International Journal of Advanced Research and Review

www.ijarr.in

ECONOMIC IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON AGRICULTURE AND BANKING SECTOR

Ayush Singh Negi

2nd Year, National Law University, Delhi (email id: ayush.negi18@nludelhi.ac.in)

Abstract

Information and Communication Technology (ICT) is one of the overreaching terms incorporating all the modes of transmissions like electronic devices and services, mobile networks and application which help in the dissemination of information. In any sector, the role of information cannot be ignored. Every sector, every industry in the economy needs information for the development. ICT is an important catalyst in the development of economy if it used in a efficient manner. This paper analyses the role of ICT in the agricultural and banking sector of economy and how ICT can revolutionize the two important segments of Indian economy.

Keywords: Information and Communication Technology (ICT), agriculture, banking, economy, agricultural productivity, financial inclusion

INTRODUCTION

Today is the era of technological advancements. The world is witnessing the new revolution through technological advancements. In this backdrop, Information Technology is changing the outlook of life in every sphere. It is spreading fast across the globe. In present world, IT has proven to be a buzz technology helping in exchanging the information in the fast, effective and efficient manner. It is stimulating the production process with reduced cost of production, providing better communication and increasing the return on investments by cutting down the operational costs. The IT has the potential to reform the economy of the developing and underdeveloped countries by circulating and communicating the information at the international platform through trade of goods and services, investments. The rapid contribution of IT in the development of the economy is such that it has become the heart of the economic reforms, developments and productivity.

In any sector, the role of information cannot be ignored. Every sector, every industry in the economy needs information for the development. ICT is an important catalyst in the development of economy if it used in a efficient manner. With this backdrop, the application of ICT on agriculture and banking sector in India will boost the agricultural productivity and will promote the financial inclusion both of which ultimately help in the growth of economy. ICT plays a significant role in disseminating the information among the farmers and helps in taking the major decisions related to use of seeds, fertilizer application, pest control, market information etc. Similarly the role of ICT in banking and financial sector cannot be ignored. In order to promote the financial inclusion, it is important that the services of the bank are available to penetrate every corner of the country and along with this; it requires the easy and affordable banking services. With support of ICT, the Banking sector can be revolutionized. The combination of internet and ICT is bringing new innovations in baking sector in the form of electronic payment services, mobile and internet banking, ATMs. All these innovation have a positive impact on the financial inclusion and helps in the promoting the growth. Therefore ICT can revolutionize these two sectors of the economy which will bring growth and development of the economy.

1. Role of IT in Indian Agriculture

Agriculture in India is one of the most important sectors of Indian economy having very high composition of workforce. It is the primary sector of the Indian economy. Significant proportion of population of India directly or indirectly derives their livelihood from agriculture and related activities. Although agriculture is considered as an important sector employing large percentage of workforce but still the problem of crop failure and lack of productivity due to variety of factors like access to agricultural market, lack of market information, pest attack, poor connectivity and transportation facilities always haunt farmers and the rural economy as a whole. [1]. In a survey conducted by the Centre for Study of Developing Societies (CSDS), based in Delhi, it was stated that as much as 74%of the farmers interviewed were unaware of farming related information from officials of agricultural department. The IT can play a dominant role in this context, providing effective solutions to these crop failure and productivity issues in the following ways:

1.1. Better exposure to market opportunities and price prevailing in the market

One of the fundamental reasons of low farmer income is the isolation of the farmers from the general trends related to agricultural products in the market and their relative prices. Because of this lack of market information and exposure to the market, Indian farmers are not able to take the correct decisions with respect to the production of crops and to sell them at the legitimate price. Due to this they are easily manipulated by the middlemen. As a result they end up getting lower incomes for the output sold.

However, IT can provide the viable solution here for the Indian problems and connecting them to the agricultural markets. Connecting IT to the agricultural sector and enhancing the mobile services and connectivity in rural areas will largely benefit the farmers. All the trends, relevant information of agricultural products as well as their price can be communicated to them digitally through mobile phones. Mobile/cell phones can be proven as an effective channel to disseminate the information among farmers. Moreover, the user friendly interface of mobile applications and the ability of the technological devices to provide information to farmers in their own regional or local language can be said an asset for circulating information. Regular access and exposure to the market information, the prices of the products to the farmers with the help of technology will make the farmers self sufficient in terms of market knowledge and the awareness of the prices of the market. They will be able to comprehend the prices offered by trade agents, middlemen and then accordingly there will be less chances of manipulation of farmers by middlemen. Thus exposure to market information will lead to better income of farmers in India. In 2000, Ministry of agriculture (Central Government) launched ‘Agricultural Marketing Information Network’ or *‘Agmaknet’* to broadcast the relevant agricultural market information to the farmers like the availability of particular agricultural commodities in the market, their relative prices to enhance the decision making power of the farmers regarding the production and selling the outputs.

