	Loan Outstanding per account	1.05	0.15	0.65	0.53
14	Loan Outstanding per branch	1,452	203	586	558
15	ST / MT / LT loans per ha.	--	--	--	--
16	% of agricultural advance to total advance	40%	61%	22%	41%
17	CD Ratio	352	66	40	53
18	% of recoveries of loans to demand thereof				
	As on 30 June 2002	51%	83%	--	--
	As on 30 June 2001	43%	80%	58%	62%
	As on 30 June 2000	51%	74%	56%	60.3%
19	Percentage of overdues to loan outstandings	19%	10%	41%	57%
20	% of net NPAs to total assets	--	4.51	--	--
21	Brief information relating to performance of credit agencies	Only 42 PACS have achieved eligibility. The recoveries of he bank are almost steady at 51% for the last three years. Recoveries increased from 74% to 83% over three years. Business improved. Bank earned profit. Recoveries are steady and agricultural advances fallen.			

The Ground level credit disbursements for Crops loans agency wise is given in Table 3.8, as under;

Table 3.8: Agency wise credit disbursement of Crop loans from 1999 - 2003: Chittoor district *(lakhs)*

S.no.	Agency	1999-2000	2000-01	2001-02	2002-03 (SAP)
1	Commercial bank	9,166.04	10,234.79	10,718.16	11,749.2
2	RRB	5,423.61	6,668.90	8,102.37	7,141.8
3	DCCB	4,476.14	6,362	3,473.5	8,393.77
	Total	19,065.79	23,265.69	22,294.03	27,284.77

3.5.5. Chittoor District Profile at a Glance as of 31st March 2002

The Chittoor district profile at a glance is provided in Table 3.9, as below;

Table 3.9: Chittoor District Profile at a Glance as of 31st March 2002

Sl. no	Items	Values
1	**Geographical Area**	**15,150 sq. kms**
1.a	No. of blocks / talukas	16
1.b	No. of villages inhabited	1,500
1.c	No. of villages electrified	1,540
1.d	No. of villages connected by all weather roads	900
3	**Rainfall (mm)**	**Normal Actual** **908** *2000-01*: **865.6** *2001-02*: **911.6**
4	**Agro climatic region and zone**	**The district is categorized under southern agro climatic zone of AP based on soil type, rainfall & altitude**

Table 3.9 (contd)			
Sl. no	**Items**	**Values**	
5	**Population** (census 2001)	**(in '000)**	
5.a	Total	3,737	
5.b	Population density per sq. km.	247	
5.c	Population below poverty line (families)	353	
6	**Classification of workers**		
6.a	Cultivators	529	
6.b	Of (6.a) Small and Marginal farmers	394	
6.c	Agricultural Labourers	491	
6.d	Household Cottage Industries	109	
6.e	Allied Agro-activities	77	
6.f	Other workers	333	
7	**Land Utilisation**	**area in ha**	
7.a	Geographical area	1,515,000	
7.b	Net sown area	4,22,636	
7.c	Forest	4,52,018	
7.d	Fallow Land	1,55,000	
7.e	Land not available for cultivation	4,75,546	
7.f	Cropping intensity (%)	113%	
7.g	Area brought under high yield variety seeds	42,000	
8	**Size of Land Holdings**	**Area (ha)**	**%**
8.a	Less than 1 ha	3,06,538	58
8.b	Between 1 and 2 ha	1,21,558	23
8.c	Above 2 ha	1,00,418	19
	Total	**5,28,514**	**100**
9	**Irrigation**	**ha.**	
9.a	Net irrigated area	1,64,009	
9.b	By channels	955	
9.c	By wells	1,44,477	
9.d	By other sources	29,153	
10	**Consumption of organic and chemical fertilizers and pesticides (per ha.)**	**73 per kg of gross cropped area.**	
11	**Agriculture and support facilities**		
11.a	Seed / Fertilisers / pesticides depots (nos)	990	
11.b	Rural markets / mandies (nos)	50	
11.c	Rural godowns (nos / total capacity)	14 nos with 8400 MT capacity	
11.d	Cold storage (nos / total capacity)	8 nos with 24000 MT capacity	
12	**Animal Husbandry**	**(No in Lakhs)**	
12.a	Plough animals	2.82	
12.b	Dairy animals	10	
12.c	Sheep/Goat	7.73	
12.d	Poultry (source: Animal Husbandry)	42	

3.6. District profile of Nizamabad district in Telangana region of Andhra Pradesh (NABARD, 2003 & 2004 b)

3.6.1. Introduction

Nizamabad is situated in the northern part of the AP. Nizamabad district on its north has Adilabad district, on its south Medak district, on its east Karimnagar district and on its west are Nanded district of Maharashtra and Bidar district of Karnataka. The map of Nizamabad can be referred in A – 3.5.

3.6.2. Area, Climate, Rainfall, Rivers & Irrigation, Soils and Forest

Nizamabad district has a geographical area of 8062 sq.kms. This is divided into 136 mandals. There are 866 inhabited villages of the total 923 villages. The climate of the district is tropical and the temperature fluctuations are high, the normal minimum temperature being 13.7^{o} C and the maximum being 39.9^{o} C and sometimes the temperature goes down as low as 5^{o} C during winter and rises as high as 47^{o} C during peak summer season. The normal average rainfall of the district is 1036mm.

Important rivers flowing through the district are Godavari and its tributary Manjeera, Aler and other streams like Kalyani, Yadlakatta, Kaulas and Pedavagu. Nizamsagar, a major irrigation project on river Manjeera registered ayacut of 1.73 lakh ha. was constructed in pre-independence era. However, for various reasons, presently, this project could provide irrigation to only 0.57 lakh ha. Though, the Sri Rama Sagar, a major irrigation project on the river Godavari is constructed, it is providing irrigation in the district to the extent of only 6000 ha. The extent of area cultivated under irrigation conditions in any given year will mostly be influenced by the quantum of water received in the Nizamsagar Project and other projects. The net irrigated area by canals is 81,639 ha., by wells is 98,260 ha., by tanks is 19,620 ha., and by other sources is 30,099 ha, forming a total of 2,29,618 ha.

It needs to be noted that, with the over exploitation of ground water, the water tables especially in water scarce regions characterised by uncertain rainfall have been depleted year after year. In light of the above the farmers in the dark and the grey areas have been advised by the district administration and also by agricultural scientists not to grow paddy and sugarcane to the extent possible and instead they are advised to grow alternate crops such as maize, jowar, groundnut, sunflower etc. In the year 2002-03, all the

mandals in the district have been declared as drought affected areas by the district administration.

The economy of the district is predominantly agriculture and rural in character. The soils in the district are divided into black soil (55 percent) and chalka soil (45 percent). The district had a forest cover of 1,812 sq. kms of the total geographical area of 8.06 lakhs ha.

3.6.3. Land Utilisation / Cultivation, Land Holdings, Cropping Pattern and Population

The net cropped area is 2.59 lakhs ha., which is 32 percent of the total districts geographic area of 8.06 lakhs ha. The remaining is forest area of 1,812 sq. kms, fallow land of 2.08 lakh ha. and the land not available for cultivation is 48,765 ha. There are 3,26946 holdings of which 2,04,433 are less than one ha., 65,410 are between one ha. and 2 ha., 38,002 between 2 ha. and 4 ha., 14,419 between 4 ha. and 10 ha. and 4,682 with above 10 ha.

The net cropped area is 2,59,688 ha. Paddy, maize and jowar are the major crops. Paddy is the predominant crop and grown during kharif as well as rabi season, followed by maize. The major pulses grown are black gram, green gram and bengal gram. The major commercial crops are sugarcane, cotton, turmeric, groundnut and sunflower. The particulars of area under cultivation of different crops in the district during 2000-01 and 2001-02 are indicated in Table 3.10, below.

Table 3.10: Average Area under Various Crops (2000-01 & 2001-02) - Nizamabad dt

S.no.	Name of crop	2000-01 (ha)	2001-02 (ha)
1	Paddy	1,28,990	1,22,018
2	Jowar	3,705	3,594
3	Maize	49,936	47,893
4	Bajra	4,617	4,311
5	Wheat	1,510	1,603
6	Groundnut	280	239
7	Sunflower	294	288
8	Black Gram	15,876	15,914
9	Green Gram	14,148	14,178
10	Red Gram	2,147	2,615
11	Cotton	8,276	10,931
12	Chillies	1,407	1,528
13	Turmeric	11,166	1,0316
14	Sugarcane	17,600	20,050
	Total	**2,59,952**	**2,55,478**

As per the 2001 census, the population of the district was 23.42 lakh of which 11.61 were males and 11.80 lakhs females. The population density is 256 per sq. km.

3.6.4. Banking Network and Review of Ground Level Credit

There are 18 Commercial Banks, 1 RRB and 1 Cooperative Bank with a branch network of 137, 27, 32 respectively, operating in the district. Of the total branches of 196, there are 130 branches in rural areas, 26 in urban areas and 40 in urban areas. State Bank of Hyderabad is the Lead Bank. Table 3.11, provides the performance indicators of the credit delivery system in Nizamabad district.

Table 3.11: Performance Indicators of Credit Delivery System – Key Banking Statistics – Nizamabad district (as on 31-03-02)

(Rs. Lakhs)

Sl. no.	Items	Cooperatives	RRBs	CBs	Total
1	No. of banks	1	1	18	20
2	No. of branches				
	Rural	17	24	89	130
	Semi-urban	09	02	15	26
	Urban	06	01	33	40
	Total	**32**	**27**	**137**	**196**
3	No. of staff per branch/society	09	04	08	
4	No. of loan accounts	1,51,423	30,227	3,07,475	4,89,125
5	No. of loan accounts per branch	4,732	1,120	2,244	2,495
6	Average population per branch	73,000	86,000	17,100	11,954
7	Average no. of villages covered per branch/per society	27	32	07	
8	Total deposits as on 31st March 2002	12,024	7,411	1,19,674	1,39,109
9	Average deposits per branch	376	274	873	710
10	Growth in deposits				
	a) 2002 over 2001	1463	839	10,711	13,013
	b) 2001 over 2000	126	570	12,016	12,712
11	Total loans outstanding as on 31st March 2002	31,098	5,161	58,095	94,354
12	% increase in loans outstanding				
	a) 2002 over 2001	28.80%	6.3%	8.6%	9.87%
	b) 2001 over 2000	31.61%	18.98%	1.90%	10.85%
13	Loan Outstanding per account (Rs.)	20,500	17,000	18,900	19,000
14	Loan Outstanding per branch	971	61	418	481
15	ST / MT / LT loans per ha.	--	--	--	--
16	% of agricultural advance to total advance	95%	43.10%	54%	64%
17	CD Ratio	258.63	69.64	49	67
18	% of recoveries of loans to demand thereof				
	As on 30 June 2002	80.9%	70%	71%	73.90%
	As on 30 June 2001	71.7%	64%	71%	68.9%
	As on 30 June 2000	65%	66%	65%	64%
19	Percentage of overdues to loan outstandings	9%	23%	30%	20.6%
20	% of net NPAs to total assets	--	8.3%	--	--

The credit flow for cultivation activities from the banking institutions during the last three years is provided in Table 3.12, as below:

Table 3.12: Agency wise credit disbursement of Crop loans from 2000- 2003: Nizamabad District *(Rs. Lakhs)*

Sl.no.	Particulars	2000-2001	2001-2002	2002-2003 *(estimate)*
1	Commercial banks	--	109.51	14020
2	Co-operative banks	176	9754	15000
3	Regional Rural Banks	--	1729	2400
	Total	176	11592.51	31420

3.6.5. Nizamabad District Profile at a Glance as of 31st March 2002

The Nizamabad district profile at a glance is provided in Table 3.13, as below;

Table 3.13: Nizamabad District Profile at a Glance as of 31st March 2002

Sl. no	Items	Values
1	**Geographical Area**	**8062 sq. kms.**
1.a	No. of blocks/mandals	09/136
1.b	No. of villages inhabited	866
1.c	No. of villages electrified	737
1.d	No. of villages connected by all weather roads	530
3	**Rainfall (mm)**	**Normal Actual** **1,036** *2000-01*: **966.7** *2001-02*: **878.3**
4	**Agro climatic region and zone**	**North Telangana**
5	**Population** (2001 census)	
5.a	Total	23,42,663
5.b	Population density per sq. km.	256
5.c	Population below poverty line	5.22 lakhs
6	**Classification of workers**	
6.a	Cultivators	3,26,946
6.b	Of (6.a) Small and Marginal farmers	2,54,000
6.c	Agricultural Labourers	3,07,454
6.d	Household Cottage Industries	52,710
6.e	Allied Agro-activities	98,000
6.f	Other workers	1,89,000
7	**Land Utilisation**	**area in ha**
7.a	Geographical area	8,06,200 ha
7.b	Net sown area	2,59,688 ha
7.c	Forest	1,812 sq. kms
7.d	Fallow Land	2,08,795 ha
7.e	Land not available for cultivation	48,765 ha
7.f	Cropping intensity (%)	97.29%
7.g	Area brought under high yield variety seeds	2,49,535
8	**Size of Land Holdings**	**Area (ha)** **%**
8.a	Less than 1 ha	1,02,716 18
8.b	Between 1 and 2 ha	99,314 17
8.c	Above 2 ha	3,66,568 64
	Total	**5,68, 598** **100**

Table 3.13 (contd)		
Sl. no	**Items**	**Values**
9	**Irrigation**	**ha.**
9.a	Net irrigated area	2,29,618
9.b	By canals (DOW, DW, TB & LIS)	81,639
9.c	By wells	98,260
9.d	By other sources	49,719
10	**Consumption of organic and chemical fertilizers and pesticides (per ha.)**	**29 kg per ha.**
11	**Agriculture and support facilities**	
11.a	Seed / Fertilisers / pesticides depots (nos)	108
11.b	Rural markets / mandies (nos)	10
11.c	Rural godowns (nos / total capacity)	08 / 2,000 MT
11.d	Cold storage (nos / total capacity)	03 / 12,000 MT
12	**Animal Husbandry**	
12.a	Plough animals	1,97,462
12.b	Dairy animals	3,92,025
12.c	Sheep & Goat	9,81,757
12.d	Poultry	7,68,061

3.7. Inter – District Comparison

Rice and jowar are the principal foodgrain crops which account for almost two thirds of total area under food grain crop and grown in almost all districts of AP. Andhra Pradesh has shown an increase of 4.8 percent in the net sown area from 106.1 lakh ha. in 1999-2000 to 111.15 lakh ha. in 2000-2001. As of March 2002, 2811 bank branches are operating in rural areas and the 2001 census states that the average population coverage per branch is about 15,000 people. The ground level flow of credit in 2001-2002 has also shown an increase of 51 percent over 2000-01.

West Godavari district, accounts for almost 15 percent of rice production in the state of AP. Paddy is the major crop, followed by sugarcane and tobacco. It lies in the coastal region with relatively more number of rivers and good alluvial soil contributing for higher production. While, Chittoor district is identified as Agri-export zone. However, in most of the mandals, water is not sufficient for the second crop since this district is in the rain shadow area of South West monsoon. Groundnut, sugarcane, paddy, jowar, pulses are the major crops in Chittoor district. Nizamabad district on the other hand, has very high temperature fluctuations; sometimes, the extremes are as low as 5^0 C during winter and as high as 47^0 C in peak summer. Though there have been some major irrigation projects in this district, the land irrigated has not been substantial. Added to this is the uncertain rainfall in some areas of the district which has led to over exploitation of ground water. In

these areas, the administration has advised to grow alternate crops instead of paddy, which need relatively lesser water like maize, jowar, groundnut, sunflower etc. Overall, paddy, maize, jowar, sugarcane and cotton are the major crops grown in Nizamabad district.

The average rice production for 1997-98 to 2000-01 in West Godavari district is 1481 tonnes, whereas it is just 206 tonnes in Chittoor and 388 tonnes in Nizamabad district as shown in Table 1.5, Appendix V. In West Godavari district, 80 percent of the net cropped area is under irrigation and the cultivated area is around 53 percent of its geographical area. Whereas, in Chittoor district the net sown area is 29 percent of its geographic area and the same in Nizamabad district is 32 percent of geographic area.

In West Godavari district, of the total 304 rural bank branches, 168 branches are in the rural area, with a total number of loan accounts of 5,19,850. The average population per branch is 12,487. The flow of credit indicates a growth of 77 percent from Rs.41,215 lakhs in 1998-99 to Rs.72,982 lakhs in 2002-2003. There has been overall healthy loan recovery percentage of 87.3 percent, which is a three year average (viz. 2000, 2001 and 2002) of all banks average percentage recovery.

While, Chittoor district has 134 rural bank branches of the total 278 branches, 134 branches are in rural areas, with a total number of loan accounts of 2,91,197. The flow of credit has increased from Rs.19,065.79 lakhs in 1999-2000 to Rs.27,284.77 lakhs in 2002-2003, which is an increase by 43 percent. The loan recovery percentage has been only 61.5 percent, which is a two year average (viz. 2001 and 2002) of all banks average percentage recovery. This is the lowest among the three districts being analysed.

While in the case of Nizamabad district only 130 bank branches are in rural areas of the total 196 branches, with a total number of loan accounts of 4,89,125. The average population per branch is 11,954. The flow of credit has been almost Rs.11,592.51 lakhs in 2001-02. There has been a slightly better loan recovery percentage of 69 percent, as against Chittoor district, which is a three year average (viz. 2000, 2001 and 2002) of all banks average percentage recovery.

Overall, it can thus be observed that West Godavari district is agriculturally more productive and also has relatively higher banking activity with very good loan recovery rates, followed by Chittoor district and Nizamabad district. The flow of credit is also substantially higher in West Godavari district, as compared to Chittoor and Nizamabad.

3.8. Conclusion

Andhra Pradesh is one among the top agricultural production states of India. The West Godavari district, Chittoor district and Nizamabad district are the representative districts of three regions of AP viz. Coastal Andhra region, Rayalseema region and Telangana region respectively. Their profiles discussed indicate quite good agricultural and banking/credit activity, with West Godavari district relatively on the higher side and Nizamabad relatively at the lower side, among the three districts. Hence, the need for ICT implementation in rural bank branches for improved service would have more relevance in these regions to begin with. The findings of the analyses done in the following chapters would also reflect the real need of the rural citizens with respect to agricultural credit and ICT in banks.

Thus, the profile analysis in this chapter gives the perspective of the regions where the research survey was conducted. Hence, the analyses in the subsequent chapters need to be studied in light of district profiles discussed in this chapter to better understand the issue, importance and the need of ICT implementation in rural banks for improved banking service.

CHAPTER 4

BACKGROUND/CHARACTERISTICS OF THE RESPONDENTS

4.1. Introduction

The background/characteristics of the respondents are discussed in this chapter. As mentioned earlier, respective structured questionnaires were administered to four sets of respondents' viz. Farmer customers, Bankers, Information Technology staff/system administrators and the Top Management of the respective bank. Prior to the quantitative and qualitative analyses in the following chapters, this chapter gives a better understanding and good perspective of the respondents whose responses would be analysed.

The relevant tables are placed along with the topic being analysed. In cases of larger tables, they are attached in the Appendix, however, the summary of the same are provided along with the text wherever possible, indicating the relevant Appendix source.

4.2. Background/Characteristics of Respondents

This section primarily deals with the background details of the farmers, bank managers, IT staff and top management respondents. This study provides a useful perspective of the respondents whose responses are analysed to achieve the research objective. It may be noted that the farmers were very reluctant to provide their income/production revenue details. It was also observed that they tended to exaggerate the production costs.

4.2.1. Broad Significance of Background/Characteristics of Farmer Respondents

The study of the background/characteristics of the farmer respondents help to give a perspective of the respondents who visited and regularly transacted with the banks for their agricultural and personal needs. Since these respondents regularly transact with the banks, their responses are expected to provide a realistic and pragmatic view on the banking service.

4.2.1.1. Sample Distribution across Bank Types

The details of respondent farmers who availed credit from cooperative and commercial banks have been provided in respective tables below, for each district, in terms of bank operations and farmer size wise.

As seen from Table 4.1, all the farmers interviewed in West Godavari (WG) district cultivated on their own land. The sample size of farmers analysed in this district is 116. The number of Medium and Small farmers of computerised commercial bank considered for analysis are 8 each. Whereas, in all other cases 10 farmers in each landholding are analyzed.

Table 4.1: Farmer Size, Bank and Operations wise, Sample and Land Ownership details of farmers in West Godavari district

Sl. No.	Bank and Farmer Size	Ownership of cultivated land	Manual Operations	Computerised Operations	Total
I	***Cooperative***				
1	Large farmers (> 5 acres)	own	10	10	20
2	Medium farmers (2.5 - 5 acres)	own	10	10	20
3	Small farmers (< 2.5 acres)	own	10	10	20
4	**Total**		30	30	**60**
II	***Commercial bank***				
1	Large farmers (> 5 acres)	own	10	10	20
2	Medium farmers (2.5 - 5 acres)	own	10	8	18
3	Small farmers (< 2.5 acres)	own	10	8	18
4	**Total**	Own	30	26	**56**
III	***Farmer Sample Size surveyed for West Godavari district (I.4+ II.4)***			**60 + 56 =**	**116**

Source: Authors field work tabulated in A – 4.1

It may be noted that, Pedapadu Large Scale Cooperative Society (LSCS) customers were interviewed as customers of manual cooperative, and as customers of computerised cooperative the Tadepalligudem LSCS customers were interviewed. Similarly, Vijayrai State Bank of India's customers were interviewed as customers of manual commercial and as customers of computerised commercial the Tadepalligudem SBI customers were interviewed (also refer A – 4.1).

Table 4.2, shows that all the farmers interviewed in Chittoor (CH) district cultivated on their own land. The sample size of farmers analysed in this district is 116. The number of large farmers in computerised cooperative considered for analysis are 6. Whereas, in all other cases 10 farmers in each landholding are analyzed.

It may be noted that, Ellamrajpalli PACS customers were interviewed as customers of manual cooperative and as customers of computerised cooperative Gangadhara Nellore PACS customers were interviewed. Similarly, SriKalahasthi Agricultural Development Bank, State Bank of India's customers were interviewed as customers of manual commercial and as customers of computerised commercial Piller SBI customers were interviewed. (also refer A – 4.2).

Table 4.2: Farmer Size, Bank and Operations wise, Sample and Land Ownership details of farmers in Chittoor district

Sl. No.	Bank and Farmer Size	Ownership of cultivated land	Manual Operations	Computerised Operations	Total
I	***Cooperative***				
1	Large farmers (> 5 acres)	own	6	10	16
2	Medium farmers (2.5 - 5 acres)	own	10	10	20
3	Small farmers (< 2.5 acres)	own	10	10	20
4	**Total**		26	30	**56**
II	***Commercial bank***				
1	Large farmers (> 5 acres)	own	10	10	20
2	Medium farmers (2.5 - 5 acres)	own	10	10	20
3	Small farmers (< 2.5 acres)	own	10	10	20
4	**Total**	own	30	30	**60**
III	***Farmer Sample Size surveyed for Chittoor district (I.4+ II.4)***			**60 + 56 =**	**116**

Source: Authors field work tabulated in A – 4.2

As on date of survey the rural branches in West Godavari and Chittoor district were not computerised and hence the respective computerised semi-urban branches with substantial rural business were surveyed.

The sample size of farmers analysed in Nizamabad (NZ) district is 104, as seen in Table 4.3. The number of large farmers interviewed and considered for analysis in manual operations and computerised operations cooperative bank are 8 and 6 respectively. Similarly, the number of large farmers interviewed and considered for analysis in manual operations and computerised operations commercial bank are 6 and 4 respectively Whereas, in all other cases 10 farmers in each landholding are analyzed.

Table 4.3: Farmer Size, Bank and Operations wise, Sample and Land Ownership details of farmers in Nizamabad district

Sl. No.	Bank and Farmer Size	Ownership of cultivated land	Manual Operations	Computerised Operations	Total
I	***Cooperative***				
1	Large farmers (> 5 acres)	own	8	6	14
2	Medium farmers (2.5 - 5 acres)	own	10	10	20
3	Small farmers (< 2.5 acres)	own	10	10	20
4	**Total**		28	26	**54**
II	***Commercial bank***				
1	Large farmers (> 5 acres)	own	6	4	10
2	Medium farmers (2.5 - 5 acres)	own	10	10	20
3	Small farmers (< 2.5 acres)	own	10	10	20
4	**Total**	own	26	24	**50**
III	***Farmer Sample Size surveyed for Nizamabad district (I.4+ II.4)***			**54 + 50 =**	**104**

Source: Authors field work tabulated in A – 4.3

It may be noted that, Armoor PACS customers were interviewed as customers of manual cooperative and as customers of computerised cooperative the Indalwai PACS customers were interviewed. Similarly, Binola SBI customers were interviewed as customers of manual commercial and as customers of computerised commercial Ramadugu the SBI customers were interviewed. (also refer A – 4.3).

The total sample size of farmers' analysed in this research is (116+116+104) **336** out of the planned 360. The shortfall in the number of farmers in respective categories used for analysis is due to reasons such as, non-availability during survey or inconsistency in their responses. Thus, responses from 93.3 percent of respondents were used for analyses.

4.2.1.2 Cropping Pattern

Tables 4.4, 4.5 and 4.6 provide the details of crops grown by the farmers surveyed for the year 2002-2003 in the three districts surveyed. Due to prevailing drought conditions in Andhra Pradesh the crops cultivation has not been to the desired extent, which is analysed below. However, those farmers with access to water could cultivate well. It must be noted that few farmers were able to grow more than one crop in a given season viz; paddy and sugarcane were both grown in kharif season in Chittoor district. Hence, in this analysis the number of farmers shown in Tables 4.4, 4.5 and 4.6 is not absolute but it only conveys that a certain crop was grown by certain number of farmers.

Table 4.4: Cropping pattern of respondents in West Godavari district

	Year 2002-2003	MANUAL OPERATIONS							
		Rabi				Kharif			
Sl. No.	Bank and Farmer Size	Paddy	Pulses	Sugar cane	Sun flower	Paddy	Pulses	Sugar cane	Maize
I	***Cooperative***								
1	Large farmers		6			10			
2	Medium farmers					10			
3	Small farmers	2				10			
II	***Commercial bank***								
1	Large farmers				8	8			2
2	Medium farmers	4			4	10			
3	Small farmers				2	8			
		COMPUTERISED OPERATIONS							
III	***Cooperative***								
1	Large farmers			10		10			
2	Medium farmers			2		10			
3	Small farmers					10			
IV	***Commercial bank***								
1	Large farmers			10		10	2		
2	Medium farmers	4			2	8			
3	Small farmers					8			
V	**Total (I+II+III+IV)**	10	6	22	16	112	2	0	2

Total no of farmers growing in: Rabi season 54 Kharif season 116

Source: Authors field work

54 farmers out of 116 interviewed in West Godavari district cultivated during rabi season as seen in Table 4.4. Crops like pulses, sunflower and sugarcane, which need relatively lesser water than paddy, were preferred. Almost all of them cultivated Paddy during Kharif.

Table 4.5: Cropping pattern of respondents in Chittoor district

	Year 2002-2003	MANUAL OPERATIONS							
		Rabi				Kharif			
Sl. No.	Bank and Farmer Size	Paddy	Pulses	Sugar cane	Oilseeds	Paddy	Pulses	Sugar cane	Oilseeds
I	***Cooperative***								
1	Large farmers							6	6
2	Medium farmers							10	6
3	Small farmers							4	10
II	***Commercial bank***								
1	Large farmers				10	10			
2	Medium farmers				6	10			
3	Small farmers				8	10			
		COMPUTERISED OPERATIONS							
III	***Cooperative***								
1	Large farmers							8	7
2	Medium farmers			2		2		8	6
3	Small farmers			2	2			6	2
IV	***Commercial bank***								
1	Large farmers							8	10
2	Medium farmers							10	6
3	Small farmers					4		6	6
V	**Total (I+II+III+IV)**	0	0	4	26	36	0	66	59

Total no of farmers growing in: Rabi season 30 Kharif season 161

Source: Authors field work

Table 4.6: Cropping pattern of respondents in Nizamabad district

	Year 2002-2003	MANUAL OPERATIONS								
		Rabi				Kharif				
Sl. No.	Bank and Farmer Size	Paddy	Pulses	Sugar cane	Oil seeds	Paddy	Maize	Turmeric	Oil seeds	Wheat
I	***Cooperative***									
1	Large farmers					8	8	4		
2	Medium farmers					6	8			2
3	Small farmers					8	10			
II	***Commercial bank***									
1	Large farmers					6	6		6	
2	Medium farmers					10	10		10	
3	Small farmers					10	10			
		COMPUTERISED OPERATIONS								
III	***Cooperative***									
1	Large farmers					6	6	6		
2	Medium farmers					10	10	4		
3	Small farmers					6	10			
IV	***Commercial bank***									
1	Large farmers					4	4			
2	Medium farmers					10	10	2		
3	Small farmers					10	8			2
V	**Total (I+II+III+IV)**	0	0	0	0	94	100	16	16	4

Total no of farmers growing in: Rabi season 0 Kharif season 230

Source: Authors field work

In Chittoor district of AP, 30 farmers out of 116 farmers interviewed cultivated during Rabi season as seen in Table 4.5. During rabi season sugarcane and oilseeds were cultivated by farmers. During the kharif season, most of them grew sugarcane in this region, followed by paddy and oilseeds.

It was observed that none of the farmers interviewed in Nizamabad district of AP cultivated during the rabi season (Table 4.6). During kharif season most of the farmers cultivated maize followed by paddy. Few farmers surveyed also grew turmeric and oilseeds.

Thus, the study has good set of respondents having experience with cultivating variety of crops. All the farmers interviewed were actively involved in the farming activity and hence approach banks for the much needed agricultural credit. Adequate, timely credit and good banking service would thus, be expected by these respondents.

4.2.1.3. Age and Family Size

The personal details of farmers related to farmer size, their family size, number of earning members and their bank branch of West Godavari, Chittoor and Nizamabad district respectively are provided in A – 4.1, A – 4.2 and A – 4.3. The summary of these tables are shown in Tables 4.7, 4.8 and 4.9. In all cases, it is noted that a) the average

number of earning members per family is one, b) the interviewed farmers were males and c) the respondents interacted with are the earning members of the family.

Table 4.7: Personal details of the farmer respondents in West Godavari District

Size of farmers	Average Family size	Average age	Earning member
Large farmer	6	46 years	1
Medium farmer	6	51 years	1
Small farmer	6	42 years	1

Source: Authors field work tabulated in A – 4.1

Table 4.8: Personal details of the farmer respondents in Chittoor District

Size of farmers	Average Family size	Average age	Earning member
Large farmer	6	49 years	1
Medium farmer	6	44 years	1
Small farmer	5	47 years	1

Source: Authors field work tabulated in A – 4.2

Table 4.9: Personal details of the farmer respondents in Nizamabad District

Size of farmers	Average Family size	Average age	Earning member
Large farmer	6	47 years	1
Medium farmer	6	49 years	1
Small farmer	6	49 years	1

Source: Authors field work tabulated in A – 4.3

The average age of the farmer respondents in West Godavari district, Chittoor district and Nizamabad district is 47 years, 46 years and 48 years, respectively. On an average the respondents' family size was 6. Thus, the responses from experienced farmers are obtained for the study.

4.2.1.4. Income Distribution

The Income distribution per year of farmers of West Godavari is tabulated in Table 4.10. It is observed that good percentage of large farmers had annual income in the range of Rs. 36,000 – Rs. 60,000. The medium farmers annual income was around Rs. 24,000 – 36,000 and the small farmers were mostly in the range of Rs.12,000 – Rs. 24,000.

Table 4.10: Annual income distribution of farmers in West Godavari district

(range of Rs.) **K - '000**

Sl. no	Bank and Farmer Size	MANUAL OPERATIONS					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers		2 (20%)	2 (20%)	6 (**60%)**		10 (100%)
2	Medium farmers	2 (20%)	8 (**80%)**				10 (100%)
3	Small farmers	5 (**45%)**	4 (36%)	2 (18%)			11(100%)
II	***Commercial bank***						
1	Large farmers				7.5 (**75%)**	2.5 (25%)	10 (100%)
2	Medium farmers			6 (43%)	6 (**43%)**	2 (14%)	14 (100%)
3	Small farmers	6 (**60%)**	2 (20%)	2 (20%)			10 (100%)
Sl. no	**Bank and Farmer Size**	**COMPUTERISED OPERATIONS**					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers			4 (**40%**)	3 (30%)	3 (30%)	10 (100%)
2	Medium farmers		2 (18%)	7 (**64%)**	2 (18%)		11 (100%)
3	Small farmers	3 (30%)	7 (**70%)**				10 (100%)
II	***Commercial bank***						
1	Large farmers				2 (20%)	8 (**80%)**	10 (100%)
2	Medium farmers		2 (25%)	6 (**75%)**			8 (100%)
3	Small farmers	6 (**75%)**	2 (25%)				8 (100%)

Source: Authors field work tabulated in A – 4.4

The income distribution per year of farmers of Chittoor district is depicted in Table 4.11. Here too it is observed that good percentage of large farmers are affluent with their annual income in the range of Rs. 36,000 – Rs. 60,000. The medium farmers had an annual income in the range of Rs. 12,000 – Rs. 24,000 and most of the small farmers had their income less than Rs.12,000 per year.

Table 4.11: Annual income distribution of farmers in Chittoor district

(range of Rs.) **K - '000**

Sl. no	Bank and Farmer Size	MANUAL OPERATIONS					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers		2 (20%)	2 (20%)	6 (**60%**)		10 (100%)
2	Medium farmers	2 (20%)	8 (**80%**)				10 (100%)
3	Small farmers	5 (**50%**)	4 (40%)	2 (20%)			11 (110%)
II	***Commercial bank***						
1	Large farmers				7.5 (**75%**)	2.5 (25%)	10 (100%)
2	Medium farmers			6 (43%)	6 (**43%**)	2 (14%)	14 (100%)
3	Small farmers	6 (**60%**)	2 (20%)	2 (20%)			10 (100%)
Sl. no	**Bank and Farmer Size**	**COMPUTERISED OPERATIONS**					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers			4 (**40%**)	3 (30%)	3 (30%)	10 (100%)
2	Medium farmers		2 (18%)	7 (**64%**)	2 (18%)		11 (100%)
3	Small farmers	3 (30%)	7 (**70%**)				10 (100%)
II	***Commercial bank***						
1	Large farmers				2 (20%)	8 (**80%**)	10 (100%)
2	Medium farmers		2 (25%)	6 (**75%**)			8 (100%)
3	Small farmers	6 (**75%**)	2 (25%)				8 (100%)

Source: Authors field work tabulated in A – 4.5

Table 4.12: Annual income distribution of farmers in Nizamabad district

(range of Rs.) **K - '000**

Sl.no	Bank and Farmer Size	MANUAL OPERATIONS					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers				7 (**78%**)	2 (22%)	9 (100%)
2	Medium farmers		4 (33%)	6 (**50%**)	2 (17%)		12 (100%)
3	Small farmers		4 (40%)	6 (**60%**)			10 (100%)
II	***Commercial bank***						
1	Large farmers					6 (**100%**)	6 (100%)
2	Medium farmers			5 (50%)	5 (**50%**)		10 (100%)
3	Small farmers		8 (**80%**)	2 (20%)			10 (100%)
Sl.no	**Bank and Farmer Size**	**COMPUTERISED OPERATIONS**					
		3. Average of Current & Last Year range of Income					Total % of column.3
		<12,000	12K - 24K	24K - 36K	36K - 60K	> 60K	
I	***Cooperative***						
1	Large farmers				4 (**67%**)	2 (33%)	6 (100%)
2	Medium farmers			8 (**80%**)	2 (20%)		10 (100%)
3	Small farmers		8 (**80%**)	2 (20%)			10 (100%)
II	***Commercial bank***						
1	Large farmers				4 (**100%**)		4 (100%)
2	Medium farmers			8 (**80%**)	2 (20%)		10 (100%)
3	Small farmers		6 (**60%**)	4 (40%)			10 (100%

Source: Authors field work tabulated in A – 4.6

The income distribution per year of farmers of Nizamabad district is tabulated in Table 4.12. Good percentage of large farmers had their annual income in the range of Rs. 36,000 – Rs.60,000. The medium farmers had their annual income in the range of Rs. 24,000 – 36,000 and the small farmers are mostly in the range of Rs. 12,000 – Rs. 24,000.

Thus, the above income distribution indicates that quite good number of the farmers surveyed are generating reasonable annual income, while few are earning in good proportion. They seek additional help from banks to augment this to support their agricultural activity.

4.2.1.5. Production Cost and Revenue

The number of farmers with their details of 'average cost of production per acre' and 'average revenue per acre from agricultural output', in West Godavari district, Chittoor district and Nizamabad district, respectively are tabulated in A – 4.7 to A – 4.10, A – 4.11 to A – 4.14 and A – 4.15 to A – 4.18, respectively.

For easy of analysing the data tabulated in A – 4.7 and A – 4.8 in the case of West Godavari district, which provides the details of the year, cost and revenue 'bank operations wise', the same are re-tabulated 'farmer size wise' in A – 4.9 and A – 4.10. The column m, n and o in this re-tabulated tables represent the number of large, medium and small farmers having respective cost and revenue. The same is followed in the case of Chittoor (A – 4.11 & A – 4.12 re-tabulated in A – 4.13 & A – 4.14) and so for Nizamabad district too.

In West Godavari district, it is observed from Tables 4.13 and Table 4.14, that most of the large farmers have an average cost of production to be around Rs.6,000 – Rs. 12,000 per acre, while the average revenue per acre from agricultural output is around Rs.15,000 – Rs.18,000. The medium farmers indicate their average cost of production to be around Rs.6,000 – Rs.9,000 per acre, while the average revenue per acre from agricultural production is around Rs.9,000 – Rs.12,000. The small farmers state that their average cost of production is around Rs.3,000 per acre and less, while the average revenue per acre from agricultural production is around Rs.3,000 – Rs.6,000.

It is observed that Average cost and revenue are relatively high in the case of manual commercial bank, computerised cooperative and computerised commercial bank

since there were farmers from here who grew Sugarcane, Sunflower and Pulses during Rabi season as seen earlier in Table 4.4, Table 4.5 and Table 4.6. These are crops that require comparatively lesser water than paddy, but need more care and other inputs like fertilisers, pesticides, manpower etc. as explained in A – 4.13, later. The returns on the other hand, from Sugarcane and Sunflower are higher than Paddy.

Table 4.13: No. of farmers average cost of agricultural production per acre: West Godavari

		TOTAL no of farmers (man+comp)		
Sl. no	Rupees Range	Large farmers	Medium farmers	Small farmers
	Cooperative	**m**	**n**	**o**
1	< 3k	0	0	**22**
2	3k – 6k	6	18	18
3	6k – 9k	14	**20**	0
4	9k – 12k	**18**	2	0
5	12k – 15k	2	0	0
6	15k – 18k	0	0	0
7	18k – 21k	0	0	0
8	> 21k	0	0	0
	Commercial bank			
9	< 3k	0	0	**16**
10	3k – 6k	0	10	14
11	6k – 9k	3	**18**	6
12	9k – 12k	**21**	8	0
13	12k – 15k	8	0	0
14	15k – 18k	0	0	0
15	18k – 21k	4	0	0

Source: Authors field work tabulated in A – 4.9

Table 4.14: No. of farmers average revenue per acre from agricultural output: West Godavari

		TOTAL no of farmers (man+comp)		
Sl. No	Rupees Range	Large farmers	Medium farmers	Small farmers
	Cooperative	**m**	**n**	**o**
1	< 3k	0	0	2
2	3k – 6k	0	10	**30**
3	6k – 9k	0	4	4
4	9k – 12k	**14**	**24**	4
5	12k – 15k	8	2	0
6	15k – 18k	4	0	0
7	18k – 21k	10	0	0
8	> 21k	4	0	0
	Commercial bank			
9	< 3k	0	0	0
10	3k – 6k	0	0	**28**
11	6k – 9k	0	0	4
12	9k – 12k	0	**24**	4
13	12k – 15k	0	6	0
14	15k – 18k	10	6	0
15	18k – 21k	8	0	0

Source: Authors field work tabulated in A – 4.10

In Chittoor district, as observed from Table 4.15 and 4.16, most of the large farmers indicate that their average cost of production is around Rs.6,000 – Rs.9,000 per acre, while their average revenue per acre from agricultural output is around Rs. 12,000 – Rs.18,000. The medium farmers have an average cost of production to be around Rs.6,000 – Rs.9,000 per acre, while the average revenue per acre from agricultural production is around Rs.9,000 – Rs.12,000. The small farmers state that their average cost of production is around Rs.3,000 – Rs.6,000 per acre, while the average revenue per acre from agricultural production is around Rs.6,000 – Rs.9,000. This is due to many of them also grew sugarcane, as discussed earlier, which provides good returns

Table 4.15: No. of farmers average cost of agricultural production per acre: Chittoor

		TOTAL no of farmers (man+comp)		
Sl. no	Rupees Range	Large farmers	Medium farmers	Small farmers
	Cooperative	**m**	**n**	**o**
1	< 3k	0	0	0
2	3k – 6k	**12**	12	10
3	6k – 9k	10	**16**	**22**
4	9k – 12k	4	8	4
5	12k – 15k	6	2	4
6	15k – 18k	0	2	0
7	18k – 21k	0	0	0
8	> 21k	0	0	0
	Commercial bank			
9	< 3k	0	0	4
10	3k – 6k	0	**18**	**28**
11	6k – 9k	**24**	16	8
12	9k – 12k	14	2	0
13	12k – 15k	2	0	0
14	15k – 18k	0	2	0
15	18k – 21k	0	2	0
16	> 21k	0	0	0

Source: Authors field work tabulated in A – 4.13

Table 4.16: No. of farmers average revenue per acre from agricultural output: Chittoor

		TOTAL no of farmers (man+comp)		
Sl. no	Rupees Range	Large farmers	Medium farmers	Small farmers
	Cooperative	**m**	**n**	**o**
1	< 3k	0	0	0
2	3k – 6k	0	2	0
3	6k – 9k	2	4	10
4	9k – 12k	10	**30**	**26**
5	12k – 15k	**12**	0	2
6	15k – 18k	4	2	2
7	18k – 21k	4	2	0
8	> 21k	0	0	0
	Commercial bank			
9	< 3k	0	0	0
10	3k – 6k	0	0	6
11	6k – 9k	0	**18**	**22**
12	9k – 12k	**16**	10	10
13	12k – 15k	8	4	2
14	15k – 18k	10	2	0
15	18k – 21k	4	2	0
16	> 21k	**2**	4	0

Source: Authors field work tabulated in A – 4.14

Table 4.17: No. of farmers average cost of agricultural production per acre: Nizamabad

		TOTAL no of farmers (man+comp)		
Sl. No	Rupees Range	Large farmers	Medium farmers	Small farmers
Cooperative		**m**	**n**	**o**
1	< 3k	0	0	**22**
2	3k – 6k	6	18	18
3	6k – 9k	14	**20**	0
4	9k – 12k	**18**	2	0
5	12k – 15k	2	0	0
6	15k – 18k	0	0	0
7	18k – 21k	0	0	0
8	> 21k	0	0	0
Commercial bank				
9	< 3k	0	0	**16**
10	3k – 6k	0	10	14
11	6k – 9k	3	**18**	6
12	9k – 12k	**21**	8	0
13	12k – 15k	8	0	0
14	15k – 18k	0	0	0
15	18k – 21k	4	0	0
16	> 21k	4	0	0

Source: Authors field work tabulated in A – 4.17

Table 4.18: No. of farmers average revenue per acre from agricultural output: Nizamabad

		TOTAL no of farmers (man+comp)		
Sl. no	Rupees Range	Large farmers	Medium farmers	Small farmers
Cooperative		**m**	**n**	**o**
1	< 3k	0	0	2
2	3k – 6k	0	10	**30**
3	6k – 9k	0	4	4
4	9k – 12k	**14**	**24**	4
5	12k – 15k	8	2	0
6	15k – 18k	4	0	0
7	18k – 21k	10	0	0
8	> 21k	4	0	0
Commercial bank				
9	< 3k	0	0	0
10	3k – 6k	0	0	**28**
11	6k – 9k	0	0	4
12	9k – 12k	0	**24**	4
13	12k – 15k	0	6	0
14	15k – 18k	10	6	0
15	18k – 21k	8	0	0
16	> 21k	**22**	0	0

Source: Authors field work tabulated in A – 18

In Nizamabad district, it is observed from Tables 4.17 and 4.18, that most of the large farmers have an average cost of production to be around Rs.9,000 – Rs.12,000 per acre, while the average revenue per acre from agricultural output is around Rs. 15,000 – Rs.18,000. The medium farmers indicate their average cost of production to be around Rs. Rs.6,000 – Rs.9,000 per acre, while the average revenue per acre from agricultural production is around Rs.9,000 – Rs.12,000. The small farmers state that their average cost of production is around Rs.3,000 per acre and less, while the average revenue per acre from agricultural production is around Rs.3,000 – Rs.6,000.

4.2.1.6. Institutional and Non-Institutional Credit Distribution

The details of credit availed by farmers from moneylenders, relatives/friends, landlords, cooperative and commercial banks during last year and current year, in West Godavari, Chittoor and Nizamabad districts, are provided in A – 4.19 to A – 4.22, A – 4.23 to A – 4.26 and A – 4.27 to A – 4.30, respectively.

Major observations in all the districts were that the large farmers obtain substantial amount of their loans from commercial or/and cooperative banks. Secondly, during discussions, it is also learnt that some large farmers while availing loan from commercial bank on one part of their large landholding also manage to get loans from cooperative or vice-versa. It is observed that credit was predominantly borrowed from money lenders by small farmers. Thus, the dependence on non-institutional sources of finance is highest among small farmers, followed by medium farmers.

4.2.1.7. Farm Input Expenditure

The details of expenditure on major farm inputs, per acre by the farmers in West Godavari, Chittoor and Nizamabad districts are provided in A – 4.31, A – 4.32 and A – 4.33, respectively. Details on major expenditures on agriculture related activities were sought from the respondents to give an idea on the major expenses incurred by the farmers. There could be various other expenses related to agricultural production not reflected here. It was found that expenditure on agricultural implements and cows/buffaloes/bullocks is not much reflected since they are long term investments and once invested incur only maintenance expenditure during subsequent years as compared to the others recurring expenditure heads mentioned.

The overall average (Sl. no. VI) of all farmers of West Godavari district in A – 4.31, depicts that the percentage expenditure on fertilisers is highest with an overall average of 32 percent of their total expenditure. This is followed by an overall average percentage expenditure on pesticides with 17 percent of their total expenditure. Percentage expenditure on land improvements is next with 16 percent of their total expenditure, followed by expenditure on manpower with 14 percent of their total expenditure.

It is observed that in case of large farmer, almost 27 percent of their total expenditure is spent on fertilisers. Next is the percentage expenditure on manpower forming 24 percent of their total expenditure, followed by 14 percent on land improvements. In the case of medium farmers 32 percent of their total expenditure is on fertilisers, followed by 19 percent on the land improvements and 18 percent on pesticides. In the case of small farmers 39 percent of their total expenditure is on fertilisers, followed by 19 percent on land improvements and pesticides. Next is the expenditure on seeds forming 18 percent of their total expenditure.

The overall average of all farmers of Chittoor district in A – 4.32, shows that the percentage expenditure on seeds is highest with an overall average of 27 percent of their total expenditure. This is followed by an overall average percentage expenditure on fertilisers with 20 percent and manpower with 18 percent of their total expenditure.

Similarly, in the case of Nizamabad district, it is observed in A – 4.33, that the percentage expenditure on seeds is highest with an overall average of 26 percent of their total expenditure. This is followed by an overall average percentage expenditure on fertilisers with 21 percent and manpower with 16 percent of their total expenditure.

The changing patterns of expenditure incurred are probably due to the regional variation in the crops being grown and charges for the various inputs as observed from Tables 4.4, 4.5 and 4.6.

4.2.2. Broad Significance of Background/Characteristics of Bank Manager Respondents

In all the three regions, in each of the four banks visited, the branch manager, the accountant and the field officer were interviewed. As mentioned in Research Methodology of Chapter-1, they would be referred as bank managers in the report. Thus, bank managers of the three regions together form the total manager sample of 36, as seen in Table 4.19.

Table 4.19: Manager Respondents sample size

Sl. No	Bank Wise Operations	Cooperative Bank		Computerised Bank		Total
		MAN OPS	COMP OPS	MAN OPS	COMP OPS	
1	WG Manager	3	3	3	3	12
2	CH Manager	3	3	3	3	12
3	NZ Manager	3	3	3	3	12
Source: Authors field work				**Total MGR Respondents**		**36**

Though, fairly a small sample however are expected to provide a good picture of the effect of computerization on banking operations, since they utilise computerised systems to provide banking service to customers. As mentioned earlier, in case there are no computerised rural branches, the computerised semi-urban branches having substantial agricultural loaning operations would be approached. Thus, in West Godavari and Chittoor district the Tadepalligudem, SBI and Piller, SBI were surveyed respectively (A – 4.35).

A – 4.34 provides a general perspective of agricultural credit and banking operations in the banks surveyed.

The average number of accounts in manual and computerised operations bank are 4325 and 5066, respectively. The average number of loan applications received in manual and computerised bank operations bank are 892 and 600, respectively. Among them, 809 loans in manual operations bank were sanctioned, while all those applied in computerised operations bank were sanctioned loan. The average amount of agricultural loans sanctioned in manual operations bank are Rs.98 lakhs, while in computerised bank it is Rs.160 lakhs.

It is observed that the average number of days taken to sanction a case of agricultural credit in cooperative banks, whether computerised or not, is around 27 days, while it takes just 6 days in commercial banks. As explained earlier, the delay is due to the credit sanctioning process being very long in cooperative. It is expected that computerisation would help in reducing this delay. There has been quite good repayment in these banks. The average percentage of repayment of all the banks has been around 81 percent.

Thus, overall these banks are performing quite well with adequate number of customers and have good agricultural loaning activities. Hence, survey of these banks and their customers can provide better insight for comparative study of computerised and non-computerised banking operations. This would also help to study the effect of computerised banking operations on providing banking services.

The bank branch and managers' details are tabulated in A – 4.35. It is observed that all the bank officials interacted with, had quite good experience and hence their responses are expected to be well seasoned and prove useful for the study. The total number of villages under the bank branch varied from the highest of 55 villages for manual commercial bank to the lowest of 3 in the case of manual cooperative.

4.2.3. Broad Significance of Background/Characteristics of IT Staff Respondents

The Information Technology Staff/System Administrators (ITS) sample surveyed is 17 as tabulated in Table 4.20. 12 belonged to the IT/computer department of respective bank surveyed. Among them few were surveyed at site i.e. located in their respective regions bank branch, while the others were surveyed at their respective banks head office. 5 belonged to the third party organisation (Cooption Technologies) implementing IT solutions in cooperatives.

Table 4.20: ITS Sample Size and respondent department details

Sl. no.	Department	Yes	No
1	IT/Computer Department	12	
2	Third Party organisation implementing IT solutions	5	
	Total Number of Respondents	**17**	

Source: Authors field work

Though the sample size is small, they are expected to provide a good picture on the benefits of computerisation since they are knowledgeable about the systems, are technically sound and responsible to implement the computerised banking solutions. Due to their small sample size their findings are used to support and reinforce the findings of the farmers and managers analyses.

Table 4.21 tabulates the details of the average period of experience of the respondents. It is observed that the ITS respondents have quite good experience in their field and hence their responses would be very useful for the present study.

Table 4.21: Average period of experience of the ITS respondents

Sl. no.	Department	Average exp. (yrs)
1	In banking sector	22 years
2	In rural branches	7 years
3	In the IT/Computer department	6 years
4	In rural areas in computer department / 3rd party	3 years

Source: Authors field work

In the case of the respondents of computer department in rural areas including the third party the average years of experience is 3 years. This is so since computerisation in rural areas is a recent development.

4.2.4. Broad Significance of Background/Characteristics of Top Management Respondents

The Top management sample surveyed is 15 as indicated in Table 4.22.

Table 4.22: Department the TM respondents belong to

Sl. no.	Department	Yes	No
1	Rural / Institutional Development Department	15	0

Source: Authors field work

The top management are executives at the head offices located in Hyderabad, the state capital of Andhra Pradesh. Few of them are even higher authorities i.e. they have the rural/institutional development departments under their purview apart from other departments.

Table 4.23: Average Period of experience of the TM respondents

Sl. no.	Department	Average years of experience
1	In banking sector	27
2	In rural development area	16

Source: Authors field work

The average period of experience of respondents in banking sector is 27 years and in rural development area is 16 years, as indicated in Table 4.23.

Here too, it may be noted that the sample size is small, however, they are expected to provide strategic view on the benefits of computerisation. Due to their small sample size their findings are used to support and reinforce the findings of the farmers and managers analyses.

4.3. Conclusion

This chapter provides a useful perspective of the profile of the respondents, in light of which the analyses need to be interpreted.

There has been almost equal representation of all the banks viz. computerised and non-computerised, commercial and cooperatives in the study. The total sample size of the farmer customers of these banks is 336. There has been variety of agricultural production in each district, with West Godavari producing more of paddy, Chittoor producing more of sugarcane and Nizamabad producing more of maize and paddy.

It is also observed that most of the farmers surveyed earn just sufficient annual incomes, which is inadequate and are in need of more credit for carrying out agricultural operations. It is observed that the cost of production per acre has been a little higher for large farmers as compared to small farmers. There is also higher dependence of small farmers on non-institutional credit. It is also observed that maximum expenditure is on fertilisers, manpower, land improvements, pesticides and seeds.

The banks surveyed overall had good performance and agricultural loaning activities. The bank mangers had good experience in the field of banking and in rural branches, while the IT staff also had good experience in IT and banking activities. The Top Management had also spent quite good amount of their career in rural development department of the bank.

Thus, the above discussions on the profile of the respondents indicates that appropriate people were surveyed, who can provide the best insight on the aspects of banking activities and the effect of computerisation on banking services.

The quantitative and qualitative analyses performed in the following chapters need to be interpreted in the backdrop of the above discussed profile.

CHAPTER 5

BANKING TRANSACTIONS ANALYSES

QUANTITATIVE ANALYSES - I

5.1. Introduction

In the following chapters an attempt is made to quantify the intangible benefits with respect to the banking services offered by the RFIs to the farming community. This is done based on the responses on the structured questionnaire from the Farmer customers, Bankers, Information Technology staff/System Administrators (ITS) and the Top Management (TM) of respective banks.

In quantitative analyses, the percentage analyses on various banking transactions is first performed, followed by applying appropriate statistical tools like weighted average method and median chi-square hypotheses testing on the ratings of the respondents. The responses are also subjected to qualitative analyses to substantiate and reinforce the findings of the quantitative analyses, with discussions on various intangible aspects that are difficult to quantify.

The quantitative analyses are divided into three chapters. The percentage analyses on various banking transactions are discussed in this Chapter (quantitative analyses - I). It analyses and compares the respondents' opinion on the various beneficial aspects of computerised banking transactions and manual banking transactions.

Chapter 6 deals with Banking Service Perception Analyses wherein, the responses of all the four set of respondents on various characteristics of banking transactions are analysed to study and compare the perception of computerised banking transaction and manual banking transactions by developing appropriate index (quantitative analyses - II). At first the farmers responses are analysed to obtain **Total Perceived Farmer Rating Index (TPFRI)**. The ratings of bank managers are then analysed to obtain **Total Perceived Manager Rating Index (TPMRI)**. Similarly, the ratings of the **Information Technology Staff/System Administrator Rating Index (TPITSRI)** and the **Top Management Rating Index (TPTMARI)** are also calculated and analysed.

To reinforce these analyses the Computerised and Manual Banking Service Comparative Analyses are performed on all the four sets of respondents and discussed in

Chapter 7 (quantitative analyses - III). Thus, **Total Farmers Scoring on Bank Operations (TFSBO) and Median Chi-square analysis and Hypothesis testing** are performed on the responses of the farmers. Similarly, **Total Bank Managers Score on Bank Operations (TMSBO) and Median Chi-square analysis and Hypothesis testing** are performed on the responses of the bank managers. This is followed by **Total Information Technology Staff/System Administrators Score on Bank Operations (TITSSBO) and Median Chi-square analysis and Hypothesis testing.** Finally, the **Total Top Management Score on Bank Operations (TTMSBO) and Median Chi-square analysis and Hypothesis testing** are performed.

Qualitative analyses on the potentials, constraints of computerisation and improvement of banking service are performed in Chapter 8. Thus, both quantitative and qualitative analyses are performed on the responses of the Farmers, Bank Managers, ITS and TM of the respective banks. Those aspects that are difficult to quantify are analysed in qualitative analyses, which is expected to be more insightful and reinforce the quantitative analyses. This would help in obtaining a holistic picture and understanding the effect and impact of the computerised banking operations on a) the customers receiving computerised banking services b) the personnel offering the service and c) the banking organisation.

As mentioned earlier, though the sample size of the ITS and TM respondents are small, their analyses are expected to provide better insight, support and strengthen the analyses of the farmers and managers responses. The mean and standard deviation analyses are also performed for the responses by the four set of respondents. It may be noted that the table in A – 6.1**,** is the master table, with indications for the calculation of rating index and scores. These indications are explained in the document while discussing the calculation process. The same calculation process is followed in tables from A – 6.2 to A – 6.4, A – 6.5 to A – 6.8 and A – 6.9 to A – 6.12.

5.2. Percentage Analyses on Various Banking Transactions

The responses of all the four sets of respondents on various banking transactions are subjected to percentage analyses in this section. At first, the responses of the farmers are subjected to percentage analyses. This is followed by percentage analyses of the responses of Bank Manager, ITS and TM.

5.2.1. Analysis of Farmer Responses

In Table 5.1, opinion on whether computerisation 'would' improve the overall banking service was sought from the respondents of the manual operations branch. Whereas, the respondents of the computerised operations were asked whether computerised operations 'has' improved their banking service.

It is interesting to note that 56 percent is the average of respondents of all the three regions of manual operations bank who are positive and state that computerisation 'would' improve the overall banking service. The respondents of West Godavari district are all favouring computerisation of banks. Whereas, 42 percent of all the three regions state that they don't know whether computerised operations would improve the banking service.

83 percent was the average of respondents of all the three regions of computerised operations bank who opined that computerisation has indeed improved banking service.

Table 5.1: Opinion on Computerisation improving overall banking service : Farmers

(nos. & percentage)

Sl. No.	Cooperative & Commercial Bank	MANUAL OPERATIONS				COMPUTERISED OPERATIONS			
		YES	NO	DON'T KNOW	Total	YES	NO	DON'T KNOW	Total
I.1	West Godavari district	60	0	0	60	54	2	0	56
I.2	Percentage	100%	0%	0%	100%	96%	4%	0%	100%
II.1	Chittoor district	20	0	36	56	50	0	10	60
II.2	Percentage	36%	0%	64%	100%	83%	0%	17%	100%
III.1	Nizamabad	18	4	34	56	35	9	6	50
III.2	Percentage	32%	7%	61%	100%	70%	18%	12%	100%
IV	Average Percentage (I.2+ II.2+III.2)/3	56%	2%	42%		83%	7%	10%	

Source: Authors field work tabulated in A – 5.1, A – 5.2 & A – 5.3

Only an average of 7 percent of respondents of all the three regions of computerised bank state that computerization has not improved the bank service. It is understood on further interaction that these farmers had encountered some bad experiences during their transactions like, printer breakdown, long time to transact due to staff on leave and may not be directly attributed to computerisation only. However, these situations are infrequent and may not be encountered by most of others. In Nizamabad district this percentage was relatively high of 18 percent, which could be probably due to computerisation being recently introduced with high incidences of such problems.

As seen in Table 5.2, the average time taken for farmers to get their turn after waiting in queue during fresh loan disbursal was around 37 minutes in computerised

operations bank, whereas, it took almost as high as 52 minutes in the manual operations bank. The time taken to complete transaction was least among commercial computerised banks. It was also observed that computerised cooperatives take more time (high of 58 mins) than manual Commercial banks (54 mins), which could be attributed to the fact computerisation is in process in the cooperative banks. Hence, the staffs of computerised cooperative are taking time to get used to the new system.

It takes 11 minutes to complete a transaction in computerised operations bank, while it takes almost 15 minutes to do the same in case of manual operations bank. This 4-5 minutes extra per customer causes good amount of delay and huge queue, considering the crowd especially during season. The average time taken to complete transaction was 12 minutes for computerised cooperative bank and was closer to manual operations commercial bank due to the reasons explained earlier.

Table 5.2: Average Time spent for various Banking Transactions : Farmers

(in minutes)

Sl No.	District	Average → / Bank wise	Time taken for turn, after waiting in queue during season (that year's fresh loan)		Time taken to complete a transaction		Time taken to update passbook		Time taken to meet manager for clarifications		Time taken to travel to bank from home	
			MAN OPS	COMP OPS	MAN OPS	COMP OPS	MAN OPS	COMP OPS	MAN OPS	COMP OPS	MAN OPS	COMP OPS
I	West Godavari	Cooperative	65	58	13	12	5	5	10	9	13	16
		Commercial bank	54	30	13	8	5	3	9	6	30	24
		District Average	**59**	**44**	**13**	**10**	**5**	**4**	**9**	**7**	**21**	**20**
II	Chittoor	Cooperative	42	28	15	12	5	5	5	4	23	24
		Commercial bank	34	25	14	10	5	3	5	4	20	27
		District Average	**38**	**27**	**15**	**11**	**5**	**4**	**5**	**4**	**21**	**26**
III	Nizamabad	Cooperative	76	43	14	12	5	4	6	5	28	26
		Commercial bank	40	39	13	11	5	4	5	5	24	25
		District Average	**58**	**41**	**14**	**11**	**5**	**4**	**6**	**5**	**26**	**25**
IV	**Overall Average**		**52**	**37**	**14**	**11**	**5**	**4**	**7**	**6**	**23**	**24**

Source: Authors field work tabulated in A – 5.4, A – 5.5 & A – 5.6

The average time taken to update passbook in computerised commercial bank was 3 minutes, being least among all, while in other cases it took almost 5 minutes each. As of survey date, no printed update of passbook was being given to farmers of computerised cooperative, as was being given at computerised commercial bank. Presently, the overall average time taken to update passbook, seems almost same with no much difference

between a computerised and manual operations bank. However, it must be noted that printed passbook is more clear and readable.

The average time taken to meet manager for any clarifications in manual and computerised banking operations shows not much difference, each taking around 6 to 7 minutes. The average time taken to travel from home to the bank was primarily analysed to find the amount of time the farmers had to invest for banking activities at an opportunity cost of agricultural activities. This totally depended on the distance of the bank from the residence of the farmers interviewed and the availability of convenient transport. On an average the farmers surveyed had to spend almost 20 minutes to reach their bank.

As observed in Table 5.3, the average number of days spent for 'No dues certificate' was almost 3-4 days. The ‘Sanctioning of Agricultural credit' was faster in computerised operations bank taking an average of 22 days, while it took almost 26 days in the case of manual operations bank. It is thus, seen that it takes much lesser number of days in commercial bank as compared to cooperatives.

The process of sanctioning in cooperatives is different from that in commercial banks. It was observed that cooperatives fix credit limits to each farmer in their area based on the land characteristics (size, soil, upland, low land etc.), crops grown, etc. and the PACS secretary waits until good number of applications are received. These are then processed together and then only sent as a whole to DCCB for approval. The formalities/procedures to be followed are the same even for one application and hence the PACS secretary waits for good number of applications to begin the procedures. Lot of time is also taken to verify the documents of the farmers and then the formalities of land hypothetication to the cooperative are to be done at the Sub-registrar office. Whereas, in commercial banks the sanctioning process is little faster. Only relevant documents like asset documents, Patadari Passbook etc, 'No due certificate' from other banks and credentials of the farmer are taken and verified after which the commercial bank manger himself sanctions. He is authorised to sanction to certain limits by virtue of his post, which can meet most of the requirements of the agricultural community. Only in cases of large long term loans the required files need to be referred to higher authorities. However, the farmers during discussion state that this time also has to be reduced.

Table 5.3: Average days spent for 'No Dues Certificate', 'Sanctioning of Credit' and 'Repayment of Credit' : Farmers *(no. of days)*

Sl no	District	Average → / Bank wise	Average no. of days spent to get 'No Dues Certificate from other bank		Average no. of days to sanction the credit applied for		Average days taken to repay the credit taken after selling the agricultural produce/output	
			MAN OPS	COMP OPS	MAN OPS	COMP OPS	MAN OPS	COMP OPS
I	West Godavari	Cooperative	1	2	31	32	5	3
		Commercial bank	2	2	22	17	3	3
		District Average	**2**	**2**	**27**	**25**	**4**	**3**
II	Chittoor	Cooperative	5	3	42	31	3	10
		Commercial bank	6	5	15	11	4	5
		District Average	**6**	**4**	**29**	**21**	**4**	**7**
III	Nizamabad	Cooperative	**5**	**3**	**35**	**31**	**6**	**5**
		Commercial bank	**2**	**2**	**13**	**11**	**4**	**4**
		District Average	**4**	**3**	**24**	**21**	**5**	**4**
IV	**Overall Average**		**4**	**3**	**26**	**22**	**4**	**5**

Source: Authors field work tabulated in A – 5.7, A – 5.8 & A – 5.9

These banks also had good repayment. The farmers surveyed state that they repay their credit on an average within 4-5 days after they sell their produce.

Table 5.4 tabulates the percentage of 'Yes' given by the respondents on dichotomous scale on various banking operations. It was observed that all farmers experienced crowd during most of their visits during season, with 97 percent of manual operations bank respondents stating ‘Yes’, while 86 percent of computerised operations bank stating the same. The relatively lesser crowd in computerised operations bank could be attributed to the relatively faster transactions in computerised bank.

An average of 96 percent of the respondents of manual operations banks state that the bank was crowded with books, ledgers, papers etc., while just 65 percent of the respondents of computerised operations bank state the same. In computerised commercial bank in West Godavari district a clear cut distinction to the question on the bank being crowded with books, ledgers, papers etc. with only 15 percent saying 'Yes', indicating that 85 percent of them stating that the bank was reduced of books, ledgers and papers. This can be attributed to the fact that due to computerisation there was relatively reduced utilisation of books, ledgers etc. While in computerised cooperative bank, good percentage of respondents felt that the bank was crowded with books, ledgers and papers. This is because computerisation is in process and there is still use of books, ledgers and papers.

However, they too are expected to experience the benefits after the transition from manual operations to computerised operations is complete.

Almost 56-53 percent of respondent state that the bank staff took long time to locate accounts and for transactions. There are quite high percentage of respondents who experience long time being taken by bank staff to process their documents. 92 percent of the respondents in manual operations bank felt that the bank staff take long time to process their documents, while it was relatively lesser percentage of 78 in the case of computerised operations bank. It is understood that computerisation speeds up internal processes but when applications and documents need to be dealt with external agencies like DCCB, sub-registrar office etc. there was delay. If these offices are networked, it is envisaged that the present delay can be drastically reduced.

Table 5.4: Percentage Responses as 'Yes' on various banking transactions : Farmers

(Percentage)

Sl.no.	Questions	Bank operations		West Godavari		Chittoor		Nizamabad		Avg.
				Cooperative	Commercial	Cooperative	Commercial	Cooperative	Commercial	
1	Bank crowded with people during most of your visits, during season?	Manual		93	87	100	100	100	100	97
		Computerised		93	74	80	70	100	100	86
2	Is the bank crowded with books, ledgers, papers etc.?	Manual		87	87	100	100	100	100	96
		Computerised		80	15	100	13	83	100	65
3	Does the staff take long time, to locate accounts and for transactions?	Manual		13	7	27	20	40	56	27
		Computerised		0	0	12	9	41	53	19
4	Does the bank staff take long time to process your documents?	Manual		93	93	100	77	100	90	92
		Computerised		93	89	80	42	93	73	78
5	Is any information you seek is provided quickly?	Manual		93	100	100	93	93	100	97
		Computerised		100	100	100	100	93	100	99
6	Do the bank officials frequently tell that they are busy and are inattentive?	Manual		0	0	0	0	0	0	0
		Computerised		0	0	0	0	0	0	0
7	Do the bank officials send you off without any reason?	Manual		0	0	0	0	7	0	1
		Computerised		0	0	0	0	0	0	0
8	Is there a need to keep aside a day for banking purpose only?	Manual		7	13	100	100	93	90	67
		Computerised		0	7	87	82	100	100	63
9	Do you experience any red-tape while getting agricultural credit?	Manual		0	0	0	0	0	0	0
		Computerised		0	0	0	0	0	0	0
10	Do you experience any corruption while getting agricultural credit?	Manual		0	0	0	0	0	0	0
		Computerised		0	0	7	0	0	0	1
11	Number of visits to bank from application to sanction of loan. (% for no. of Visits)	Manual	2 vts	67	80			20	33	50
			3-5 vts	40	20	60	80	77	81	60
			6-8 vts	20		40	30	25	25	28
		Computerised	2 vts	93	93	30	20	17	10	44
			3-5 vts	20	20	67	87	91	87	62
			6-8 vts			20	20	10	15	16

Source: Authors field work tabulated in A – 5.10, A – 5.11 & A – 5.12

It was observed that across all the banks, the respondents' state that any information sought was provided quickly, the bank officials are quite attentive and do not send off without any reason. Similarly, the respondents state that they do not experience much red-tape and corruption while getting agricultural credit. Though, few farmers in Chittoor district did state that they experienced corruption in cooperatives.

Almost 65 percent of respondents of all banks opined that they need to keep aside a day for banking purpose only. It was observed that most of the farmers work was done in 3-5 visits in all the banks as stated by an average of 61 percent respondents. However, an average of 28 percent of respondents in manual operations bank state that they had to visit the bank 6-8 times from application to sanction of credit, while it was the case by only 16 percent in computerised operations bank. Thus, this indicates that most of sanctioning in computerised operations bank happens within 3-5 visits.

5.2.2. Analysis of Bank Managers Responses

It is observed from Table 5.5, that the average number of days to sanction a case of agricultural credit in cooperative is clearly very high as compared to commercial bank The managers of respective banks state that it took 25-28 days on an average to sanction a case of agricultural credit in the case of cooperatives, whereas, it took just 5-6 days in case of commercial bank. This is primarily due to the procedural differences in the way loans are sanctioned in cooperative and commercial banks. However, there seems a gap in the number of days taken to sanction credit in commercial banks, as perceived by farmers in Table 5.3 and as indicated by the bank managers in Table 5.5. This difference could be due to reasons that though the loan is sanctioned, it takes more days by the time the order is in its final form and the loan credited/reaches the farmer, and hence the farmers state that it takes some 11-17 days.

The average percentage repayment in manual cooperative was 84 percent and for computerised cooperative it was 75 percent. In the case of manual commercial the average repayment percentage was 72 percent and for computerised commercial it was 93 percent.

The average time taken to complete one transaction of a farmer in manual operations bank was 14 minutes, while it just took around 8 minutes in computerised operations bank. Thus, it takes approximately 5 minutes more time for a single transaction in manual operations compared to computerised operations. This saving using computerised operations when projected for the whole day, month and year is a large

saving in computerised operations, which could be appropriately utilised for business development.

Average time taken to update a passbook of a farmer in manual operations bank was stated to be 5 minutes. Whereas, it took approximately 3 minutes in computerised banking operations. The average time spent on paper work per day was approximately 7 hours in manual bank operations and approximately 5 hours in the case of computerised bank operations.

Table 5.5: Average of various banking activities and transactions : Bank managers

Sl. No	Questions	Bank Operations	Cooperative	Commercial	Avg.
Summary of A – 4.34 (m to p)					
1	Average number of days taken to sanction a case of agricultural credit (days)	**Manual**	28	6	17
		Computerised	25	5	15
2	Percentage repayment of credit (%)	**Manual**	84	72	78
		Computerised	75	93	84
Summary of A – 5.13					
1	Average time taken to complete one transaction of a farmer (mins)	**Manual**	15	13	14
		Computerised	9	8	8.5
2	Average time taken to update a passbook of a farmer (mins)	**Manual**	5	5	5
		Computerised	4	3	3.5
3	Average time spent on paper work per day (hrs)	**Manual**	7	7	7
		Computerised	6	5	5.5
4	Average time spent interacting with farmers per day (hrs)	**Manual**	5	4	4.5
		Computerised	6	5	5.5
5	Average number of days to fix a technical problem in the computer (days)	**Manual**			
		Computerised	2	1	1.5
6	Approximate number of clarifications by farmers regarding entries in passbook per month due to non-clarity of what is written in the passbook. (number)	**Manual**	4	3	3.5
		Computerised	2	2	2

Source: Authors field work tabulated in A – 4.34 (m to p) & A – 5.13

The average time spent for interacting with farmers per day was approximately 5 hours in manual bank operations and approximately 6 hours in computerised banking operations. The average number of days to fix any technical problem in the computers was stated to be 2 days in computerised banking operations. This has to be reduced to reduce the downtime of the computerised operations. Finally, the approximate number of clarifications by farmers regarding entries in the passbook per month due to no-clarity of what was written in passbook was 3 times in case of manual operations and 2 times in case of computerised operations.

5.2.3. Analysis of Information Technology Staff/System Administrators' Responses

Table 5.6, tabulates the ITS responses on their perception of the attitude of their management towards computerisation of PACS/rural branches. 59 percent of the ITS state that their management encourages computerisation of rural branches, while 33 percent felt that their management was against computerisation. 8 percent of them felt that the management is neutral.

Table 5.6: Attitude of their management towards computerisation of PACS/rural branches: ITS

Sl. no.	Attitude towards bank computerisation	Average of percentage		Percentage
1	Encourage computerisation of rural branches	82	=82*100/139	59
2	Against computerisation of rural branches	46		33
3	Management is neutral	11		8
4	TOTAL	139		100

Source: Authors field work

The reason being attributed to the top management being against computerisation is that, they presently are unaware of the new technology and not interested to know more about it since most are towards their end of career. Secondly, during discussion some respondents under anonymity state that few of the top management were involved in some misappropriation cases, which they fear would be traced if computerised.

Table 5.7 tabulates the ITS opinion on fully computerised branch/PACS. 100 percent of them state that both front and back office should be computerised and all banking activities should be done through them.

Table 5.7: Opinion on Fully computerised branch / PACS: ITS

Sl. no.	Attitude towards bank computerisation	Percentage
1	Front office computerised	0
2	Back office computerised	0
3	Both front and back office computerised and all banking activities done through/using them	**100**

Source: Authors field work

The opinion on whether computerisation of banks has improved their functioning is tabulated in Table 5.8. 88 percent of the ITS respondents have opined that computerisation has indeed improved the functioning of the bank, whereas 12 percent said that there is no improvement. 82 percent of ITS state that rural financial institutions/branches should be computerised, while 18 percent state otherwise, as seen in Table 5.9.

Table 5.8: Opinion on whether computerisation of banks has improved their functioning: ITS

Sl. no.	Opinion on improvement of bank functioning	Percentage
1	YES	**88**
2	NO	0
3	Somewhat	12
4	Don't Know	0
5	TOTAL	100

Source: Authors field work

Table 5.9: Should rural financial institutions/branches be computerised? :ITS

Sl. No.	Opinion	Percentage
1	YES	**82**
2	NO	18
4	Don't Know	0
5	TOTAL	100

Source: Authors field work

Table 5.10 tabulates the responses on the major constraints while building/implementing IT infrastructure in rural financial institutions. 33 percent of ITS respondents felt that the major constraint is the lack of constant power supply. This is followed by 21 percent of them stating that there was lack of enough training to personnel using the system. 16 percent of the respondents state that it was very costly to build and implement IT solutions and lack adequate skilled personnel to maintain the infrastructure.

Table 5.10: Major Constraints while building/implementing IT infrastructure in RFIs : ITS

Sl. No	Major Constraints	No of responses		Percentage
1	Lack of office space	1	=(1*100)/43	2
2	Lack of constant power supply	14		33
3	Lack of enough people to maintain the infrastructure	7		16
4	High maintenance cost	5		12
5	Lack of enough training to personnel using the system	9		21
6	High cost to build and implement IT solutions	7		16
7	TOTAL	43		100

Source: Authors field work

An attempt was made to estimate the average cost of computerisation and networking which is tabulated in Table 5.11. These investment details are perceived strategic and hence its details are not easily divulged. An attempt however was made to collect as much information as possible on the same. The responses are definitely opinionated and are approximate; however they form a useful estimate for the research study.

Table 5.11: Cost of Computerisation and Networking: ITS

Sl. no	Options		1 lakh	1.5 lakhs	2.5 lakhs	5 lakhs	Total
1	Full-fledged computerisation of one rural branch	No of respondents	2	5		10	17
		percentage	12	29		59	100
2	Networking of rural branches to their District Head Office	No of respondents		2	8	7	17

Source: Authors field work

59 percent of the respondents felt that the average cost of computerisation of a rural branch is Rs. 5 lakhs. This value is an estimate for 2 PCS, a UPS and a printer. In the case of PACS, there is 5year service contract with Cooptions Technologies Ltd. wherein, the hardware/software/customer support/training and hand handling charges are included until trained. It is understood that Cooptions charged Rs. 5 lakhs, which is shared by Andhra Pradesh State Cooperative Bank Limited (APCOB), District Central Cooperative Bank (DCCB) and Primary Agricultural Cooperative Society (PACS) in the ratio of 25:25:50 respectively. The average cost of networking of rural branches to their district head offices is approximately Rs. 2.5 lakhs as estimated by 47 percent of the respondents. The networking cost includes a router, modem and telephone line. There is no need to have a Server, except in cases where there is need to cater to large agricultural clientele. Thus, for full-fledged computerisation of a rural branch and networking to their head office, the total cost incurred is approximately Rs. 8 lakhs.

An attempt is made to estimate the cost incurred on major heads for fully computerising and networking branch/PACS as shown in Table 5.12.

Table 5.12: Estimate on the major cost heads for a fully computerized branch / PACS and training time : ITS

Slno	Major Heads of costs	No. of units required	Average cost of a unit
1	Server		
2	Personnel computer	2	1lakh
3	Dot matrix printer	1	Rs. 15,000
4	Modem	1	Rs. 10,000
5	Phone	1	Rs.1,000
6	UPS + battery (2 hr back up)	1	Rs. 15,000
7	Generator	1	Rs. 30,000 + Rs.1000 / month
8	Software		Rs. 80 Lakhs for 22 DCCB and 570 branches
9	IT maintenance Staff		Rs. 8,000
10	Networking, Cabling etc.		Rs. 15,000
11	Paper / Stationery		Rs. 3,000 / month
12	Training to use the system		Rs. 10,000
13	Miscellaneous recurring costs		Rs. 3,000 / month
14	**Fixed Cost (1+2+3+4+5+6+7+10+12)**	approximately	Rs. 3,62,000
15	**Variable cost (7+9+11+13)**	per month approx.	15,000
16	Average time to train one bank official	approximately	1.5 months

Source: Authors field work

The average cost depends on the configuration of the equipment bought and the prevailing market prices. The fixed cost was estimated around Rs.3,60,000/- and the variable cost was estimated to be around Rs.15,000/- per month. The variable cost may range between Rs.5,000 – Rs. 15,000 per month, depending on the need for using generator, the requirement of the IT maintenance staff etc. The average time taken to train one bank official was stated to be approximately 1.5 months.

5.2.4. Analysis of Top Management Responses

80 percent of the top management opined that fully computerised branch/PACS was one that has both front office and back office computerised and all banking activities done through them, as seen in Table 5.13. Whereas, 20 percent of them state that it should be able to perform all transactions real-time with online processing and delivery of service in an integrated manner. It should also enable a Decision Support System (DSS) for the bank management, which should provide inputs while incorporating the events happening in the external environment.

Table 5.13: Opinion on Fully computerised branch / PACS: TM

Sl. no.	Opinion	Percentage
1	Front office computerised	0
2	Back office computerised	0
3	Both front and back office computerised and all banking activities done through them	80
4	Others, Please specify	20

Source: Authors field work

Table 5.14 tabulates the opinion on the whether computerisation of banks has improved their functioning. 87 percent of the top management respondents are affirmative, while 13 percent of them state that computerisation of banks has somewhat improved the functioning of the bank. 100 percent of the top management opined that rural financial institutions/branches should be computerised as seen in Table 5.15.

Table 5.14: Opinion on whether computerisation of banks has improved their functioning : TM

Sl. no.	Opinion on improvement of bank functioning	Percentage
1	Yes	**87**
2	No	0
3	Somewhat	13
4	Don't Know	0
5	TOTAL	100

Source: Authors field work

Table 5.15: Should rural financial institutions/branches be computerised? : TM

Sl. no.	Opinion	Percentage
1	Yes	**100**
2	No	0
4	Don't Know	0
5	TOTAL	100

Source: Authors field work

The major constraints while building/implementing IT infrastructure in rural financial institutions are tabulated in Table 5.16. 27 percent state that constant power supply is a major constraint, followed by 24 percent indicating that there is lack of enough training to use the computerised systems. 20 percent of the top management feel that there are not adequate personnel to maintain the infrastructure.

Table 5.16: Major Constraints while building/implementing IT infrastructure in RFIs: TM

Sl. no	Major Constraints	No of responses		Percentage
1	Lack of office space	4	=(4*100)/41	10
2	Lack of constant power supply	11		27
3	Lack of enough people to maintain the infrastructure	8		20
4	High maintenance cost	5		12
5	Lack of enough training to personnel using the system	10		24
6	High cost to build and implement IT solutions	3		7
7	TOTAL	41		100

Source: Authors field work

An attempt was made to estimate the average cost of computerisation and networking which is tabulated in Table 5.17. As mentioned earlier, these investment details are perceived strategic and hence were not easily divulged. An attempt however was made to collect as much information as possible on the same. The responses are definitely opinionated and are approximate; however they form a useful estimate for the research study.

Table 5.17: Cost of Computerisation and Networking: TM

Sl. no	Options		1 lakh	1.5 lakhs	2.5 lakhs	5 lakhs	Total
1	Full-fledged computerisation of one rural branch	No of respondents		2	9	4	15
		Percentage		13	60	27	100
2	Networking of rural branches to their District Head Office	No of respondents			8	7	15
		percentage			53	47	100

Source: Authors field work

60 percent of the TM respondents state that on an average, a cost of 2.5 lakhs is incurred for full-fledged computerisation of a rural branch and 53 percent state that it takes

almost the same amount for networking of rural branches to their district head office. It needs to be noted that for computerizing rural financial institutions, the past data entered on books has to be converted to digital data, which involves lot of labour. The respondents also opined that, if investment on computerisation was not done now and upgraded incrementally at certain amount per year, it shall cost very high later, when computerisation becomes lifeline and inevitable

Table 5.18: Opinion on setting up of Rural Credit Information Bureau (RCIB) having updated information and networking rural branches to improve the flow of agricultural credit:TM

Sl. No	Opinion	No. of Respondents	Percentage
1	YES	12	**87**
2	NO	0	0
3	Not Sure	2	13
4	Don't Know	1	0

Source: Authors field work

In Table 5.18 the opinion on setting up of Rural Credit Information Bureau (RCIB) having updated information on rural population and linking up of rural branches to improve the flow of agricultural credit, is tabulated. 80 percent of the top management respondents state that it should be setup. 13 percent of them are not sure and 7 percent of them don't know whether it should be setup.

5.3. Conclusion

The first part of the quantitative analyses has been done in this chapter. An attempt has been made to quantify the intangible benefits of computerised banking operations by subjecting the obtained responses from the farmers, bank managers, ITS and the TM to percentage analyses. All three representative districts put together, the total sample size of farmers are 336, bank managers are 36, IT staff are 17 and the TM sample size are 15. Thus the total sample size of the respondents is 404.

This section is divided into five; a) conclusion of farmers' analyses, b) conclusion of bank managers' analyses, c) conclusion of IT staff analyses, d) conclusion of TM analyses and e) the corollary & conclusion which is the gist of all the above analyses.

5.3.1. Conclusion of Farmers' Analyses

The percentage analyses on various banking transactions has been performed on the farmers' responses. Most of the respondents in manual operations bank felt that

computerisation would help to improve the bank services and most of the respondents of computerised operations felt that computerisation has improved the banking services. There are also instances of computerised bank respondents who felt either, that computerisation has not improved the bank services or they don't know whether computerisation has improved the bank service. This is observed since as on the date of survey, computerisation has been recently introduced in rural commercial banks, and expected to show its effect in due course of time.

The Percentage analyses of all the three districts indicates that the average time taken for farmers to get their turn after waiting in queue during fresh loan disbursal was found to be least in computerised commercial bank vis-à-vis that for others banks. The time taken to complete a transaction was again least in the case of computerised commercial, followed by computerised cooperative. The time taken to update passbook and the time taken to meet manager for clarification are almost same in all banks, except for marginal reduction in the case of computerised commercial. However, such marginal reduction also is important and needs to be given attention due to its cumulative positive affect as well as due to increase in efficiency over a period of time.

The average number of days spent to get 'No dues certificate' from other banks was found to be on an average 3 to 4 days. Thus these many man-hour days of farmers are lost and needs to be reduced. The average number of days to sanction the credit applied was the least of 11 days in the case of computerised commercial and a highest of 42 in the case of manual cooperative. This number of days needs to be drastically cut down for quicker availability of financial resources to the needy and thus facilitate better agricultural productivity. Secondly, due to the delay, there was increased tendency of the farmers to approach the moneylenders, and thus, the purpose for which the rural institutional agencies are set would be defeated. Most of the farmer respondents' state that they repay the credit quite well in time after selling their agricultural produce/output.

Most of the respondents felt that banks are crowed during season, however, the computerised bank are relatively to a lesser extent. Most of the respondents of computerised commercial felt that the bank was less crowded with books, ledgers, papers etc. as compared to other manual operations bank. This indicates that a computerised operations bank has lesser utilisation of books/ledgers, papers etc. as compared to manual operations bank. Some respondent also felt that there was no reduction in the books, ledgers, papers etc. in computerised cooperative. This is since the cooperatives are in the process of computerisation. It is also observed that that the staff takes relatively lesser time

to locate accounts and for transactions in computerised bank as compared to manual operations bank.

Almost all of the respondents of all the banks of all the three regions felt that the bank staff took long time to process the documents except for the computerised commercial bank where relatively lesser number respondents feel the same. This means that computerised commercial banks are relatively faster than the other banks. In case of cooperatives, if the various offices involved in sanctioning process like sub-registrar office, DCCB etc. are computerised and networked, it was felt there would be quick processing and verification of the various documents of farmers and sanctioning of credit.

The respondents of all the banks state that any information that was sought was provided quickly, none of the bank officials told that they are busy and are inattentive, are not sent off without any reason and do not experience much red-tape & corruption while getting agricultural credit. However, the farmers wish that the bank staff should work with more dedication.

The respondents of all the banks in all the districts state that there a definite need to keep aside a day for banking purpose only. Most of the respondents claim that they have to visit bank 3-5 times from the time of application to sanction of loan. It is observed that there has been marginal reduction in the number of visits in case of computerised operations bank, which indicates that the credit can be sanctioned faster over a period of time by computerised banking operations due to increase in the working efficiency.

Thus, from the above farmers' response analyses it can be stated that the computerised banking operations are better than manual banking operations. It can be further inferred that the commercial bank services are better than cooperatives.

5.3.2. Conclusion of Managers' Analyses

The percentage analyses on various banking transactions has been performed on the bank managers' responses. The percentage analysis of all the managers' of all the three districts indicate that the average time taken to complete transaction of a farmer and to update a passbook in computerised operations bank was relatively lesser in comparison to manual operations bank. The average time spent on paper work by managers' was considerably reduced in computerised banking operations, which in turn has an effect in terms of increased hours of interaction with the farmers. Any technical problem in

computerised bank was fixed in approximately 2 days, which has to be reduced and clarification on passbook entries by the farmers was least in computerised operations.

Thus, from the above it can be stated that the bank mangers perceive that computerised banking environment are better than manual banking activities.

5.3.3. Conclusion of Information Technology Staff/System Administrators' Analyses

The percentage analysis on various banking transactions has been performed on the IT staff responses. Ratings were obtained on various aspects of banking services in line with the objectives of the research. Good percentage of the ITS respondents opined that their management encourages computerisation. The respondents' state that both front office and back office should be computerised and all banking activities should be done through them. Almost all the respondents have opined that the computerisation has improved the functioning of the bank and rural financial institutions/branches should be computerised.

The lack of constant power supply followed by lack of adequate training to personnel using the system are identified as the major constraints for building/implementing IT infrastructure in rural financial institutions. An attempt was made to estimate the average cost of computerising and networking them. The average cost of computerising of a rural branch is stated to be Rs. 5 lakhs. The average cost of networking of rural branches to their district head office was stated as approximately Rs. 2.5 lakhs. Thus the overall average estimate of investment for computerising of a rural financial institution branch and networking to their head office is approximately Rs. 8 lakhs. An attempt is also made to estimate the fixed cost and variable cost which was found to be Rs. 3,60,000/- and Rs. 15,000/ per month, respectively. The respondents state that a minimum of 1.5 months are needed for training a bank official.

Thus, the above indicates that the ITS perceive computerised bank operations to be more beneficial than manual bank operations, however identify some constraints like power shortage and lack of adequate training.

5.3.4. Conclusion of Top Management Analyses

The percentage analysis on various banking transactions has been performed on the Top Management responses. Almost all respondents state that both front office and back office should be computerised and all banking activities should be done through them. Few of them also state that it should be able to provide a Decision Support System (DSS),

which should be able to incorporate on a real-time basis, the events happening in the external environment.