1.2 Accurate/Correct weather information

Weather plays an important role when it comes to farming in India. Almost entire agricultural force is dependent on the climate and weather and accordingly as per the weather prevailing in the rural area, farmers decide to produce particular crops. Weather has the capacity to influence the crop yield and growth. Agricultural crops are very responsive to the moisture, temperature and humidity. Thus having the accurate of information is very significant in order to produce higher productivity. However, in India many crops are being destroyed and lot of crop wastages occur due to the incorrect weather information in India. Therefore it is imperative that the farmers receive the accurate and timely information related to weather in order to take right decisions while deciding the crop production. Ministry of Agriculture with the help of various IT companies have developed various portals and channels to communicate the weather related information to farmers like *e-Arik, Mahindra Kisan Mitra* aiming at forecasting correct weather information and communicating the same to farmers through digital platforms, portals and mobile devices.

1.3 Pest control and Use of fertilizers

Pesticides and fertilizers are very useful in order to prevent the crops from the pest control and to stimulate the growth of crops. However it has often been witnessed that the farmers end up destroying the crops due to indiscriminate use of pesticides and fertilizers. Even if the crop survives the indiscriminate use of fertilizers and pesticides, it is often unfit for the human consumption. This problem arises because of lack of information about the quality and quantity of pesticides, fertilizers. With the help of IT such indiscriminate use of fertilizers and pesticides can be controlled and can be used in a right quantity and quality. Therefore knowing the precise information about the collection of pest numbers will help the farmers in choosing right quantity and type of pesticides to eliminate pest control and thus help them in safeguarding the crop without any fear of crop failure due to excessive use of pesticides. Similarly in case of fertilizers also ICT may play a crucial role by providing the accurate information to the farmers regarding the use of right type, quality and quantity of fertilizers and thus will assist the farmers in using the fertilizers in the right and legitimate way. Also market information related to the prices, availability and different types of fertilizers and pesticides at one single place like in the mobile devices will also provide the huge assistance to them in taking the right decision. With respect to this, various initiatives have been taken by the Government to disseminate the information to the farmers with respect to using fertilizers and pesticides through the digital portals and mobile devices like *eSagu, iKisan, Agrisnet.* All these schemes aims to provide the information to farmers through digital and fast medium by the experts which further allow the farmers to take the right decision.

1.4 Information related to the warehouses, transportation and market

After the successful harvest of the crop, the next tasks before the farmers are storing the outputs in appropriate warehouses and from warehouses transporting the produce to the market. In between there are various impediments like lack of awareness of the availability of the appropriate warehouses, transportation facilities and suitable markets for agricultural produce. Even if the farmers are able to grow the crops and harvest them successfully, still they have to face the storage problems, the problem of transporting the agricultural produce to the appropriate markets. ICT can coordinate all these three activities in one single thread by simply maintaining the data of all the warehouses spread across the country along with the prices, similarly it can maintain the data for all the transportation facilities available in the area and further it can maintain and provide data for all the agricultural markets near around the area and the prices prevailing in that market area. Schemes like *Digital Mandi, Mahindra Kisan Mitra* are some of the examples initiated by the state governments providing the information with respect to cold storage facilities, nearby agricultural markets and thus enabling the farmers to take the informed decision regarding their production.

1.5 Information of Government Schemes

As the government introduces various schemes and police related to the agricultural produce but sometimes they do not reach to the farmers who need them. Many farmers remain unaware of the schemes and policies running for their welfare. In a survey, it was found out that that 62% of the farmers interviewed, were not aware of the Minimum Support price (MSP).

Thus providing information related to all the agricultural schemes and policies running for the farmer's welfare can be provided and communicated to them effectively through platforms like mobile devices which will keep farmers of the country connected to various schemes and policies. In this regard, schemes like Agrisnet launched by the Ministry of Agriculture of India provides the relevant information to the related to the Government policies and schemes beneficial for the farmers.

2. ECONOMIC IMPACT OF INCREASED AGRICULTURAL PRODUCTIVITY

The increased agricultural productivity and surplus production will unlock the potential of the rural economy and will enhance the growth and development of the farmers and rural areas in the following ways:

2.1 Increase in income and revenue

Agricultural Productivity helps in determining the prices of the food. Increase and decrease in productivity lead to rise or fall in prices of agricultural products. In practice generally, the elasticity of demand for food stuffs is inelastic. One of the principal characteristics of demand for food stuff is that it is both price and income inelastic. People will not stop buying and consuming food if the price shoots up or income of the people increases. Each and every person irrespective of the income level will buy the food stuff to survive however the quantity they buy differs. Thus the demand for foodstuff is generally considered inelastic both in the long run and short run. Since increase in agricultural productivity raises the supply of agricultural outputs and the demand for agricultural produce is inelastic then increase in supply tends to lower the price of farm produce.

Due to this, the price of farm output falls with the slight increase in quantity sold and thus reduces the revenue of the farmers. It can be assumed that increase in agricultural productivity may not necessarily increase the revenue of farmers unless the decline in the prices is not substantiated by productivity gains. [2]

Increase in food productivity will not reap proper benefits and will not make farmers well off in terms of income if the gains in total factor productivity do not outweigh the fall in food prices. The productivity gains will come in terms of reduced cost of production by using technological advances and support. With the technological aid, the crop wastage and failure can be minimized. Further with the help of technological support, the farmers will be exposed to more numbers of agricultural markets, with easy availability of market information the middle men could be reduced to greater extent, further purchasing and using right quantity of the fertilizers and pesticides the cost can reduced to a larger extent. Also with correct and accurate weather information, production of crop can be performed in more efficient and cost saving manner. Thus with the help of technological advancement, the cost of production may decrease and therefore improve the productivity gains.