Majority of the TM opine that computerisation of banks has improved their functioning and state that rural financial institutions should be computerised. The TM also state that lack of constant power supply and lack of enough training to use computerised systems are the major constraints for setting up IT infrastructure in rural financial institutions. The other constraints are lack of adequate personnel to maintain the computerised infrastructure. An attempt was made to estimate the cost of computerisation of a rural branch and networking them to their district office. The TM state that the approximate cost for both are Rs.2.5 lakhs each. Most of the TM agreed on the need to set up Rural Credit Information Bureau (RCIB) having updated information on rural population and linking up of rural branches to improve the flow of agricultural credit.

Thus, from the above TM response analyses it can be stated that the TM perceive that computerised banking operations are better than manual banking operations.

5.3.5. Corollary & Conclusion

Responses from the farmers', managers, ITS and TM were sought on various aspects of banking transactions and service keeping in mind the objectives of the research. Their responses were sought comparing the computerised banking operation and manual banking operations. The farmers', managers, ITS and TM responses, subjected to percentage analysis on various aspects of banking transactions. The percentage analyses on the farmer responses indicate that the computerised banking operations take lesser overall time for transaction as compared to manual banking operations and the farmers are positive towards computerising banking operations. The bank mangers also find that computerisation of banking activities improve their functioning and help to provide improved service to their customers. The ITS and TM are also very positive towards the computerisation and networking of rural banking activities, though certain constraints like lack of power supply, training etc were identified as major constraints that need to be overcome. Overall it can be inferred that computerisation of RFIs is favoured, thus indicating that computerised banking operations has the potential and can reduce the overall transaction time and provide faster banking service to the farmer customers.

CHAPTER 6

BANKING SERVICE PERCEPTION ANALYSES

QUANTITATIVE ANALYSES – II

6.1. Introduction

As banking is a service industry, its benefits are mostly intangible in nature. In the process of quantifying the intangible aspects of computerised banking operations, the responses are subjected to another quantitative analyses. Thus, this chapter discusses the Banking Service Perception Analyses by developing appropriate rating Index on the responses of the farmers, bank managers, IT staff and Top Management. The responses of all the four set of respondents on various characteristics of banking transactions are analysed to study and compare the perception of computerised banking transaction and manual banking transactions by developing appropriate index. At first the farmers responses are analysed to obtain **Total Perceived Farmer Rating Index (TPFRI)**. The ratings of bank managers are then analysed to obtain **Total Perceived Manager Rating Index (TPMRI)**. Though the sample size is small, the **Information Technology Staff/System Administrator Rating Index (TPITSRI)** and the **Top Management Rating Index (TPTMARI)** are calculated and analysed to have better insight, support and strengthen the farmers and managers findings. Mean and Standard deviation analysis is also performed for the responses by the four set of respondents.

6.2. Banking Service Perception Analyses: Attribute Rating Index

In the Attribute rating index, the 'Weighted Average' method is employed on the obtained responses for calculating respective rating index for each bank operations. The responses of farmers are analysed to obtain the **Total Perceived Farmer Rating Index (TPFRI)**, which tries to map the perceptual difference between the computerised banking operations and manual banking operations, as perceived by the farmer customers. To have a better understanding and insight on the benefits of computerised operation over manual operations, to the managers, the **Total Perceived Manager Rating Index (TPMRI)** is calculated based on the responses by bank managers. This is followed by the supporting analysis of the responses by Information Technology staff/system administrators to obtain the **Total Perceived Information Technology/System Administrators Rating Index (TPITSRI)** and the analysis of the responses of top management to obtain **Total**

Perceived Top Management Rating Index (TPTMARI). Each respondent is coded for unique identification, with specific need for the Scoring analyses. Hence, the coding aspects are explained in the next chapter dealing with the scoring analyses. In this chapter it may be just known that each respondent is uniquely coded.

6.2.1. FARMERS PERCEPTION: *Total Perceived Farmer Rating Index*

The responses by farmers on their respective bank operations are analysed in this section. The respondents sample is explained followed by discussion on the various characteristics, on the set of attributes forming each characteristic and on the weights for each characteristic. The rating scale used for calculation and the process of calculating the TPFRI from the farmers' responses are then explained. Finally, the mean and standard deviation of the responses are analysed

6.2.1.1. Respondents Sample

Responses of 116 farmers of West Godavari district, 116 farmers of Chittoor district and on 104 farmers of Nizamabad district (refer Tables 4.1 to 4.3), forming a total farmer customer sample of 336 is used for this analysis. In West Godavari district, responses were obtained from 30 farmers of manual operations cooperative bank, with 10 respondents in each land holding size viz. 10 of large farmers, 10 of medium farmers and 10 of small farmers. Similar category of respondents were interviewed from manual operations commercial bank (30 respondents), computerised operations cooperative (30 respondents) and computerised operations commercial bank (26 respondents).

Similarly, in Chittoor district, responses were obtained from 26 farmers of manual operations cooperative and 30 respondents of computerised operations cooperative. 30 respondents from manual operations commercial bank and 30 respondents from computerised operations commercial bank were obtained and analysed.

Similarly, in Nizamabad district, responses were obtained from 28 farmers of manual operations cooperative and 26 farmers from computerised operations cooperative. 26 respondents from manual operations commercial bank and 24 respondents from computerised operations commercial bank were obtained and analysed.

6.2.1.2. Characteristics and Weights

Four broad characteristics/classifications of agricultural credit & banking operations and transactions relevant to the objectives of the research were identified.

These are assimilated from literature, internal and external discussions. The broad characteristics identified are 'Policies on Agricultural Credit Operations', 'Infrastructure', 'Administrative & Procedural Activities' and 'Attitude of People/Bank Staff'. Policies on agricultural activities pertain to the agricultural policy makers' decisions, issues, programmes that are formulated for the benefit of agriculturists. Administrative and procedural activities pertain to the day-to-day administration/management of office work and banking transaction (savings, deposits, credit sanctioning etc.) with the customers. In case of moneylender, it deals with the way he transacts and maintains the customer account. Attitude of People/Bank Staff pertains to the behaviour of the people dealing with the customers. In case of a bank, 'bank staff' is used and in case of money lender 'people' is used. Finally, Infrastructure pertains to the basic building, equipments, location and office space of the bank.

The farmer respondents gave weights to each of the mentioned four characteristics totalling to 100 according to their perceived importance of each of the characteristic with respect to agricultural credit operations. The weights given are thus averaged characteristic-wise. Each characteristic weight is then scaled down to 1 for use as weights for the respective characteristic. In this manner the weights for respective characteristics are calculated for manual cooperative, computerised cooperative, manual commercial and computerised commercial.

Thus, the scaled weights, given by farmers of West Godavari district on the four characteristics of agricultural credit & banking operations/transactions are tabulated bank operation wise in Table 6.1.

Table 6.1: Average Weights on comprehensive 'banking operations characteristics' by farmers

Scaled to 1 **West Godavari**

Sl. No.	Characteristics → / Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c+d
I	Manual Cooperative farmers	0.28	0.19	0.27	0.26	1
II	Computerised Cooperative farmers	0.28	0.19	0.27	0.26	1
III	Manual Commercial farmers	0.26	0.18	0.27	0.28	1
IV	Computerised Commercial branch	0.23	0.2	0.27	0.3	1
V	Average of Manual Operations (I & III)	0.27	0.19	0.27	0.27	1
VI	Average of Computerised Operations (II & IV)	0.26	0.20	0.27	0.28	1
VII	Overall Average of Manual & Computerised Operations (V & VI)	**0.26**	**0.19**	**0.27**	**0.28**	**1.00**

Source: Authors field work

Attitude of people/bank staff receive the highest of 0.28, followed by 0.27 for administrative & procedural activities. Policies on agricultural credit operations receive 0.26 and relatively least weight of 0.19 is received by Infrastructure.

Table 6.2: Average Weights on comprehensive 'banking operations characteristics' by farmers

Scaled to 1 **Chittoor**

Sl. No.	Characteristics → / Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c+d
I	Manual Cooperative farmers	0.33	0.13	0.25	0.31	1
II	Computerised Cooperative farmers	0.24	0.12	0.37	0.27	1
III	Manual Commercial farmers	0.24	0.14	0.33	0.29	1
IV	Computerised Commercial branch	0.33	0.14	0.25	0.27	1
V	Average of Manual Operations (I & III)	0.29	0.14	0.29	0.30	1
VI	Average of Computerised Operations (II & IV)	0.29	0.13	0.31	0.27	1
VII	Overall Average of Manual & Computerised Operations (V & VI)	**0.29**	**0.13**	**0.30**	**0.29**	**1.00**

Source: Authors field work

Table 6.2 tabulates the scaled weights given by farmers of Chittoor district. The calculation procedure for the weights is the same as followed for West Godavari districts farmers' responses. Administrative & procedural activities receive highest weight of 0.3, followed by 0.29 received by both Policies on agricultural credit operations and Attitude of people/bank staff. This is followed by 0.13 for Infrastructure.

Table 6.3 tabulates the scaled weights given by farmers of Nizamabad district. The calculation procedure for the weights is the same as followed for the other previous two district responses. Attitude of people/bank staff receive highest weight of 0.32. This is followed by 0.27 for both Policies on agricultural credit operations and Administrative & procedural activities. Infrastructure receives the least weight of 0.14.

Table 6.3: Average Weights on comprehensive 'banking operations characteristics' by farmers

Scaled to 1 **Nizamabad**

Sl. No.	Characteristics → / Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c+d
I	Manual Cooperative farmers	0.27	0.14	0.29	0.30	1
II	Computerised Cooperative far.'s	0.26	0.12	0.28	0.33	1
III	Manual Commercial farmers	0.28	0.15	0.26	0.31	1
IV	Computerised Commercial branch	0.26	0.15	0.26	0.33	1
V	Avg. of Manual Operations (I & III)	0.27	0.14	0.27	0.31	1
VI	Avg. of Computerised Operations (II & IV)	0.26	0.13	0.27	0.33	1
VII	Overall Average of Manual & Computerised Operations (V & VI)	**0.27**	**0.14**	**0.27**	**0.32**	**1.00**

Source: Authors field work

It can be observed from the overall average of the responses of the three regions, that the farmers perceive Attitude of people/bank staff to be the most important of all. Administrative and procedural activities come next which is closely followed by Policies on agricultural credit operations. Infrastructure comes last among all of them. Attention to these aspects needs to be prioritised to improve on each of them. Good and helpful attitude need to be nurtured among the rural bank staff, improve administrative and procedural activities reducing the burden on farmers, formulate better policies on agricultural credit followed by improving the infrastructure facilities of rural banks.

It is observed that Infrastructure receives the least weight. This indicates that the respondents feel infrastructure is relatively less important vis-à-vis the other three, since relative weights were obtained among the four characteristics. Thus, according to the respondents the policies on agricultural credit operations, administrative and procedural activities and the attitude of bank staff should be given priority and improved upon, followed by infrastructure. Hence, activities to improve them should be undertaken. It should however be noted that appropriate additional infrastructure which can enable the bank to provide improved services and also positively influence on the other 3 characteristics should be provided. Infrastructure in terms of computerisation is expected to have a positive influence on all the banking activities and hence should be encouraged.

6.2.1.3. Ratings Scale

With the farmer customers' perspective, an attempt was made to identify maximum number of attributes that broadly make up each of the above-mentioned four characteristics of agricultural banking operations relevant to the objectives of the research. These are assimilated from literature, internal and external discussions. Thus, it needs to be noted that the attributes identified in this process broadly represent each of the four characteristics and are extensive but not exhaustive. (Research with more detailed and exhaustive attributes may be undertaken in future).

As seen in A – 6.1 to A – 6.4, characteristic Infrastructure is broadly composed of two attributes (marked 'A' in the master Appendix:- A – 6.1). They are; location and accessibility (marked 'B' in A – 6.1). The Administrative and procedural activities is broadly composed of seven attributes. They are: procedures, agricultural sanctioning time, official documentation language, pass book entries, working speed, banking/lending transaction and process of taking collaterals. The Attitude of People/Bank Staff is broadly

composed of six attributes. They are: behaviour, interactive, availability of the concerned person, cooperation of the person in-charge, bankers sensitive to your (farmer) needs, bankers sensitive to your problems. The Policies on agricultural credit operations is broadly composed of eight attributes. They are: interest rates, terms and conditions, repayment instalments, repayment flexibility, credit schemes, advertisement of credit schemes, principal amount and working hours. Analyses for the other two districts have also been carried out with this classification of characteristics.

Ratings (marked 'C' in Table 6.1) from farmer customers with 1 representing Least Favourable, 2 - Not Favourable, 3- OK, 4 - Favourable and 5 - Most Favourable, from farmer customers, are obtained on these constituent attributes. The ratings are then averaged bank-wise (commercial & cooperative) and operations-wise (manual and computerized). They are tabulated for comparison and analysis as shown in A – 6.1 to A – 6.4 for West Godavari district, A – 6.5 to A – 6.8 for Chittoor district and A – 6.9 to A – 6.12 for Nizamabad district. The procedure for developing and tabulating the ratings is explained in the following section.

6.2.1.4. Farmers Rating and analysis: bank and operation-wise

All the farmers rated on all the attributes as listed in Farmers Questionnaire (A – 1.8), Q.no.3.23.b, with respect to either commercial bank or cooperative bank, depending on which bank the farmer is the customer.

When a farmer customer from manual cooperative bank is rating a cooperative bank, he is invariably rating on his own banking service. Which means that he rates on the bank where he has taken an agricultural loan, transacts regularly, and was interviewed by researcher as a customer of that bank. This rating is regarded as rating on manual cooperative bank. Similarly, a farmer customer of computerised commercial bank when he rates on commercial bank he is rating on his own banking service and this is regarded as ratings on computerised commercial bank. The ratings by farmer customers of manual commercial bank on commercial bank are regarded as rating on manual commercial bank. Similarly, the ratings by farmer customer of computerised cooperative on cooperative are regarded as rating on computerised cooperative. Thus, these ratings reflect the farmers' perceptions about their respective banks service to them. These ratings are averaged and used for analysis as explained below.

In the analysis, the ratings on manual commercial bank by their own customers' viz. large, medium and small farmers, are **averaged** attribute-wise (vertically column-wise) as tabulated in A – 6.1 (marked 'D'). Similarly, the ratings by the large, medium and small farmers of computerised commercial bank on their own bank i.e. computerised commercial bank is **averaged** attribute-wise as shown in A – 6.2. Further, attribute-wise average for manual cooperative is obtained by averaging the responses by the customers of manual cooperative bank as shown in A – 6.3. And, attribute-wise average for computerised cooperative is obtained by averaging the ratings by the customers of computerised cooperative bank as shown in A – 6.4.

For any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. The averages of the attributes forming the respective characteristic are added to obtain the total for that characteristic (marked 'E' in A – 6.1). The responses are then normalised by dividing this sum by the number of attributes to obtain the 'Normalised average' for each characteristic (marked 'F' in A – 6.1). The normalisation is done so that the rating index that is developed is free from all subjective attributes of the investigator, the investigator's perception and investigator's instrument. As explained earlier, the attributes utilised in this study are extensive but not exhaustive and hence such normalisation enables comparable further studies with more number of relevant attributes, which might have not been identified and studied here. Thus, normalisation would enable comparison of this study with similar studies in future.

The normalised average would provide a per unit value that represents the information of all its constituent attributes and the value would lie between 1 and 5. This is then indexed to a scale of 100 to obtain the Sub-rating index (marked 'G' in A – 6.1). This Sub-rating index is then multiplied with the weight of the respective characteristic (weights has been discussed in **II1.2. Characteristics and Weights**), to obtain **FR sub-rating index factor** (marked 'H' in A – 6.1). Thus, for each of the four characteristics, we obtain four respective FR sub-rating index factor.

We can observe from A – 6.1, that for manual commercial banks of West Godavari district the Infrastructure FR sub-rating index factor is 14.6, Administrative and procedural activities FR sub-rating index factor is 18.9, Attitude of bank staff/people FR sub-rating index factor is 22.2 and Policies on agricultural credit operations FR sub-rating index factor is 17.3. **Total Perceived Farmer Rating Index (TPFRI)** is then obtained by **adding** the **FR sub-rating index factor** received on each characteristic. Thus, the manual

commercial bank of West Godavari district shown in A – 6.1, gets **TPFRI** of **73** (14.6+18.9+22.2+17.3 = 73, marked 'I'). Similar calculations are performed for other three banks in West Godavari district to obtain TPFRI for each of them. Thus, for computerised commercial of West Godavari district shown in A – 6.2, gets TPFRI of **78.5**. The manual cooperative of West Godavari district shown in A – 6.3, gets TPFRI of **68.8** and for computerised cooperative of West Godavari district shown in A – 6.4, gets TPFRI of **70.7**. The FR sub-rating index factor and TPFRI for all the bank operations in West Godavari district are tabulated in Table 6.4 derived from A – 6.1 to A – 6.4.

TABLE 6.4 : Comparison of the Total Perceived Farmers Rating Index (TPFRI) received by banks in West Godavari district

Sl no	Banking Operations Characteristics	Manual Cooperative branch	Computerised Cooperative branch	Manual Commercial branch	Computerised Commercial branch
		FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor
I	Infrastructure	14.0	15.8	14.6	17.3
II	Administrative & Procedural Activities	16.0	16.4	18.9	21.4
III	Attitude of Bank Staff/People	20.6	19.9	22.2	23.6
IV	Policies on agricultural credit operations	18.2	18.6	17.3	16.2
TOTAL Perceived Farmer Rating Index (TPFRI) (I+II+III+IV)		**68.8**	**70.7**	**73.0**	**78.5**

Source: Authors field work tabulated in A – 6.1 to A – 6.4

The same procedure is followed for all the banks in other two regions surveyed. The detailed calculations are tabulated in A – 6.5 to A – 6.8 for Chittoor district and A – 6.9 to A – 6.12 for Nizamabad district. The TPFRI for banks in Chittoor district are tabulated in Table 6.5 and the TPFRI for banks of Nizamabad district are tabulated in Table 6.6, as below.

TABLE 6.5: Table comparing the Total Perceived Farmers Rating Index (TPFRI) received by banks in Chittoor district

Sl.no	Banking Operations Characteristics	Manual Cooperative branch	Computerised Cooperative branch	Manual Commercial branch	Computerised Commercial branch
		FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor
I	Infrastructure	8.0	8.4	9.7	10.6
II	Administrative & Procedural Activities	11.2	21.7	20.5	17.8
III	Attitude of Bank Staff/People	21.2	20.8	20.4	20.8
IV	Policies on agricultural credit operations	18.0	15.0	14.7	22.0
TOTAL Perceived Farmer Rating Index (TPFRI) (I+II+III+IV)		**58.4**	**65.9**	**65.2**	**71.2**

Source: Authors field work tabulated in A – 6.5 to A – 6.8

TPFRI reflect the banks service as perceived by their customers. The obtained TPFRI in all regions indicate that the farmers perceive the overall service of banks with computerised operations to be better than manual operations. In West Godavari district the TPFRI for computerised commercial is **78.5**, which is higher than a) the TPFRI of **70.7** of computerised cooperative, b) **73** the TPFRI of manual commercial and c) **68.8** of manual cooperative. It is also observed that the TPFRI of commercial banks are higher than the cooperatives.

TABLE 6.6: Table comparing the Total Perceived Farmers Rating Index (TPFRI) received by banks in Nizamabad district

Sl.no	Banking Operations Characteristics	Manual Cooperative branch	Computerised Cooperative branch	Manual Commercial branch	Computerised Commercial branch
		FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor	FR sub-rating Index Factor
I	Infrastructure	9.8	8.0	11.0	11.1
II	Administrative & Procedural Activities	12.4	15.1	17.2	18.0
III	Attitude of Bank Staff/People	20.5	23.1	22.3	25.4
IV	Policies on agricultural credit operations	14.9	15.1	18.6	17.0
TOTAL Perceived Farmer Rating Index (TPFRI) (I+II+III+IV)		**57.5**	**61.3**	**69.2**	**71.4**

Source: Authors field work tabulated in A – 6.9 to A – 6.12

In Chittoor district the TPFRI for computerised commercial is **71.2** and for computerised cooperative is **65.9**, which are higher than the TPFRI of manual commercial bank with **65.2** and manual cooperative with just **58.4**. This indicates that the farmers

perceive the computerised banking service to be better than manual banking service. Secondly, the commercial banks have a better TPFRI, however, it needs to be noted that the computerised cooperative receive a TPFRI marginally higher to that of the manual commercial, indicating that computerisation enables improved service.

In Nizamabad district the TPFRI for computerised commercial is **71.4**, which is quite close to the TPFRI of **69.2** of manual commercial. Secondly, the TPFRI of **61.3** of computerised cooperative is also quite closer to the TPFRI of **57.5** of manual cooperative. Though the difference exists, there is less perceptible difference between the computerised and manual operations, which can be attributed to the fact the computerisation has just been introduced in Nizamabad district, when the survey was conducted. It is also observed here that the TPFRI for commercial bank is higher than that received for the cooperative.

It can be observed that presently the difference in banking service between manual operations and computerised operations though exists is of a lesser magnitude. This difference is expected to increase over a period of time with usage of computerised banking operation which would be evident by marked improvement of banking service using computerised banking operations. Though the difference seems apparently small, a study of the causes and additional analyses could reveal more aspects that would strengthen the hypotheses that computerised operations are better than manual operations.

Among the many possible causes for the small difference between computerised and manual banking operations, few are analysed below. First, the attributes identified for the study are extensive but not exhaustive, and hence the same responses on the attributes are analysed using another statistical method to give a different perspective and explore if it can yield improved understanding. Thus, for better understanding of the differences between computerised operations and manual operations, **Scoring technique analysis and Median Chi-square hypotheses testing** in Chapter 7, is performed by appropriately utilising the same responses used for ratings index analysis. This would help to statistically explore whether computerised banking operations are significantly better than manual banking operations.

Second, the bank staff needs more training and settling time to get to know and work with the computers, and deal with the operations of the new system. Hence, it takes time for the bank staff to actually deliver better service using computerised banking operations. This time can be termed as latency time for the customers to actually

experience the benefits of computerised operations of banks. The perceptions of the bank staff in section **6.2.2. BANKERS' PERCEPTION: TPMRI** are analysed with respect to the second objective of the research, which is also expected to offer better insight into the above analysis. The perceptions of the **6.2.3. Information Technology Staff/System Administrators': TPITSRI** and the **6.2.4. Top Management: TPTMARI** are also analysed.

Thirdly, which follows from the second, due to the latency time, the farmers perceive only subtle improvement in the banking service while transacting with the computerised banks. Fourthly, since banking is a service, the benefits of offering improved service using Information and communication technology are intangible in nature. Though an attempt has been made in the above analysis to quantify the benefits to the maximum extent possible, it is imperative to analyse the quantitative responses also, to study the impact/effect of computerisation. Thus, performing these analyses in addition to the explained rating index analysis would provide a holistic perspective and reinforce the benefits of computerised banking operations.

6.2.1.5. Mean and Standard Deviation Analysis

Mean and Standard deviation are calculated for each attributes for each bank operation-wise. These are tabulated in each of the Table for all three regions, from A – 6.1 to A – 6.12.

Most of the responses of West Godavari respondents as shown in A – 6.1 to A – 6.4, have a standard deviation of around 0.6, except for few which have higher than 0.6. In manual commercial bank (A – 6.1), attributes 'Location', 'Accessibility' and 'Banking/Lending Transactions' each have standard deviation of 0.7 (The mean calculation are marked 'J' and standard deviation are marked 'K', in A – 6.1). In computerised commercial bank (A – 6.2), attributes 'Process of taking collaterals and asset documents', 'Behaviour' and 'Working hours' each have standard deviation of 0.7.

In manual cooperative bank (A – 6.3), the attribute 'Agricultural credit sanctioning time' has a mean of 2.6 and standard deviation of 1.1. Each of the attributes 'Terms & Conditions' and 'Procedures' has a standard deviation of 0.8. The attributes 'Official documentation language', 'Process of taking collaterals and asset documents', 'Interest rates' and 'Working hours' have a standard deviation of 0.7 each. In computerised

cooperative bank (A – 6.4), attributes, 'Agricultural credit sanctioning time' has a mean of 2.8 and standard deviation of 0.7.

Mean and Standard deviation have also been calculated on the responses of both manual commercial (A – 6.1) and manual cooperative (A – 6.3) taken together and tabulated at the bottom of A – 6.4 titled **"Overall manual operations"** (A – 6.1 & A – 6.3). Amongst the attributes: 'Location' has a mean of 4 and standard deviation of 0.7, 'Procedures' has a mean of 3.4 and standard deviation of 0.7, 'Agricultural credit sanctioning time' has a mean of 3.1 and standard deviation of 1, 'Process of taking collaterals' has mean of 2.9 and standard deviation of 0.7, 'Interest rates' has a mean of 3.8 and standard deviation of 0.7, 'terms and conditions' has a mean of 3.2 and standard deviation of 0.7, 'Principal amount' has a mean of 3.2 and standard deviation of 0.7, and 'Working hours' has a mean of 3.6 and standard deviation of 1.

Similarly, Mean and Standard deviation have also been calculated on the responses of both computerised commercial (A – 6.2) and computerised cooperative banks (A – 6.4) taken together and tabulated at the bottom of A – 6.4 titled **"Overall computerised operations"** (A – 6.2 & A – 6.4); **mean & standard deviation**. attributes: 'Agricultural sanctioning time' has a mean of 3.4 and standard deviation of 0.9, 'Official documentation language' has a mean of 2.8 and standard deviation of 0.8, 'Working speed' has a mean of 3.9 and standard deviation of 0.7, 'Process of taking collaterals and asset documents' has a mean of 3.1 and standard deviation of 0.9, 'Terms and conditions' has a mean of 3.2 and standard deviation of 0.8 and 'Working hours' has a mean of 3.7 and standard deviation of 0.9.

Most of the responses of Chittoor district as shown in A – 6.5 to A – 6.8**,** have a standard deviation of around 0.6, except for few which have higher than 0.6. In manual cooperative (A – 6.7), attributes 'Agricultural sanctioning time', 'Banking/lending transactions' and 'Process of taking collaterals' each have a standard deviation of 0.7. In computerised cooperative (A – 6.8) attributes, 'Agricultural credit sanctioning time' and 'Interest rates' each has a standard deviation of 1. Attribute 'Accessibility' has a standard deviation of 0.8, followed by 'Location', 'Procedures' and 'Terms and conditions' each having standard deviation of 0.7.

Mean and Standard deviation was also calculated on the responses of both manual commercial (A – 6.5) and manual cooperative banks (A – 6.7) taken together and

tabulated at the bottom of A – 6.8 titled **"Overall manual operations"** (A – 6.5 & A – 6.7). Amongst the attributes: 'Procedures' has a mean of 2.4 and standard deviation of 0.7, 'Agricultural credit sanctioning time' has a mean of 2.6 and standard deviation of 1.2, 'Working speed' has a mean of 2.9 and standard deviation of 0.7, 'Banking/lending transactions' has mean of 3.2 and standard deviation of 0.8 and 'Interest rates' has a mean of 3.1 and standard deviation of 0.8.

Similarly, Mean and Standard deviation were also calculated on the responses of both computerised commercial (A – 6.6) and computerised cooperative (A – 6.8) taken together and tabulated at the bottom of A – 6.8 titled **"Overall computerised operations" (**A – 6.6 & A – 6.8**)**; **mean & standard deviation**. Amongst the attributes: 'Location' and 'Accessibility' each have a standard deviation of 0.7. Amongst the attributes: 'Procedures' has a mean of 2.7 and standard deviation of 0.8, 'Agricultural sanctioning time' has a mean of 3.1 and standard deviation of 1 and 'Interest rates' has a mean of 3.4 and standard deviation of 1.1.

The A – 6.9 to A – 6.12, of Nizamabad district has most of the responses with a standard deviation of around 0.6, except for few which have higher than 0.6. In manual cooperative (A – 6.11), attributes 'Process of taking collaterals' has a mean of 1.9 and a standard deviation of 0.7 and 'Interest rates' has a mean of 2.8 and a standard deviation of 0.7.

Mean and Standard deviation were also calculated on the responses of both manual commercial (A – 6.9) and manual cooperative (A – 6.11) taken together and tabulated at the bottom of A – 6.12 titled **"Overall manual operations"** (A – 6.9 & A – 6.11). Amongst the attributes: 'Procedures' has a mean of 2.5 and standard deviation of 1.1, 'Agricultural credit sanctioning time' has a mean of 2.5 and standard deviation of 1.2, 'Passbook entries' has a mean of 2.8 and standard deviation of 0.9, 'Working speed' has a mean of 2.8 and standard deviation of 0.8, 'Banking/lending transactions' has mean of 2.9 and standard deviation of 0.7, 'Process of taking collaterals' has a mean of 2.4 and standard deviation of 0.8, 'Interest rates' has a mean of 3.3 and standard deviation of 0.8, 'terms and conditions' has a mean of 2.5 and standard deviation of 1 and 'Principal amount' has a mean of 2.7 and standard deviation of 2.7.

Similarly, Mean and Standard deviation were also calculated on the responses of both computerised commercial (A – 6.10) and computerised cooperative (A – 6.12) taken

together and tabulated at the bottom of A – 6.12 titled **"Overall computerised operations"** (A – 6.10 & A – 6.12); **mean & standard deviation**. Amongst the attributes: 'Procedures' has a mean of 2.9 and standard deviation of 0.8, 'Agricultural sanctioning time' has a mean of 2.9 and standard deviation of 1, 'Passbook entries' has a mean of 3.4 and standard deviation of 0.7 and 'Interest rates' has a mean of 3.2 and standard deviation of 0.7.

6.2.2. BANKERS' PERCEPTION: *Total Perceived Manager Rating Index*

The responses by managers on their respective bank operations are analysed in this section. The respondents sample is explained followed by discussion on the various characteristics, on the set of attributes forming each characteristic and on the weights for each characteristic. The rating scale used for calculation and the process of calculating the Total Perceived Manager Rating Index (TPMRI) from the managers' responses are then explained. Finally, the mean and standard deviation of the responses are analysed.

6.2.2.1. Respondents Sample

This analysis is performed on the responses of the bank managers of all the three regions put together, forming a total sample size of 36 (refer Table 4.19). Though, fairly a small sample however are expected to provide a good picture of the effect of computerization on banking operations and expected to help achieve the second objective of the research activity. In all the three regions, in each of the four banks visited, the branch manager, the accountant and the field officer were interviewed. They would be henceforth referred as bank managers in the report. Thus, three respondents each from manual cooperative bank, computerized cooperative bank, manual commercial bank and computerized commercial bank, formed a total of 12 respondents in West Godavari district. Similarly, 12 such respondents each from Chittoor district and Nizamabad district were interviewed, forming a total of 36 respondents for the three regions.

6.2.2.2. Characteristics and Weights

The managers were asked to give weights to each of the same four characteristics as identified and explained in section **6.2.1.2 Characteristics and Weights** with respect to farmers. They are Infrastructure, Administrative & Procedural Activities, Attitude of People/Bank Staff and Policies on Agricultural Credit Operations. The manager respondents were asked to give weights to each of the mentioned four characteristics,

totalling 100 according to their perceived importance of each characteristic with respect to agricultural credit operations. These values have been averaged characteristic-wise and then scaled down to 1 for use as their weights for the respective characteristic.

Thus, the average of weights scaled to 1, given by managers on the four characteristics of agricultural credit & banking operations are tabulated bank operations-wise in Table 6.7.

Table 6.7: Average Weight on comprehensive 'banking operations characteristics' by Managers of Rural bank branches

Sl. No.	Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c +d
1	**Manual Cooperative**	0.32	0.16	0.26	0.27	1
2	**Computerised Cooperative**	0.22	0.18	0.29	0.31	1
3	**Manual Commercial**	0.32	0.17	0.27	0.24	1
4	**Computerised Commercial**	0.28	0.13	0.29	0.30	1
5	**Average**	**0.28**	**0.16**	**0.28**	**0.28**	1

Source: Authors field work

It can be observed from the average of the responses of the managers of the three regions, that they perceive Policies on agricultural credit operations to be the most important of all with a weight of 0.283. Administrative and procedural activities and Attitude of people/bank staff comes next with each weight of 0.279.This is closely followed by Infrastructure with a weight of 0.158. Thus, they are of the opinion that good policies on agricultural credit operations need to be formulated followed by improved administrative and procedural activities and inculcate good attitude among the bank staff. It is observed that the managers also tend to agree that when the other characteristics are taken care, enabling infrastructure like computerisation should be encouraged.

6.2.2.3. Ratings Scale

With the bankers' perspective, an attempt has been made to identify maximum number of attributes that broadly make up each of the above-mentioned four characteristics of agricultural banking operations relevant to the objectives of the research. These are assimilated from literature, internal and external discussions. Thus, it needs to be noted that the attributes identified in this process broadly represent each of the four characteristics and are extensive but not exhaustive.

As seen in A – 6.13 to A – 6.16, 'Infrastructure' is broadly composed of **ten** attributes. They are: office space occupation, cost of procurement, cost of maintenance, cost and need of special environment, dependability on electricity, space for old data, communication with other banks/HO, rough use/handling, location, accessibility. 'Administrative and Procedural Activities' is broadly composed of **twenty six** attributes. They are: chances of duplication of work, overcrowded with people, fear of losing data/work getting stopped, operations/working efficiency, operations are user friendly, deletion of data entered erroneously, related data updating and balancing of records, passbook updating, clarity in passbook entries, end-of-day closing and balancing of accounts, cross referencing of data available at different places, data and records searching/tracing, data analysing, prompting facility, decision making, ability to create a scenario, reliability, accuracy, taking back-up, taking multiple copies, agricultural credit sanctioning time, working speed, overall banking transactions, processing of collaterals/asset documents, error identification and corrections. 'Attitude of People/Bank Staff' is broadly composed of **six** attributes. They are: clarification attended to, behaviour of bank staff to farmers, cooperation of bank staff to farmers, bankers are interactive with the farmers, bankers sensitive to farmers' needs and bankers sensitive to farmers problems. Finally, 'Policies on Agricultural Credit Operations' is broadly composed of **eight** attributes. They are: training, repayment instalments, repayment flexibility, interest rates, terms and conditions, credit schemes, advertisement of credit schemes and working hours.

Ratings from managers with 1 representing Very Poor, 2 - Poor, 3 - OK, 4 - Good and 5 -Very Good are obtained on these constituent attributes. The ratings are then averaged bank-wise (commercial & cooperative) and operations-wise (manual and computerized). They are tabulated for comparison and analysis as shown in A – 6.13 to A – 6.16**.** The procedure for developing and tabulating the ratings is explained in the following section.

6.2.2.4. Manager Rating and analysis: bank and operation-wise

All the managers rated on all the attributes as listed in Bank Managers questionnaire (A – 1.9), Q.no. 2.19.b & Q. no. 2.20, with respect to either manual operations or computerized operations, depending on whether the bank is computerised or not. The ratings on manual operations by the managers of manual operations bank were

used for analysis. Similarly, the ratings on computerised bank operations by the managers of computerised operation bank are used for analysis. This is performed so that the present systems that are being used and experienced by the managers in day-to-day activities get reflected in the managers' ratings.

In the analysis, the ratings of the managers of manual cooperative on manual banking operations are **averaged** attribute-wise (vertically column-wise) and tabulated in A – 6.13. Similarly, the ratings of the managers of manual commercial bank on manual banking operations are averaged attribute-wise as seen in A – 6.14. Further, attribute-wise average of the ratings of the manager of computerised cooperative on computerised banking operations were obtained as shown in A – 6.15. And, the ratings of the managers of computerised commercial bank on computerised banking operations were averaged attribute-wise and tabulated in A – 6.16.

As discussed earlier in section **6.2.1.4. Farmers Rating and analysis: bank and operation-wise**, for any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. The averages of the attributes forming the respective characteristic are then added to obtain the total for that characteristic. The responses are then normalised by dividing this sum by the number of attributes to obtain the 'Normalised average' for each characteristic. The normalisation is done so that the rating index that is developed is free from all subjective attributes of the investigator, the investigators perception and investigators instrument. As explained earlier, the attributes utilised in this study are extensive but not exhaustive and hence such normalisation enables comparable further studies with more number of relevant attributes, which might have not been identified and studied here. Thus, normalisation would enable comparison of this study with similar studies in future.

The normalised average would provide a per unit value that represents the information of all its constituent attributes and the value would lie between 1 and 5. This is then indexed to a scale of 100 to obtain the sub-rating index. This sub-rating index is then multiplied with the weight of the respective characteristic (weights were discussed in **6.2.2.2. Characteristics and Weights**), to obtain **MAGR sub-rating index factor**. Thus, for each of the four characteristic we obtain four respective MAGR sub-rating index factor.

We can observe from A – 6.13 that for manual cooperative the Infrastructure MAGR sub-rating index factor is 10.2, Administrative and procedural activities MAGR sub-rating index factor is 12.7, Attitude of bank staff MAGR sub-rating index factor is 17.1 and Policies on agricultural credit operations MAGR sub-rating index factor is 19.5. **Total Perceived Manager Rating Index (TPMRI)** is then obtained by **adding** the **MAGR sub-rating index factor** received on each characteristic. Thus, the manual cooperative in A – 6.13, gets **TPMRI** of **59.58** (10.2+12.69+17.1+19.5 = 59.58). Similar calculations are performed for other three banks to obtain **TPMRI** for each of them. Thus, manual commercial in A – 6.14, gets TPMRI of 61.91, computerised cooperative in A – 6.15, gets TPMRI of 72.39 and computerised commercial in A – 6.16 gets TPMRI of 74.46. The TPMRI of all the bank operations are tabulated in Table 6.8.

TABLE 6.8: Table comparing the Total Perceived Manager Ratings Index (TPMRI)

Sl. No.	Banking Operations Characteristics	Manual Cooperative branch	Computerised Cooperative branch	Manual Commercial branch	Computerised Commercial branch
		MAGR sub-rating Index	MAGR sub-rating Index factor	MAGR sub-rating Index	MAGR sub-rating Index factor
I	**Infrastructure**	10.2	12.8	11.2	9.3
II	**Administrative & Procedural Activities**	12.7	28.0	14.5	32.0
III	**Attitude of Bank Staff/People**	17.1	17.9	12.1	14.8
IV	**Policies on agricultural credit operations**	19.5	13.8	24.2	18.4
V	**TOTAL Perceived Manager Rating Index (TPMRI) (I+II+III+IV)**	**59.6**	**72.4**	**61.9**	**74.5**

Source: Authors field work tabulated in A – 6.13 to A – 6.16

It is clearly observed that the computerised commercial has highest TPMRI of **74.5** and followed by computerised cooperative with TPMRI of **72.4**, which is higher than manual commercial with TPMRI of **61.9** and manual cooperative with TPMRI of **59.6**. This indicates that the managers perceive that computerised operations are far better than manual operations, which reinforces the results of the farmers rating index analyses.

Therefore it can be inferred that the users of the computers in banking operations are experiencing the immediate benefits of computerisation. However, since computerization is a new development the bank staff need to get used to the new system, to reap all the benefits of computerization, thus improving the efficiency and effectiveness of rural banking operations. This is the necessary condition before these benefits can be

actually transferred to the customer/farmers. This would then set a new trend in rural banking operations.

Later, **Scoring Technique analysis** and **Median Chi-square hypotheses testing** in Chapter 7, is performed on the responses of managers to study whether the difference between computerised and manual banking operations are statistically significant and to have a better understanding of the differences between computerised banking operations and manual banking operations.

6.2.2.5. Mean and Standard Deviation Analysis

Mean and standard deviation are calculated for the ratings on each attributes for each bank operations-wise. These are tabulated in A – 6.13 to A – 6.16. Most of the responses have a standard deviation of around 0.6 - 0.7. The attributes having standard deviation higher than 0.7 are hereby discussed. In manual cooperative (A – 6.13), attribute 'rough use/handling' has a standard deviation of 1.4. Amongst the attributes: 'data analysing' has a standard deviation of 1.1, followed by 'interest rates' with standard deviation of 0.97. Attributes 'office space occupation of books/computers', 'cost and maintenance of books/computers', 'overcrowded with people', 'fear of losing data/work getting stopped', 'clarity in passbook entries', 'bankers sensitive to farmers needs' 'bankers sensitive to farmers problems' and 'advertisement of credit schemes' each have a standard deviation of 1. Attributes 'operations and working efficiency', 'ability to create a scenario', 'processing of collaterals/asset documents', 'corrections' each have a standard deviation of 0.8.

In manual commercial (A – 6.14), attributes 'office space occupation of books/computers', 'cost of maintenance of books/computers', 'overcrowded with people', 'fear of losing data/work getting stopped', 'deletion of data entered erroneously', 'clarity in passbook entries', 'corrections' 'interest rates' and 'advertisement of credit schemes' each have a standard deviation of 1. Amongst the attributes: 'related data updating and balancing of records', 'passbook updating', 'terms and conditions' and 'credit schemes' each have a standard deviation of 0.9. Amongst the attributes: 'cost and need of special environment', operating/working efficiency', 'data analysing' and 'error identification' each have a standard deviation of 0.8.

In computerised cooperative (A – 6.15), Amongst the attributes: 'cost and maintenance of books/computers', 'dependability on electricity', fear of losing data/work

getting stopped', 'clarity in passbook entries', 'bankers sensitive to your needs', 'bankers sensitive to your problems' and 'advertisement of credit schemes' each have a standard deviation of 1. Attributes 'cost and procurement of books/computers' and 'ability to create a scenario' have standard deviation of 0.9 and 0.8 respectively.

In computerised commercial (A – 6.16), amongst the attributes: 'overall banking transaction' has a standard deviation of 1.3. Amongst the attributes: 'office space occupation of books/computers', 'bankers sensitive to bankers needs' and 'interest rates' each have standard deviation of 1. 'Location' has a standard deviation of 0.9.

Mean and Standard deviation was also calculated on the responses of both manual cooperative (A – 6.13) and manual commercial (A – 6.14) taken together and tabulated at the bottom of A – 6.16, titled **'Overall manual operations'** (A – 6.13 & A – 6.14). Attribute 'rough use/handling' has a standard deviation of 1.2, followed by 'interest rates' with 1. Attributes 'operation/working efficiency', 'deletion of data entered erroneously', 'data analysing', 'corrections' and 'credit schemes' each have a standard deviation of 0.9. The attributes, 'cost and need of special environment', 'fear of losing data/work getting stopped', 'passbook updating', 'terms and conditions' and advertisement of credit schemes' each have standard deviation of 0.8.

Similarly, Mean and Standard deviation was also calculated on the responses of both computerised cooperative (A – 6.15) and computerised commercial (A – 6.16) taken together and tabulated at the bottom of A – 6.16 titled **'Overall computerised operations'** (A – 6.15 & A – 6.16) **mean & standard deviation**. Attribute 'overall banking transactions' has a standard deviation of 1, followed by 'cost and maintenance of books/computers' with 0.9. Attributes 'cost of procurement of books/computers', 'location' and 'interest rates' have a standard deviation of 0.8 each.

6.2.3. INFORMATION TECHNOLOGY STAFF/SYSTEM ADMINISTRATORS PERCEPTION: *Total Perceived Information Technology Staff/System Administrator Rating Index*

The responses by the Information Technology Staff/System Administrators (ITS) on both manual and computerised bank operations are analysed in this section. The respondents sample is explained followed by the discussion on various characteristics, on the set of attributes forming each characteristic and on the weights for each characteristic. The rating scale used for calculation and the process of calculating the Total Perceived Information Technology Staff/System Administrator Rating Index (TPITSRI) from the

managers' responses are then explained. Finally, the mean and standard deviation of the responses are analysed.

It needs to be mentioned that the sample size is 17 and each respondent rated on both manual banking operations and computerised banking operations. Thus, there would be 17 ratings on manual banking operations and 17 ratings on computerised banking operations by the same respondent. Secondly, since each respondent rate on manual as well as computerised banking operations, the same set of weights given to the four characteristics are used to calculate the manual TPITSRI and computerised TPITSRI.

6.2.3.1. Respondents Sample

This analysis is performed on the responses of all the Information Technology Staff/System Administrators (ITS) of all the three regions put together, forming a total sample size of 17 (refer Table 4.20). Each respondent rates on both manual and computerised banking operation. Though, fairly a small sample however are expected to provide a good picture of the effect of computerization on banking operations and most significantly expected to reinforce the finding of the farmers' and managers' rating analyses.

6.2.3.2. Characteristics and Weights

The ITS/SA were asked to give weights to each of the same four characteristics as identified and explained in **6.2.1.2. Characteristics and Weights** with respect to farmers. They are Infrastructure, Administrative & Procedural Activities, Attitude of People/Bank Staff and Policies on Agricultural Credit Operations. The ITS respondents were asked to give weights to each of the mentioned four characteristics, totalling to 100 according to their perceived importance of each characteristic with respect to agricultural credit operations. These values have been averaged characteristic-wise and then scaled down to 1 for use as their weights for the respective characteristics.

Thus the average of weights scaled to 1, given by the ITS on the four characteristic of agricultural credit & banking operations/transactions are tabulated bank operation-wise in A – 6.17. As explained earlier, the same weights are used for calculating both the manual TPITSRI and computerised TPITSRI.

Table 6.9: Average Weights on 'banking operations characteristics' by IT Staff / System Administrators

Sl. no.	Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c+d
1	**Manual banking operations**	0.39	0.16	0.19	0.26	1
2	**Computerised banking operations**	0.39	0.16	0.19	0.26	1
5	**Average**	**0.39**	**0.16**	**0.19**	**0.26**	1

Source: Authors field work tabulated in A – 6.17

It can be observed from the average of the responses of the ITS of the three regions, that they perceive Policies on agricultural credit operations to be the most important of all with a weight of 0.39. Attitude of people/bank staff comes next with a weight of 0.26. This is followed by Administrative and procedural activities with a weight of 0.19 and Infrastructure with a weight of 0.16. Thus, they are of the opinion that good policies on agricultural credit operations need to be formulated. Right attitude among the bank staff need to be inculcated, followed by improved administrative and procedural activities. Infrastructure receives the least weight. It can be reasoned that the ITS also tend to agree that when the other characteristics are taken care, enabling infrastructure like computerisation should be encouraged.

6.2.3.3. Ratings Scale

With the ITS perspective, an attempt was made to identify maximum number of attributes that broadly make up each of the above-mentioned four characteristic of agricultural banking operations relevant to the objectives of the research. These are assimilated from literature, internal and external discussions. Thus, it needs to be noted that the attributes identified in this process broadly represent each of the four characteristics and are extensive but not exhaustive.

As seen in A – 6.18 and A – 6.19, 'Infrastructure' is broadly composed of **eight** attributes. They are; office space occupation, space for old data, cost of procurement, cost of maintenance, cost and need of special environment, dependability on electricity/UPS, communication with other banks/HO and rough use/handling. 'Administrative and Procedural Activities' is broadly composed of **twenty one** attributes. They are: speed, operations/working efficiency, operations are user friendly, data entry, deletion of data entered erroneously, related data updating and balancing of records, cross referencing of

data available at different places, data retrieving, data searching, data analysing, error check, prompting facility, decision making support, ability to create a scenario, dependability/reliability, taking backup, taking multiple copies, secrecy maintained, end-of-day closing and balancing of accounts, data redundancy, fear of losing data/work getting stopped. 'Attitude of People/Bank Staff' is broadly composed of **two** attributes. They are; 'customer service' and 'learning to operate'. Finally, 'Policies on Agricultural credit operations' is broadly composed of **two** attributes. They are; 'staff training' and 'working hours'.

Ratings from ITS with 1 representing Very Poor, 2 - Poor, 3 - OK, 4 - Good and 5 - Very Good are obtained on these constituent attributes. The ratings are then averaged bank operations wise (manual and computerised). They are tabulated for comparison and analysis as shown in A – 6.18 and A – 6.19**.** The procedure of developing and tabulating the ratings is explained in the following section.

6.2.3.4. ITS Ratings and analysis: bank and operation wise

All the ITS respondents rated on all the attributes as listed in Questionnaire for the Information and Communications Technology Staff questionnaire (A – 1.10), Q.no. 2.19.b & Q. no. 2.20, on **both** manual operations and on computerized operations. Thus each respondent rate on attributes of manual bank operation as well as on the same attributes for computerised banking operations.

In the analysis, the ratings of the ITS on manual banking operations are **averaged** attribute-wise (vertically column-wise) and tabulated in A – 6.18. Similarly, the ratings of the ITS on computerised banking operations are averaged attribute-wise and tabulated in A – 6.19.

As discussed earlier in section **6.2.1.4. Farmers Rating and analysis: bank and operation wise**, for any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. The averages of the attributes forming the respective characteristic are added to obtain the total for that characteristic. The responses are then normalised by dividing this sum by the number of attributes to obtain the Normalised average for each characteristic. The normalisation is done so that the rating index that is developed is free from all subjective attributes of the investigator, the investigators perception and investigators instrument. As explained earlier, the attributes utilised in this study are extensive but not exhaustive and hence such normalisation enables comparable

further studies with more number of relevant attributes, which might have not been identified and studied here. Thus, normalisation would enable comparison of this study with similar studies in future.

The normalised average would provide a per unit value that represents the information of all its constituent attributes and the value would lie between 1 and 5. This is then indexed to a scale of 100 to obtain the sub-rating index. This sub-rating index is then multiplied with the weight of the respective characteristic (weights were discussed in **6.2.2.2. Characteristics and Weights**), to obtain **ITS sub-rating index factor**. Thus, for each of the four characteristic we obtain four ITS sub-rating index factor.

We observe from A – 6.18 that for manual banking operations the Infrastructure ITS sub-rating index factor is 9.7, Administrative and procedural activities ITS sub-rating index factor is 10, Attitude of bank staff ITS sub-rating index factor is 19.6 and Policies on agricultural credit operations ITS sub-rating index factor is 24. **Total Perceived Information Technology Staff/System Administrators Rating Index (TPITSRI)** is then obtained by **adding** the **ITS sub-rating index factor** received on each characteristic. Thus, the manual banking operations in A – 6.18, gets **TPITSRI** of **63.3** (9.7+10+19.6+24 = 63.3). Similar calculations are performed for computerised banking operations, which receives **TPITSRI** of **80.2**, as tabulated in A – 6.19. The TPITSRI of manual and computerised bank operations are tabulated in Table 6.10.

Table 6.10: Table comparing the Total Perceived IT S/SA Rating Index (TPITSRI)

Sl. no	Banking Operations Characteristics	Manual banking operations	Computerised banking operations
		ITS Sub-rating Index factor	ITS Sub-rating Index factor
I	**Infrastructure**	9.7	11.2
II	**Administrative & Procedural Activities**	10.0	18.0
III	**Attitude of Bank Staff/People**	19.6	22.9
IV	**Policy**	24.0	28.1
V	**Total Perceived Information Technology Staff /SA Rating Index (TPITSRI) (I+II+III+IV)**	**63.3**	**80.2**

Source: Authors field work tabulated in A – 6.18 & A – 6.19

It is clearly observed that the computerised banking operation has highest TPITSRI of **80.2** and the manual banking operations has TPITSRI of just **63.3**. This indicates that the **ITS** respondents perceive that computerised operations are far better than manual

operations, which reinforces the results of the farmers and manager rating index analyses. Therefore, it can be inferred that those knowledgeable about computers and its capabilities perceive that computerised operations are beneficial in proving improved banking services to the rural population. It seems that it's a matter of time and continuous usage for day-to-day banking transactions before these benefits can be actually transferred to the customer/farmers.

Later, **Scoring Technique analysis** and **Median Chi-square hypotheses testing** in chapter 7, is performed on the responses of ITS to study whether the difference between computerised and manual banking operations are statistically significant and to have a better understanding of the differences between computerised banking operations and manual banking operations.

6.2.3.5. Mean and Standard Deviation Analysis

Mean and standard deviation are calculated for the ratings on each attributes for manual and computerised bank operations. These are tabulated in A – 6.18 and A – 6.19. Most of the responses have a standard deviation of around 0.6 - 0.7. The attributes having standard deviation higher than 0.7 are hereby discussed. In manual bank operations (A – 6.18), attribute ''rough use/handling' and 'deletion of data entered erroneously' each has a standard deviation of 1.4. Amongst the attributes: 'end-of-day closing and balancing of records' has a standard deviation of 1.3, followed by attributes 'data entry' and 'secrecy maintained' each with standard deviation of 1.1. Attributes 'space for old data', 'cost of procurement of books/computers', 'cost and need of special environment', 'operations are user friendly', 'decision making support' and 'fear of losing data/work getting stopped' have a standard deviation of 1, each. Attributes 'communication with other banks/HO', 'speed', 'operation/working efficiency', 'data searching', 'error check', 'prompting facility', 'ability to create a scenario', 'taking backup and 'staff training' each have a standard deviation of 0.9. Attributes 'office space occupation', updating of related data and balancing of records', 'data analysing' and 'data redundancy' each receive a standard deviation of 0.8.

In computerised banking operations (A – 6.19), attribute 'fear of losing data/work getting stopped' has a standard deviation of 1.1. Attributes 'cost of procurement of books/computers', cost and need of special environment', 'deletion of data entered erroneously', 'staff training' and 'working hours each have a standard deviation of 1.

Attributes ‘operations are user-friendly’ has a standard deviation of 0.9. Attributes ‘space for old data’, ‘rough use/handling’ and ‘data entry’ have a standard deviation of 0.8. Finally, the attribute ‘working hours’ has a standard deviation of 0.72.

6.2.4. TOP MANAGEMENT PERCEPTION: *Total Perceived Top Management Rating Index*

The responses by the Top Management (TM) respondents on both manual and computerised bank operations are analysed in this section. The respondents sample is explained followed by the discussion on various characteristics, on the set of attributes forming each characteristic and on the weights for each characteristic. The rating scale used for calculation and the process of calculating the Total Perceived Top Management Rating Index (TPTMARI) from the responses of the top management are then explained. Finally, the mean and standard deviation of the responses are analysed.

It needs to be mentioned that the sample size is 15 and each respondent rated on both manual banking operations and computerised banking operations. Thus, there would be 15 ratings on manual banking operations and 15 ratings on computerised banking operations by the same respondent. Secondly, since each respondent rate on manual as well as computerised banking operations, the same set of weights given to the four characteristics are used to calculate both the manual TPTMARI and computerised TPTMARI.

6.2.4.1. Respondents Sample

This analysis is performed on the responses of the respective banks Top Management (TM) at their head offices located in Hyderabad, forming a total sample size of 15 (refer Table 4.22). Each respondent rates on both manual and computerised banking operations. Though, fairly a small sample however are expected to provide a good picture of the effect of computerization on banking operations and most significantly expected to reinforce the finding of the farmers’, managers and also ITS rating index analyses.

6.2.4.2. Characteristics and Weights

The TM respondents were asked to give weights to each of the same four characteristics as identified and explained in **6.2.1.2. Characteristics and Weights** with respect to farmers. They are Infrastructure, Administrative & Procedural Activities, Attitude of People/Bank Staff and Policies on Agricultural Credit Operations. The TM

respondents were asked to give weights to each of the mentioned four characteristics, totalling to 100 according to their perceived importance of each characteristic with respect to agricultural credit operations. These values have been averaged and then scaled down to 1 for use as their weights for the respective characteristics.

Thus, the average of weights scaled to 1, given by the TM on the four characteristics of agricultural credit & banking operations/transaction are tabulated bank operation wise in A – 6.20. As explained earlier, the same weights are used for calculating both the manual TPTMARI and computerised TPTMARI.

Table 6.11: Average Weights on 'banking operations characteristics' by Top Management

Sl. no.	Bank Operations	Policies on Agricultural Credit Operations (a)	Infrastructure (b)	Administrative and Procedural activities (c)	Attitude of People/ Bank Staff (d)	Total e=a+b+c+d
1	**Manual banking operations**	0.30	0.20	0.16	0.34	1
2	**Computerised banking operations**	0.30	0.20	0.16	0.34	1
3	**Average**	**0.30**	**0.20**	**0.16**	**0.34**	1

Source: Authors field work tabulated in A – 6.20

It can be observed from the average of the responses of the TM, that they perceive Attitude of people/bank staff to be the most important of all with a weight of 0.34. Policies on agricultural credit operations come next with a weight of 0.3. This is followed by Infrastructure with a weight of 0.2 and Administrative and procedural activities with a weight of 0.16.

Thus, the top management are of the opinion that right attitude of the bank staff is very important for good banking business and agricultural credit operations. This has to be followed by good policies on agricultural credit operations. The top management opine Infrastructure as the next important aspect in agricultural credit operations followed by Administrative and Agricultural activities. It can be analysed that the TM have long-term planning and management perspective for institutional building.

6.2.4.3. Ratings Scale

With the TM perspective, an attempt was made to identify maximum number of attributes that broadly make up each of the above-mentioned four characteristics of agricultural banking operations relevant to the objectives of the research. These are assimilated from literature, internal and external discussions. Thus, it needs to be noted

that the attributes identified in third process broadly represent each of the four characteristics and are extensive but not exhaustive.

As seen in A – 6.21 and A – 6.22, 'Infrastructure' is broadly composed of **eight** attributes. They are; office space occupation, space for old data, cost of procurement, cost of maintenance, cost and need of special environment, dependability on electricity/UPS, communication with other banks/HO and rough use/handling. 'Administrative and Procedural Activities' is broadly composed of **twenty one** attributes. They are; speed, operations/working efficiency, operations are user friendly, data entry, deletion of data entered erroneously, related data updating and balancing of records, cross referencing of data available at different places, data retrieving, data searching, data analysing, error check, prompting facility, decision making support, ability to create a scenario, dependability/reliability, taking backup, taking multiple copies, secrecy maintained, end-of-day closing and balancing of accounts, data redundancy, fear of losing data/work getting stopped. 'Attitude of People/Bank Staff' is broadly composed of **two** attributes. They are; 'customer service' and 'learning to operate'. Finally, 'Policies on Agricultural credit operations' is broadly composed of **two** attributes. They are; 'staff training' and 'working hours'.

Ratings from TM with 1 representing Very Poor, 2 - Poor, 3 - OK, 4 - Good and 5 - Very Good are obtained on these constituent attributes. The ratings are then averaged bank operations-wise (manual and computerised). They have been tabulated for comparison and analysis as shown in A – 6.21 and A – 6.22. The procedure of developing and tabulating the ratings is explained in the following section.

6.2.4.4. TM Ratings and Analysis: bank and operation wise

All the TM respondents rated on all the attributes as listed in Questionnaire for the Top Management questionnaire (A – 1.11), Q.no. 2.19.b & Q. no. 2.20, on **both** manual operations and on computerized operations. Thus each respondent rate on attributes of manual banking operation as well as on the same attributes for computerised banking operations.

In the analysis, the ratings of the TM on manual banking operations are **averaged** attribute-wise (vertically column-wise) and tabulated in A – 6.21. Similarly, the ratings of the TM on computerised banking operations are averaged attribute-wise as tabulated in A – 6.22.

As discussed earlier in **section 6.1.1.4. Farmers Rating and analysis: bank and operation wise**, for any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. The averages of the attributes forming the respective characteristic are added to obtain the total for that characteristic. The responses are then normalised by dividing this sum by the number of attributes to obtain the Normalised average for each characteristic. The normalisation is done so that the rating index that is developed is free from all subjective attributes of the investigator, the investigators perception and investigators instrument. As explained earlier, the attributes utilised in this study are extensive but not exhaustive and hence such normalisation enables comparable further studies with more number of relevant attributes, which might have not been identified and studied here. Thus, normalisation would enable comparison of this study with similar studies in future.

The normalised average would provide a per unit value that represents the information of all its constituent attributes and the value would lie between 1 and 5. This is then indexed to a scale of 100 to obtain the sub-rating index. This sub-rating index is then multiplied with the weight of the respective characteristic (weights were discussed in 6**.2.2.2. Characteristics and Weights**), to obtain **TM sub-rating index factor**. Thus, for each of the four characteristics we obtain four TM sub-rating index factor.

We observe from A – 6.21 that for manual banking operations the Infrastructure TM sub-rating index factor is 13.1, Administrative and procedural activities TM sub-rating index factor is 8.6, Attitude of bank staff TM sub-rating index factor is 23.8 and Policies on agricultural credit operations TM sub-rating index factor is 22.6. **Total Perceived Top Management Rating Index (TPTMARI)** is then obtained by **adding** the **TM sub-rating index factor** received each characteristic. Thus, the manual banking operations in A – 6.21, gets **TPTMARI** of **68.1** (13.1+8.6+23.8+22.6 = 68.1). Similar calculations are performed for computerised banking operations, which receives **TPTMARI** of **80.5**, as tabulated in A – 6.22. The TPTMARI of manual and computerised bank operations are tabulated in **Table 6.12**. It is clearly observed that the computerised banking operation has highest **TPTMARI** of **80.5** and the manual banking operations has **TPTMARI** of just **68.1**. This indicates that the TM perceive that computerised operations are far better than manual operations, which reinforces the results of the farmers, manager and ITS rating analyses.

Table 6.12: Table comparing the 'Total Perceived Top Management Rating Index (TPTMARI)'

Sl. no	Banking Operations Characteristics	Manual banking operations	Computerised banking operations
		TM Sub-rating Index factor	TM Sub-rating Index factor
I	**Infrastructure**	13.1	13.6
II	**Administrative & Procedural Activities**	8.6	14.8
III	**Attitude of Bank Staff/People**	23.8	29.6
IV	**Policy**	22.6	22.4
V	**TOTAL Perceived Top Management Rating Index (TPTMARI) (I+II+III+IV)**	**68.1**	**80.5**

Source: Authors field work tabulated in A – 6.21 & A – 6.22

Therefore it can be inferred, that the TM perceive computerised banking services enable to provide improved banking services to the rural population. It could be used as a strategic tool to provide enhanced banking service, which also can provide a competitive advantage over a period of time.

Later, **Scoring Technique analysis** and **Median Chi-square hypotheses testing** in chapter 7, is performed on the responses of TM to study whether the difference between computerised and manual banking operations are statistically significant and to have a better understanding of the differences between computerised banking operations and manual banking operations.

6.2.4.5. Mean and Standard Deviation Analysis

Mean and standard deviation are calculated for the ratings on each of the attributes for manual and computerised bank operations. These are tabulated in A – 6.21 and A – 6.22. The attributes having standard deviation higher than 0.7 are hereby discussed. In manual banking operations (A – 6.21), attributes ‘space for old data’, ‘rough use/handling’, ‘speed’, ‘operations are user friendly’, ‘data entry’, ‘cross referencing of data available at different places’, ‘data retrieving’, ‘data retrieving’, ‘data searching’, ‘data analysing’, ‘error check’, ‘prompting facility’, ‘decision making support’, ‘taking backup’, taking multiple copies’, ‘secrecy maintained’, ‘end-of-day closing and balancing of accounts’ and ‘data redundancy’ have a standard deviation of 1, each. Attributes ‘communication with other bank/HO’, ‘Deletion of data entered erroneously’, ‘updating of related data and balancing of records’ and ‘ability to create a scenario’ have a standard deviation of 0.9, each. Attributes ‘fear of losing data/work getting stopped’ and ‘working hours’ have a standard deviation of 0.8, each.

In computerised banking operations (A – 6.22), attributes 'space for old data', 'rough use/handling', 'speed', 'operations are user friendly', 'data entry', 'error check', 'decision-making support', dependability/reliability', 'secrecy maintained', 'data redundancy' and 'staff training' each has standard deviation of 1. Attributes 'cost of procurement of books/computers' and 'deletion of data entered erroneously' have a standard deviation of 0.9, each. Finally, attributes 'cost of maintenance' and 'fear of losing data/work getting stopped' have a standard deviation of 0.8, each.

6.2.5. Corollary

The Tables 6.13 and 6.14 below are the summary of the earlier tables. They provide comprehensive idea of the perception of four sets of respondents interacted with during the survey. It can be inferred that computerised operations are perceived to offer better service than manual operations. However, in some cases of the farmer customers the difference in the rating index is found to be little close. Whereas, similar attribute rating index analyses on the responses of managers (the provider of banking service), information technology staff/system administrators and top management do perceive improved bank service with computerised operations, which reinforces the earlier findings.

TABLE 6.13 : Comparing the Total Perceived Farmers Rating Index (TPFRI) received by banks in West Godavari district

Sl. No.	Banking Operations Characteristics	Manual Cooperative branch	Computerised Cooperative branch	Manual Commercial branch	Computerised Commercial branch
I	**FARMERS: TPFRI**				
I.1	***West Godavari***	68.8	**70.7**	73.0	**78.5**
I.2	***Chittoor***	58.4	**65.9**	65.2	**71.2**
I.3	***Nizamabad***	57.5	**61.3**	69.2	**71.4**
II	**Managers: TPMRI**	59.6	**72.4**	61.9	**74.5**

Source: Authors field work tabulated in Tables 6.4, 6.5, 6.6 & 6.8

Table 6.14: Comparing the TPITSRI & TPTMARI

Sl. No.	Banking Operations Characteristics	Manual banking operations	Computerised banking operations
I	**Information Technology Staff/System Administrators: TPITSRI**	63.3	**80.2**
II	**Top Management : TPTMARI**	68.1	**80.5**

Source: Authors field work tabulated in Tables 6.10 & 6.12

However, to have better understanding it is imperative to statistically establish that the computerised operations are significantly better than manual operations, and that better banking services could be indeed provided by computerised banking operations. Hence the Individual scoring and Median chi-square hypotheses testing are performed on all the four set of respondents.

6.3. Conclusion

Responses from the farmers', managers, ITS and TM were sought on various aspects of banking service keeping in mind the objectives of the research. Their responses were sought for comparing the computerised banking operation and manual banking operations.

The **Total Perceived Farmer Ratings Index (TPFRI)** is performed to understand the perception of farmers on manual bank operations vis-à-vis the computerised bank operations. Ratings were obtained on various aspects of banking services in line with the objectives of the research. In West Godavari and Chittoor district representing Coastal Andhra and Rayalseema regions of Andhra Pradesh respectively, the computerised banking operations received considerably high ratings index relative to the manual banking operations. While Nizamabad district representing Telangana region of Andhra Pradesh received quite close rating index for computerised banking operations and manual banking operations. As mentioned earlier, the computerisation was in process in Nizamabad district and hence, the less difference between computerised and manual banking operations. Overall, the indication is that the computerised banking operations services are perceived to be more beneficial than the services delivered by manual banking operations. Hence, other analyses are performed to understand the difference better.

Secondly, in the process of analysing the above it is noticed that the commercial banks received overall higher rating index than the cooperative. Thus, it can be concluded that commercial bank services are perceived to be better than that provided by cooperatives.

The mean and standard deviation of the farmers' responses were quite consistent, though few responses had marginally higher standard deviation. The higher standard deviation could be attributed to the fact that computerised systems are new to the bank staff and shall require some time to get used to.

Thus, it is concluded by the farmers' analyses that the computerised banking operations are better than manual banking operations. And the commercial bank services are better than cooperatives.

The **Total Perceived Manager Ratings Index (TPMRI)** is performed to understand the perception of managers on manual bank operations vis-à-vis the computerised bank operations. Ratings were obtained on various aspects of banking services in line with the objectives of the research. The computerised banking operations have received substantially higher ratings than the manual banking operations, with computerised commercial bank receiving higher rating than computerised cooperative bank. The users of the computers in banking operations are experiencing the immediate benefits of computerisation. However, since it is a recent development given some time for stabilization, we can expect that the benefits would automatically get extended to the farmer customers. Overall, this indicates that the computerised banking operations services are perceived to be more beneficial than the service delivered by manual banking operations. In the process of analysing the above it is also observed that commercial bank services are perceived to be better than that provided by cooperatives.

The mean and standard deviation of the managers' responses were quite consistent though few responses had marginally higher standard deviation. As was reasoned, the rural bank managers are recently introduced to computerisation and are finding computerised banking operations to slowly improve their efficiency. However, over a period of time as they get used to the computerised banking operations systems they would be able to deliver still better service with more efficiency.

Thus, it is concluded by the managers' analyses that the computerised banking operations are better than manual banking operations. And the commercial bank services are better than cooperatives.

The **Total Perceived Information Technology Staff Rating Index (TPITSRI)** is performed to understand the perception of Information Technology Staff/System Administrators (ITS) on manual banking operations vis-à-vis the computerised banking operations. The computerised banking operations received substantially higher ratings than the manual banking operations. This indicates that the ITS perceive computerised bank operations to be more beneficial than manual bank operations.

The mean and standard deviation of the ITS responses were quite consistent though few responses had marginally higher standard deviation.

Thus, it is concluded by the ITS analyses that the computerised banking operations are better than manual banking operations.

The **Total Perceived Top Management Rating Index (TPTMARI)** is performed to understand the perception of Top Management on manual bank operations vis-à-vis the computerised bank operations. Ratings were obtained on various aspects of banking services in line with the objectives of the research. The computerised banking operations have received substantially higher ratings than the manual banking operations. This indicates that the Top Management perceive computerised bank operations to be more beneficial than manual bank operations.

The mean and standard deviation of the ITS responses were quite consistent though few responses had marginally higher standard deviation.

Thus, the rating index analysis proves that the computerised operations are far better than manual operations. In the case of Nizamabad district, the rating index for computerised banking operations and manual banking operations were observed to be quite close, since the rural computerised banks surveyed were in the process of computerisation. It is expected to deliver its benefits once it is well established over a period of time.

Thus, we observe that the overall Percentage and Rating Index Analyses together reinforce that computerised operations are far better than manual operations. It not only helps the organisation in the long run but also enables the bank staff to reap the benefits by way of improving their operations and deliver improved banking service to the rural populations.

In the next chapter, we perform Scoring and Median Chi-Square Hypotheses testing for a comparative study of the manual and computerised banking service, to have better insight on the improvement of banking service due to computerisation in rural banks.

CHAPTER 7

COMPUTERISED AND MANUAL BANKING SERVICE COMPARATIVE ANALYSES

QUANTITATIVE ANALYSES - III

7.1. Introduction

In the process of quantifying the intangible aspects of computerised banking operations, the quantitative analyses in terms of Percentage analyses and Rating Index Analyses are performed and discussed in previous chapters. The third and final part of quantitative analyses are performed in this chapter by subjecting the responses of the farmers', bank managers, IT staff and TM of the respective banks, to Scoring and Median Chi-square Hypotheses testing. As mentioned earlier, the responses are also subjected to qualitative analysis in next Chapter 8**,** to substantiate the findings of the quantitative analysis, with discussions on various intangible aspects that are found difficult to quantify.

7.2. Individual Scoring and Median Chi-Square Hypotheses Testing

Individual scoring technique and Median Chi-square Hypotheses testing in addition to the Banking Service Perception Analyses: Attribute Rating Index in previous Chapter 6, is employed for better understanding and exploring statistically significant difference, if present, between manual and computerised operations. In this analysis, score is developed for individual respondent based on each ones response on all the attributes and statistical hypotheses testing performed using Median Chi-square statistical tool.

Individual scoring technique and Median chi-square hypotheses testing are performed on the farmers' responses for each of the three regions separately, which are discussed in section **7.2.1**. The responses of managers' in section **7.2.2.**, information technology staff/system administrators (ITS) in section **7.2.3.** and the TM in section **7.2.4.**, are then analysed in the same fashion as done for farmers', however, respective respondents of all the three regions are taken together and analysed. For example, the manager analysis is performed by pooling in the responses by managers of all the three districts together, which is also followed in case of ITS and TM. This scoring and median chi-square hypotheses testing on all the four sets of respondents are explained below.

7.2.1. Scoring on Farmers' Responses

The total farmers' score on bank operations are calculated for each of the district surveyed in each of the three regions of Andhra Pradesh. Analysis for West Godavari region is done in section **7.2.1.1.**, Chittoor region is done in section **7.2.1.2.** and Nizamabad district is performed in section **7.2.1.3**.

The farmers' are coded for ease of analysis and for unique identification in A – 6.1 to A – 6.12. **MCOOPFar** stands for **Farmers' Scores of Manual Cooperative**, **CCOOPFar** stands for **Farmers' Scores of Computerised Cooperative**, **MCOMFar** stands for **Farmers' Scores of Manual Commercial** and **CCOMFar** stands for **Farmers' Scores of Computerised Commercial**. It needs to be noted that, the **TFSBO** for each respondent of each bank were developed based on their rating on their own bank. Thus, **TFSBO** for farmers' of manual cooperative bank was calculated only from their ratings on cooperative column in the questionnaire. Similarly, the **TFSBO** for farmers' of manual commercial bank is obtained only from their ratings on commercial bank. **TFSBO** for the farmers' of computerised cooperative bank was computed only from their rating on cooperative and similarly, the **TFSBO** for farmers' of computerized commercial bank is calculated only from their rating on commercial bank.

This ensures that we take into consideration the farmers' experience and perception of their bank operations (the bank where he has agricultural loan, transaction high and was interviewed by researcher as a customer of that bank) and hence reflect the actual situation. The scores thus obtained are used for median chi-square hypotheses testing for each district, as discussed in the following section.

7.2.1.1. West Godavari District

7.2.1.1.1. Total Farmers' Score on Bank Operations (TFSBO): WG

Individual farmer-wise analysis was performed on 116 respondents and score developed for each farmer of the West Godavari district. Each farmer rated the commercial bank and tabulated in A – 6.1 (manual – marked 'C') & A – 6.2 (computerised) and cooperative in A – 6.3 (manual) & A – 6.4 (computerised) on all attributes. Attributes (marked 'B' in A – 6.1**)** broadly related to the four characteristics (marked 'A' in A – 6.1**)** are listed below each of the characteristic. The characteristics and their attributes were earlier discussed in Attribute Rating Index analyses in section **7.2.1.2.**

Characteristics and Weights & 7.2.1.3. Ratings Scale in chapter 6. Ratings were obtained on these attributes.

For any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. **Each farmer wise** (horizontally), the ratings on attributes forming the respective characteristic are added and normalised by dividing the sum by the number of attributes used to calculate the sum (normalisation was earlier discussed during rating index analyses **7.2.1.4. Farmers' Rating and analysis: bank and operation wise** in Chapter 6. The obtained value is then multiplied by the respective characteristic weight to obtain the sub-score. Thus for each characteristic one sub-score is obtained (not shown in table). The first sub-score is on characteristic Infrastructure, second sub-score on Administrative and Procedural Activities, third sub-score on Attitude of People/Bank Staff and the fourth sub-score on Policies on Agricultural Credit Operations. These four sub-scores are added to get the **Total Farmer Score on Bank Operations (TFSBO)** (marked 'L' in A – 6.1).

For further analysis, these are tabulated in A – 7.1 reproduced from A – 6.1 to A – 6.4**.** These scores are then used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.1.1.2. Median Chi-Square Hypothesis Testing: WG

The 116 **TFSBO** thus obtained for each farmer are tabulated in A – 7.1 and arranged in **ascending order** sorted by the **quantity of the TFSBO score** and tabulated in A – 7.2. The Median positioned TFSBO in this sorted table is then calculated as below:

Median = (N+1) / 2 *when* N = Sample size is odd number

Median = N / 2 *when* N = Sample size is even number

The farmer sample size is 116. Thus, the median for the sample size of N = 116 is

Median = 116 / 2 = 58 i.e**. the 58th positioned TFSBO**

Thus, **58th position** TFSBO is the median of the ordered tabulation of the farmers' scores. Consequently, there are two groups of scores. One group are those farmers' scores, which are positioned above **58th TFSBO** (including 58th position), indicating that they perceive the bank is providing good service (good service group). The second group are those farmers' scores, which are positioned **not above 58th TFSBO**, indicating that they perceive that the bank is unable to provide good service (poor service group).

Chi-square (χ2) test is applied to the farmers' scores to test the **1st Null Hypothesis $Ho_{(1)}$** of the research study. The contingency table for **χ2 analysis** is shown below in Table 7.1 (the calculations are also shown in A – 7.3). The number of respondents of **computerised operation bank,** either belonging to computerized cooperative or computerised commercial bank, whose position is **above the 58th TFSBO** due to the **high TFSBO** are represented as A. The numbers of the same, **not above 58th TFSBO** score are denoted as B. Similarly, the number of respondents of **manual operations bank**, either belonging to manual cooperative or manual commercial bank, whose position is **above the 58th TFSBO** are represented as C and D is denoted as the number of those respondents **not above 58th TFSBO** score.

Table 7.1: Chi-Square Testing; farmers' responses -WG

Farmers' →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	36 (A)	20 (B)	***56 (F=A+B)***
Manual Operations	22 (C)	38 (D)	***60 (H=C+D)***
TOTAL	***58 (E=A+ C)***	***58 (G=B+D)***	***N = 116***

Source: Authors field work tabulated in A – 7.1, A – 7.2 & A – 7.3

The expected frequency for cell A, B, C and D are;

For cell A, the expected frequency is = (E * F)/N = (58*56)/116 = 28

For cell B, the expected frequency is = (G * F)/N = (58*56)/116 = 28

For cell C, the expected frequency is = (E * H)/N = (58*60)/116 = 30

For cell D, the expected frequency is = (G * H)/N = (58*60)/116 = 30

Since the expected frequencies are above 10 (Levin, 1977: 165-166) the normal Chi-square formula is applied as below;

$$\chi^2 = \frac{N (AD - BC) \wedge 2}{(A+B)(C+D)(A+C)(B+D)} = \frac{99897344}{11303040} \quad \chi^2 = \mathbf{8.84}$$

Degrees of freedom = (row – 1) * (column – 1) = (2 – 1) * (2 – 1) = **1**

At **95 percent** confidence value, the **χ2** table value is **3.841** and at **90 percent** confidence value, the **χ2** table value is **6.635**. Thus, for not rejecting the **Null hypothesis $Ho_{(1)}$** , at 0.1 significance level with one degree of freedom the calculated chi-square should be smaller than **χ2** table value of **6.635**. Since the calculated chi-square value is **8.84**, the Null Hypothesis **$Ho_{(1)}$** is rejected in favour of **Research Hypothesis $Hr_{(1)}$** for West Godavari district of Coastal Andhra region.

Hence, for Coastal Andhra region, we can conclude statistically that credit sanctioning and other banking services from computerised bank branches are **significantly better** than non-computerised bank branches.

7.2.1.2 Chittoor District

7.2.1.2.1. Total Farmers' Score on Bank Operations (TFSBO): CH

Individual farmer-wise analysis was performed on 116 respondents and score developed for each farmer of the Chittoor region. The same procedure has been followed to develop the 116 scores for Chittoor district as was followed in the case of West Godavari region.

Each farmer's rating on the commercial bank in Chittoor district, is tabulated in A – 6.5 (manual) & A – 6.6 (computerised) and cooperative in A – 6.7 (manual) & A – 6.8 (computerised) on all attributes. Similar procedure as explained in section **7.2.1.1.1 TFSBO: West Godavari district** is followed to calculate the four sub-scores, one for each characteristic. These four sub-scores are added to get the **Total Farmer Score on Bank Operations (TFSBO)** as tabulated in A – 7.4, reproduced from A – 6.5 to A – 6.8. The scores thus obtained for each farmer are used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.1.2.2. Median Chi-Square Hypothesis Testing: Chittoor district

The 116 **TFSBO** thus obtained for each farmer and tabulated in A – 7.4 is arranged in **ascending order** sorted by the **quantity of TFSBO score** and tabulated in A – 7.5. Similar procedure as explained in section **7.2.1.1.2. Median Chi-Square Hypothesis Testing: West Godavari district** is followed and the below contingency table obtained for **χ2 analysis** (the calculations are also shown in A – 7.6). The farmer sample size is 116 and the median position is the 58th position of TFSBO in A – 7.5.

Table 7.2: Chi-Square Testing; farmers' responses -CH

Farmers' →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	41 (A)	19 (B)	***60 (F=A+B)***
Manual Operations	17 (C)	39 (D)	***56 (H=C+D)***
TOTAL	***58 (E=A+ C)***	***58 (G=B+D)***	***N = 116***
Source: Authors field work tabulated in A – 7.4, A – 7.5 & A – 7.6			

The expected frequency for cell A and cell B is 30 each and the expected frequency for cell C and D is 28 each. The degree of freedom is 1.

Since the expected frequencies are above 10, the normal chi-square formula is applied as below:

$$\chi^2 = \frac{N (AD - BC) \wedge 2}{(A+B)(C+D)(A+C)(B+D)} = \frac{188868416}{11303040} = \mathbf{16.71}$$

At **95 percent** confidence value, the χ**2** table value is **3.841** and at **90 percent** confidence value, the χ**2** table value is **6.635**. Thus, for not rejecting the **Null hypothesis Ho$_{(1)}$** , at 0.1 significance level with one degree of freedom the calculated chi-square should smaller than χ**2** table value of **6.635**. Since the calculated chi-square value is **16.71**, the Null Hypothesis **Ho$_{(1)}$** is rejected in favour of **Research Hypothesis Hr$_{(1)}$** for Chittoor district.

Hence, for Chittoor district of Rayalseema region, we can conclude statistically that credit sanctioning and other banking services from computerised bank branches are **significantly better** than non-computerised bank branches.

7.2.1.3. Nizamabad District

7.2.1.3.1. Total Farmers' Score on Bank Operations (TFSBO): NZ

Individual farmer-wise analysis was performed on 104 respondents and score developed for each farmer of the Nizamabad district. The same procedure is followed to develop the 104 scores for Nizamabad district as was followed in the case of West Godavari district.

Each farmer's rating on the commercial bank of Nizamabad district, is tabulated in A – 6.9 (manual) & A – 6.10 (computerised) and cooperative in A – 6.11 (manual) & A – 6.12 (computerised) on all attributes. Similar procedure as explained in section **7.2.1.1.1. TFSBO: West Godavari district** is followed to calculate the four sub-scores, one for each characteristic. These sub-scores are added to get the **Total Farmer Score on Bank Operations (TFSBO)** as tabulated in A – 7.7, reproduced from A – 6.9 to A – 6.12. The scores thus obtained for each farmer are used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.1.3.2. Median Chi-Square Hypothesis Testing: NZ District

The 104 **TFSBO** thus obtained for each farmer and tabulated in A – 7.7 is arranged in **ascending order** sorted by the **quantity of TFSBO score** and tabulated in A – 7.8. Similar procedure as explained in section **7.2.1.1.2. Median Chi-Square Hypothesis Testing: West Godavari district** is followed and the below contingency table obtained for **χ2 analysis** (the calculations are also shown in A – 7.9). The farmer sample size is 104 and the median position is the 52nd position of TFSBO in Table 7.3.

Table 7.3: Chi-Square Testing; farmers' responses -NZ

Farmers of →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	27 (A)	23 (B)	***50 (F=A+B)***
Manual Operations	25 (C)	29 (D)	***54 (H=C+D)***
TOTAL	***52 (E=A+ C)***	***52 (G=B+D)***	***N = 104***

Source: Authors field work tabulated in A – 7.7, A – 7.8 & A – 7.9

The expected frequency for cell A and cell B is 25 each and the expected frequency for cell C and D is 27 each. The degree of freedom is 1.

Since the expected frequencies are above 10, the normal chi-square formula is applied as below:

$$\chi^2 = \frac{N\,(AD - BC)\,\wedge\,2}{(A+B)\,(C+D)\,(A+C)\,(B+D)} = \frac{4499456}{7300800} = \mathbf{0.62}$$

At **95 percent** confidence value, the **χ2** table value is **3.841** and at **90 percent** confidence value, the **χ2** table value is **6.635**. Thus, for not rejecting the Null hypothesis **$Ho_{(1)}$** , at 0.1 significance level with one degree of freedom the calculated chi-square should smaller than **χ2** table value of **6.635**. Since the calculated chi-square value is **0.62**, the **Null Hypothesis $Ho_{(1)}$** is not rejected in the case of Nizamabad district. This indicates that there is no enough evidence against Null Hypothesis **$Ho_{(1)}$** to reject it in favour of Research Hypothesis **$Hr_{(1)}$**.

Hence, for Nizamabad district in Telangana region we can conclude statistically that credit sanctioning and other banking services from computerised bank branches are **NOT significantly better** than non-computerised bank branches

7.2.2. Scoring on Managers Responses

The total managers' score on bank operations are calculated as below. These scores of all the manager of all three regions together are then used for median chi-square hypothesis testing as explained below.

7.2.2.1. Total Bank Managers Score on Bank Operations (TMSBO)

Individual manager-wise analysis was performed and score developed for each manager. Thus 36 scores were obtained for 36 bank manager respondents.

Each manager rated on computerised operations (A – 6.15 & A – 6.16) and manual operations (A – 6.13 & A – 6.14) on all attributes. Similar procedure as explained in section **7.2.1.1.1. TFSBO: West Godavari district** is followed to calculate the four sub-scores, one for each characteristic. The first sub-score is on characteristic Infrastructure, second sub-score on Administrative and Procedural Activities, third sub-score on Attitude of People/Bank Staff and the fourth sub-score on Policies on Agricultural Credit Operations. These four sub-scores are added to get the **Total Manager Score on Bank Operations (TMSBO)** as tabulated in A – 7.10, reproduced from A – 6.13 to A – 6.16. The scores thus obtained for each farmer are used for Median Chi-Square hypothesis testing as discussed in the following section.

The column 'Manager' lists the manager bank wise and is coded for ease of analysis and unique identification in A – 6.13 to A – 6.16**,** A – 7.10 and A – 7.11. **MCOOPMar** stands for **Manager scores of Manual Cooperative bank**, **CCOOPMar** stands for **Managers scores of Computerised Cooperative**, **MCOMMar** stands for **Manager scores of Manual Commercial** and **CCOMMar** stands for **Manager scores of Computerised Commercial**.

Here too the **TMSBO** for each respondent of each bank were developed based on their rating on their own bank. The **TMSBO** for managers of manual cooperative bank was calculated only from their ratings on manual operations column in the questionnaire. Similarly, **TMSBO** for managers of manual commercial bank is obtained only from their rating on manual operations. **TMSBO** for the managers of computerised cooperative bank was computed from their rating on computerised operations and similarly, the **TMSBO** for managers of computerised commercial bank is calculated from their rating on computerised operations.

This ensures that we take into consideration the managers' experience and perception of the banking operations presently being followed in their bank and thus, reflects the actual situation. These scores are used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.2.2. Median Chi-Square Hypothesis Testing

The 36 **TMSBO** thus obtained for each manager and tabulated in A – 7.10 is arranged in **ascending order** sorted by the **quantity of TMSBO score** and tabulated in A – 7.11. **Median positioned TMSBO** for managers is calculated in this sorted table, as done for farmers' in **7.2.1.1.2. Median Chi-Square Hypothesis Testing: West Godavari district**. The median for manager respondents of sample size N = 36 is

Median = 36 / 2 = **18** i.e. the **18th positioned TMSBO**

Thus, **18th position TMSBO** is the median of the ordered tabulation (A – 7.11) of the managers' scores. Consequently, there are two groups of scores. One group are those managers' scores, which are positioned **above 18th TMSBO** (including 18th position), indicating that they perceive the bank is providing good service (good service group). The second group are those managers' scores, which are **not above 18th TMSBO**, indicating that they perceive that the bank is unable to provide good service (poor service group).

Chi-square (χ2) test is applied to the managers' scores to test the **2nd Null hypothesis Ho$_{(2)}$** of the research study. The contingency table for **χ2 analysis** is shown below (the calculations are also shown in A – 7.12). The number of respondents of **computerised operation bank**, either belonging to computerised cooperative or computerised commercial bank, whose position is **above the 18th TMSBO** due to the **high TMSBO** are denoted as A. The numbers of the same, **not above 18th TMSBO** score are represented as B. Similarly, the number of respondents of **manual operations bank**, either belonging to manual cooperative or manual commercial bank, whose position is **above the 18th TMSBO** are represented as C. The number of the same **not above 18th TMSBO** are represented as D.

Table 7.4: Chi-Square Testing; bank managers' responses

Farmers of →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	18 (A)	0 (B)	***18 (F)***
Manual Operations	0 (C)	18 (D)	***18 (H)***
TOTAL	***18 (E)***	***18 (G)***	***N = 36***

Source: Authors field work tabulated in A – 7.10, A – 7.11 & A – 7.12

The expected frequency for cells A, B, C and D are;

For cell A, the expected frequency is = (E * F)/N = (18*18)/36 = 9

For cell B, the expected frequency is = (G * F)/N = (18*18)/36 = 9

For cell C, the expected frequency is = (E * H)/N = (18*18)/36 = 9

For cell D, the expected frequency is = (G * H)/N = (18*18)/36 = 9

Since the expected frequency values are **below 10**, the **Yates Corrected Chi-square formula** (Levin, 1977: 165-166) is applied, so that we do not get an inflated value of Chi-square.

$$\chi^2 = \frac{N [I AD - BC I - (N/2)] \wedge 2}{(A+B)(C+D)(A+C)(B+D)} = \frac{3370896}{104976} \quad \chi^2 = \mathbf{32.11}$$

Degrees of freedom = (row – 1) * (column – 1) = 1*1 = **1**

At **95 percent** confidence value, the χ**2** table value is **3.841** and at **90 percent** confidence value, the χ**2** table value is **6.635**. Thus, for not rejecting the **Null hypothesis Ho$_{(2)}$** , at 0.1 significance level with one degree of freedom the calculated chi-square should smaller than χ**2** table value of **6.635**. Since the calculated chi-square value is **32.11**, the **Null Hypothesis Ho$_{(2)}$** is rejected in favour of **Research Hypothesis Hr$_{(2)}$**.

Hence, we can conclude statistically that the managers perceive that computerised bank branches working environment in terms of efficiency and effectiveness are **significantly better** than non-computerised bank branches.

7.2.3. Scoring on Information Technology Staff/System Administrators Responses

The total Information Technology Staff/System Administration (ITS) respondents score on bank operations are calculated as below. These scores of all the ITS of all three regions together are then used for median chi-square hypotheses testing as explained below.

7.2.3.1. Total ITS Score on Bank Operations (TITSSBO)

Individual ITS-wise analysis was performed on 17 ITS respondents. The same procedure is followed to develop the scores for ITS as was followed in the case of farmers' and managers respondents. Except that, each ITS respondent rated on both manual banking operations and computerised banking operations. Thus there are 17 scores developed on manual banking operations and 17 scores on computerised banking operations.

Each ITS respondents ratings on manual banking operations were utilised to develop **manual** banking **TITSSBO** and their code is **MANITS{respondent-organisation&number}**. Similarly, their ratings on computerised banking operations were utilised to develop the computerised banking operations **TITSSBO** and their code is **COMITS{respondent-organisation&number}**. They are coded for ease of analyses in A – 6.18 and A – 6.19**,** A – 7.13 to A – 5.15. Thus, **COMITSSBI, COMITSAPB** and **COMITSCOP** stands for ratings on **computerised banking operations** by Information Technology Staff/System Administrators, of State Bank of India, of Andhra Pradesh State Cooperative Bank Limited and of Cooptions Technologies limited, respectively. Similarly, **MANITSSBI, MANITSAPB** and **MANITCOP** stand for ratings on **manual banking operations** by Information Technology Staff/System Administrators, of State Bank of India, of Andhra Pradesh and of Cooptions Technologies Limited., respectively.

Attributes broadly related to the four characteristics are listed below each of them, which were already discussed in Attribute Rating Index analysis section **6.2.3.2. Characteristics and Weights & 6.2.3.3. Ratings Scale** in Chapter 6. Rating was obtained on these attributes. For any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. **Each ITS wise** (horizontally), the ratings on attributes forming the respective characteristic are added and normalised by dividing the sum by the number of attributes used to calculate the sum (normalisation already discussed during rating index analyses **6.2.1.4. Farmers' Rating and analysis: bank and operation wise; Chapter 6**). The obtained value is then multiplied by the respective characteristic weight to obtain the sub-score. Thus, for each characteristic one sub-score is obtained (not shown in table). These four sub-scores are added to get the **Total ITS Score on Bank Operations (TITSSBO)** as tabulated in A – 7. 13 reproduced from A – 6.18 and A – 6.19.

The **Total ITS Score on Bank Operations (TITSSBO)** for manual banking operations and computerised banking operations are together used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.3.2. Median Chi-Square Analysis and Hypothesis Testing

The 34 **TITSSBO** thus obtained are tabulated in A – 7.13 and arranged in **ascending order** sorted by the **quantity of TITSSBO score** and tabulated in A – 7.14. **Median positioned TITSSBO** for manual banking operations and computerised banking operations together is 34 / 2 = 17 i.e. the **17th positioned TITSSBO**

Thus, **17th position TITSSBO** is the median of the ordered tabulation (A – 7.14) of the ITS scores. Consequently, there are two groups of scores. One are those ITS scores which are positioned **above 17th TITSSBO** (including 17th position), indicating that good service is being provided (good service group). The second are those ITS scores which are **not above 17th TITSSBO**, indicating that the bank is unable to provide good service (poor service group).

Chi-square (χ2) test is applied to the ITS scores to test the **3rd Null hypothesis Ho$_{(3)}$** and to reinforce the earlier findings of the farmers' and managers. The contingency table for **χ2 analysis** is shown below (the calculations are also shown in A – 7.15). The number of respondents of **computerised operations bank**, whose position is **above the 17th TITSSBO** due to the **high TITSSBO** are denoted as A. The numbers of the same, **not above 17th TITSSBO** are represented as B. Similarly, the number of responses on **manual operations bank**, whose position is **above the 17th TITSSBO** are represented as C. The number of the same **not above 17th TITSSBO** are represented as D.

Table 7.5: Chi-Square Testing; IT/SA responses

Farmers of →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	17 (A)	0 (B)	***17 (F=A+B)***
Manual Operations	0 (C)	17 (D)	***17 (H=C+D)***
TOTAL	***17 (E=A+ C)***	***17 (G=B+D)***	***N = 34***

Source: Authors field work tabulated in A – 7.13, A – 7.14 & A – 7.15

The expected frequency for cell A, cell B, cell C and cell D is 8.5 each. The degree of freedom is (2-1) x (2-1), which is equal to 1.

Since the expected frequency values are **below 10**, the **Yates Corrected Chi-square formula** is applied, so that we do not get an inflated value of Chi-square.

$$\chi^2 = \frac{N [I AD - BC I - (N/2)] \wedge 2}{(A+B)(C+D)(A+C)(B+D)} = \frac{2515456}{83521} \qquad \chi^2 = \mathbf{30.12}$$

At **95 percent** confidence value, the **χ2** table value is **3.841** and at **90 percent** confidence value, the **χ2** table value is **6.635**. Thus, for rejecting the **Null hypothesis $Ho_{(3)}$**, at 0.1 significance level with one degree of freedom the calculated chi-square should be smaller than **χ2** table value of **6.635**. Since the calculated chi-square value is **30.12**, the **Null Hypothesis $Ho_{(3)}$** is rejected in favour of **Research Hypothesis $Hr_{(3)}$**.

Hence, we can conclude statistically that IT Staff perceive the computerised bank branches working environment in terms of efficiency and effectiveness are **significantly better** than non-computerised bank branches. This also reinforces the findings of the farmers' and managers analyses.

7.2.4. Scoring on Top Management Responses

The total TM respondents' score on bank operations are calculated as below. These scores of the all the TM of all the banks are taken together and then used for median chi-square hypotheses testing as explained below.

7.2.4.1. Total Top Management Score on Bank Operations (TTMSBO)

Individual TM-wise analysis was performed on 15 TM respondents. The same procedure is followed to develop the scores for TM as was followed in the case of farmers', managers and Information Technology Staff/System Administrators'. Here too, each TM respondent rated both on manual banking operations and computerised banking operations. Thus, there are 15 scores developed on manual banking operations and 15 scores on computerised banking operations

Each TM respondents ratings on manual banking operations were utilised to develop **manual** banking **TTMSBO** and their code is **MANTM{respondent-organisation&number }**. Similarly, their ratings on computerised banking operations were utilised to develop the **computerised** banking operations **TTMSBO** and their code is **COMTM{respondent-organisation&number}**. They are coded for ease of analysis in A – 6.21 and A – 6.22, A – 7.16 and A – 7.17. Thus, **COMTMSBI, COMTMAPB** and

COMTMCOP stands for ratings on **computerised operations** by Top Management, of State Bank of India, of Andhra Pradesh State Cooperative Bank Limited and of Cooptions Technologies limited, respectively. Similarly, **MANTMSBI, MANTMAPB** and **MANTMCOP** stand for ratings on manual operations by Top Management, of State Bank of India, of Andhra Pradesh and of Cooptions Technologies Limited., respectively.

Attributes broadly related to the four characteristics are listed below each of them, which were already discussed in Attribute Rating Index analysis section **6.2.4.2. Characteristics and Weights & 6.2.4.3. Ratings Scale** in Chapter 6. Rating was obtained on these attributes. For any further statistical treatment, the raw ordinal ratings have to be converted to cardinal ratings. **Each TM-wise** (horizontally), the ratings on attributes forming the respective characteristic are added and normalised by dividing the sum by the number of attributes used to calculate the sum (normalisation already discussed during rating index analyses **6.2.1.4. Farmers' Rating and analysis: bank and operation wise** in Chapter 6). The obtained value is then multiplied by the respective characteristic weight to obtain the sub-score. Thus, for each characteristic one sub-score is obtained (not shown in table). These sub-scores are added to get the **Total Top Management Score on Bank Operations (TTMSBO)** as tabulated in A – 7.16 reproduced from A – 6.21 and A – 6.22.

The **Total Top Management Score on Bank Operations (TTMSBO)** for manual banking operations and computerised banking operations are together used for Median Chi-Square hypothesis testing as discussed in the following section.

7.2.4.2. Median Chi-Square Analysis and Hypothesis Testing

The 30 **TTMSBO** thus obtained and tabulated in A – 7.16 is arranged in **ascending order** sorted by the **quantity of TTMSBO score** and tabulated in A – 7.17. **Median positioned TTMSBO** for manual banking operations and computerised banking operations together is 30 / 2 = 15 i.e. the **15th positioned TTMSBO**

Thus, **15th position TTMSBO** is the median of the ordered tabulation (A – 7.17) of the TM scores. Consequently, there are two groups of scores. One group are those TM scores, which are positioned **above 15th TTMSBO** (including 15th position), indicating that they perceive that good service is being provided (good service group). The second are those TM scores, which are **not above 15th TTMSBO**, indicating that they perceive the bank is unable to provide good service (poor service group).

Chi-square (χ2) test is applied to the TM scores to test the **4th Null hypothesis $Ho_{(4)}$** and to reinforce the earlier finding of the farmers', managers and IT staff (ITS). The contingency table for **χ2 analysis** is shown below (the calculations are also shown in A – 7.18). The number of respondents of **computerised operations bank**, whose position is **above the 15th TTMSBO** due to the **high TTMSBO** are denoted as A. The numbers of the same, **not above 15th TTMSBO** score are represented as B. Similarly, the number of responses on **manual operations bank**, whose position is **above the 15th TTMSBO** are represented as C. The number of the same **not above 15th TTMSBO** are represented as D.

Table 7.6: Chi-Square Testing; Top management responses

Farmers of →	HIGH Score-position above median (GOOD SERVICE)	LOW Score- position **NOT** above median (POOR SERVICE)	**TOTAL**
Computerised Operations	15 (A)	0 (B)	***15 (F=A+B)***
Manual Operations	0 (C)	15 (D)	***15 (H=C+D)***
TOTAL	***15 (E=A+ C)***	***15 (G=B+D)***	***N = 30***

Source: Authors field work tabulated in A – 7.16, A – 7.17 & A – 7.18

The expected frequency for cell A, cell B, cell C and cell D is 7.5 each. The degree of freedom is (2-1) x (2-1), which is equal to 1.

Since the expected frequency values are **below 10**, the **Yates Corrected Chi-square formula** is applied, so that we do not get an inflated value of Chi-square.

$$\chi^2 = \frac{N [\, | AD - BC | - (N/2)]^{\wedge} 2}{(A+B)(C+D)(A+C)(B+D)} = \frac{1323000}{50625} \qquad \chi^2 = \mathbf{26.13}$$

At **95 percent** confidence value, the **χ2** table value is **3.841** and at **90 percent** confidence value, the **χ2** table value is **6.635**. Thus, for not rejecting the **Null hypothesis $Ho_{(4)}$**, at 0.1 significance level with one degree of freedom the calculated chi-square should smaller than **χ2** table value of **6.635**. Since the calculated chi-square value is **26.13**, the **Null Hypothesis $Ho_{(4)}$** is rejected in favour of **Research Hypothesis $Hr_{(4)}$**.

Hence, we can conclude statistically that the Top Management perceive the computerised bank branches working environment in terms of efficiency and effectiveness are **significantly better** than non-computerised bank branches. This too, reinforces the findings of the farmers' and managers analyses.

7.2.5. Conclusion for Scoring and Median Chi-square Hypotheses Testing

The Conclusion for Scoring and Median Chi-square Hypotheses Testing is discussed in five sections meant for farmers, bank managers, ITS and TM, respectively. These are finally followed with corollary which is the essence and implication of the analyses in the five sections.

7.2.5.1. Conclusion of Farmers' Analyses

The **Total Farmers' Score on Bank Operations (TFSBO)** is performed for statistically proving that computerised banking operations are significantly better than manual banking operations. The Scoring and Median chi-square hypothesis testing in West Godavari district and Chittoor district has indicated that credit sanctioning and other banking services from computerised bank branches are significantly better than non-computerised bank branches, thus, rejecting the **Null hypothesis $Ho_{(1)}$** in favour of Research hypothesis **$Ho_{(1)}$**. This statistically proves that improved banking services can be provided by computerising all the banking activities. However, the same analysis in Nizamabad district indicates that credit sanctioning and other banking services from computerised bank branches are not significantly better than non-computerised bank branches, thus, not rejecting the **Null hypothesis $Ho_{(1)}$,** in this case. This analysis of not rejecting the **Null hypothesis $Ho_{(1)}$** and the rating index analysis (chapter 4) showing marginal difference between computerised banking service and manual banking service, for Nizamabad district indicates that the banking service of computerised and manual operations bank are almost similar. This can be attributed to the fact that as on date of survey, bank computerisation was in progress in Nizamabad district of Telengana region of AP, and its benefits are not yet much experienced by the farmer customers.

Thus, from the overall farmers' analysis the **Null hypothesis $Ho_{(1)}$** is rejected in favour of **Research hypothesis $Hr_{(1)}$**. Thus, it is concluded by the farmers' analyses that the computerised banking operations are better than manual banking operations. It is also observed that the commercial bank services are better than cooperatives.

7.2.5.2. Conclusion of Managers' Analyses

The **Total Managers Score on Bank Operations (TMSBO)** is performed for statistically proving that computerised banking operations are significantly better than manual banking operations. The Scoring and Median chi-square hypothesis testing has indicated that the computerised bank branches working environment in terms of efficiency

and effectiveness are significantly better than non-computerised bank branches, thus, rejecting the **Null hypothesis $Ho_{(2)}$** in favour of **Research hypothesis $Ho_{(2)}$**. This statistically proves that better service can be delivered by computerised banking operations as compared to the manual banking operations.

Thus, it is concluded by the managers' analyses that the computerised banking operations are better than manual banking operations. It is also observed that the commercial bank have better working environment than cooperatives.

7.2.5.3. Conclusion of Information Technology Staff/System Administrators' Analyses

The **Total Information Technology Staff/System Administrators Score on Bank Operations (TITSSBO)** is performed for statistically proving that computerised banking operations are better than no-computerised/manual banking operations. The Scoring and Median chi-square hypothesis testing has indicated that the computerised bank branches working environment in terms of efficiency and effectiveness are significantly better than non-computerised bank branches, thus, rejecting the **Null hypothesis $Ho_{(3)}$**. This statistically proves that better service can be delivered by computerised banking operations as compared to the manual banking operations. Thus, it is concluded by the ITS analyses that the computerised banking operations are better than manual banking operations.

7.2.5.4. Conclusion of Top Management Analyses

The Total Top Management Score on Bank Operations (TTMSBO) is performed for statistically proving that computerised banking operations are significantly better than manual banking operations. The Scoring and Median chi-square hypothesis testing has indicated that the computerised bank branches working environment in terms of efficiency and effectiveness are significantly better than non-computerised bank branches, thus, rejecting the **Null hypothesis $Ho_{(4)}$** in favour of **Research hypothesis $Ho_{(2)}$**. This statistically proves that better service can be delivered by computerised banking operations as compared to the manual banking operations. Thus, it is concluded by the TM analyses that the computerised banking operations are better than manual banking operations.

7.2.6. Corollary

The below table summaries the scoring and median chi-square hypotheses testing analyses performed on the responses of the farmers', managers, ITS and TM. It can be observed in Table 7.7, that except in the case of Nizamabad district, where computerisation is in the process, in all the other cases the calculated Chi-square value is **significantly higher** than the chi-square table value at **90 percent** confidence level. It needs to be mentioned that the sample size of ITS and TM are small but their analysis forms a supplementary analysis to support the farmers' and managers analysis. Based on the overall analyses of median chi-square hypotheses testing and as indicated in Table 7.7, it can be inferred that the respective Null Hypotheses are rejected and Research Hypotheses are accepted.

Table 7.7 : Table comparing the calculated Chi-square obtained on the responses of Farmers', Managers, ITS and TM

	Farmers' Responses			Managers Responses	ITS Responses	TM Responses
	West Godavari	Chittoor	Nizamabad			
Calculated Chi-square	**8.84**	**16.71**	***0.62***	**32.11**	**30.12**	**26.13**
Greater or less than	V	V	Λ	V	V	V
Chi-square ***Table value*** at **90%** confidence level	6.635	6.635	6.635	6.635	6.635	6.635

Source: Section 7.2.1.1.2, Section 7.2.1.2.2, Section 7.2.1.3.2, Section 7.2.2.2, Section 7.2.3.2 & Section 7.2.4.2 of Chapter 7

Thus, the scoring and median chi-square hypotheses testing analyses **statistically proves** that the computerised banking operation service are significantly better than manual banking operations service. This analysis also reinforces the earlier Percentage and Rating index analyses findings.

7.3. Conclusion for Quantitative Analyses : Chapter 5, Chapter 6 & Chapter 7

The Quantitative analyses is performed in an attempt to quantify the intangible benefits of computerised banking services. Percentage analyses are performed in Chapter 5, Banking Service Perception- Attribute rating index analyses in Chapter 6 and Scoring and Median Chi-square Hypotheses Testing in this Chapter 7.

Responses from the farmers, managers, ITS and TM were sought on various aspects of banking service keeping in mind the objectives of the research. Their responses were sought comparing the computerised banking operation and manual banking operations. It is observed in the Percentage and Rating Index Analyses performed

complement each other to conclude that computerised operations are far better than manual operations. The responses of all the four sets of respondents are also subjected to the scoring and median chi-square hypotheses testing statistical tool. It is observed that in all cases the calculated chi-square value is significantly higher than the chi-square table value at 90 percent confidence level, except in the case of Nizamabad district.

It must be noted that in the case of Nizamabad district, the rural computerised commercial bank surveyed was in the process of computerisation. This is reflected in their analysis, where the overall analysis on the banking transactions and rating analysis was slightly favourable towards computerisation but the scoring median chi-square hypothesis testing clearly does not reject the Null Hypothesis. Thus, in this case it could be concluded that since computerisation is a recent phenomenon, the benefits are expected to be delivered once it is well established over a period of time.

Thus, based on the overall scoring and median chi-square hypotheses testing, it is concluded that the respective Null Hypotheses are rejected and the Research Hypotheses are accepted. This statistically proves that better banking services can be offered by computerised banking operations, which again complements the previous findings.

Thus, we observe that the overall Quantitative analyses performed in Chapter 5, Chapter 6 and Chapter 7, converge and reinforce that computerised operations are far better then manual operations. The credit sanctioning and other services are perceived by the agriculturists to be far better in computerised banking operations branches and the managers feel that the working environment in terms of efficiency and effectiveness is enhanced in computerised banking operations. These analyses overall address the research objectives that ICT has very high potential in identifying the deserving beneficiaries, expediting the scrutiny of credit applications and advancements and recovery of agricultural credit by the bankers. ICT has very high potential to provide improved service to the agriculturists. It not only helps the organisation in long run but also enables the bank staff to reap the benefits by way of improving their operations and delivering improved banking service to the rural populations.

To reinforce these analyses, the responses to the open-ended questions were subjected to qualitative analysis, which have been analysed in the next Chapter 8. This is performed to explore whether the non-quantifiable, intangible aspects are inline with the Quantitative analyses and objectives of the research. The potential and constraints of implementing ICT in rural financial institutions are also studied in the next Chapter 8.

CHAPTER 8

POTENTIALS, CONSTRAINTS OF COMPUTERISATION AND IMPROVEMENT OF RURAL BANKING SERVICES

QUALITATIVE ANALYSES

8.1. Introduction

Banking being service industry, most of the benefits and drawbacks are intangible and hence qualitative analyses are performed to better understand these intangible aspects. The questionnaires discussed earlier also had related open ended questions. The obtained responses on these open ended questions are discussed in this chapter.

In the previous three chapters quantification of many intangible benefits was attempted by applying appropriate statistical tools to the responses on various banking activities. In this chapter qualitative analyses of the responses of the farmers, bank managers, the information technology staff/system administrators and top management on various questions related to banking transactions and activities has been undertaken.

This analysis provides for a holistic understanding and also to reinforce the quantitative analyses. Further, many intangible benefits and constraints of computerised banking operation, suggestions to improve banking service etc. have been discussed.

8.2. Qualitative Analyses

The farmers' responses are first discussed, followed by the responses of bank managers, IT staff and top management. The responses of respective sample units were consolidated and those points and issues identified by most of the respondents are discussed in this chapter.

8.2.1. Farmers Responses

The responses of farmers were elicited using open-ended questions on the advantages and disadvantages of transacting with various credit sources viz. moneylenders, friends/relatives, landlords, commercial banks and cooperative banks. Their feedback on the difficult banking procedures, suggestions to improve banking service etc. are also obtained and analysed as below. It was observed that the farmers were not able to provide adequate response on aspects of computerisation, since

computerisation has been a recent phenomenon and not directly interfacing with the computers as much as the banking staff. Another factor is the illiteracy among the farmers.

8.2.1.1. Advantages and disadvantages of different financial sources

The consolidated advantages and disadvantage of credit transactions with different financial sources as perceived by farmers are discussed in this section. Table 8.1 discusses the same with respect to Commercial bank. The advantages and disadvantages with respect to transactions with Cooperative bank are tabulated in Table 8.2, followed by those with respect to Moneylenders in Table 8.3.

Table 8.1: Advantages and disadvantages of credit transaction with Commercial banks

Advantages	Disadvantages
😀 Overall, the interest rates are lower 😀 The loan sanctioning process is faster and favourable. 😀 The procedures to be followed to get agricultural credit sanctioned in commercial banks are relatively fewer and less time consuming than in cooperatives.	☹ The commercial bank strictly works only during its working hours. ☹ Bank managers are transferred almost every 3 years. A new appointee takes time to be acquainted with the farmers, their conditions etc. before sanctioning credit which leads to delayed credit. To prevent NPAs, the bank manager verifies other credentials of farmers apart from the documents submitted and hesitate to give loans especially during the first time. ☹ Interest rates are not brought down during droughts as frequently by commercial banks as done by the cooperatives. And when they do so, they take longer time to implement the same. ☹ The farmers deposits are invested somewhere else and the profits so earned are not always put back in that rural branch.

Source: Authors survey

Table 8.2: Advantages and disadvantages of credit transaction with Cooperative banks

Advantages	Disadvantages
😀 The local people themselves govern the cooperatives; hence, are well acquainted with the bank staff and vice-versa. This helps in building good relationships. Bank staff understands the farmers problem and work with good faith, for the betterment of both the parties.	☹ There is extreme delay in getting credit from cooperatives. Secondly, the credit sanctioned is upto the credit limit set which is felt inadequate. These factors necessitate borrowing from the exploitative moneylenders. Benami loans are eating away the system of cooperatives.

Table 8.2: ***(contd)***

Advantages	Disadvantages
☺ The process of setting the scale of finance i.e. credit limit for each farmer, which is presently being set for a period of 3 years is tedious and time consuming. However, once credit limit is set for a certain category of farmers, credit can be sanctioned by the cooperative upto that limit. This credit limit stays valid for 3 years and the farmer is free to repeatedly withdraw and repay any number of times during the period of 3 years, within the credit limit, through the Kisan Credit Card Scheme. This easy withdrawal and repayment is highly welcomed by the farmers. Earlier, the repaid amount was not available for use again in that particular year. ☺ The credit limit set is an advantage since they are not tempted to borrow more than their capacity to repay and the tendency to divert funds to other non-productive uses is reduced. ☺ The working hours of cooperatives are better than commercial banks, since they work from 9.00 am to sometimes as late as 6.00 pm. ☺ In most cases of drought, cooperatives reduce the interest rates, but commercial banks do it less frequently.	☹ In cooperatives, the finance comes from NABARD which gives to APCOB at almost 6 percent interest rate, which in turn gives to District Central Cooperative Bank (DCCB) at 8 percent, which then gives to PACS at 10 percent interest rate. The PACS then adds its own margin and gives credit to the farmer at 12 percent - 13 percent interest rates. The farmers claim that this is relatively high as against the commercial bank, which gives credit at an average of 11 percent. ☹ The dividends on shares that the farmers need to compulsorily subscribe to the banks share capital amounting to almost 10 percent of the loan amount should be paid to the shareholders. After paying back to DCCB, the profits that remain with the PACS should be used for the benefit of the PACS and its members. It is understood from the PACS secretary that the dividend payment is in process of implementation. ☹ The farmers have to hypotheticate their assets to the bank while taking any loan from cooperative. ☹ The cooperative banks induce a lot of psychological pressure by regular notices and visits even before the due date of repayment. These are charged on the farmers. All this, results in an incredibly high cost of credit to the farmers.

Source: Authors survey

Table 8.3: Advantages and disadvantages of credit transaction with Moneylenders

Advantages	Disadvantages
☺ The village moneylender being one of the villagers is known to all the farmers and vice-versa and hence gives credit immediately. The moneylender in many cases on repeated requests by the debtor reconsiders and defers the date of repayment for some more days.	☹ Often repayment is coerced. Failure to repay can be taken to the village panchayat or court and on occasions assets can be auctioned to recover dues. In most cases, the farmers are forced to repay even if crops fail. Many suicides are reported in the last few years in AP because of such pressures from moneylenders (in addition to pressures from institutional agencies). If the borrowers are unable to repay the amount

Table 8.3: ***(Contd)***

Advantages	Disadvantages
☺ The moneylender is the sole decision maker, and so if he is convinced, he can do anything. Unlike, institutional agencies where bank manager sanctions in accordance with the rules, regulations and only to the extent he is authorized. If repayment is in time, the moneylender may also reduce the interest rates, especially if it is a one-time settlement.	borrowed, some moneylenders renew the credit by merging the principal and interest as a principal for the next year, which is just postponing with increased burden.

Source: Authors survey

8.2.1.2. Experience on credit sanctioning and suggestions to simplify it.

The experience on credit sanctioning and suggestions to simply it, in case of Commercial banks and cooperatives are tabulated in Table 8.4.

Table 8.4: Experience on credit sanctioning and suggestions to simplify it

Commercial banks	Cooperatives
☺ When the amount applied for is above the sanctioning authority of rural branch bank manager, it has to go to higher authority, especially in cases of long-term credit. This takes longer time for sanctioning. An alternative to speed this process needs to be evolved. ☺ The 'No dues certificate' that is being still insisted are charged Rs.15 to Rs.20 by the other banks, which is taxing. This system should be totally eliminated, since the Patadari Passbook have all the details. ☺ Signatures of all the family members related to the asset are required and in instances where the family has divided into separate families it is quite not possible to get them often due to reasons of separation. While these are to avoid frauds, but an alternative method needs to be followed with minimum procedures ☺ The rules, regulations and procedures of sanctioning should be reduced and simplified. Work should get faster and credit be sanctioned at the earliest	☺ PACS secretary do not have the authority to sanction credit as bank managers in commercial banks. Hence, such authority needs to be provided to him. ☺ Credit sanctioning time is very high. The processing and scrutiny of applications for credit is not taken up as soon as a farmer applies for the credit. The processing of application starts only after substantial number of them has been received, since the same procedures need to be followed and sent to DCCB for approval. This is done to minimise the work load of the bank, by avoiding performing the process when each application comes in. However, this hinders the farmers' activities because of non-availability of much needed timely finance and creates anxiety due to uncertainty of credit being sanctioned or not. This forces the farmers to borrow from moneylenders at high interest rates. The farmers are demanding simplified process of sanctioning.

Source: Authors survey

8.2.1.3. Suggestions for improved banking service

As PACS are managed by local people themselves, if managed and run well can be highly productive and perform better but unfortunately are not being managed so. The amount of credit sanctioned is insufficient and more credit should be provided to farmers for agricultural production. To encourage adequate borrowing, the interest rates on loans should be brought down during good seasons.

They opine that if there is mutual give and take between farmers and bank, borrowing from institutional agencies is better than borrowing between father and son. However, also state that the political interference and other influences are crippling the institutional agencies, which should be vehemently resisted. Needy, hardworking, responsible and productive farmers should be identified, encouraged and given credit along with other support.

The Insurance scheme should be modified to give benefits to a single farmer whose crop failed and not only when crop in the whole district had failed. After struggle and agitation by farmers, the unit for consideration has been brought down from the district level to the mandal level.

It would be easier if the transaction details, balance amount etc. were in the local language viz. Telugu, also. The accounts written on passbook are not very clear which leads on occasions to misunderstanding. As most of the farmers are illiterate the bank staff should patiently deal with farmers and educate them on the various schemes and procedures. They should be sensitised to the needs of farmers and their aim should be the development of farmers'.

The cooperatives which have been established with the primary objective of farmers' welfare are neglecting them and instead are more worried about their own profit and development. The farmers state that not many of the bank staff empathise and respond well to their clarifications and any information that they seek. Few farmers state that, given some more time they would repay but the bankers force and coerce the farmer to repay so that the cooperative staff gets their pay, bonus etc. Hence, the farmers request that the bank staff show a little patience in genuine cases for repayment.

Farmers complain that the government takes time to give Insurance. At first it takes lot of time to declare a region drought affected, after which a committee comprising of Agriculture, Revenue and Insurance officers is constituted. It decides on the percentage

of crop failure and the compensation to be paid. This is a time consuming process, while the farmer is in immediate need of finance to sustain his and family's livelihood. All of his savings being invested on crops, its failure due to factors not under his control, makes him vulnerable. This makes him an easy prey to the exploitative moneylenders. This leads to indebtness, which is not just economical problem but also a social problem.

The interest rates being lower in institutional agencies, farmers prefer to take more credit from them and avoid the exploitative moneylender. They opine that the institutional credit is presently inadequate and should extend increased credit, which is expected to prevent indebtness.

In commercial banks managers insist for Patadari Passbook – which has land particulars, no dues certificate from other banks, encumbrance certificate, legal opinion (depending on loan amount) and title deed (legal opinion also got for clear title and marketability opinion). In case of non-repayment etc. the commercial banks approach the civil courts for legal permission to take action. Whereas, in cooperatives the staff insist on Patadari passbook, 101 revenue accounts (has details about whether there is cultivation or no, the water source-whether it is river or bore water etc.), No.2 Adanggal (History of land transfer etc.), Hak book (Enjoyment Certificate) etc. and land has to be hypotheticated to the bank by submitting the original land documents. In case of non-repayment etc. the cooperatives approach the Government Cooperative Department Magistrate for legal permission to take action. This process should be reduced, as it is more a hindrance rather than of any assistance.

The need to produce the 'No dues certificate' from other banks has to be done away with. It is difficult for a common farmer to spend so much time going around to different banks to get this certificate as it is not given instantly. He is often asked to come back later and also has to pay a fee to get it. The 'No dues certificate' is felt unnecessary as the 'Patadari passbook' has all the relevant information. In cooperatives strict monitoring of operations is needed, often, proper documents and accounts are not maintained, interest waiver and other schemes are not properly communicated etc. Sometimes the farmers feel harassed as their land documents are locked with the cooperative bank officials. Due to these reasons farmers are more comfortable to transact with commercial banks rather than cooperative banks.

Land documents are a must for getting financial assistance from institutional sources, however, financial assistance should be extended to those who do not own land, as in some micro-finance schemes in some areas. Similarly, more schemes like providing loans for purchasing milch cows should be provided. Such schemes should be taken up in large magnitude to benefit maximum population.

They opine that computerisation aids in identifying frauds and hence should be encouraged. Banks should explore all the possibilities to reduce the interest rates which would encourage borrowing as well as timely repayment.

There is no proper information on the dividend of the share capital contributed to the cooperative. They opine that this dividend should be shared among all its members and the share capital interest should be given regularly. During drought 'drought crop loan should be provided'. When the government announces drought and waives interest rates, it is not implemented quickly. There is time gap between announcement of waiver and its implementation. If the bank staff can go around and collect small amounts daily then there would be no heavy pressure to pay the total amount on the due date. This is very similar to microfinance.

By harvest time all the credit is used up and hence the farmer is forced to borrow from the moneylender. The possibility of credit being given at mutually agreed instalments should be explored. This would ensure availability of funds at the time of harvest. Availability of funds in bank will also strengthen its fundamentals. Banks in different areas follow different procedures, while in some areas the bank insists on 'No dues Certificate', and in other areas the banks don't insist on it.

Banks should explore the possibility of marketing produced goods or atleast enable it. The banks should have different schemes of loans wherein more loan can be provided on the request of the farmer. It should be appropriately arranged, with the extra component at a higher interest rate but lower than the rate at which the moneylender lends. The private lenders just take 2-3 documents and signatures and finance is provided immediately. Whereas, in banks there are lengthy procedures and documentation but are still inefficient and delay in sanctioning credit.

The farmer should not be made to go from pillar to post, the verification and re-verification creates delays, which should be minimised. The lengthy process of filling

forms should be reduced drastically and credit sanctioned in 10 days. Computers being transparent and accurate can help speed the sanctioning process.

8.2.2. Bankers Responses

The responses of bank managers' was obtained on open-ended questions pertaining to difficulties encountered while granting loans to farmers, potential benefits of computerisation to farmers and banks, and networking of all rural branches/ZOs/HOs. Their opinion on the constraints and suggestions to solve them was sought. Further, their opinion on Return on Investment of computerisation and, the computerisation of other agencies that can help speed up the sanction and recovery of credit to farmers was also obtained.

8.2.2.1. Difficulties encountered while granting loans to the farmers

The difficulties encountered by the bank managers while granting loans to the farmers has been analysed. In cooperatives, they feel that the process of sanctioning loan is lengthy. The procedures requiring the filling of various forms should be simplified. All the documents and certificates have to be checked. The farmers assets must be pledged to the bank. The scale of finance for each farmer has to be calculated and finally all the applications must be sent to DCCB for approval. Banks and farmers have to wait for the sanction to come from DCCB office. This process is time taking, and there is constant nagging by needy and the farmers get restless. It has been observed that even for renewal of loans all documents have to be submitted, this leads to repetition of work. A simplified procedure with a letter of undertaking, valid for 3 years would be a better alternative. The authority for sanctioning is distributed. The board of management, secretary, supervisor, manager, agricultural development officer, all need to cooperate for loan sanction. Whereas in commercial bank the field officer and bank manager have the authority to sanction and hence sanctioning is faster. After some of the cooperative scams like Krushi Bank, people doubt the operations of the cooperative. There is political pressure in sanctioning the credit and hence the right beneficiary does not receive the loan.

Managers' highlighted that the farmers have no knowledge about the scale of finance, they lack proper planning and management of finance. Many a times the farmers are reluctant to pay for the insurance, however, when their crop fails they come immediately for reimbursement. They start demanding saying that they had paid the insurance premium, but they do not give attention to the point that insurance cover is only

when the whole Mandal is affected. The farmers are illiterate, and hence there is need to explain and re-explain to them. They have to deal with the farmers with lots of patience. The managers reason that repayment is not upto the mark due to drought. Due to delay in sanctioning credit there is unrest among the farmers who regularly visit the bank anticipating sanction of the loan. The process should be speeded up and authority to sanction upto Rs.5000 – 8000 should be given to the PAC secretary.

The managers complain that any rebate and schemes are not known at right time, otherwise collection can be increased. The PACS secretaries (the manager of PACS) state that there is need for refresher training every two years to get them updated on best practices in accounting. This would ensure that all the PACS follow the best practices and similar procedures. The farmers are often in need of more credit. They suggest that all PACS take up the business of fertilisers and pesticides, as there are many farmers who need to travel long distance to get these. The farmers are unaware about the uses of the credit, whether it should be used for production or for consumption. They use the money in a very unplanned manner, hence proper awareness on thrift and planning of expenditures needs to be provided.

8.2.2.2. Potential benefits of computerisation to Farmers

Bank mangers state that accurate Interest calculation is possible in computerised operation. In manual system, there are good chances of making mistakes. Computerised systems are accurate for all routine transaction. Wrong entries cannot escape noticed in most cases and one example cited is if the cashier feeds Rs.200.80 as Rs.200 in the computer, later during the voucher feeding by another staff, when the correct entries are made i.e.Rs.200.80, the computer immediately prompts the error in entry, which leads to re-check. Thus, the prompting facility helps in many ways to avoid unacceptable or erroneous entries. The bankers feel that it is easier to operate, enter the values etc. and are also able to provide better service due to computerisation. Any clarifications sought by farmers can be provided with more confidence, secondly the farmer when in doubt is shown what are displayed on the terminal. In this manner the farmer is also convinced. Presently, in computerised operations almost 3-4 bank officials have to authorize each transaction, yet it is faster and done with more confidence. They envisage that very soon single window system would be introduced in rural areas too, where any transaction can

be made at a single place. And this can be made possible only through computerisation as can be seen in urban branches of banks and other private banks.

If connected to Internet, bank people can help the farmers to get fertilizer, pesticides at best prices and also help in identifying the best market to sell their produce. There are farmers who have 2-3 loans (short term, long term etc.) hence, it would be possible to give a small printed slip of transaction to them. The farmers also will feel confident about the transaction.

Timely and easy finance could be provided to farmers since banks can have the history and up-to-date computerised information about the transactions of the farmer. Computers can be used to help in scheduling repayment and better cash management. The managers opine that the actual benefits could be accrued and the banking operations would improve only after 4 – 5 years and state that once the older staff retires and younger staff replace them with better learning capacity and exposure to computers.

The benefits of computerisation are quick loaning process, genuine loaning and ability to know the financial position of the borrower immediately. All the details of the farmer can be provided on one screen and shown to the farmer who is in doubt, by just keying in the General Ledger number. The demand notices sent to farmers would be clear and understandable if printed in local language. And this could be referred without the help of the bank staff. The passbook entries would be very clear. There is need to provide cheaper ATMs to enable the farmers to perform anywhere, anytime banking within the limits provided to each farmer. Farmers feel confident and satisfied due to computer, as they feel that the transactions are accurate and reliable.

8.2.2.3. Potentials benefit of computerisation to Bankers

The biggest burden of balancing end-of-day accounts, calculation of returns, interest rates etc. is now accomplished almost instantly, without the tedious manual calculations and ledger postings/bookkeeping. Another hassle, of moving Ledgers and books around the bank is no more required. Based on authorization in computers, details of an account can be accessed at any terminal in the bank after proper authorisation. Correct data is available immediately to fill-in all returns and satisfy all requirements thus, reducing the burden on employees. There is no fear of income-leakage due to wrong calculation.

Each year from mid March to mid April the banks work gets hectic with preparation of charts and documents on its performance, which have to be submitted to their Head Offices. The manual operations can now be done away as computerisation aids in these operations. The drudgery is now almost eliminated, the administrative workload being reduced, the bank staff can concentrate on other developmental and recovery activities. Due to computerisation, the bank can strategically diversify into related areas, for example, SBI diversified into Insurance sector and the surplus staffs due to computerisation were appropriately posted in the Insurance Unit.

The secretaries of computerised PACS state that many accounts are required to be maintained by PACS in different books like; 1) Receipt of payments 2) Cash/Day book 3) General Ledger 4) Loan Ledger 5) Liability register 6) Village wise demand, and in the cases of over-due customers 7) Arbitration register 8) Execution Petition, other general registers like 9) Registration fee 10) Court fee 11) Photo fee etc. In computerised operation, most of these registers can be updated online as and when transaction is completed. Secondly, all related data is also updated, which is impossible in manual operations, where for each transaction, the respective ledger need to be opened and manually entered; followed by opening other related ledgers/registers and updating. Chances of making errors are more in manual operations, which are completely avoided, in computerised operations. Daily transactions are also up-to-date.

In manual system, any information from Government or from bank head office takes a minimum period of 1 month. Secondly, for a given clarification, different versions are obtained from different departments, which lead to confusion of the manager. Some orders are such that even if information is obtained from one agency, say government, implementation by the bank manager can be done only when he receives orders form his concerned department. But, by computerisation and networking of all concerned agencies, such communication delays and gaps can be reduced. Computerisation and networking does incur investment but is timesaving. The database if utilized appropriately is useful for any research, investigation and development of business.

Some managers suggest that the PACS should maintain only Rs.500 balance and should remit the remaining to DCCB, to avoid misuse of the extra money. By computerisation and networking, the DCCB staff can get to know how much balance is available and thus there is a check on any fraudulent use of the extra money.

Quick work and good service will earn goodwill from farmers. This will lead to increased business. Updated accounts and verification can be easily done. If care is taken while entering the data the first time, errors are minimised and frauds can be reduced, if not eliminated. Details of PACS transactions can be seen at the DCCB and APCOB level and vice-versa. Repayment schedule, dues and demand list can be easily created which would better help the bank mangers to plan for repayment activities. Lots of time spent on interest calculation and posting of records is easily done by the computer and thus, there is less wastage of manhours. In future, the ledgers and other books may not be required. The cost of transactions is reduced and there is better management.

If case of an error, the higher officer can't rectify it by himself. It has to be sent back to lower officer and compensating entry need to be given and then verified by the higher authority, for security reasons. However in manual system the higher officer can just counter sign besides the incorrect entry and go ahead with the transactions. Half yearly interest for agricultural loans and monthly interest for personal loans (house, educational loan) is automatically calculated. The day to day work gets over on that day itself. Quick information resource and good accounting principles. The instalments schedule is calculated and can be given to the farmer on the spot. Querying is easy and information can be easily retrieved. There is less need to regularly cross-check the entries, however, care should be taken when entering data the first time.

8.2.2.4. Constraints of Computerisation

8.2.2.4.1. Problems in computerisation

Bankers receive approximately a month's training in the use of computerised systems, which is considered grossly inadequate. In certain situations the computer gives some prompt and the bank staff do not know why it has come and don't know how to proceed. Sometimes the machines get very slow and the reasons are unknown.

To be on the safer side, some computerised banking operations are performed manually and manual/hardcopy backups are taken. Experienced and older staffs say that they have been using the traditional manual systems for almost 30-40 years; from the time, they joined and hence, are finding it difficult to get adjusted to the new system and adapt to the computerised operations. There is lack of initiatives and interest in using the computerised system.

Mangers state that the computer staffs do not know the requirements of bank staff for banking operations and bank staffs on the other hand, do not know how to use the computers. Even higher ups at the AGM level etc. also do not have an understanding in the use the computers and the software. They can perform only those operations taught during training, with lot of doubts and frequently call the technical staff.

Power supply is a major problem in rural areas. Banks are presently using generators, thus increasing the cost of transactions. Hence, effort should be made by Government to provide adequate power supply atleast during banking hours. Alternatively approximately Rs.4,000 per month would be needed to spend on a generator.

The major problem in the case of cooperatives is limited funds for computerisation. PACS earn very little through credit operations. The PACS secretary is not aware of the equipment needed for computerized operations, such as computer, printer, UPS etc. and their prices. It is good to note that APCOB is taking initiative and negotiating the cost for computerisation of few PACS on pilot basis with 3rd party organisations like Cooptions Technologies etc.

Currently, all the staff work manually and lack knowledge of computers. The managers opine that the bank staff would slowly learn to use the systems and the efficiency improvements would be gradual. During computerising the feeding-in data of past and existing transactions is difficult and time consuming.

8.2.2.4.2. Problems after computerisation

In cooperatives, a 5-year contract is given to 3rd party agency viz. Cooptions Technologies; where in, the executives of Cooptions Technologies attend to any problem. The bank staffs are also imparted necessary training by them. However, as technology advances, customers' expectation increase and the expiry of the 5 years of contract is all worrying the bank staff. Workload has increased as both computerised and manual operations have to be done. However, in general, banking in computerised environment is much easier than in manual operations. The managers state that there are many fields to be filled for transactions and unless all the fields are properly filled the system will not register information. Some of the staff are afraid that something may go wrong or some files may get corrupted if they do something they are not sure about, hence don't want to take risk and initiative. Thus, the staff has not taken to computerisation quickly.

8.2.2.5. Measures suggested

The managers suggest that one skilled computer technician having both hardware and software knowledge covering few villages should be employed by the bank. More training and education should be provided to the bank staff to use computerised systems. Over a period of one year, every 3 months discussions should be held by IT staff with the rural bank staff, to clarify doubts. Staff with computer experience should be posted in rural areas.

In cooperatives, the managers feel that APCOB should give cheap finance to implement computerisation. APCOB should make it compulsory for PACS to use computers and the 3 tiers viz; APCOB, DCCB and all PACS should be networked. These should also be linked up to the Sub-Registrar office, Collectorate and related offices.

The PACS Secretaries feel that the cost and maintenance of computers should be borne by the government for 2 years and more training has to be provided. Business has to be increased by introducing good schemes to accommodate high cost of computerisation.

8.2.2.6. Computerisation of other agencies, which can speed up the sanction and recovery of credit to farmers

Mandal Parishad Development Office, Mandal Revenue Office, Registrar, Sub-registrar office, District Central Cooperative Bank, Joint Director of Agriculture and Agricultural extension office for agricultural and banking operations. Links with electrical, water, telephones department etc. should be made so that system like e-seva can also be implemented. APCOB to DCCB to PACS should be networked for quick and hassle free sanctioning of loans to the farmers.

8.2.2.7. Return on investment of computerisation and networking of rural branches

The computers can do more work and the existing employees have become underemployed due to computerisation. Employees can now be used to take care of other activities like business development, collection etc. which increases the performance of the bank. Ease of working with computers, accuracy and transparency are the various benefits, because of which the business hours of banks can also be extended. This also helps in providing better and faster service.

Until stabilization of the new systems, the transaction cost will be higher, but are expected to reduce over a period of time. There will be more transactions, bank business is

expected to increase and customer patronage would improve, thus reducing the overall cost of transactions.

A very important aspect that is highlighted by most of the respondents is that within 3 years, the book value of computerisation is reduced to zero, by way of depreciation at the rate of 33 percent per year. Secondly, computers can provide service of almost 10 to 15 people with equal efficiency and effectiveness for 10 or more years, if maintained well. Thus, the investment on computerisation and establishment cost is reduced steadily.

There would be improved customer service and satisfaction, thus increasing the loyalty and business. If the PACS are connected to DCCB and APCOB there is no need for the officials to come down all the way to PACS to verify and audit. Preliminary verification/audit can be easily done from their own offices, which saves time and money.

By computerisation the surplus staff can be utilised for activities that require more involvement of humans like business development, interacting and counselling the farmers etc. In situations where there is more office work, computerisation comes to the rescue of the staff. Customers feel happy when transactions are expedited. 24hrs service and extended banking hours can be provided.

The staff overheads and stationery overheads are relatively reduced. Profitability increases since overheads in terms of salaries, books, paper work are reduced. Few state that there is less psychological strain, thus transactions can be performed with lesser strain improving productivity. Computerisation is initially very costly but in the long run it is very cost effective. Public confidence increases since transactions are transparent and neat as compared to manual systems where many entries were not legible with ink cut marks and crosses. 30 days work can be completed in 30 minutes, thus reducing the manual labour. They opine that they should be enabled to provide e-seva services, school results, training, village voters list and other services.

8.2.2.8. Requirement of skilled staff and training requirement of existing staff

Bankers strongly feel that the training given to bank staff is inadequate and there is need for more training to use the computerised banking operations. The older staff has more banking knowledge but less computer knowledge and the new generation staff has more computer knowledge and less banking knowledge. Thus, exchange should be enabled between them so that there is good transfer of knowledge. Equilibrium point is

expected to be achieved in 5-6 years where each age group equips themselves with what each lacked.

In the case of cooperatives, Co-options Technologies provide training for 3 months and after that they come once in a week. If the PACS Secretary is on credit collection then the training is missed. They feel, one year training on all aspects of computers is required for learning the system since the PACS secretaries have to look after other work and business activities along with learning to use the computers. Thus, authorised and dedicated trainers should be sent to all rural areas so that they can train all the staff.

8.2.2.9. Suggestions of bank managers to improve the flow of agricultural credit

Quick sanctioning and disposal of agricultural credit is needed and procedures need to be more simplified. Insurance premium to be paid by farmers should be reduced. Few managers state that interest rates waiver should be abolished and instead interest rate should be reduced to 3.4 percent (presently range from 10 –12 percent), this would result in more agricultural development, less wilful defaulters and no waiver/rebate from government would be anticipated.

There is a suggestion that farmers who pay regularly and in time should be given incentives like 2 percent reward or rebate on the amount to be paid. The credit lending should be associated with the potential/capacity of the borrowers rather than only on the land holding. Need based finance to agriculturists should be provided. Professionally well qualified people (BSc Agriculture and those with exposure to banking technology) need to be brought into the banking system with more rigor. Bank manager should be provided with proper finance and discretionary powers to sanction loans to needy farmers, with accountability. Simple documentation is the need of the hour.

More subsidies need to be provided and all services need to be provided at the doorstep of the farmers to improve the banking business. Offering such services and computerisation are time-saving and an asset to the bank. Computers can also be appropriately used to provide education and entertainment. Profitable technology should be provided and enabled to be used by the farmers. Awareness among agriculturists regarding various facilities for agricultural credit and the importance of repayment need to be increased so as to improve the flow of credit and inculcate the habit of prompt repayment. This is possible by regular meetings of the bank staff with the farmers.

Once a PACS secretary is convicted for misappropriation they should be immediately removed from service and debarred for life from contesting the elections. Elections should be conducted at regular intervals and on time, which would help in good management of the cooperatives. They opine that to avoid misappropriations, good salary should be given and regular transfers to PACS secretaries. The amount of credit should be increased since the prices of the commodities and expenditure levels have increased. Also other loans like TV loans, scooter loans and others should be given rather than only agricultural loans.

8.2.3. Information Technology Staff/System Administrators responses

8.2.3.1. Opinion on computerisation of rural financial institutions

8.2.3.1.1. Reasons for computerisation of rural financial institutions

Information Technology Staff/System Administrators (ITS) agree that the rural financial institutions should be computerised as it would facilitate better service and offer convenience to the rural population. This would also place them in a strategic and profitable position and arrest new generation banks to establish their branches in rural areas and eat into their share of business. This would also facilitate to implement the latest 'Core Banking Solutions' in rural branches wherein 'Anywhere', 'Anytime' banking service can be provided to its customers. This would also help to be in line with the Chief Vigilance Commission guidelines on business to be captured through computerised operations. There would be inherent efficiency in accounting and end-of-day balancing system due to computerisation, eliminating the time consuming drudgery of manually performing them, thus improving the internal housekeeping. Multilevel updating is very easy and automatic, eliminating almost 4-5 different entries that need to be manually entered in different records for a single transaction in manual system. There would be more time for business development and better customer service can be provided.

According to RBI guidelines, there is need to apply interest rates almost monthly and computerisation helps perform this tedious activity automatically and meticulously. More time can be devoted for field visits on a continuous basis. This would help to concentrate more on business instead of routine activities which can be automated. This is expected to increase deposits, improve the quality of lending and help in reducing the Non-performing assets (NPAs). The workload reduces and due to automation the system

takes care of the rules and performs according to the book of instructions of the bank. Entries are at single screen, which provides the whole picture of the customer at a glance viz. drawing power, limit, outstanding, renewal dates of fixed deposits etc. on an updated manner, which helps the bankers to take quicker decisions.

Appropriate reduction and redeployment of manpower will lead to more profitable business activity. Machine could be depended upon for more consistent performance, especially for routine jobs. Not all people work to the same level of efficiency and speed though adequate training is given, but computerisation performs activities systematically and accurately with no deviation unless the banking software is incorrectly programmed. The hardware prices are down and investment on technology is relatively very less with respect to business being carried out and hence computerisation should be taken up in a big way. Data can be used for good and prompt MIS purposes for effective control. Data mining techniques can be appropriately used to extract information for strategic planning. Financial statements can be generated whenever required and the status of the branch in terms of viability, potentiality and profitability can be judged on a real time basis. Report generation is quite easy.

Most of the rural population is illiterate and like any other customer they also wish to complete their transaction at the earliest without any hassles. Computers give that reliability and confidence to them. The most important outcome of computerisation is the uniformity and commonality in accounting and other procedures. Computerisation would arrest income leakages and keep a check on misappropriation due to increased transparency, though necessary security needs to be inbuilt in the system. There would be faster information inflows and outflows resulting in quicker, timely credit and banking services. The eligibility, scale of finance etc. can be judged and calculated instantaneously by giving relevant basic inputs to give an idea to the customer. The rural banks should also be connected to the ATMs and Internet.

8.2.3.1.2. Reasons against computerisation of rural financial institutions

Computerisation is justified when there are very high transactions, whereas in rural areas the transactions are more periodic due to seasonality of agricultural activities. If there are 2 crops then there will be transactions twice a year other wise only once and there seems no real necessity to have online data in rural areas. The major drawbacks are the lack of knowledge to use the computers, irregular power supply, and inadequate

infrastructure. It is not economically feasible to invest so much on technology and try to cover the rural areas in the present scenario. It requires lots of involvement and dedication to provide technology enabled services on a long term basis.

8.2.3.2. Major constraints/problems encountered while building and implementing IT infrastructure in rural financial institutions/branches

The major constraints identified by most of the ITS respondents are inadequate training to personnel to use the systems and the high investment involved for implementing IT infrastructure in RFIs. Presently, the training to use the systems is provided by visiting faculty and in some cases a few days training is given at training institutes which is perceived to be inadequate. There is lack of awareness about the use of computers and its benefits. Few suggest that young people should be recruited as they can learn the computerised operations faster and are more acquainted with computer knowledge.

Lack of constant power supply is also identified as a major constraint, especially during summer when there are more power cuts. However, most of financial institutions are now being provided with UPS and generators, especially the commercial banks. Few respondents opine that since they are not big branches, even if there is power cut they can cope up till the power is back, but power cut shouldn't be for a long time. There is a general lack of telephone and communication facilities. The locations being remote transportation of the PCs takes time, so also for attending to any repairs. It was pointed out that while computerisation is good, it becomes very difficult to implement it at far away locations and hilly regions like North Eastern states. Software is time-tested and hence problems with it are least, however hardware problems could be expected due to rural conditions These can be rectified, however with delay due to logistics issues.

People are resisting change, and few PACs are in such state of affairs that they can't afford to computerise. The resistance can be attributed to many reasons. Among others, the PACS secretaries are not able to see how the calculations are done. Whereas, in manual they know which number/entry goes where and how the final result comes. In computers since everything is done automatically they are unable to digest it well, since they now need to visualize the calculations and accept the output as it comes. In a way they feel a lack of control in computerised operations whereas, in manual operations they have a feeling that everything is under their control and fiddle with the numbers/entries at their will. It is however observed that this flexibility in manual system is sometimes put to

wrong use, wherein the accounts are worked-out the reverse way and window dressing is done. In computerised operations control is only on the input of data and not sure about what the consolidated output would be until the computer provides this information at the end of the transactions. The entries cannot be manipulated easily. These are few reasons, among others that act as a mind block for the usage of computers. Generation gap is another reason leading to lack of commitment to the use of computer by the older generation.

In the present communication channel when banks connect to their higher offices, there is lot of disturbance, so the staff have doubts while sending the data. Sometimes the disturbance is so high that it is doubted whether it reaches the destination. There has not been any fresh recruitment and Voluntary Retirement Schemes (VRS) has resulted in reduction of staff hence employees are against computerisation. There is lack common practices across the PACS, however, it was learnt that Cooptions Technologies – the IT implementing agency in PACS of AP has impressed upon APCOB and DCCB, that common practices must be followed in all PACS. Due to lack of maintenance of up-to-date books of accounts and irregular posting of entries in PACS, computerisation process is hampered. The process of updating the database with the past data is very time consuming and tedious.

8.2.3.3. Computerised enabled products that could be offered to agricultural farmers to profit from computerised operations

'Anywhere' 'Anytime' banking could be provided by connecting all the rural branches to their Head offices. Internet/Telephone banking and ATM access could be provided to Kisan Credit Card (KCC) holders. Add-on products like electronic passbook and demand draft printers can be provided too. User friendly and graphic touch screen equipment would empower the farmers to transact on their own. In future, rural financial institutions could operate as an information kiosk, where e-pay services as provided in e-seva centers are enabled. Thus, electricity, water, telephone, tax bills can be paid and also birth certificates, land certificates etc. can be obtained. Child welfare programs like the UNICEF project 'Sishu Samrakshak' by Cooptions can be explored to be appropriately provided by the banks.

8.2.3.4. Opinion on establishing Rural Credit Information Bureau (RCIB)

RCIB is expected to have updated information and connected to all rural branches, it would help access authentic information needed for better decision making by the managers and help improve agricultural credit flow to farmers.

All the respondents are affirmative on the need to establish RCIB, however, are little apprehensive about its feasibility due to the effort involved. RCIB can ensure online, relevant data availability and thus enable quick delivery of credit. A good Management Information System (MIS) can be made feasible. Such a system prevents financing the defaulters and double financing thus reducing credit risk and NPAs.

RCIB can also enable agricultural extension services. Information, advices and suggestions on cultivation activities can be provided. If data storage and secured access is centralized then decision making is easy, effective. Information can be easily sought through this centralised MIS, region wise, area wise, gender wise, wet land, dry land and on all other classifications. Latest agricultural and credit schemes, re-scheduling of the repayments etc. can be made known to the managers in the rural areas without loss of time. It will enable to collate information and other banking habits about the rural population to develop new products/services region wise. Data being secured and updated, would definitely help in better and speedier decision making process. Credit limit generation can be programmed and generated very fast. The sanctioning of the credit, which takes almost a month in manual systems can be expected to be completed in approximately 3-4 days. Once sanctioned, the loan can be immediately distributed.

8.2.3.5. Potential benefits of computerisation of banks and later networking them to RCIB

8.2.3.5.1. Benefits to farmers

Convenience banking and good service can be offered to the farmer customers. Better and quicker decision would be enabled increasing the speed of transactions, reducing the credit sanctioning time thus requiring customers to spend lesser time at banks. Efficient and effective credit delivery as per database can be made possible. Greater avenues, options and services offered by different RFIs can be made available at all RFIs, among which the best can be opted by the rural population. Printed passbooks would have very clear and discernable entries. The farmers' express confidence that the

interest rate calculations are accurate. The most preferred repayment schedule especially for long term loans can be provided.

To improve productivity, the banker can counsel the farmer by studying his database. The farmer can also be provided more credit depending on the need and history of transactions. Timely credit is the most important aspect that all farmers desire. This is what they are more interested in rather than whether the bank is computerised or not. However, as computerising banking operations helps in speeding up the credit sanctioning process and enables improved services, they welcome it. Agricultural extension services can also be provided. New orders, schemes, repayment deferment etc. can be communicated without delay and brought into immediate effect thus benefiting the farmers.

8.2.3.5.2. Benefits to banks

The immediate benefits of computerisation to banks are effective and updated housekeeping, accurate accounts and reduced cost of operations over a period of time. Defaulters and double financing can be reduced, thus NPAs can be checked. There would be improved and efficient delivery of service, thus improving the image of bank and saving time which can be effectively devoted to business development and recovery purposes. Banks are commercial organizations and have to be more efficient, as they don't receive any charity from any source. They can't be extravagant and have to be innovative to reduce costs. They need to generate their own resources and computerisation though involves higher initial investment is expected to usher profitable income over a period of time by better operations and services. Bankers can get relevant information at the click of the button, due to good network and MIS.

Human Resource Management would need more attention, since excess staff needs to be effectively utilised for development, recovery and innovative activities for the betterment of the organization. The improvement in customer service as well as the cumulative returns from diversified activities by computerised operations is expected to increase the profitability of the bank. In computerised banking operations, it is possible to consolidate the accounts at regular intervals of time, which helps the top management to get real time holistic picture of their respective bank business. By taking appropriate security measures the income leakages and misappropriations can be reduced to barest minimum, if not eliminated.

The demand as on date, the rebate, the penal interest and other relevant information can be printed for clear communication to the farmers. Immediate service can be provided to farmers by digital transfers viz. in case of cooperatives, these transfers could be from PACS to DCCB to APCOB and back as per requirements. More work can be performed with less manpower. Flow of information upwards is faster and the feedback can also be received faster, thus enabling timely decision making. The confidence level of rural customers on banking system is improved, due to increased transparency in computerised banking operations. Relevant and sharable data on farmers can be provided to fertilizer, seed companies at a cost so that it can be used strategically to make available needed products at right time. Some farmers take short term, long term and other personal loans and so to know his updated position many books need to be referred in manual systems, whereas, the updated total customer profile can be obtained in one screen in computerised banking systems. The audit process in manual systems need more than a week and each rural branch has to be visited, however with computerised auditing many tedious steps and visits are drastically reduced thus speeding up the audit process.

8.2.3.6. Opinion on return on investment of computerisation and networking of rural branches

The return on investment on computerisation of rural branches is in many forms. There are good chances to attract more number of customers by delivering timely and efficient computerised banking services. They would also be having an edge over other non-computerised branches. This saves a lot of time and enhances convenience banking. Various intangible benefits are accrued. All the rural branches are computerised and networked, improved rural banking service are provided, social obligation and statutory obligation can be met, reduced time and effort on internal housekeeping the savings of which can be used for concentrating on business development, loans, deposits, meeting the customers etc.

If connected to internet, more agricultural information can be obtained, different markets can be accessed and this will increase the farmers business. In commercial banks, the investment and efforts of computerising and networking all rural branches is estimated to be less when compared to, their present business turnover and the potential additional increase in revenue due to computerisation. At macro level there will be growth in net profit in branch and lesser incidences of NPAs.

The computers and other related equipments get depreciated in 3 years and their book value becomes zero, however they can be utilised for another 8-10 years, without much modifications and investment, before they get outdated. The salary overheads can be reduced, since computers can perform the job of 4-6 employees consistently for long periods without any problems. Computerised operations can take up the workload with consistence performance. In the present situation, many of the employees are in the middle to end of their career whose children are studying in urban areas and hence would like to shift to urban areas. By virtue of seniority they get transferred to urban areas. On the other hand it is understood that there has been no recruitment since 1986, hence there will be good amount of gap in the availability of staff in rural areas in the near future. However, the non-performing staff is a burden and has to be identified and removed. Equivalent number of staff need not be recruited, however, appropriate number of skilled staff should be recruited. The skilled staff will be comfortable with the use of computers and also perform multi-tasks with ease and dexterity.

Few of the respondents opine that initially it is difficult to break-even after computerisation, however in the long run it is expected to be profitable. It will enable diversifying into other related activities which would also increase the revenue flow, reduce costs and NPAs. HRD will need more attention to help organisational effectiveness and growth. There would be uniformity of accounts, transparency, timely availability of credit, knowledge and more empowered farmers. Computerisation helps improved flow of information and credit to the needy. Computerisation seems like a transformation process especially in cooperatives, where the employees are against computerisation, since they feel that they are losing their control and hence make unnecessary allegations to prevent computerisation. Cooperative is the stepping stone/spring board for politicians. Computerisation hence has to be forced upon, but since this is a top down push it makes the PACS level staff feel insecure. The PACS are presently in extreme anarchy, and when attempts to streamline them for computerisation are made the staff dislike it and get defensive.

The ITS respondents state that computerisation and networking of rural banks is the need of the hour and is definitely a good investment, which is the need of the hour. Returns more than expected would be forthcoming once the computerised activities are stabilized and start functioning in full swing. The returns being intangible can’t be assessed and quantified easily and immediately. It does require some gestation period to

exhibit its contributions. Benami loans can be reduced by checks and balances, thus achieve high transparency in banking operations. The tangible benefits can be obtained by providing value added services like e-seva centers. Additional services to collect insurance premium, electricity bills, land tax/property tax etc. should be provided by taking reasonable fee. Good maintenance of records has a positive effect in improving business.

As of now, the banking sector is in the 'take-off' stage and looking forward for returns. In most commercial banks, Wide Area Network (WAN) is in place and ATMs are also being established in semi-urban areas, the reconciliation procedures are being fine tuned and are expected to yield good returns in 5-7 years from now. The trend however, is definitely moving in positive direction. Computerisation has helped to extend the banking hours by almost 2 hrs especially in urban areas, to capture more business, which was not possible during manual operations. In banking 3 main activities are involved 1) Monthly balancing of ledger 2) sending of reports to higher offices and 3) Application of monthly interest. These activities can be done by computers most accurately, consistently quickly and on real time basis. In Sate Bank of India (SBI), the DOS based Bank Master is going to be upgraded to windows based operations using Oracle software. Computerised branches pave way for technological upgradations to offer technology enabled improved banking services. Computerisation is a must for banks to survive and prosper.

8.2.4 Top Management's Responses

8.2.4.1. Opinion on computerisation of Rural Financial Institutions

8.2.4.1.1. Reasons for computerisation of RFIs

All rural financial institutions put together have a large number of accounts, many of them are small accounts, which need constant follow up. The rural branches are widespread and are both costly and inefficient to manage them, manually. The rural areas are short of staff and burdened with clerical work which prevents the bank officials to attend to business development activities. The computers in bank could also be appropriately used for imparting computer literacy in rural areas. Therefore, it is of prime importance that rural branches should be computerised. The end-of-day balancing and closing of accounts, interest applications etc are automated, fast and accurate, improved marketing and prompt banking service can be provided. The drudgery of bookkeeping by the managers is drastically reduced. In some branches the shortage of staff is overcome by

reduced manual work due to computerisation. It is more transparent and more accountable. The loans utilization, misutilisation, misappropriation and financial position can be studied to improve governance.

The 'Core Banking Solutions' for providing enhanced service by having centralised database is being implemented by SBI, which requires all branches to be computerised. The transaction cost in rural areas is expected to come down over a period of time, since all the rural accounts can be efficiently tracked and managed by computerisation and networking to centralised database. It is being questioned, as to why the rural areas should be denied the technology when it can provide many benefits. The TM respondents suggest that the skill base of the rural people should be improved, since computerisation is inevitable. The rural people have to get modernized and change their mindsets which would influence the attitude of the urban people on rural areas. The self-esteem of the rural customers would also increase since they feel that their branch is computerised and is an advanced bank. It is expected to have spill over effect as it happened in the case of Television, which helped to increase the awareness levels of the rural masses as compared to when it was not there.

Current, prompt, timely and accurate data would be available at regular intervals which help in determining the exact state of affairs of the bank and thus enhance decision making. More real time data is expected to go upto the higher office, unlike in manual systems where documents were filled just to satisfy the needs of higher offices and sent by post. The system becomes more reliable. Thus, when computerised and networked, all transactions at any rural branch get reflected at their head office. Once accurate information is fed, it can be easily traced and used for variety of purposes for the benefit of the bank. This data can be appropriately aggregated for MIS needs and all other relevant financial reports. This enables better decision making and planning by the Top Management. These are the reasons for which the RFIs should be computerised.

8.2.4.1.2. Reasons against computerisation of rural financial institutions

Only those rural branches having multifarious activities and good net profit are justified for computerisation since they can afford to computerise their activities. It is predominantly observed in the case of PACS that the President, Secretary, Supervisor, Auditor etc have no knowledge of computer operations. Even if the systems are provided they would not be put to the optimum use. Hence, it is not advisable to invest so much on

computerising RFIs. Agricultural activities being seasonal in nature, during off-season the computers would not be utilised to the optimum.

8.2.4.2. Major constraints/problems encountered while building and implementing IT infrastructure in rural financial institutions/branches

The problem of power supply exists. To overcome this UPS and generators have been used. However, in summer, power cuts being for a long period these become inadequate. In such cases the transactions are performed manually and later entered into the computer. Adequate knowledge of using the computerised system is lacking. Trained people are needed to maintain the computerised infrastructure. The infrastructure for communication with higher offices is below the expected performance standard. There is very slow acceptance of computerisation among the bank staff, which has to be changed. The prime need is to change the mindset/attitude of employees. They have to accept it since it is here to stay. In some branches, the employees were initially afraid of computers, however over a period of time they started accepting them as they found them helpful.

In the case of cooperatives, common software is not available all through the 3 tiers of the cooperative structure, unlike the commercial banks which are going for 'Core Banking Solutions', which networks all their branches on a common platform. The DOS based banking software would be soon upgraded to more user friendly browser based software for all the banking activities. There is need to train the employees to use the systems and create more awareness about computers among them. Proper manpower should be identified for training. The personnel below 35 years should be trained to use computers since the employees above the age of 45 years have been using manual systems since they joined and find it difficult to get acquainted to the new computerised system.

In cooperative sector, there is no finance to fund the computerisation project and many of the PACS face financial constraints to implement computerisation. It is observed that the income that the PACS generate is sometimes just not sufficient to meet the salaries and other overheads for running the PACS. Infact, government is trying to revitalize many of the PACS running in losses. If they can perform better and sustain themselves then all branches can be computerised.

People with right mixture of skill, attitude and interest to serve the rural areas are needed whose performance can be enhanced by computerisation. People who have interest and younger generation adept with computers should be encouraged. Computerisation is yet to be stabilized and there is need of total commitment towards computerisation from

the Top Management. The roads, electricity, water and other related infrastructure also need to be developed. Skilled staff has to be recruited to pick up the pace of computerisation and streamline the process. Presently the software is learnt by trial and error. The rectification of hardware problem is time consuming as it has to be sorted out by external technical people.

8.2.4.3. Computerised enabled products that could be offered to agricultural farmers to profit from computerised operations

Smart Kisan Credit Cards (KCC), gold cards and necessary infrastructure to make Intelligent districts need to be provided. Information and non-financial support can be provided. The coordination of agricultural supplies, technical information on crops, animal husbandry, agro-climatic diagnostic packages, comparative data on yields of crops, cropping calendar and other extension services should be provided in the most lucid manner in local vernacular language. Payment of electricity bills, water bills and other payments should be enabled at banks. Internet connection and ATMs can also be provided. Due to ATMs the rural customers can withdraw anytime which can induce savings and reduce the role of money lender.

The customer database would be useful to determine their credit worthiness and also help in formulating new products. Insurance products both life and crop can be provided. New deposit and loan schemes can be formulated due to improvement in operational convenience. Credit to farmers can be in cash component and kind component like cheques to the dealers of fertilizers etc. Presently this is not being followed in all banks and the money is given in lumpsum to the farmer. The respondents state that the farmer customers demand that the whole amount should be given in cash, since it is his wish to use the money he receives in the manner he wants, which has to be anyway repaid with interest. However, there is no systematic utilisation of the credit when given in cash. Thus, the banks should devise a scheme wherein the credit sanctioning is more streamlined and reduces the chances of misutilisation and diversion of funds. Thus, enabling the farmer to plan his requirements and appropriate utilisation.

8.2.4.4. Opinion on establishing Rural Credit Information Bureau (RCIB)

The TM respond that all rural branches should be computerised and data should be stored in an uniform manner at RCIB. This RCIB should be managed by National Informatics Center (NIC) or Reserve Bank of India (RBI) which are trusted sources.

Rural branches are almost like a self-contained unit. These basic units should be strong. Better decision making helps to provide better service to rural population. It must be realized that if MIS is generated and meant for someone else, then it is of not much use. However, if the rural branch managers appreciate the information from MIS and use if for the improvement of their own branch, it makes sense in generating the MIS and there would be dedication in generating it. The MIS should form as a feedback to the banks higher offices on the banks progress and performance.

A unique identification number given to a rural customer can be used to assess his credit worthiness. Other organisations/NGOs etc can refer to the background information of the person before extending any help. Some respondents state that a detailed study should be conducted on the possibility and feasibility of establishing RCIB, and such a facility should be established at the earliest.

8.2.4.5. Potential Benefits of computerisation of banks and later networking them to RCIB

8.2.4.5.1. Benefits to farmers

The TM respondents state that the farmer customers can finish their work much faster and number of visits to banks is also reduced, due to quicker delivery of service. If ATMs are provided then the farmer can withdraw money at his convenience and manage his money/expenditures well. This would also help him to get interest on the money that is not withdrawn. The customers' confidence on the banking system increases as most of them perceive that computers are right. When overall banking services are improved farmers will also be more positive towards repayment, thus reducing NPAs. Printed passbook is clearer and helps the farmer to have a clear picture of his transactions. Repeated submission of various documents can be avoided once they are computerised, as they can be easily traced and details of transactions available at the click of a button. The processing of applications also gets much faster than manual system.

There is improved quality and promptness of service, reduced instances of corruption and NPA due to computerisation. If Internet connectivity is provided then the farmers can get updated market prices, know the demand for their products and sell their products at better prices. All schemes relevant to rural development and their details can be communicated easily and promptly to the concerned officials immediately, which can be implemented quickly, benefiting the farmers.

The rural customers are yet to benefit from the full potential of computerisation of rural financial institutions. Computerisation would benefit the farmers and there would be more time available for the farmer to concentrate on farming activity.

8.2.4.5.2. Benefits to banks

The TM state that the ability to provide good service to the rural population improves the image of the bank and helps in enhancing peoples' confidence on the bank. The banking system would become more reliable and transparent as interest rates are calculated accurately, printed passbooks give a clear picture of the transactions, updated accounts etc. Transaction and operating costs are reduced, interest calculations are easy and income leakage reduced. In manual system though there is checking, due to the time and effort involved in checking all the records, some transactions go unnoticed. Whereas, in computerised operations there is automatic check and balance hence activities are more accurate. This is expected to increase the time for development work. Management Information System would be available for speedy and strategic decision making. There would be good cash management by banks. There is inherent improvement in efficiency and productivity of the banking activities. The needs of farmers can be identified more accurately by studying the data available.

The time reduced due to computerisation of manual operations can be used by the bankers for planning, business development, providing variety of services like seed/crop insurance and other financial products. The capacity to give such services increases with computerisation which is otherwise not possible in manual systems. The non- borrowers also can be studied to know the potential of the area for different banking activities. Interest rate application etc. was always in arrears, but after computerisations all these are cleared off promptly and consolidation of information is easy.

Computerisation and networking would enable good MIS and Decision Support System (DSS). Such systems would be strategic and also enable the banks to meet the latest norms of BASLE regulations, and undertake good Asset Liability Management measures. Such systems help to identify and understand recurring problems and hence can address it well. The problems can be technical, financial and/or organisational.

The 'fittest will survive', there is thus a need to provide good service, easy and speedy information flow on day to day basis, so that good decisions can be taken to increase profits. Globalization has expanded the markets making it imperative to introduce innovative products. The risk can be minimized by better planning and forecasting.

8.2.4.6. Opinion on return on investment of computerisation and networking of rural branches

Banking has reached a stage where there is no option other than computerizing and networking all their urban and rural branches. Asset Liability Management is now more scientific and there is no choice other than being online. In financial industry the denominator is Cost of Labour or Manpower, so have to become more efficient without incurring cost in the long run. The respondents opine that the attrition rate and death etc. is almost 2 percent to 4 percent of wage bills, whereas, the computerisation is 0.25 percent of the wages. Hence, the investment on computerisation and skilled personnel can be increased. Computerisation can handle almost 3 times more business with the same staff. The cost of manpower is reduced and time is saved, which can be utilised for business development activities. This would not only increase the profitability of the bank but also help to improve the goodwill of the customer and enhance the morale of the employees.

The TM respondents' state that in the beginning the returns are least, however as it stabilizes, the returns keep increasing, and will give more benefits than investment. The example of electric train is being quoted for the same, wherein during its inception it was felt to be a costly affair. However, presently almost all trains are electrified and there is better train service than before. The respondents opine that initially the operation costs are high but later the operation cost comes down, there is more clean work, better service and higher customer satisfaction. The future is in computerizing and all rural branches should necessarily computerise.

Among others, the prevention of income leakage can cover the service charge on each account. There are more intangible benefits in terms of better customer service, quick disposal, better housekeeping, efficient MIS generation, more availability of time for business development, extended working hours, redeployment of staff whenever necessary etc. The respondents question whether Return on Investment is calculated for telephones. The respondents state that computers are becoming more a necessity rather than fashion. Computerisation is important since it reduces transaction costs and is part of development process which should be treated as investment. Computerisation being new, it helps in team building and unites people. It is a common platform and gives a level playing field for all the computerised branches which face almost similar problems. The surplus manpower can be reduced in a phased manner. The cost of establishment and transaction costs are reduced and so are administrative costs. The depreciation also reduces the book value of the equipment to zero in just few years.

Internet connectivity helps in getting to know the market prices, best practices followed by other farmers, exchange of innovative ideas, climatic conditions, rainfall, advices on agricultural exports, application of fertilizers etc. The farmers can be exposed to the world if connected to internet, especially in the era of globalisation and WTO.

If the basic data is accurately collected, it could be the basis for census, five-year plans etc. Quality of work is improved, quickness, accuracy, neatness of display can attract and improve business, hence computerisation is good. Deposits increase or decrease due to customer service, computerisation can help provide better service thus increasing the customer satisfaction, which shows improvement on the profitability of the banks operations. Improved service will have a positive effect on the overall business and also has the potential to increase the customer base. Area specific solutions can be arrived at, which will increase the profitability of the bank.

8.2.4.7. Future of rural branch computerisation

In wake of Chief Vigilance Commissioner's order 70 percent of business should be captured through computers which is met by computerizing their urban operations. Hence, the Top Managements' opinion on the future of rural branch computerisation was sought.

The TM opines that rural areas have to be computerised. It is time-taking and good amount of investment is involved but is definitely needed. An important aspect is that there is need for more training and the HRD aspects need more attention. The users should be in a position to appreciate the work and to use the system for better volumes and utilizing the potential of the computers optimally.

One major aspect that needs to be kept in mind is that unless computer literacy programmes reach the rural population, awareness on the usage of computers may not be possible. All the respondents state that the rural financial institutions should be computerised.

8.2.4.8. Unemployment due to computerisation, requirement of skilled staff and training requirement of existing staff to perform computerised operations

The TM respondents state that it is a myth that computerisation will increase unemployment, on the contrary it will result in employment generation. There would be more indirect employment. The nature of personnel needed only gets shifted in terms of personnel to attend & maintain continuous power, software, hardware, peripherals, etc. Skilled staff who can work with the banking technology and other support staff with lesser

skills are required. The existing employees need to be given more training on technology and fresh recruitment of technologically skilled people should be undertaken.

Some of the respondents opine that surplus employees can be sacrificed for betterment of the organisation. However, till date no one has been removed due to computerisation. The Voluntary Retirement Scheme (VRS) was introduced, to reduce on the employees who do not have inclination and attitude to get trained. The surplus staff are shifted/transferred and given other responsibilities. The extra personnel can concentrate on development and customer service with proper orientation. HRD can play a vital role by planning for appropriate redeployment of personnel to offer better customer service and improve scope of the banks' business. More loans could be extended to encourage potential projects and entrepreneurs. This also leads to indirect employment.

There is no unemployment due to computerisation of rural branches, since most of them are at the fag end of their service, and can recruit younger computer literates. Presently the older generation need to be trained on computerisation, if not atleast on the capability of what the computers can do and how it can be leveraged for decision making. The employees are slowly realising that they are becoming global citizens due to computerisation and all barriers removed.

8.2.4.9. Suggestions

It needs to be remembered that computerisation is not a panacea for all things. It is an enabling tool for the process of risk mitigation, improve efficiency and productivity. All the RFIs should be computerised. Government of India should fund a rural Business to Business (B2B) portal and offer agricultural services at a subsidised rate. The payment gateway could be maintained by RBI with Real Time Gross Settlement for agricultural payments made possible. The farmers can access this portal and conduct their business with the above backbone in place. It should be service oriented, subsidised and build a trusted means of transactions without partiality. Initially it should be implemented with missionary zeal. In the long run it will turn profitable and self reliant. One of the top management opines that the rural areas should have separate software which has all important components and cost lesser than the 'Bank Master' and 'Core Banking Solutions', which should get appropriately integrated to their head offices.

8.2.5. General Problems and Issues

The farmer respondents say that 75 percent of Indian economy is dependent on agriculture and if there is no proper agricultural development then rural people would migrate to urban areas. This leads to urban congestion and if they aren't able to get employment they turn to anti-scoial activities like robberies etc. The cost of power is increased and farmers are finding it difficult to afford it. Some 25 percent of electricity is being theft, which the government should check and control. This would help provide power at cheaper rates. There is acute shortage of power in rural areas. Electricity is available at odd hours and that too only for 4-5 hrs, which causes disruptions in farming as well as banking operations. Banks having computerised operations have to necessarily have a generator to overcome the shortage of power supply.

Farmers suggest that they should be educated on various banking activities/operations and provisions. When the banking activities are complex farmers are apprehensive that bank employees may mislead them and use for their own benefit. Mimum Support price fixed by government is not being adhered to. Majority of farmers are unable to store the produce for future selling. They look forward to sell off the produce as early as possible, and so sell it at whatever price the buyers give, sometimes even at a loss. One farmer respondent states that "If farmer hoards rice for future selling it is considered criminal act under the Essential Commodities Act. But, if a miller stores rice he gets loan on this stock (called key loan)." He further states that the farmer who provides food for others is made beggar.

Interestingly, some respondents compare Industry and Agriculture. They say, in industry, there is safety net for jobs, no one can just remove them from their job, and in case they lose a job they can support themselves until they get a new one. But, in agriculture there is no safety net. If the crop fails, the farmer gets highly indebted and one day gets totally collapses which is why there have be increased suicides in Andhra Pradesh. In industry if a factory is destroyed, then the owner can claim insurance but in agriculture, the insurance scheme is not at all favourable. Insurance is given only when the crop in the whole mandal gets destroyed.

Some respondents compare our country with others. Farmers of other countries are literate, have more knowledge about agriculture and latest scientific as well as technological aspects in agricultural field and also have political lobbies. Whereas, majority of Indian farmers are illiterate, having least knowledge of latest agricultural

developments and vulnerable to politicians. Other countries give good subsidy, but it is not the case in India. An example is quoted on the subsidy for fertilizer and its transportation, wherein 20 percent subsidy is given in America, 4 percent in Japan and 15 percent in Pakistan, while its only 5 percent in India.

One farmer reasons on the need to keep the cost of food grains low. He states “If more revenue is to be given to the farmer, then more price per bag of food grain should be given. The price of food grain would then rise. But, the cost of food grains to the consumers cannot be raised, since it should be affordable to all people of the country from the rich to the poor.” He says that “80 percent of an organizations revenue goes to pay the salaries to its’ employees. Now, if foodgrain costs increase, the salaries also need to be increased. It gets dearer to the poor people and unaffordable too. And hence, no country would like to raise the cost of food grains. It is at this point that minimum support price can play a vital role where more money can be given to farmers and the food grains sold at affordable price”

Many a time’s paper adjustment for the credit activities are performed, without the actual flow of money. Necessary training to face the political pressure needs to be provided to the rural bank manager. In the case of cooperatives, it is understood that there are no proper service terms and conditions in Andhra Pradesh, and hence many of the cooperative employees feel insecure.

One of the PACS secretary points out that penal interest has to be paid if the farmers don’t repay in time, which is understood to be added to the principal and written as a total in the passbook. It is observed that in the Patadari Passbook (appox. pg 52-53) where the details of the long term loans are to be entered there is no column for the ‘Penal Interest’ and thus entered as a total. However, this has a separate column in the ledger with the PACS. This confuses the farmer who questions why there is increase in the principal amount. So the passbook needs to be updated with this new column. Another PACS secretary states that in the commercial banks certain incentives like increments and promotions are available to bank officials who acquire additional qualifications, however the PACS secretary gets nothing for such additional qualifications.

In the credit sanctioning process, if the amount to be sanctioned is less than Rs.50,000 then the PAC secretary and the DCCB supervisor should visit and verify the land/crop of the farmer. If the credit needed is ranging from Rs.50,000 to Rs.1 lakh then the DCCB Manager, DCCB supervisor and the PAC secretary need to visit the land. If the amount needed is more than Rs.1 lakh then the DCCB Assistant General Manager (AGM),

DCCB Manager, DCCB supervisor and the PAC secretary should visit and verify the land of the farmer. After these officials consent the farmers application is then sent to the Agricultural Development Officer (ADO) for sanction. This is a very long process and a simpler faster method should be developed.

The Co-options Technologies has developed the software for PACS and collected data according to APCOB guidelines. Whereas, the books at the PACS level are different and hence there is lot of time being spent in getting the software working at the PACS since the developed software needs to incorporate the procedures which are followed at the PACS. The PACS secretary opines that the agency for fertilisers and pesticides should not be given to private agents who take a profit of almost Rs.5 per bag. The PACS can give such service at lesser cost with lesser margin. On the other hand, it has been observed that the farmers prefer the private agencies since they get such services on credit whereas the banks accept only cash for such services. The private agents extend the service quickly and also provide door delivery service, which the banks should explore to provide at a lesser cost.

Most of the respondents opine that the share capital of almost 10 percent on short term loan should be removed. The interest rates have to be reduced from the present level. The insurance premium paid is very high and Insurance which is applicable at Mandal level, has to be brought down to village level. The scale of finance should be increased, the loaning schemes should be liberalised and the ceiling amount for taking collateral security should be increased. In case of problems related to the PACS secretaries, the correct procedure of enquiry should be followed. The PACS say is at the mercy of the President as the secretaries appointment and removal is based on the pleasure of the President. He is thus obliged to act in accordance with the Presidents wishes.

The PAC secretary opines that Commercial banks are benefited as they can give loans at lesser interest rates. This is possible because finance comes directly from NABARD to the Commercial bank. Whereas, in cooperatives the finance from NABARD goes through 3 tiers before coming to the farmer resulting in relatively higher interest rates. In commercial banks the manager has authority to sanction the credit. But, in cooperatives the PACS secretary has to wait to receive loan applications from approximately 50-100 members, which are then processed and sent to DCCB for sanction. This is a lengthy and time consuming process.

8.3. Conclusions of Qualitative Analyses

The qualitative analyses reinforce the results obtained in quantitative analyses. The farmers feel that it is easier and safer to deal with the RFIs rather than Moneylenders. The interest rates are also less. However, the rules, regulations and procedures to be followed in RIA are very high, time consuming and delay the receipt of credit. The farmers feel that cooperatives have high potential if properly managed but are not being managed well. The political and other influences are hampering the progress of these agencies. The credit amount sanctioned is inadequate and more is being demanded by the farmers. The transfers of bank mangers of commercial banks create disruptions in, long-term relationships and development unlike cooperative, where the PACS secretary is one of the villager himself.

The interest rates in cooperatives are getting higher by the time finance comes from NABARD to PACS, to the farmers hand, which is not beneficial to the farmers. The farmers belonging to cooperatives are demanding dividends on the share capital they were forced to subscribe while taking their first loan from cooperative. The credit limit fixed for each farmer has been found to be inadequate.

The processing and scrutinizing of application in cooperative does not begin until substantial number of applications are received. The credit limit for each applicant is calculated and then sent together to DCCB for sanctioning the amount. The farmers complain about delay in this system and demand simplified and quicker process of sanctioning credit. It is here that computerisation and networking of offices like DCCB, APCOB etc. can play a vital role for online submission, verification and quick sanctioning.

The farmers feel that the Insurance scheme is not favourable and needs modification to make it more farmer friendly. They also feel that immediate attention should be given to the farmers needs and problems. The farmers reiterate that transactions should be speeded up, documentation should be reduced and better service be given to them. The bankers also support the farmers saying that loan sanctioning is a lengthy process, and farmers need education on banking schemes and operations.

The managers state that the credit sanctioning process especially in cooperatives is very lengthy. Not all the documents are available with the farmers and this creates problems in sanctioning of credit to the farmers. The documentation is very high in

institutional financial agencies. The rural masses are not clear about crop insurance. It has to be well advertised and its nuances explained. The farmer customers being illiterate have to be patiently explained sometimes repeatedly about the loaning activities, the need to repay in time and other banking schemes.

The managers list several benefits of computerisation to the farmers as well as for bankers. Accurate calculation, good presentation and the belief that computers can't make mistake builds lot of confidence both among farmers and bank staff. Transparency in banking operations is also achieved, which is most important for good governance. Undue delays and mistakes are reduced, transactions are faster and the managers felt they were able to provide better service due to computerisation.

The major benefit to bank staff is that accounting burden is drastically reduced. All entries are automatically updated. Correct and up-to-date information is available at finger tips. Calculations are accurate. Farmers have improved confidence in bank staff. The time thus gained can be productively utilized for development and repayment activities. Books and ledgers are now done away with, due to computerisation. Paper work is drastically reduced. They envisage if the banks are connected to relevant offices for sanction of credit, the sanctioning process will get faster and easier.

The constraints are that adequate training is required to the bank staff to use the new systems. Their attitude needs improved orientation to help farmers. With respect to technical aspects of computerisation the present bank staffs are illiterate. Consistent power supply is one of the major problems in rural India. Few of the managers state that there has been an increase in the work load since both the computerised and manual work is being carried out, but it is reasoned that this is a transition period and later the manual work will reduce. The Return on Investment is well justified as can be observed that computers can do the work of 10-15 employees, faster, accurately, efficiently, effectively and consistently for more than 10 years if maintained well and appropriately utilized. Within almost 3 years, the banks get back the cost incurred in computerisation by way of depreciation too.

Computerisation is very beneficial with intangible component forming a major part, making it difficult to quantify the returns on investment on computerisation. Accuracy, clarity, reliability, transparency are all the benefits due to computerisation. Under normal conditions, they cannot be so easily tampered too. Error and unacceptable entry prompting is a very good feature to reduce errors. Analysis can be performed on the

database available to study the trend and banking habits to improve the business of the bank. Any clarifications sought by farmers can be provided with more confidence, as, they feel computer cannot make mistake.

Computer systems are difficult to operate for those who have no knowledge of its operation, however with adequate training, it becomes easy. It is the best system for routine functions of banking. Since mangers feel that training is inadequate, more training should be provided to them. It takes time for the new systems to stabilize, young and energetic staff having exposure to computers should be recruited, to utilize computerize systems and reap the benefits of computerisation.

The ITS respondents also opine that rural financial institutions should be computerised so that convenience and prompt service can be offered to the rural populations. The efficiency of the bank would increase and computerisation would be strategic in the near future in wake of competition. The time saved in housekeeping could be appropriately utilised for business development and recovery activities. They highlight that computers perform consistently and do not deviate from what is programmed. Advanced datamining tools can be applied to the large rural database to extract useful information and used for introducing new products and schemes.

The ITS also list certain reasons against computerisation of RFIs. They state that rural transactions are seasonal in nature and there seems no real necessity to computerise RFIs. The major constraints encountered in the process of computerising and networking rural financial institutions are in terms of finance, training, maintenance of the systems, lack of constant power supply, lack of good communication links etc. Hence proper decision has to be taken keeping all these aspects in view vis-à-vis the tangible and intangible benefits.

Responding in the question of offering computer enabled products the ITS respondents state that ATM access should be provided to Kisan Credit Card (KCC) holders. Add-on products like electronic passbook and demand draft printers can also be provided. User friendly and graphic touch screen equipment would empower the farmers to transact on their own.

All the respondents state that the Rural Credit Information Bureau (RCIB) should be set up. They state that it would help them to have online centralised database of the farmer and can hence speed up credit sanctioning process. Good service can be offered to

the rural populations and thus win their goodwill, which would improve the business of the bank. The bankers can avoid double finance and keep a check on NPAs. The banks need to generate their own resources. The computerisation involves higher initial investment but will usher in profitable income over a period of time. However, they are apprehensive about its feasibility due to the effort that needs to be put in to establish it.

The ITS state that the returns on investment on technology in RFIs would be in terms of ability to provide prompt service, saving valuable time of bankers, reducing the drudgery of manual entries in various books/ledgers which can be used to improve the banking business. These are just few of the intangible benefits of computerisation. Returns more than expected would be forthcoming once the computerised activities are stabilized and start functioning in full swing. The depreciation on the equipment brings their value to almost nil in 3-4 years. Appropriate technology enabled revenue generating additional services can be easily provided once the RFIs are computerised and networked, which can be planned once computerised.

The Top Management (TM) state the RFIs need to be computerised to improve the operational efficiency of the rural financial institutions. Various banks are implementing 'Core Banking Solutions' for enhancing banking service by having centralised database which necessitates all its branches including rural to be computerised. The transaction cost in rural areas is expected to come down over a period of time, since all the rural accounts can be efficiently tracked and managed by computerisation and networking with centralised database. Data would be available to the top management at regular intervals which shall provide the exact status of the bank for strategic decision making. More accurate and reliable data would be available right from the rural branches to the head office.

The TM also point out certain aspects that question the process of computerisation. They state that only rural branches having different activities and good net profit are suitable for computerisation. There is also need to increase awareness and train the employees of rural branches as well as the rural populations, for the high potential of computerisation to be optimally utilised.

The TM also identify power supply to be a major constraint. The others are the knowledge of using the systems is very low, the communication infrastructure is below standard, slow acceptance of computerisation due to employees attitudes, different

software's being used for banking transactions by different tiers in cooperatives, lack of finance to fund the computerisation initiative in cooperatives etc.

The TM state that internet connection and ATMs should be provided to the rural populations. Information on Agricultural extension services, payment of various bills can be enabled at banks, thus creating intelligent districts. They state that the rural database should be analysed to introduce new and innovative products to the rural populations. An appropriate product should be devised to reduce the chances of misutilisation and diversion of funds and which can enable the farmer to plan his requirements and utilisation.

The TM state that RCIB would help to have a common database which would be stored in an uniform manner that can be useful to all banks. Repeated submissions of various documents are avoided. Speedy sanction of credit is enabled. Increased transparency in banking operations will improve the image of the bank. There would be inherent improvement in efficiency and productivity in banking activities. The computerisation and networking would enable good MIS and Decision Support System (DSS).

The TM states that the cost of manpower is an important aspect and its cost to the organisation can be minimised by employing skilled and efficient manpower. Returns can be maximised by providing an enabling computerised environment. The TM opine that computerisation can save lot of recurring costs on various fronts, though the investment for this technology initially is very high, there would be good returns over a period of time. The respondents opine that initially the operation costs are high but later the operation cost comes down and there is clean work, better service and higher customer satisfaction. There are more intangible returns in terms of better customer service, quick disposal, better housekeeping, efficient MIS generation, greater availability of time for business development purposes, extended working hours, redeployment of staff wherever necessary etc. They further state that quality of work is improved. Computerisation can help provide better service in terms of quickness, accuracy, neatness of display thus increasing the customer satisfaction, which increases the profitability of the banks operations. Improved service will have a positive effect on the overall business and also has the potential to increase the customer base.

On the future of rural branch computerisation the TM state that the rural areas have to be computerised and awareness and training of the employees should be stepped up.

The TM emphasise that it is a myth that unemployment will increase due to computerisation and while in reality there would be rise in indirect employment of skilled personnel. Those employees who can't get tuned to the latest technologies used by \the organisation, better opt out for which VRS has been introduced. There are also employees who are to retire and are not inclined towards learning new methods of operation and so should pave way for more technologically skilled younger generation. The extra personnel could be appropriately utilised for business development activities. The TM suggest that a national rural Agri-portal should be established. They also suggest if the present systems are expensive, then a cost effective systems should be devised for rural areas.

Finally, the general problems & issues faced by the respondents are discussed. Among others the respondents state that agricultural is not getting the attention that it should be receiving. There is irregular supply of power necessitating that the banks have generators. Simplification of bank operations is being demanded. In cooperative, certain columns for entries are absent in the passbook given to the farmer, which are present in the banks books. The crop insurance scheme is perceived unfavourable to the farming community. It is understood that there are no proper service terms and conditions for the employees of the cooperatives, resulting in job insecurity. One of the major constraints that has been identified in cooperative sector is that the software for the cooperatives has been developed based on the information from the head office, however, the working is different in the PACS and this leads to delays in getting the system working.

Qualitative analyses involved the detailed study of the benefits, returns and constraints of computerisation and networking of rural financial institutions. It can be concluded that computerisation and networking of rural branches is a necessity which is beneficial, strategic, enhancing the functioning of the rural banks resulting in improved service to the rural populations. Though constraints do exist these are being appropriately addressed as the overall benefits to the organisation and the customer seem to overshadow the constraints. The qualitative analyses reinforce the results that were obtained in quantitative analyses.

CHAPTER 9

SUMMARY OF MAJOR FINDINGS, RECOMMENDATIONS AND SCOPE FOR FURTHER RESEARCH

9.1. Introduction

Agricultural is one of the major occupations for the Indian rural population and is a means of livelihood to them. RFIs provide credit, which is a vital input to the farming community as well as to other members of rural population for other activities. However, it has been observed by various researchers, that there are various bottlenecks, credit doesn't reach the deserved at the right time in right quantities and there is general lack of good service in rural branches. Thus, it is imperative that the service efficiency and effectiveness of the rural financial institutions should be improved at the earliest to provide enhance banking service to the rural population and thus foster rural development at large. Information and Communication Technologies could enable improved services in RFIs Hence, this study was conducted to explore the potential and constraints of leveraging on ICT in cooperative and commercial banks.

Thus, the broad research objective of this study is to explore the potentials and constraints in utilising and managing Information and Communication Technology in Cooperative and Commercial banks for effective and efficient flow of agricultural credit to attain balanced socio-economic agricultural development.

The four null hypotheses formulated are;

$Ho_{(1)}$: Agricultural customers perceive that credit sanctioning and other banking services from computerised bank branches are not better than non-computerised bank branches.

$Ho_{(2)}$: The Bank Managers perceive the computerised bank branches working environment in terms of efficiency and effectiveness are not better than non-computerised bank branches.

$Ho_{(3)}$: The working environment in terms of efficiency and effectiveness in computerised bank branches is perceived not better than the non-computerised bank branches by the Information Technology Staff.

$Ho_{(4)}$: The Top Management perceive the working environment in terms of efficiency and effectiveness in computerised bank branches are not better than non-computerised bank branches.

The research is performed in three stages, the first stage is the secondary data collection, the second stage is the primary data collection and finally data analyses.

Literature review is first performed to explore the existing knowledge in the area of research. This and external discussions form the basis for primary data collection/survey. Questionnaires for the farmers, the bank managers, the system administrators and the top management were then developed for the pilot survey. These were then refined after pilot study to evolve the final version of each of the four questionnaires.

Five stage Stratified Purposive Sampling Technique is employed in this study. In the first stage AP is stratified into three regions viz. Telangana, Rayalseema and Coastal Andhra. In the second stage, West Godavari district in Coastal Andhra region, Chittoor district in Rayalseema region and Nizamabad district in Telangana region are chosen as representative districts. In the third stage, one commercial bank and one cooperative bank are chosen in each of the above districts. In the fourth stage, in each of the district, State Bank of India's one computerized branch and one non-computerised branch are chosen for the study. Similarly, in each district one computerised PACS and one non-computerised PACS are chosen for the study. In the fifth stage, in each of the computerised and non-computerised commercial branch and PACS, farmers based on their land holding size (large, medium and small) are chosen and questionnaire administered to them. The questionnaires are also administered to the branch managers and their deputies, working in the area of rural credit and to the system administrators working in case of computerised branches. Top management and system administrators are administered the questionnaire at their regional offices located in the state capital.

The total sample size of farmers' analysed in this research are 336. The sample size of manager respondents of all the three regions put together forms a total of 36. The Information Technology Staff/System Administrators (ITS) formed a total sample size of 17. The Top Management (TM) formed a total sample size of 15. Thus, the total sample size analysed for the research activity are 404.

The data collected was subjected to various quantitative and qualitative analyses to understand the issues in achieving the objective of the potential role of ICT to provide improved agricultural credit. These are briefly summarised in the following section. This is then followed by the final conclusion, recommendation and concludes with the scope for further research.

9.2. Conclusion for Quantitative Analyses

Responses from the farmers', managers, ITS and TM were sought on various aspects of banking service keeping in mind the objectives of the research. Their responses were sought comparing the computerised banking operation and manual banking operations.

The background/characteristics of the respondents are performed to have a perspective of the respondents. Further quantitative analyses are performed in an attempt to quantify the intangible benefits of computerised banking services, where-in the percentage and rating index analyses are performed, followed by scoring and median chi-square hypotheses testing.

The farmers', managers, ITS and TM responses were subjected to percentage analysis on various aspects of banking transactions indicate that computerised banking operations have the potential and can reduce the overall transaction time and provide faster banking service to the farmer customers. The rating index analysis proves that the computerised operations are far better than manual operations. However, only in the case of Nizamabad district, the rating index for computerised banking operations and manual banking operations were observed to be quite close, since the rural computerised banks were in the process of computerisation. It is expected to deliver its benefits once it is well established over a period of time.

It is observed that the percentage and rating index analyses overall complement each other to conclude that computerised banking operations are far better than manual banking operations.

In continuation of the quantitative analyses, the responses of all the four sets of respondents are subjected to the 'Scoring and median chi-square hypothesis testing' statistical tool. It is observed, that, in all cases the calculated Chi-square value is significantly higher than the chi-square table value at 90 percent confidence level, except in the case of Nizamabad district. As explained earlier in the case of Nizamabad district, the rural computerised commercial banks were in the process of computerisation. This is reflected in their analysis, where the overall analysis on the banking transactions and rating analysis was slightly favourable towards computerisation but the scoring median chi-square hypothesis testing clearly does not reject the Null Hypothesis. Thus, in this case

it could be concluded that since computerisation is a recent phenomenon, the benefits are expected to be delivered once it is well established over a period of time.

Thus, based on the overall scoring and median chi-square hypotheses testing, it was concluded that the respective Null Hypotheses are rejected in favour of the Research Hypotheses. It can thus be statistically stated that better banking services can be offered by computerised banking operations, which again complements the previous findings.

Thus, it is observed that the overall Quantitative analyses converge and reinforce that computerised operations are far better than manual operations. The agriculturists perceive that the credit sanctioning and other banking services are far better in computerised banking operations branches than non-computerised bank branches. The managers, IT staff and the Top Management also perceive that the working environment in terms of efficiency and effectiveness is enhanced in computerised banking operations. These analyses overall go to indicate that ICT, in general has very high potential to enable improved services to the rural population. It not only helps the organisation in long run but also enables the bank staff to reap the benefits by way of improving their operations and deliver improved banking service to the rural populations. To reinforce these analyses, the responses to the open-ended questions were subjected to qualitative analysis.

9.3. Conclusion for Qualitative Analyses

Qualitative analyses were performed to explore whether the non-quantifiable, intangible aspects were inline with the quantitative analyses and the objectives of the research. The potential and constraints of implementing ICT in RFIs were also studied. The farmers felt that it was easier and safer to deal with the RFIs rather than the Moneylenders. The interest rates were also less relative to the exploitative money lenders, however it was felt that in cooperatives the interest rates gets higher by the time finance comes from NABARD to PACS, to the farmers' hand, which was not beneficial to the farmers. The rules, regulations and procedures to be followed in RFIs are very daunting, time consuming which delay the receipt of credit and hence the farmers demand simplified and quick process of sanctioning of credit. It was felt that the potential of the banks were not being utilised to the fullest extent, to serve the rural population. In addition to that, there were other hindrances such as political interferences, lack of adequate staff or frequent transfers of staff especially in commercial banks. The farmers demand sanctioning more amount of credit. Apart from speeding the sanctioning process, the farmers demand reduced documentation work and provide better service to them.

The bank managers on the other hand also support the farmers saying that loan sanctioning was a lengthy process, and farmers need education on banking schemes and operations. The computerisation and networking of relevant offices can play a vital role for online submission, verification and quick sanctioning. The benefits are accurate calculation, good presentation and the belief that computers can't make mistake, builds lot of confidence both among farmers and bank staff. Correct and up-to-date information as well as transparency in banking operations was also achieved, which is most important for good governance. Routine accounting burden, undue delays and mistakes are drastically reduced. Transactions are faster, entries are automatically updated to relevant database and the managers feel they are able to provide better service due to computerisation. The time thus gained can be productively utilized for development and repayment activities.

The constraints stated by managers in computerising rural branches are lack of adequate and trained staff, lack of right attitude towards computerised operations and help farmers, lack of consistent power supply etc. The Return on Investment was well justified as, it can be observed that computers can do the work of 10-15 employees, faster, accurately, efficiently, effectively and consistently for more than 10 years if maintained well and appropriately utilized. Within almost 3 years, the banks can write-off the cost incurred in computerisation by way of depreciation too. Accuracy, clarity, reliability, transparency are all the benefits due to computerisation and many more intangible components contribute to the benefits which are difficult to quantify.

The ITS respondents also opine that rural financial institutions should be computerised so that convenience and prompt service can be offered to the rural populations. The efficiency of the bank would increase and computerisation would be strategic in the near future in wake of the trends in competition. The time saved in housekeeping could be appropriately utilised for business development and recovery activities. Advanced datamining tools can be applied to the large rural database to extract useful information that can be used to introduce new products and schemes.

The ITS also reason against computerisation of RFIs, stating that the rural transactions are seasonal in nature and lack adequate finance, training, constant power supply, communication links in addition, the need of regular maintenance of the systems etc. Hence they state that there seems no real necessity to computerise RFIs. However, proper decision has to be taken keeping in view all these aspects vis-à-vis the tangible and intangible benefits accrued over a period of time.

All the respondents state that the Rural Credit Information Bureau (RCIB) should be set up, to have online centralised database of the farmers and can hence speed up credit sanctioning process. This is expected to prevent double finance and thus keep a check on NPAs. The computerisation though involves higher initial investment is expected to usher profitable income over a period of time.

The ITS state that the returns on investment on technology in RFIs would be in terms of ability to provide prompt service, saves valuable time of the bankers by reducing the drudgery of manual accounting which can be used to improve the banking business. Returns more than expected would be forthcoming once the computerised activities are stabilized and start functioning in full swing and the depreciation on the equipment bring their book value to almost nil in 3-4 years.

The Top Management (TM) state the RFIs need to be computerised to improve the operational efficiency of the rural financial institutions. The transaction cost in rural areas are expected to come down over a period of time, since all the rural accounts can be efficiently tracked and managed by computerisation and networking to the centralised database, especially as many banks are in the process of implementing 'Core Banking Solutions'. Data would be available to the top management at regular intervals which shall provide the exact status of the bank for strategic decision making. More accurate and reliable data would be available right from the rural branches to the head office.

The TM also state that only rural branches having variety of activities and good net profit are justified for computerisation. There is also need to increase awareness and train the employees of rural branches as well as the rural populations. In addition to the constraints of computerising of rural branches mentioned by the farmers, managers and ITS, the TM in cooperatives state the different software's are being used for banking transactions at each tiers of the cooperative setup and state that there should be smooth integration of them for good flow of information.

They state that the rural database should be analysed to introduce new and innovative products to the rural populations. The TM state that RCIB could maintain a common database that can be useful to all banks. This shall avoid repeated submissions of various documents by customers, enable quicker sanctioning of credit, increase transparency in banking operations, foster inherent improvement in efficiency and productivity in banking activities and enable good MIS and DSS.

The TM states that manpower needs to be skilled and efficient to reduce the cost to the organisation and be competitive, wherein the returns can be maximised by providing an enabling computerised environment. The TM opine that computerisation can save lot of recurring costs on various fronts, though the investment for this technology at the beginning was very high, there would be good returns over a period of time. The operational costs are lowered and more intangible returns are accrued in terms of better customer service, quick disposal, better housekeeping, efficient MIS generation, improved quality of work, accuracy, more time availability for business development purposes, extended working hours, redeployment of staff whenever necessary etc. This increases the customer satisfaction and has the potential to increase the customer base which finally would reflect positively on the profitability of the banks operations. The TM state that it is a myth that unemployment will increase due to computerisation and the truth is that there would be rise in indirect employment of skilled personnel.

Finally, the general problems & issues, among others the respondents state that agricultural is not getting the attention that it ought to receive, there is a shortage of power, simplification of bank operations are needed, uniformity in cooperative accounting system are needed etc.

Thus, the Qualitative analyses performed, discussed the benefits, returns and constraints of computerisation and networking of rural financial institutions. It can be concluded that computerisation and networking of rural branches are necessary, which is found to be beneficial, strategic, improve the functioning of the rural banks and thus offer improved service to the rural populations. Though the constraints do exist these are being appropriately addressed since the overall benefits to the organisation and the customer seem to overshadow the constraints.

9.4. Conclusion for Quantitative and Qualitative Analyses

The detailed quantitative and qualitative analyses performed on the responses of the farmers, managers, Information Technology Staff/System Administrators and the Top Management of respective banks converge and reinforce that computerised operations are far better than manual operations.

Thus, by subjecting the responses from all the above mentioned respondents to various quantitative and qualitative analyses, the null hypotheses are rejected in favour of research hypotheses which are as follows.

$Hr_{(1)}$: Agricultural customers perceive that credit sanctioning and other banking services from computerised bank branches are better than non-computerised bank branches.

$Hr_{(2)}$: The Bank Managers perceive the computerised bank branches working environment in terms of efficiency and effectiveness are better than non-computerised bank branches.

$Hr_{(3)}$: The working environment in terms of efficiency and effectiveness in computerised bank branches are perceived better than the non-computerised bank branches by the Information Technology Staff.

$Hr_{(4)}$: The Top Management perceive the working environment in terms of efficiency and effectiveness in computerised bank branches are better than non-computerised bank branches.

To state the findings in a sentence; quantifying various intangible aspects of ICT and analyzing the open ended responses, overall, there is improved banking service in computerised bank branches as compared to manual banking branches.

9.5. FINAL CONCLUSION

There is huge potential in the way ICTs can revolutionize rural activities although they come with their own constraints and with most of the returns in intangible in form. This should be no surprise since ICT is a service enabler and service is mostly intangible in form. The constraints have to be worked through by good training, skilled committed staff and dedicated service approach. Thus, it is concluded that computerisation not only helps the organisation in long run but also enables the bank staff to reap the benefits by way of improving their operations and delivering improved banking service to the rural populations. Eliminating inefficiencies and improving the overall banking services by appropriate implementation and leveraging on ICT in RFIs, would attract more farmers for increased financial transactions. Since, the credit sanctioning process would be quick, streamlined and deserving beneficiaries identified and granted credit, the repayment also is expected to be prompt. Thus, over a period of time, the quantum of agricultural credit to the deserving beneficiaries is also expected to increase.

The outcome of the research task is to suggest and recommend how ICT can act as a enabling and change agent to the rural populations not only in terms of improving agricultural credit and banking activities, but also in terms of good supply chain activities, education etc. In this direction a model *'A Rural Integrated Computer Network Model Leveraging on Information and Communication Technologies in Rural Financial Institutions for Rural Development'* (Prem & Sarangal, 2003) is proposed and recommended. An improved version of the same model is illustrated in Fig. 9.1.

In this model, there is need to place atleast two Personnel Computers (PC) in each of the bank branches. One PC would be utilised purely for the banking operations, managed by the bank manager and/or his deputies. The second PC would be utilized for e-business/e-commerce services charging nominal fee for each service rendered, which would be managed by selecting and training an appropriate local youth called 'Business Executive'. RFIs can adopt one of the following two strategies. RFIs can either be an integral part of the business activity or just be an enabler of the business activity. As an enabler, the bank would be independent of the business centre, except for providing the facilitating infrastructure. The business executive identified should be a local youth entrepreneur who would run the business as an independent profit-centre. The business executive may be provided with the required loan and adequate training.

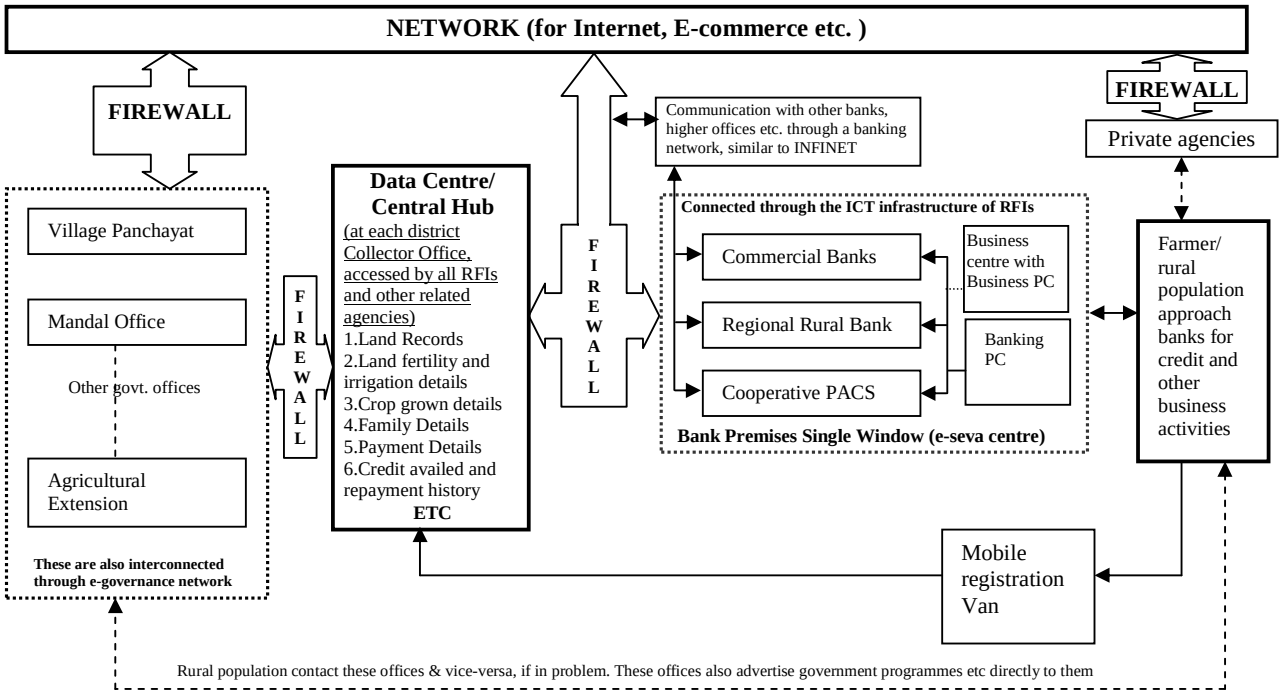

Fig.9.1 Rural Integrated Computer Network Model for both, improved flow of agricultural credit and enhanced business activities

In the second strategy, RFIs could appropriately integrate the banking activities with the business activities. Primary Agricultural Cooperative Societies (PACS) generally have various business activities associated with it like selling farm inputs, stationery, oil, etc. Thus, business centre with e-business PC could be another one of such business and the revenue so generated be appropriately reflected in their balance sheets. The bank could give the business executive salary/commission in proportion to the service rendered and

revenue generated. However, this would need appropriate policy changes and amendment of the Banking Regulation Act (India - 1949), so that RFIs can also perform such business activities in rural areas.

In the absence of optical fibre connectivity, the telephones with modems can be used for connectivity since almost all the rural branches have atleast one telephone. This shall enable the RFIs, not only to provide improved banking services but also provide enhanced business services. This model is envisaged to computerize all the rural areas and network them at national level to form an *Integrated National Rural Network.*

It could be observed in the qualitative analyses that the farmers, bank managers encounter difficulties for accessing relevant data such as customer information from other banks, details of land records, market prices of commodities, among others. This situation is addressed by this model, which aims to provide rural coordinated approach by appropriately integrating various related institutions and leveraging on ICT in RFIs, to extend improved business and banking services in rural areas of India. Thus, the *Rural Integrated Computer Network Model* if implemented well has the potential to provide greater benefits. Variety of services can be offered to larger rural population by the RFIs since they have a wider reach. This could be implemented, perhaps, at a lesser investment per region vis-à-vis that by the private agencies, as it would be implemented as a large holistic project thus benefiting by economies of scale.

The National Bank for Agriculture and Rural Development (NABARD) being an apex bank for agricultural and rural development in India can take a lead role in detailed planning, designing and appropriately enable the implementation of this project. This project as a whole no doubt, is challenging to implement, however, it is expected to provide improved banking and other business activities, at a relatively lesser cost than other such initiatives, by implementing appropriate ICTs and leveraging on the wide spread network and existing infrastructure of RFIs in India. It would help in better governance, access to institutional credit, its speedy sanction, better rural connectivity, improved rural education, health services, microfinance, better information dissemination and rural empowerment, better price and business offers for the farmers' produce increasing rural-urban business activities. This should be implemented keeping the social objective also in mind, which would help to achieve the Millennium Development Goals. Such networks need to be implemented in all developing nations so that the urban-rural

divide in minimized fostering rural development. Thus, this would help in achieving a balanced socio-economic rural development in developing nations.

9.6. RECOMMENDATIONS

The recommendations which emerge from the research study are as below;

1. Government should make higher budgetary allocation for increased flow of institutional agricultural credit which is one of the most essential prerequisite for agricultural development.
2. All the rural bank branches should be computerised. As discussed it would bring in additional transparency, increase its operational efficiency and improve management and help reduce frauds, among others. Government and banks should take policy level measures to ensure that computerisation in rural banks is taken up on priority basis with special financial allocation for the same.
3. Increased flow of institutional credit to the deserving and eligible agriculturalist needs to be strictly ensured. This can be enabled by computerisation of RFIs with accurate and updated databases of rural population. In this direction the Government should explore setting up of Credit Information Bureau meant for rural India. This could be termed ‘Rural Credit Information Bureau’ housing updated credit related details of the rural population in a strong secure environment. All banks can appropriately access and use this database as the reference point for sanctioning credit. In this direction, the RBI/Government should establish standards and evolve the best and uniform formats to be followed by all banks for all their rural operations for secure interoperability, improved decision making, easier maintenance of database, efficient monitoring of rural operations and speedy report generation, among others.
4. Increased training to use computerised banking operations need to be rendered to the rural banking staff. Keeping in view the strategic and future requirements, skilled staff has to be recruited. During the process, it should also ensure that they are motivated to serve the rural areas. Similarly, a programme to create awareness among the rural masses on the bank computerisation should also be carried out.
5. The government and banks should, as a special initiative, enable the use of Kisan Credit Cards as an electronic payment instrument in any organization and use it in any ATMs across India, free of cost to the farmers.

6. The *Rural Integrated Computer Network Model* by leveraging on the existing extensive infrastructure of RFIs for enhanced rural connectivity discussed earlier is strongly recommended. NABARD should take active role by setting up an exclusive department for its successful implementation and monitoring, across the nation.
7. All government offices related to agricultural credit and agricultural activities have also to be computerised and connected to all Rural Financial Institutions, on priority basis.

9.7. Scope for further research

The following is the outline of the limitations of the research discussed in Chapter1;

The research is limited to the state of AP. The research has been conducted with respect to Commercial banks and Cooperative banks only, while excluding the RRBs. State Bank of India could be surveyed in all the districts, instead of the Lead banks in respective district which were originally planned. The computerised commercial banks surveyed in West Godavari and Chittoor district were semi-urban branches having substantial agricultural lending/banking activities. Whereas, in the case of Nizamabad district was able to survey the computerised rural commercial bank. The sample size of the ITS and TM is quite small. Maximum possible characteristics and attributes of agricultural banking for obtaining the responses on the structured questionnaire and quantifying the intangible benefits of computerisation were identified. However, these are extensive but not exhaustive.

Thus, from the above limitations of the present study, the below is the broad scope for further research.

In this research the characteristics and their attributes on which responses was obtained were extensive but not exhaustive, and hence future research could identify more relevant characteristics and attributes to study the impact of computerisation on the organization as a whole and as part of the competitive market. Other districts, states and agro-climatic zones could also be studied and compared to obtain better insight into the development enabling potential of ICT. Further studies may also look into the computerisation aspect in RRBs, thus, covering the whole of RFIs. Effort must also be made to specifically conduct research with respect to the Lead bank in each district. It is also expected by the end of this research that good number of rural branches may be

computerised, unlike they being in the process of computerisation during the present study and hence only rural branches could be studied. The present research was vertical study with responses from farmers to the top management, whereas, in future horizontal study may be undertaken with more samples of the top management and IT staff. This could also be undertaken across banks for comparative study to examine the effect of the strategy of implementation by different banks on the improvement of agricultural banking activities.

Further research could be carried out in terms of case study of a rural financial institution with respect to the process of computerisation and analyzing the short-term and long-term strategic benefits vis-à-vis the detailed financial analysis for computerisation. .

As recommended for a *Rural Integrated Computer Network Model* in this research, a more detailed plan of implementation linking all the banks and related entities to form a strong information and value-added network needs to be worked out. Other alternatives can also be explored, on how best the vast infrastructure of rural financial institutions could be leveraged for improved banking service, agricultural credit, agro and commercial activities for improved agricultural and rural development.

Overall, it can be concluded that Information and Communication Technology in RFIs should be taken full advantage to achieve the end goal of rural prosperity and human emancipation

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APPENDIX

A – 1.1

LIBRARIES VISITED AND EXPLORED FOR SECONDARY DATA

1. Indira Gandhi Memorial Library (IGML), University of Hyderabad, Hyderabad.
2. Institute for Development and Research in Banking Technology (IDRBT), Hyderabad.
3. State Bank of India Institute for Rural Banking (SBIRD), Hyderabad.
4. City Central Library, Ashok Nagar, Hyderabad.
5. National Institute of Rural Development (NIRD), Rajendranagar, Hyderabad.
6. National Institute of Agricultural Extension Management (MANAGE), Rajendranagar, Hyderabad.
7. National Bank for Agricultural and Rural Development (NABARD), Hyderabad.
8. Indian Institute of Management, Bangalore.
9. Indian Institute of Science, Bangalore.
10. Jawaharlal Nehru University Library, Delhi.
11. Delhi University, North Campus, Delhi.
12. Delhi University, South Campus, Delhi.
13. Faculty of Management Studies, Delhi.
14. Institute of Economic Growth, Delhi.
15. Ratan Tata Library of Delhi School of Economics, Delhi.
16. Referred the library of Indian Institute of Technology, Delhi.
17. State Bank Institute of Information and Communication Management, Banjara Hills, Hyderabad.

A – 1.2 Brief Summary of Agricultural Credit requirement from Commercial Banks and the resource availability

(Rs. Crores)

Year	Credit requirements at 1984-85 prices	Assuming increase in credit requirement at 5% per annum	Resources available at current prices
1989-1990	12, 551	16, 019	19, 948
1994-1995	20, 306	33,076	34, 237
1999-2000	30, 804	64, 037	57, 035

Source: "Agriculture and Industrial Survey 1994", IV Volume, Vadamalai Media (P) Ltd., 1993-94, Pg.47.

A – 1.3 Sectoral Deployment of Gross Bank Credit by Major Sectors

(Rs. Crores)

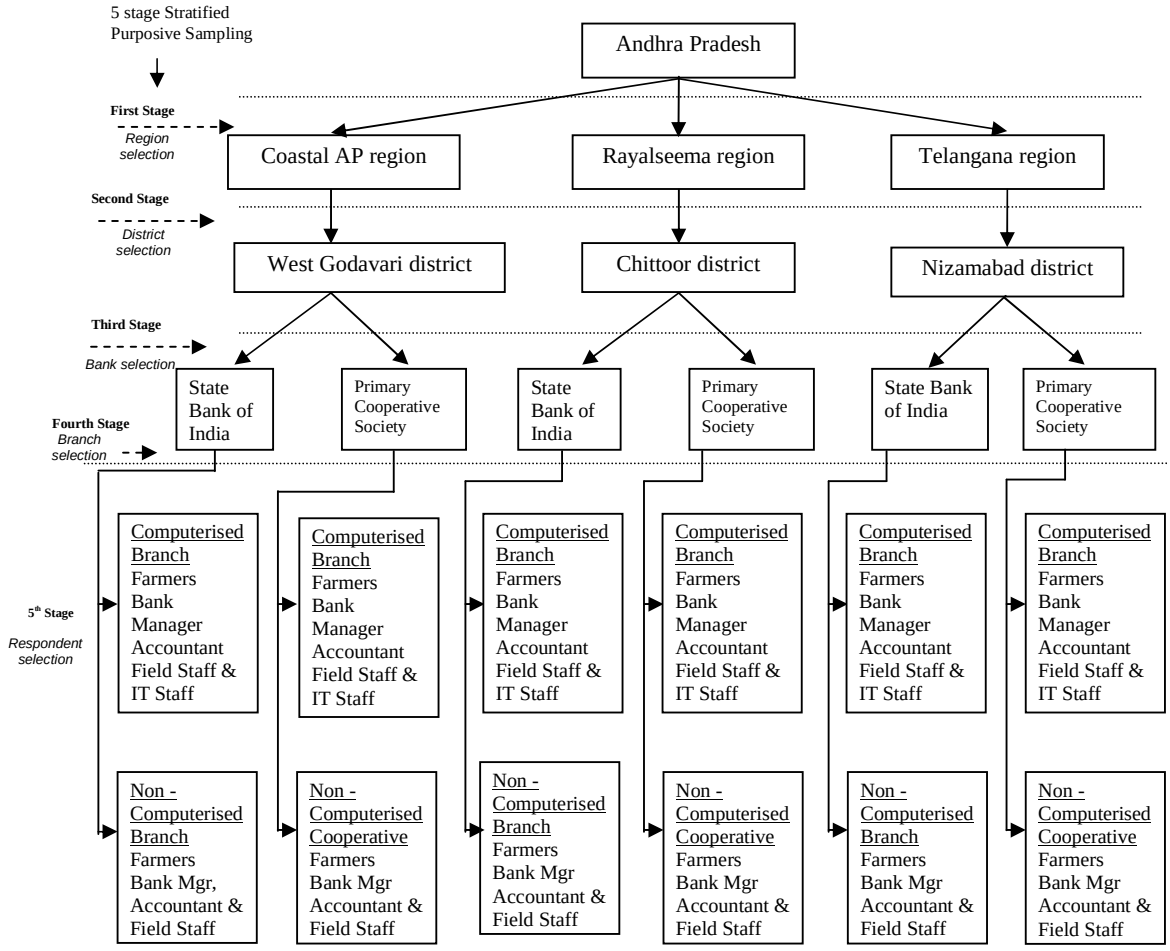
Sectors	Outstanding as on					
	March 31st 1995	March 29th 1996	March 28th 1997	March 27th 1998	March 26th 1999	March 24th 2000
Gross Bank Credit	196, 185	231, 860	258, 991	300, 283	342, 012	400, 818
Priority Sectors	64, 161	73, 329	84, 880	99, 507	114, 611	131, 827
Agriculture	23, 983	27, 044	31, 442	34, 869	39, 634	44, 381
Priority Sector as a % to Net Bank Credit	33.3	32.1	34.5	33.5	33.8	33.1
Agricultural Sector credit as a % of Net Bank Credit	12.5	11.9	12.8	11.7	11.7	11.1

Note: Data related to selected scheduled commercial banks which amount for about 90-95% of bank credit of all scheduled commercial banks. Gross bank credit data include bills rediscounted with RBI, IDBI, EXIM bank, other approved financial and inter-bank participants.

Source: Annual Reports on Trends and Progress of Banking in India, RBI, 1996-97, 1998-99 and 1999-2000.

A – 1.4

Five Stage Stratified Purposive Sampling Technique



A – 1.5

Area, Productivity & Production of AP's Major Food Grain Crops

Area, Productivity & Production of AP's Major Food Grain Crops:- Rice, Jowar and Maize

		Average of 5 years 1994-95 to 1998-99			1999-2000			Average of 6 years 1994-95 to 1999-2000		
Sl. No.	Crop	Area in lakh hectares	Productivity in Kgs/ Hect	Production in lakh tonnes	Area in lakh hectares	Productivity in Kgs/ Hect	Production in lakh tonnes	Area in lakh hectares*	Productivity in Kgs/ Hect*	Production in lakh tonnes*
a	b	c	d	e	f	g	h	i	j	k
1	Rice^	38.51	2609	98.73	40.14	2710	106.38	**38.78**	**2625.83**	**100.01**
2	Jowar^^	8.45	699	5.91	7.36	728	5.35	8.27	703.83	5.82
3	Maize^^^	3.62	2963	10.78	4.52	3258	14.72	3.77	3012.17	11.44

Source: "Season and Crop Report of Andhra Pradesh 1999-2000", 1409 FASLI, Directorate of Economics and Statistics, Government of Andhra Pradesh, Govt. Secretariat Press, Hyderabad, 2002.

^ Table 6.1 pg. 32**;** ^^ Table 6.2 pg. 41**;** ^^^ Table 6.5 pg. 45.

* I, j and k calculated from 'c f' , 'd g' and 'e h' respectively.

Important Notes

1. **Rice is the principal staple food crop** grown in all districts in the state of AP. It accounted for 30.8 percent of the total cropped area and 77.7 percent of the total food grains production during 1999-2000.

2. Next to Rice, Jowar is the principal foodgrain crop in the state of AP. It is sown both in Kharif and Rabi seasons. AP stands fourth in area and production of Jowar Crop among the states in India. The area sown under Jowar was 7.36 lakh hectares during 1999-2000.

3. Maize crop is mostly gorwn in Nizamabad, Medak, Warangal, Karimnagar and Adilabad districts together accounted for about 72.6 percent of the total area under the crop in the state of AP.

Source: "Season and Crop Report of Andhra Pradesh 1999-2000", 1409 FASLI, Directorate of Economics and Statistics, Government of Andhra Pradesh, Govt. Secretariat Press, Hyderabad, 2002, pg. 32 and 45.

A – 1.6 & A – 1.7

Average Ground Level Credit and Average Rice Production
(Avg. of 1997 – 2001)

A – 1.6

Average* Ground Level Credit *District wise
(AP Rank and Rank within region)

(Rs. Lakhs)

AP Rank	Rank within region	District	**Average Ground Level Credit:** 1997-98 to 2000-2001
Coastal Andhra Region			***203,672***
1	1	Guntur	45591
2	**2**	**West Godavari**	**45122**
3	3	East Godavari	31056
4	4	Krishna	26864
5	5	Prakasam	21003
9	6	Nellore	15918
18	7	Visakhapatnam	10339
19	8	Srikakulam	6854
22	9	Vizianagaram	5244
Ralayseema Region			***61,076***
6	1	Anantpur	20642
7	**2**	**Chittoor**	**18441**
13	3	Kurnool	12294
17	4	Cuddapah	10483
Telangana Region			***95,193***
8	**1**	**Nizamabad**	**16584**
10	2	Warangal	14925
11	3	Mahabubnagar	14117
12	4	Khammam	12386
14	5	Karimnagar	11574
15	6	Medak	11449
16	7	Nalgonda	11269
20	8	Rangareddy	6384
21	9	Adilabad	6025

Ground Level Credit Source:
"State focus Paper: 2001-2002 Andhra Pradesh" , NABARD, Regional Office, Hyderabad, Statement 26, pg. 208-209.

A – 1.7

***Average* Rice Production *District* wise**
(AP Rank and Rank within region)

(Tonnes)

AP Rank	Rank within region	District	**Average Rice Production:** 1997-1998 to 2000-2001
Coastal Andhra Region			
1	**1**	**West Godavari**	**1481**
2	2	Krishna	1228
3	3	East Godavari	1151
4	4	Guntur	994
7	5	Nellore	608
10	6	Prakasam	399
12	7	Srikakulam	348
16	8	Vizianagaram	244
19	9	Visakapatnam	145
Ralayseema Region			
14	1	Kurnool	269
17	**2**	**Chittoor**	**206**
18	3	Cuddapah	160
19	4	Ananthapur	150
Telangana Region			
5	1	Karimnagar	730
6	2	Nalgonda	704
8	3	Warangal	448
9	4	Khamman	420
11	**5**	**Nizamabad**	**388**
13	6	Mahaboobnagar	282
15	7	Medak	249
20	8	Adilabad	146
22	9	Rangaraddy	122
23	10	Hyderabad	0

Rice Production Source:
Season and Crop Report of Andhra Pradesh 1999-2000, 1409 FASLI, Directorate of Economics and Statistics, Government of Andhra Pradesh, Govt. Secretariat Press, Hyderabad, 2002, Detailed Table - V B, pg.322.

A – 1.8

FQ. No.

Questionnaire to the Farmers

This is part of the **Doctoral study** being conducted at School of Management Studies, University of Hyderabad to understand the problems that farmers face in availing credit from agricultural banks. Kindly fill the **option number** in the empty box corresponding to the question. The **personal** details will be **confidential** and all the information provided shall be used for **Academic** purpose only. **Your suggestions are very valuable for evolving the future plan for agricultural banking and rural development.** Your cooperation would be most appreciated.

Prem Syamsundar
Research Scholar

1. Confirmation Details

1.1 Have you availed **agricultural credit** from any rural bank in the past five years?

Kindly mark '**1'** for '**Yes**', and '**2**' for '**No**', in the box provided beside. ☐

If '**Yes**', then please continue. If **'No'** please terminate, Thank you.

2. Agriculture and Credit Information

2.1 What is the average acres of land utilized for agricultural activity?

1. < 2.5 acres **2**. 2.5 acres to 5 acres **3**. > 5 acres ☐

2.2 Of the **above** what is the average you; **2.2.1**) Own: __ **2.2.2**) or Lease in:_ **2.2.3**) or Lease out to others:_.

2.3 What are the two **major crops** grown in each season?

1. Rice **2**. Wheat **3**. Maize **4**. Raggi **5**. Sugarcane **6**.Cotton **7**. Oilseeds **8**. Others

2.3.1 Rabi ☐ & ☐ 2.3.2 Kharif ☐ & ☐ 2.3.3 Summer ☐ & ☐

2.4 **Average Cost and Average Revenue** of **Agricultural Production per year per acre.** ***('000 = k)***

Rupees: **1**. <3k **2.** 3k – 6k **3.** 6k – 9k **4.** 9k – 12k **5.**12k – 15k **6**.15k – 18k **7.** 18k – 21k **8.** > 21k

	Current Year		***Last year***	
Average Cost of Agricultural Production	2.4.1.1		2.4.2.1	
Average Revenue from above Agricultural output	2.4.1.2		2.4.2.2	

2.5 & 2.6*:** Details of **Average Agricultural Credit** availed for **current** and **last** year. ***('000 = k)

2.5 **Rupees:** **1**. <3k **2.** 3k – 6k **3.** 6k – 9k **4.** 9k – 12k **5.**12k – 15k **6**.15k – 18k **7.** 18k – 21k **8.** 21k – 24k **9.** 24k-27k **10.** 27k – 30k **11.** 30k – 33k **12.** 33k – 35k **13.** > 35k

2.6 **Term of Credit: 1**: Short Term (**< 1year**) **2**: Medium Term (**1- 4 years**) **3**: Long Term (**> 4years**)

Rupees	***Current Year***				***Last Year***			
	Q. no	**Rupees**	Q. no	**Term**	Q. no	**Rupees**	Q. no	**Term**
Money lender	2.5.1.1		2.6.1.1		2.5.2.1		2.6.2.1	
Relatives/Friends	2.5.1.2		2.6.1.2		2.5.2.2		2.6.2.2	
Landlords	2.5.1.3		2.6.1.3		2.5.2.3		2.6.2.3	
Commercial Banks / RRBs	2.5.1.4		2.6.1.4		2.5.2.4		2.6.2.4	
Cooperative Banks	2.5.1.5		2.6.1.5		2.5.2.5		2.6.2.5	
TOTAL	**2.5.1.6**				**2.5.2.6**			

2.7 What are the interest rates and the **advantages & disadvantages** of receiving credit from below agencies?

Agencies	**Interest rates (%)**	**Advantages**	**Disadvantages**
2.7.1 Money lender			
2.7.2 Relatives/Friends			
2.7.3. Landlords			
2.7.4 Commercial Banks / RRBs			
2.7.5 Cooperative Banks			

2.8 What is the average amount/percentage of expenditure on the below major agricultural inputs?

Agricultural Inputs	2.8.1 Seeds	2.8.2 Fertilizers	2.8.3 Pesticides	2.8.4 Pump set	2.8.5 Agricultural Implements	2.8.6 Cows/Buffalos/ Bullocks	2.8.7 Land Improvement	2.8.8 Manpower	**Total**
Avg. Amount / %									**100**

3. Banking Transaction Experience

3.1 Does your bank use computers for banking operations? (Kindly mark **1** for '**Yes'** and **2** for '**No**') 3.1 [ ]

3.2 Do you think that computerisation of banking operations, *will improve* banking service(non-computerised bank)/*have improved* the banking service(computerised bank)? (**1-Yes 2-No 3-Don't know**) 3.2 [ ]

3.3 – 3.7 Kindly use the following options for Q.no. **3.3** ***to*** Q.no. **3.7**.

1. < 5 mins **2**. 5 – 10 mins **3**. 10 – 15 mins **4.** 15 – 30 mins **5.** more than 30 mins

Questions	Q. no.	Ans.
After waiting in queue, what is the **average time** taken to get your turn?	3.3	
After getting your turn, what is the **average time** taken to complete your transaction?	3.4	
What is the **average time** taken to update your passbook?	3.5	
What is the **average time** taken, to get to, meet the manger for any clarifications?	3.6	
What is the **average time** taken from home to go to bank for availing agricultural credit?	3.7	

3.8 – 3.10 Kindly use the following options for Q.no. **3.8** ***to*** Q.no. **3.10**

1. one day **2**. 2 - 5 days **3**. 6 - 10 days **4**. 11 - 15 days **5**. more than 15 days

Questions	Q. no.	Ans.
How many days do you spend to get the **'No Dues Certificate'** from other Banks to get agricultural credit from your bank?	3.8	
Approximate number of days to sanction the credit?	3.9	
After how many days do you repay your loans after getting cash from selling your agricultural production?	3.10	

3.11 to 3.20: Kindly mark **1** for '**Yes**' and **2** for '**No**'

Questions	Q. no.	Ans.
Do you find the bank crowded with people during most of your visits during season?	3.11	
Do you find the bank crowded with books, ledgers, papers etc.?	3.12	
Does the bank staff take long time to locate your accounts and for transaction?	3.13	
Does the bank staff take long time to process your documents?	3.14	
Is any information you seek provided quickly?	3.15	
Do the bank officials frequently tell that they are busy and are inattentive?	3.16	
Do bank officials send you off without any reason?	3.17	
Is there a need to keep aside a day for banking purpose only?	3.18	
Do you experience any red-tape while getting agricultural credit?	3.19	
Do you experience any corruption while getting agricultural credit?	3.20	

3.21 Approximate number of visits to the bank from the time of application to sanction of credit. 3.21 [ ]

1. 2 visits **2**. 3 – 5 visits **3**. 6 – 8 visits **4**. Others, pl. specify

3.22 What are the various **difficult procedures** you experience in sanctioning of agricultural credit? What according to you should be done to **simplify** them?

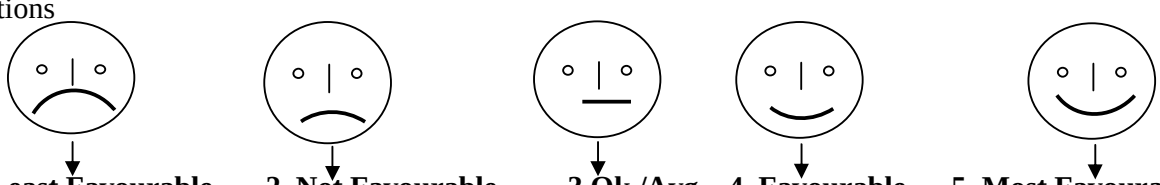
3.22 a Please allocate 100 points across the following according to the importance to you for Agricultural credit operations.

1	Policies on Agricultural Credit Operations	
2	Infrastructure	
3	Administrative and Procedural Activities	
4	Attitude of People/Bank Staff	

100

3.23 Tick (✓) in appropriate boxes based on your perception/views on the below characteristics of banking operations

.



1.Least Favourable **2. Not Favourable** **3.Ok /Avg** **4. Favourable** **5. Most Favourable**

Sl. no.	Agencies →	Commercial banks					Cooperatives				
	Characteristics	☹	😟	😐	🙂	😀	☹	😟	😐	🙂	😀
3.23.1	Location	1	2	3	4	5	1	2	3	4	5
3.23.2	Accessibility	1	2	3	4	5	1	2	3	4	5
3.23.3	Procedures	1	2	3	4	5	1	2	3	4	5
3.23.4	Interest rates	1	2	3	4	5	1	2	3	4	5
3.23.5	Behavior of the bank officials persons	1	2	3	4	5	1	2	3	4	5
3.23.6	Interactive										
3.23.7	Terms and conditions	1	2	3	4	5	1	2	3	4	5
3.23.8	Repayment installments (in terms of amount)	1	2	3	4	5	1	2	3	4	5
3.23.9	Repayment flexibility (in terms of time)	1	2	3	4	5	1	2	3	4	5
3.23.10	Availability of the concerned person	1	2	3	4	5	1	2	3	4	5
3.23.11	Cooperation of person in-charge	1	2	3	4	5	1	2	3	4	5
3.23.12	Agricultural credit sanctioning time	1	2	3	4	5	1	2	3	4	5
3.23.13	Official documentation language	1	2	3	4	5	1	2	3	4	5
3.23.14	Bankers/Lenders sensitivity to your needs	1	2	3	4	5	1	2	3	4	5
3.23.15	Bankers/Lenders have concern for your problems	1	2	3	4	5	1	2	3	4	5
3.23.16	Passbook entries	1	2	3	4	5	1	2	3	4	5
3.23.17	Working speed	1	2	3	4	5	1	2	3	4	5
3.23.18	Banking/Lending transactions	1	2	3	4	5	1	2	3	4	5
3.23.19	Credit schemes	1	2	3	4	5	1	2	3	4	5
3.23.20	Advertisement of various credit schemes	1	2	3	4	5	1	2	3	4	5
3.23.21	Principal amount	1	2	3	4	5	1	2	3	4	5
3.23.22	Working hours	1	2	3	4	5	1	2	3	4	5
3.23.23	Process of taking collaterals and asset documents	1	2	3	4	5	1	2	3	4	5
3.23.24	**Overall**	1	2	3	4	5	1	2	3	4	5

4. Personal Details

Name (Optional) :

4.1 Gender (**M**ale/**F**emale): 4.2 Age: 4.3 Village: 4.4 District:

4.5 Name and **code** of the **bank** you availed credit:

4.6 Family size, educational details and earning members (Average).

Education	4.6.1 Primary	4.6.2 Secondary	4.6.3 Intermediate	4.6.4 Graduation	4.6.5 Total Family	4.6.6 Earning Members
Number						

4.7 Details of average family **Income per year.**

Rupees: **1**. <12,000 **2**. 12,000-24,000 **3**. 24,000-36,000 **4**. 36,000-60,000 **5**. more than 60,000

4.7.1 Current Year ☐ 4.7.2 Last Year ☐

4.8 Details of average family **Expenditure per month.**

Rupees: **1**. 500-1,000 **2**. 1,000-1,500 **3**. 1,500-2,000 **4**. 2,000-2,500 **5**. Others, pl. specify

4.8.1 Current Year ☐ 4.8.2 Last Year ☐

4.9 What are your suggestions to improve banking services to agricultural borrowers?

Thank You

BQ. No.

A – 1.9

Questionnaire to the Bank Managers in Rural Branches

This is part of the **Doctoral study** being conducted at School of Management Studies, University of Hyderabad to analyse the problems that the bankers encounter while sanctioning agricultural credit and how information and communication technologies can be appropriately managed to improve the efficiency in rural banks. Kindly fill the **option number** in the empty box corresponding to the question. Information provided shall be **confidential** and used for **Academic** purposes only. **Your suggestions are very valuable to evolve the future for computerising agricultural banking and for rural development.** Your cooperation would be most appreciated.

Prem Syamsundar
Research Scholar

1. Confirmation Details

1.1 Does your bank provide agricultural credit to farmers? Kindly mark **1** for '**Yes**' & **2** for '**No**' ☐

If '**No**' then, kindly terminate, Thank you. If '**Yes**', please continue.

1.2 Your branch Computerisation details. Your bank is… ☐
1. Fully Computerised **2.** Front office only **3.** Back Office only **4.** Not at all computerised

If **'Not at all computerised'**, then kindly **skip** the **questions marked with** ©

2. Banking Operations Details

2.1 What are the difficulties that you encounter while granting loans to the farmers?

2.2 Your opinion on the **Potential benefits** of computerising and later networking of all PACS/rural branches/ZOs/HOs.

Potential benefits to Farmers	Potential benefits to Banks
	Hint: Increase in operating efficiency, reduction in transaction cost, easy accessibility and verification of farmers documents etc. speed up the sanction of credit to farmers etc.

2.3 What do you think are the **Constraints for Computerisation** & **Problems after computerisation** of PACS/rural branches and ZOs / HOs? What are your suggestions to overcome them?

Constraints **for** computerisation:	**Suggested solutions**
Problems **after** computerisation:	

2.4 Computerisation of which other agencies can help speed up the sanction and recovery of credit to farmers?

2.5 Kindly comment on the **Return on Investment** of Computerisation and Networking of PACS/rural branches?

2.6 What is your opinion on the **requirement of skilled staff** and **training requirements of existing staff** to perform computerized operations?

2.7 If your **PAC/branch is not computerized**, reasons for not yet computerising? When does it intend to computerize?

2.8 to 2.18**:** If your bank is **not computerised** than respond in the **Manual** Operations column. If it is **computerised** than respond in the **Computerised** Operations© column.

1. < 5 mins **2**. 5 – 10 mins **3**. 11 – 15 mins **4.** 16 – 20 mins **5.** >20 mins

Questions	Manual Opts		Computerised Opts©	
Average **time** taken to complete one transaction of a farmer	2.8.1		2.8.2©	
Average **time** taken to update a passbook of a farmer	2.9.1		2.9.2©	
Average **time** spent on paper work per day	2.10.1		2.10.2©	
Average **time** spent interacting with farmers per day	2.11.1		2.11.2©	

1. < 20 **2**. 20 – 50 **3**. 51 – 80 **4.** . 81 – 110 **5.** >110

Average **number** of **accounts** in your branch (nos.)	2.12.1		2.12.2©	
Average **number** of **loan applications received** in your branch (nos.)	2.13.1		2.13.2©	
Average **number** of **agricultural loans sanctioned** (nos.)	2.14.1		2.14.2©	

1. < Rs.10,000 **2**. 10,000 - 20,000 **3.** 21,000 - 30,000 **4.** 31,000 - 40,000 **5.** > 40,000

Average **amount** of **agricultural loans sanctioned** (Rs.)	2.15.1		2.15.2©	
Average **amount** of **deposits** (Rs.)	2.16.1		2.16.2©	

1. < 2 days **2**. 2 – 4 days **3**. 5 – 7 days **4.** . 8 – 10 days **5.** >11 days

Average **number** of **days** taken to sanction a case of agricultural credit	2.17.1		2.17.2©	

1. < 30 % **2**. 31 – 50 % **3**. 51 – 70 % **4.** . 71 – 90 % **5.** > 90 %

Percentage repayment of credit	2.18.1		2.18.2©	

2.19a Please allocate 100 points across the following according to the importance to you for Agricultural credit operations.

1	Policies on Agricultural Credit Operations	
2	Infrastructure	
3	Administrative and Procedural Activities	
4	Attitude of People/Bank Staff	

100

2.19 Tick (✓) in appropriate boxes, across the below attributes of banking operations.
Leave the columns of '**Computerised banking Operations**' **BLANK** if your branch is **not** computerised.

		Manual banking Operations					***Computerised banking Operations©***				
Sl. no	**Variables / Characteristics**	**Very Poor**	**Poor**	**OK**	**Good**	**Very Good**	**Very Poor**	**Poor**	**OK**	**Good**	**Very Good**
2.19.1	Office space occupation of books *(for manual operations)* Or Computers	1	2	3	4	5	1	2	3	4	5
2.19.2	Cost of procurement of the above	1	2	3	4	5	1	2	3	4	5
2.19.3	Cost of maintenance of the above	1	2	3	4	5	1	2	3	4	5
2.19.4	Cost and need of Special environment (dust free, AC etc.)	1	2	3	4	5	1	2	3	4	5
2.19.5	Dependability on electricity / UPS	1	2	3	4	5	1	2	3	4	5
2.19.6	Chances of duplication of work	1	2	3	4	5	1	2	3	4	5
2.19.7	Space for old data	1	2	3	4	5	1	2	3	4	5
2.19.8	Over crowded with people	1	2	3	4	5	1	2	3	4	5
2.19.9	Fear of losing data / work getting stopped	1	2	3	4	5	1	2	3	4	5

		Manual banking Operations					*Computerised banking Operations©*				
Sl. no	**Variables / Characteristics**	**Very Poor**	**Poor**	**OK**	**Good**	**Very Good**	**Very Poor**	**Poor**	**OK**	**Good**	**Very Good**
2.19.10	Operation / working efficiency	1	2	3	4	5	1	2	3	4	5
2.19.11	Training	1	2	3	4	5	1	2	3	4	5
2.19.12	Operations are User-friendly	1	2	3	4	5	1	2	3	4	5
2.19.13	Deletion of data	1	2	3	4	5	1	2	3	4	5
2.19.14	All related data updating and balancing of records	1	2	3	4	5	1	2	3	4	5
2.19.15	Passbook updating	1	2	3	4	5	1	2	3	4	5
2.19.16	Clarity in passbook entries	1	2	3	4	5	1	2	3	4	5
2.19.17	Clarification attended to	1	2	3	4	5	1	2	3	4	5
2.19.18	End of day, Closing and balancing of accounts	1	2	3	4	5	1	2	3	4	5
2.19.19	Referencing and cross-referencing of data available at different places.	1	2	3	4	5	1	2	3	4	5
2.19.20	Data and records searching/Tracing	1	2	3	4	5	1	2	3	4	5
2.19.21	Data Analysing	1	2	3	4	5	1	2	3	4	5
2.19.22	Prompting facility	1	2	3	4	5	1	2	3	4	5
2.19.23	Decision making	1	2	3	4	5	1	2	3	4	5
2.19.24	Ability to create a scenario	1	2	3	4	5	1	2	3	4	5
2.19.25	Reliability	1	2	3	4	5	1	2	3	4	5
2.19.26	Accuracy	1	2	3	4	5	1	2	3	4	5
2.19.27	Taking Backup	1	2	3	4	5	1	2	3	4	5
2.19.28	Taking multiple copies	1	2	3	4	5	1	2	3	4	5
2.19.29	Communication with other banks/ZO/HO	1	2	3	4	5	1	2	3	4	5
2.19.30	Agricultural credit sanctioning time	1	2	3	4	5	1	2	3	4	5
2.19.31	Working Speed	1	2	3	4	5	1	2	3	4	5
2.19.32	Overall banking transactions	1	2	3	4	5	1	2	3	4	5
2.19.33	Processing of Collateral/Asset documents	1	2	3	4	5	1	2	3	4	5
2.19.34	Behaviour of Bank Staff to farmers	1	2	3	4	5	1	2	3	4	5
2.19.35	Cooperation from bank staff to farmers	1	2	3	4	5	1	2	3	4	5
2.19.36	Bankers are interactive with farmers	1	2	3	4	5	1	2	3	4	5
2.19.37	Bankers sensitive to farmers needs	1	2	3	4	5	1	2	3	4	5
2.19.38	Bankers sensitive to farmers problems	1	2	3	4	5	1	2	3	4	5
2.19.39	Repayment Installments	1	2	3	4	5	1	2	3	4	5
2.19.40	Repayment Flexibility	1	2	3	4	5	1	2	3	4	5
2.19.41	Error identification	1	2	3	4	5	1	2	3	4	5
2.19.42	Corrections	1	2	3	4	5	1	2	3	4	5
2.19.43	Rough use/Handling	1	2	3	4	5	1	2	3	4	5
2.19.44	**Overall Service**	1	2	3	4	5	1	2	3	4	5

2.20 Tick (✓) in appropriate boxes, across the attributes of banking operations

Sl. no	**Variables / Characteristics**	**Very Poor**	**Poor**	**OK**	**Good**	**Very Good**
2.20.1	Location	1	2	3	4	5
2.20.2	Accessibility	1	2	3	4	5
2.20.3	Interest rates	1	2	3	4	5
2.20.4	Terms and Conditions	1	2	3	4	5
2.20.5	Credit Schemes	1	2	3	4	5
2.20.6	Advertisement of Various credit schemes	1	2	3	4	5
2.20.7	Working hours	1	2	3	4	5

2.21© If a technical problem with a computer system requires your bank technical personnel or a professional form city, how many days it takes for him to come, repair and put back the systems in working condition? ☐

1. < 2 days **2**. 2 – 4 days **3**. 5 – 7 days **4**. 8 – 10 days **5**. 11 – 13 days **6**. >13 days

3. Personal Details (Information is kept ***strictly confidential*** and used for ***statistics*** purpose only)

Name (Optional): 3.1 Designation: 3.2 Branch name : 3.3 Village:

3.4 District: 3.5 Total numbers of Villages under this branch:

3.6 What has been your total period of experience in banking sector and total experience in rural branch?

Years: 1. < 1 2. 1 – 5 3. 6 – 10 4. 11 – 15 5. 16 – 20 6. Others, pl. specify

3.6.1 Total period of experience in banking sector ☐ 3.6.2 Total period of exp. in Rural Branch ☐

3.7. Any suggestions to improve the flow of agricultural credit?

Thank You

IT Q. No.

A – 1.10
Questionnaire to the IT Staff / System Administrators in Banks

This is part of the **Doctoral study** being conducted at School of Management Studies, University of Hyderabad to analyse the problems that the bank professionals encounter while sanctioning agricultural credit, problems faced by the IT professionals to implement IT solutions in rural branches and how Information and Communication Technologies (ICT) can be appropriately managed to overcome the problems and improve the efficiency in rural banks. Kindly fill the option wherever provided, in the adjoining empty box. The below information shall be used for **Research purpose** only. **Your suggestions are very valuable for evolving the future plan for agricultural banking and rural development.**

Prem Syamsundar
Research Scholar

1. Confirmation Details

1.1 Do you work in the IT/Computer Department? ☐

1. **Yes** 2. **No** **3.** Third party implementing IT solutions

If '**No**', please Terminate, Thank you; else, please continue…

2. Computerisation Details

2.1 What according to you is a fully computerized branch / PACS?

2.1.1 Front office Computerised ☐ 2.1.2 Back office Computerised ☐

2.1.3 Both Front and Back office Computerised and all banking activities done through them ☐

2.1.4 Others, please specify…

2.2 In your opinion should rural financial institutions/branches be computerised? **1**. Yes **2**. No **3**.Don't know

If '**Yes**', please justify… ☐

If '**No**', please justify…

2.3 What according to you is the cost of …

(***Rs*****: 1**. < 1 lakh **2**.1.5 lakhs **3**. 2.5 lakhs **4**. 4.5 lakhs **5**. 5 lakhs **6**. Others, pl. specify)

2.3.1 Full-fledged computerization of a rural branch / PACS? ☐

2.3.2 Networking of rural branches / PACS to their District head office / DCCB. ☐

2.4 What are the major constraints/problems encountered by you while building and implementing IT infrastructure in rural financial institutions branches? **(1 - Yes and 2 – No)**

2.4.1 Lack of Office Space ☐ 2.4.2 Lack of constant power supply ☐

2.4.3 Lack of enough people to maintain the infrastructure ☐ 2.4.5 High maintenance cost ☐

2.4.6 Lack of enough training to personnel using the system ☐ 2.4.4 High cost to build and implement

2.4.7 Others, please specify… IT solutions ☐

2.5 What is the attitude of the management of your bank towards computerization of PACS/rural branches?

S. No.		Percentage
2.5.1	Encourage computerization of rural branches	
2.5.2	Against computerization of rural branches	
2.5.3	Management is neutral	
	Total	**100**

2.6 Kindly estimate the below requirements for a fully computerized rural branch / PACS.

S. No.		Cost of a unit	Number required	
2.6.1	Server			
2.6.2	Computer /PC			
2.6.3	Dot matrix printer			
2.6.4	Modem			
2.6.5	Phone			
2.6.6	UPS + battery (2 hrs backup)			
2.6.7	Software			
2.6.8	IT maintenance staff			
2.6.9	Networking, cabling etc.			
2.6.10	Paper / Stationary			
2.6.10	Training to use the systems		-----	Avg. time to train one official

2.7 What are the various computerized enabled products that could be offered to agricultural farmers to profit from computerized operations?

2.8 Do you think the setting up of Rural Credit Information Bureau **(RCIB)** having updated information and linking up of rural branches/PACS to it would help to access authentic information needed for better decision making by the managers and help improve agricultural credit flow to farmers? ☐

1. Yes 2. No 3. May be, not sure 4. Don't know

Kindly elaborate……

2.9 Do you think computerization of banks/PACS has improved their functioning?

1. Yes 2. No 3. Somewhat 4. Don't know ☐

2.10 What are the potential benefits of computerization of banks and later networking them to **RCIB**?

2.10.1 Benefits to farmers:…

2.10.2 Benefits to banks: …

2.11 What is your opinion on the Return on Investment of Computerization and networking of rural branches?

2.12 Please allocate 100 points across the following according to the importance to you for Agricultural credit operations.

1	Policies on Agricultural Credit Operations	
2	Infrastructure	
3	Administrative and Procedural Activities	
4	Attitude of People/Bank Staff	
		100

2.13 Tick (✓) in appropriate boxes based on your perception/views on the below characteristics of banking operations..

		Manual banking operations					*Computerised banking operations*				
Sl. no	**Variables / Characteristics**	**Very Poor**	**Poor**	**OK/ Avg**	**Good**	**Very Good**	**Very Poor**	**Poor**	**OK/ Avg**	**Good**	**Very Good**
2.13.1	Speed	1	2	3	4	5	1	2	3	4	5
2.13.2	Operation / working efficiency	1	2	3	4	5	1	2	3	4	5
2.13.3	Learning to operate / use	1	2	3	4	5	1	2	3	4	5
2.13.4	Operations are user-friendly	1	2	3	4	5	1	2	3	4	5
2.13.5	Data entry	1	2	3	4	5	1	2	3	4	5
2.13.6	Deletion of data entered erroneously										
2.13.7	Automatic updating of all related data and balancing of records.	1	2	3	4	5	1	2	3	4	5
2.13.8	Referencing and cross-referencing data available at different places.	1	2	3	4	5	1	2	3	4	5
2.13.9	Data retrieving	1	2	3	4	5	1	2	3	4	5
2.13.10	Data searching	1	2	3	4	5	1	2	3	4	5
2.13.11	Data analysing	1	2	3	4	5	1	2	3	4	5
2.13.12	Error check	1	2	3	4	5	1	2	3	4	5
2.13.13	Prompting facility	1	2	3	4	5	1	2	3	4	5
2.13.14	Decision making support	1	2	3	4	5	1	2	3	4	5
2.13.15	Ability to create a scenario	1	2	3	4	5	1	2	3	4	5
2.13.16	Dependability / Reliability	1	2	3	4	5	1	2	3	4	5
2.13.17	Taking backup	1	2	3	4	5	1	2	3	4	5
2.13.18	Taking multiple copies	1	2	3	4	5	1	2	3	4	5
2.13.19	Communication with others within and other bank branches	1	2	3	4	5	1	2	3	4	5
2.13.20	Secrecy maintained	1	2	3	4	5	1	2	3	4	5
2.13.21	Rough use / handling	1	2	3	4	5	1	2	3	4	5
2.13.22	Customer service	1	2	3	4	5	1	2	3	4	5
2.15.23	Working hours	1	2	3	4	5	1	2	3	4	5
2.15.24	End of day closing and balancing accts	1	2	3	4	5	1	2	3	4	5
2.13.25	Office space occupation of books/computer	1	2	3	4	5	1	2	3	4	5
2.13.26	Space for old data	1	2	3	4	5	1	2	3	4	5
2.13.27	Cost of procurement / Purchasing	1	2	3	4	5	1	2	3	4	5
2.13.28	Cost of maintenance	1	2	3	4	5	1	2	3	4	5
2.13.29	Cost and need of special environment (AC., dust free etc.)	1	2	3	4	5	1	2	3	4	5
2.13.30	Staff training	1	2	3	4	5	1	2	3	4	5
2.13.31	Dependability on electricity / UPS	1	2	3	4	5	1	2	3	4	5
2.13.32	Data redundancy / repetition	1	2	3	4	5	1	2	3	4	5
2.13.33	Fear of losing data/work getting stopped	1	2	3	4	5	1	2	3	4	5
2.13.34	**Over all service**	1	2	3	4	5	1	2	3	4	5

3. Personal Details

3.1 Name (optional) : 3.2 Age: 3.3 Designation:

3.4 Bank & Branch name and Code: 3.5 Village 3.6 District:

3.7 Professional Qualifications

1. BE Computers Science 2. MCA 3. PGDCS/CA 4. NIIT 5. CIIAB 5. Others pl. specify ☐

3.8 Period of Experience:

***Years*: 1**. < 1 **2**. 1 – 5 **3**. 6 – 10 **4**. 11 – 15 **5**. 16 – 20 **6**. Others, pl. specify

3.8.1 In banking sector ☐ 3.8.2 In rural branches ☐

3.8.3. In the IT/Computer Department ☐ 3.8.5 In rural areas in computer department/3rd party ☐

4. Any other opinion you wish to share or any suggestion to be made?

Thank You

TM Q. No.

A – 1.11

Questionnaire to the Top Level Management of Banks

This is part of the **Doctoral study** being conducted at School of Management Studies, University of Hyderabad to analyse the problems that the bank professionals encounter while sanctioning agricultural credit, problems faced by the IT professionals to implement IT solutions in rural branches and the views of the top management of banks on how Information and Communication Technologies (ICT) can be appropriately managed to overcome the problems and improve the efficiency in rural banks. Kindly fill the option wherever provided, in the adjoining empty box. The below information shall be used for **Research purpose** only. **Your suggestions are very valuable for evolving the future plan for agricultural banking and rural development.**

Prem Syamsundar
Research Scholar

1. Confirmation Details

1.1 Do you work in the IT/Computer Department or in the Rural development department? ☐

1. **Yes** 2. **No**

If '**No**', please Terminate, Thank you; else, please continue…

2. Computerization Details

2.1 What according to you is a fully computerized branch / PACS?

2.1.1 Front office Computerised ☐ 2.1.2 Back office Computerised ☐

2.1.3 Both Front and Back office Computerised and all banking activities done through them ☐

2.1.4 Others, please specify……..

2.2 In your opinion should rural financial institutions/branches be computerised? **1**. Yes **2**. No **3**.Don't know

If '**Yes**', please justify… ☐

If '**No**', please justify…

2.3 What according to you is the cost of …

(***Rs*****: 1**. < 1 lakh **2**.1.5 lakhs **3**. 2.5 lakhs **4**. 4.5 lakhs **5**. 5 lakhs **6**. Others, pl. specify)

2.3.1 Full-fledged computerization of a rural branch / PACS? ☐

2.3.2 Networking of rural branches / PACS to their District head office / DCCB. ☐

2.4 What are the major **constraints/problems** encountered while building, implementing and maintaining IT infrastructure in rural financial institutions branches? **(1 - Yes and 2 – No)**

2.4.1 Lack of Office Space ☐ 2.4.2 Lack of constant power supply ☐

2.4.3 Lack of enough people to maintain the infrastructure ☐ 2.4.5 High maintenance cost ☐

2.4.6 Lack of enough training to personnel using the system ☐ 2.4.4 High cost to build and implement

2.4.7 Others, please specify… IT solutions ☐

Kindly elaborate on the constraints; ….

2.5 Do you think the setting up of Rural Credit Information Bureau **(RCIB)** having updated information and linking up of rural branches/PACS to it would help to access authentic information needed for better decision making by the managers and help to improve flow of agricultural credit to the farmers? ☐

1. Yes 2. No 3. Not sure 4. Don't know

2.6 What are the **potential benefits** of computerization of banks and later networking them to **RCIB**?

2.6.1 Benefits to farmers:…

2.6.2 Benefits to banks: …

2.7 Do you think computerization of banks/PACS has improved their functioning?

1. Yes 2. No 3. Somewhat 4. Don't know ☐

2.8 What is your banks initiative to computerize rural branches?

2.9 What are the various computerized enabled products that could be offered to agricultural farmers to profit from computerized operations?

2.10 What is your opinion on the Return on Investment of Computerization and networking of rural branches?

2.11 In wake of Chief Vigilance Commissioner's order 70% of the business needed to be captured through computers. This compliance is met by computerizing urban and semi-urban branches, since business volumes are high here. What is the future of computerization of rural branches?

2.12 What is your opinion on the unemployment due to computerization, the requirements of skilled staff and training requirements of existing staff to perform computerized operations?

2.13 Please allocate 100 points across the following according to the importance to you for Agricultural credit operations.

1	Policies on Agricultural Credit Operations	
2	Infrastructure	
3	Administrative and Procedural Activities	
4	Attitude of People / Bank Staff	
		100

2.14. Tick (✓) in appropriate boxes based on your perception/views on the below characteristics of banking operations.

		Manual banking operations					*Computerised banking operations*				
Sl. No	**Variables / Characteristics**	**Very Poor**	**Poor**	**OK/ Avg**	**Good**	**Very Good**	**Very Poor**	**Poor**	**OK/ Avg**	**Good**	**Very Good**
2.14.1	Speed	1	2	3	4	5	1	2	3	4	5
2.14.2	Operation / working efficiency	1	2	3	4	5	1	2	3	4	5
2.14.3	Learning to operate/use	1	2	3	4	5	1	2	3	4	5
2.14.4	Operations are user-friendly	1	2	3	4	5	1	2	3	4	5
2.14.5	Input data / data entry	1	2	3	4	5	1	2	3	4	5
2.14.6	Deletion of faulty data entries										
2.14.7	Automatic updating of all related data and balancing of records.	1	2	3	4	5	1	2	3	4	5
2.14.8	Referencing and cross-referencing data available at different places.	1	2	3	4	5	1	2	3	4	5
2.14.9	Data retrieving	1	2	3	4	5	1	2	3	4	5
2.14.10	Data searching/tracing	1	2	3	4	5	1	2	3	4	5
2.14.11	Data analysing	1	2	3	4	5	1	2	3	4	5
2.14.12	Error check	1	2	3	4	5	1	2	3	4	5
2.14.13	Prompting facility	1	2	3	4	5	1	2	3	4	5
2.14.14	Decision making support	1	2	3	4	5	1	2	3	4	5
2.14.15	Ability to create a scenario	1	2	3	4	5	1	2	3	4	5
2.14.16	Dependability / Reliability	1	2	3	4	5	1	2	3	4	5
2.14.17	Taking backup	1	2	3	4	5	1	2	3	4	5
2.14.18	Taking multiple copies	1	2	3	4	5	1	2	3	4	5
2.14.19	Communication with others within and other bank branches	1	2	3	4	5	1	2	3	4	5
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2.14.27	Cost of procurement / Purchasing	1	2	3	4	5	1	2	3	4	5
2.14.28	Cost of maintenance	1	2	3	4	5	1	2	3	4	5
2.14.29	Cost and need of special environment (AC, dust free etc.)	1	2	3	4	5	1	2	3	4	5
2.14.30	Staff training	1	2	3	4	5	1	2	3	4	5
2.14.31	Dependability on electricity / UPS	1	2	3	4	5	1	2	3	4	5
2.14.32	Data redundancy / repetition	1	2	3	4	5	1	2	3	4	5
2.14.33	Fear of losing data/work getting stopped	1	2	3	4	5	1	2	3	4	5
2.14.34	**Overall service**	1	2	3	4	5	1	2	3	4	5

3. Personal Details

3.1 Name (optional): 3.2 Age: 3.3 Designation:

3.4 Bank name : 3.5 Village 3.6 District:

3.7 Professional Qualifications

1. M.Com 2. MBA-Finance 3. M.A. 4. LLB 5. CIIAB 5. Others pl. specify ☐

3.8 What has been your total period of experience in banking sector and in rural development area?

***Years*: 1**. < 1 **2**. 1 – 5 **3**. 6 – 10 **4**. 11 – 15 **5**. 16 – 20 **6**. Others, pl. specify

3.8.1 Total period of experience in banking sector ☐ 3.8.2 Total period of exp. in Rural dev. area ☐

4. Any other opinion you wish to share or any suggestion to be made?

A – 1.12

Flow of Agricultural credit by different agencies

(Rs. Crore)

Sno.	Institutions	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000*	1999-2001@
		a	b	c	d	e	f	g
1	**Co-operative Banks**	**9,406**	**10,479**	**11,944**	**14,085**	**15,957**	**1,8429**	**22,706**
2	Short Term	7,250	8,331	9,328	10,895	12,571	14,648	17,598
3	Medium/Long term	2,156	2,148	2,616	3,190	3,386	3,781	5,108
4	**Regional Rural Banks**	**1,083**	**1,381**	**1,684**	**2,040**	**2,460**	**3,329**	**4,061**
5	Short Term	688	849	1,121	1,396	1,710	2,517	2,412
6	Medium/Long term	395	532	563	644	750	812	1,649
7	**Commercial banks**	**8,255**	**10,172**	**12,783**	**15,831**	**18,443**	**22,854**	**24,693**
8	Short Term	N.A.	5,345	6,549	8,349	9,622	11,697	10,973
9	Medium/Long term	8,255	4,827	6,234	7,482	8,821	11,157	13,720
10	**Total**	**18,744**	**22,032**	**26,411**	**31,956**	**36,860**	**44,612**	**51,460**
11	**Percent increase**	**14**	**18**	**20**	**21**	**15**	**21**	**15**

* Estimated @ Projection

Source:

a to d: Economic survey, 1999-2000, Government of India, Ministry of Finance, Economic Division, pg.142.

e to g: Economic survey, 2000-2001, Government of India, Ministry of Finance, Economic Division, pg.164.

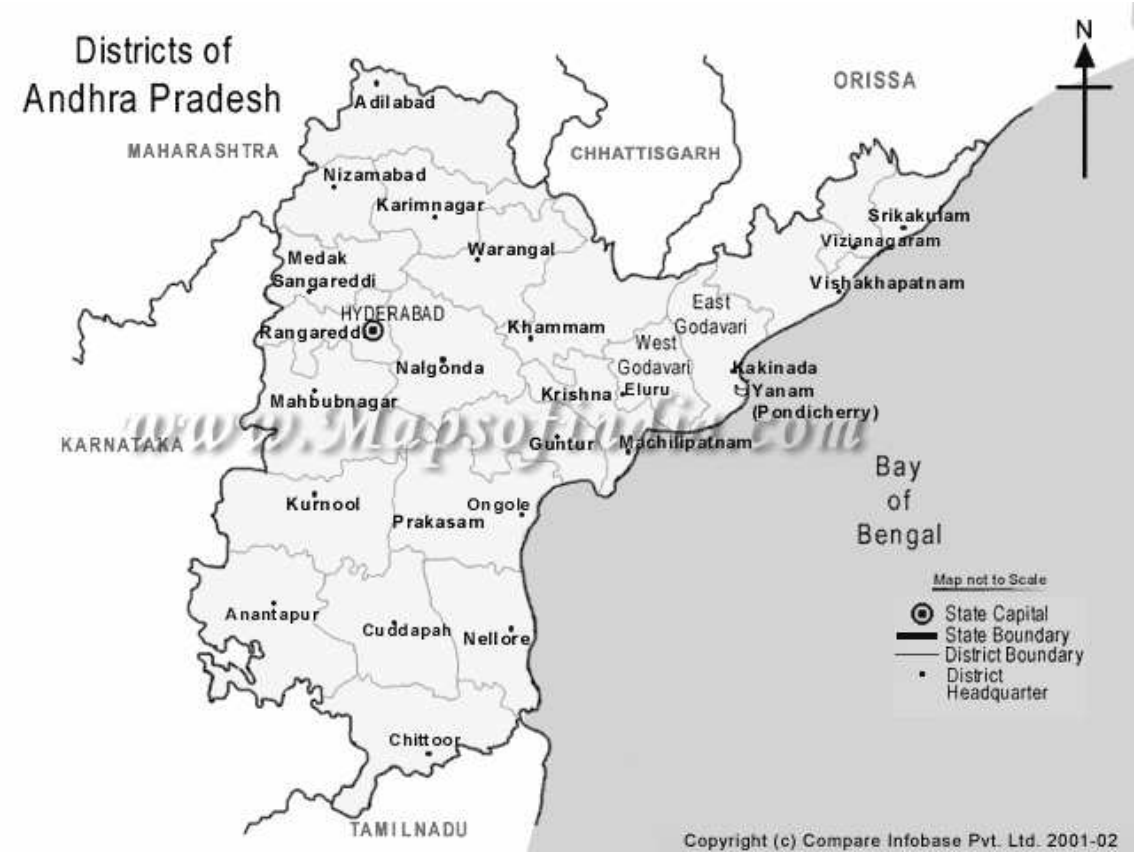
A – 3.1

Map of INDIA

Source: www.mapsofindia.com

A – 3.2

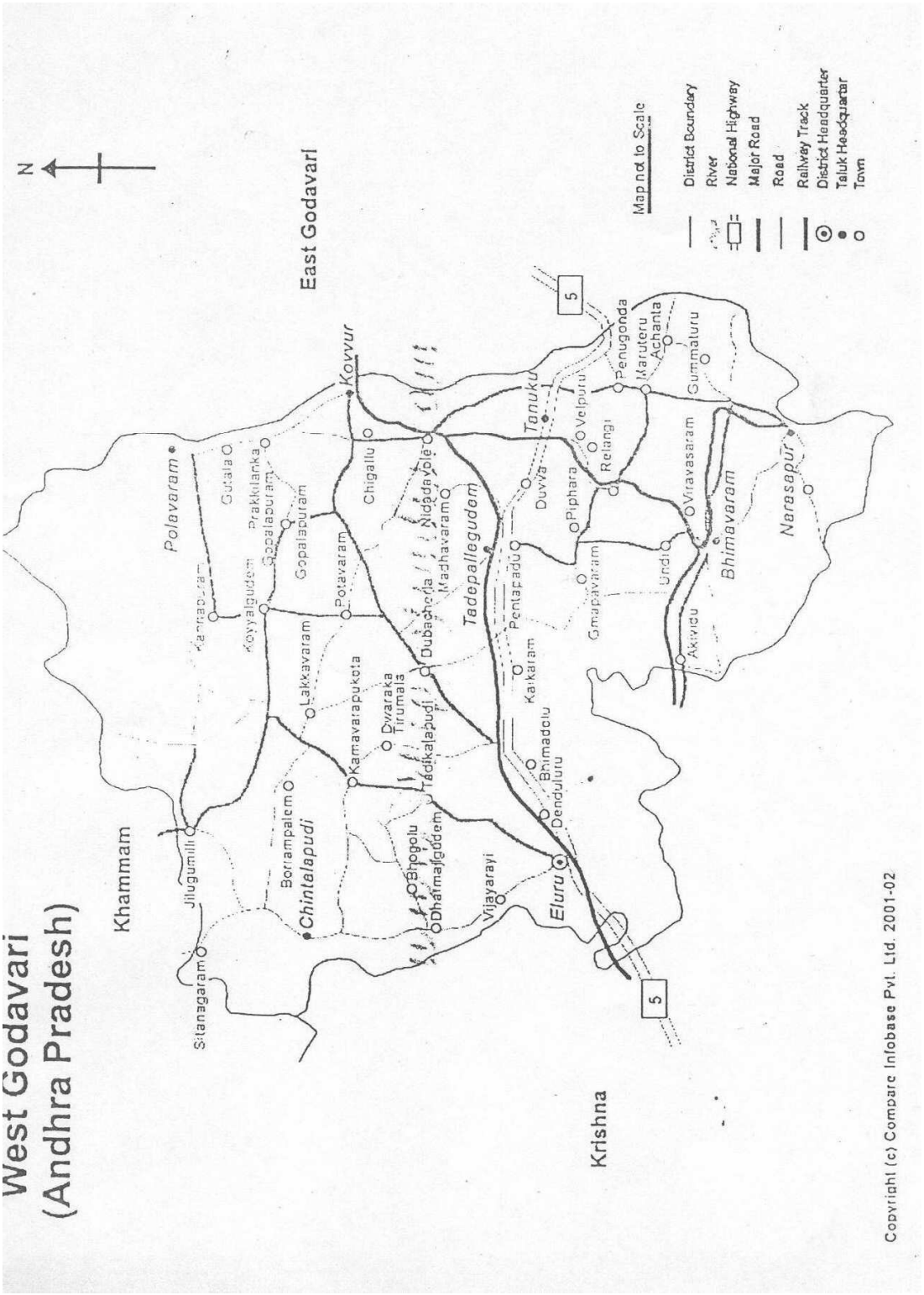
Map of state of ANDHRA PRADESH



Source: www.mapsofindia.com

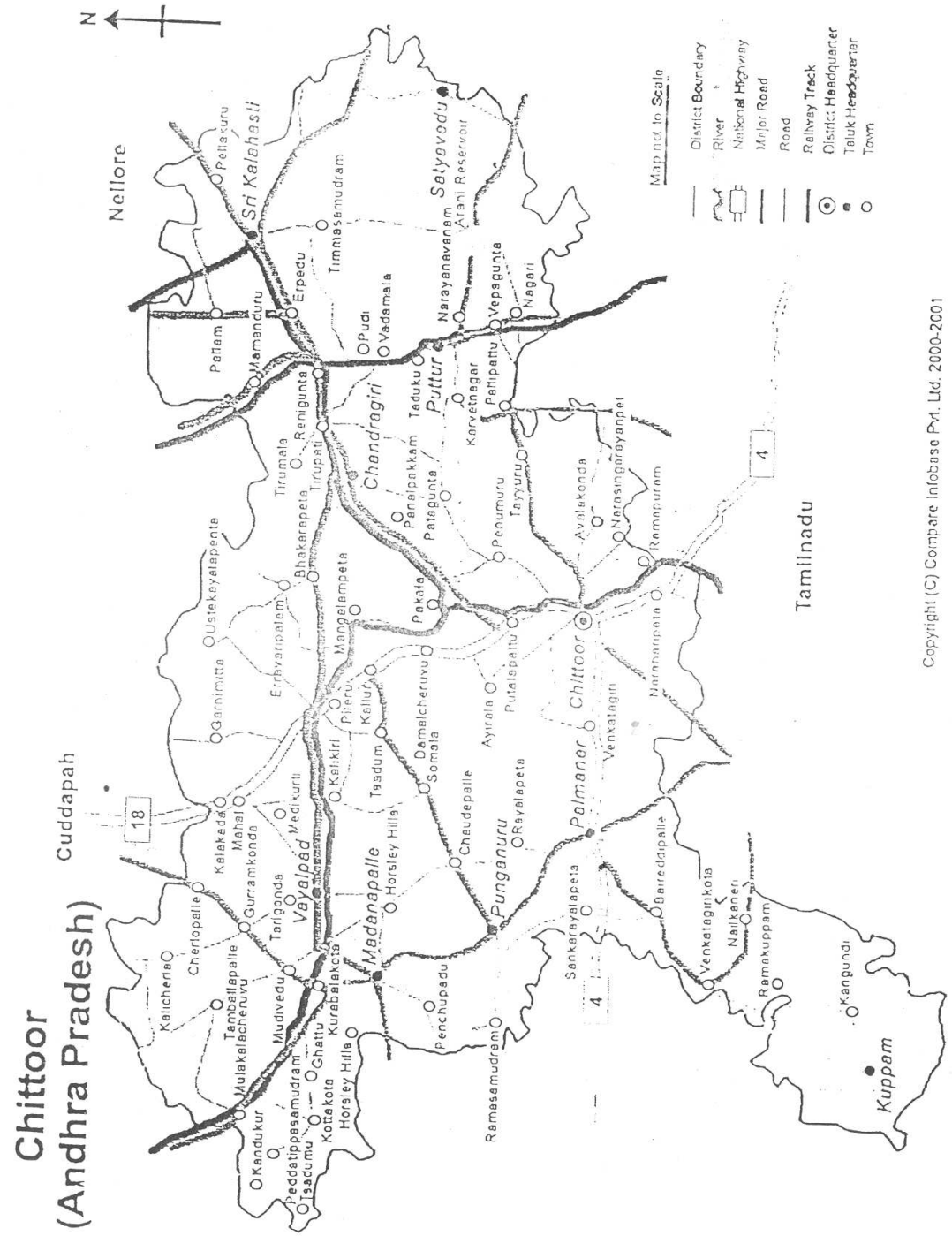
A – 3.3

Map of WEST GODAVARI DISTRICT



A – 3.4

Map of CHITTOOR DISTRICT



A – 3.5

Map of NIZAMABAD DISTRICT