Furthermore along with productivity gains, the recent trend of market liberalizations have increased the tradability of agricultural goods and the increased output or surplus of farm products if utilized for export purpose may generate additional revenue or earnings of farmers. [3] Thus with technological support and consequently because of that, increase in productivity gains in terms of reduced cost of production, greater access to markets, increased tradability of food products in liberalized market and revenue generated from surplus production will definitely outweigh fall in income of farmers due to reduced price of farm output. Calculating overall gain of farmers from the total cost and total revenue perspective, we see that although income of the farmers' decreases with the increased productivity but this decrease is being compensated with enhanced productivity gains which can raise total revenue over total cost of production and therefore improve the welfare of farmers. An increased productivity has contributed an increase in the 27.5 % increase in the famers' income in the last seven years. [4]

2.2 Industrialization

The increased agricultural productivity due to the technological advancements will lead to a rightward shift of supply curve which in turn will create a domestic market for industrial products through intermediate and final demand linkages. Hans Singer, a very famous scholar described the strategy called Agricultural-demand-led-industrialization (ADLI), describing it as one of the most effective policy for nation building for those nations whose agricultural culture is the primary sector and developing industries have much more linkages with the agricultural outputs.

We can found a direct linkage of increased agricultural productivity and industrialization in the sense that much of the increased agricultural production will require the industrial processing and provide the basis of inputs, new resources or raw materials for the agro-based industries and food based industries. [5]

Hence in India also we can boost the economy by increasing agricultural productivity by reaping the benefits of technological advancements and reducing the cost of inputs and raising the agricultural productivity. The increased agricultural productivity will not only increase the earnings of the farmers but also the poor people who spent a large proportion of their income on food but now due to increased agricultural productivity and taking the benefits of economies of scale, the supply of agricultural commodities will lead to the reduced prices of agricultural products which will in turn will increase the net disposable income left after spending on food. This increased net disposable income will lead to increased demands for consumer goods which produced by the domestic industries.

2.3. Poverty Reduction

According to Irz and Roe model, the decrease the prices of the food products due to technological advancement in agriculture can lead to a substantial or huge rise in the savings of households and thereby provides a effective way to exit from poverty. Increased agricultural productivity had shown the positive results in reducing poverty from 55 % in 1973 to 26% in 1998. [6]

Benefits of increased agricultural productivity can have major impact on the urban poverty as the urban poor have to spend much wider proportion of their income on food consumption. Increased supply of food results in lower food prices hence the urban poor will be better off.

The rural poverty can also be reduced to a large extent. The farmers will be directly benefitted from increased farm production. This may lead to production of more food and nutrition for their own consumption requirements and simultaneously reaping the benefits of economies of scale by mass production with lower production cost and thus selling the outputs at a price higher than which they used to get earlier. Simultaneously the landless laborers and farmers will be better off due to increased agricultural employment opportunities and higher wages.

2.4. Nutritional Status

The increased in agricultural productivity will lead to the significant increase in the consumption of the food by poor households and thus enhance the nutritional status of the poor and will increase the productivity of the labors and workers. With increased productivity level, a health worker can contribute more in development of economy.

2.5. Employment

Higher incomes derived from increased agricultural productivity will increase the demand for industrial goods. The industries in order to maintain the supply of the products whose demand is increasing will require producing more. More production will require more labors to run factories and machines. Thus higher agricultural outputs stimulates demand for other industrial and consumer goods and at the same time increases the demand for labors in other sectors and industries. The higher agricultural productivity helps in creation of non-farm rural employment and urban employment opportunities with the help of forward and backward linkages manufacturing and service sector activities.

3. Role of in ICT in baking sector

Circulation and mobilization of money is the crucial requirement for development of an economy. In this regard Banking Institutions act as major structured, organized financial intermediaries that help in efficient flow of funds and helps in boosting the growth of economy. It act as intermediary between borrowers and savers and facilitates transfer of funds from surplus side to deficit side. [7]

In India, banking sector is stressing for financial inclusion so as to include large proportion of population in the financial system of the country. Thus here comes the role of Information Technology to act as stimulant and provides banking services to even the vulnerable and weaker sections of society, to the most remote places where the physical branch of banks cannot be established. With the help of Information Technology, the cost of banking services can be reduced and can make available access to banking services to the excluded sections of society in a more user friendly manner.

Some of the contributions of IT in baking sector are discussed below:

MICR (Magnetic ink character recognition) technology

MICR helped in overcoming the limitation of clearing of cheques within the banking transaction hours and helped and therefore enabled the customers to get credit quickly. MICR is based on technology in which machine readable codes are added at the bottom of cheque leaf which enables in branch wise sorting of cheques and ensures smooth delivery to the respective banks. [8]

Cheque Truncation System

It was launched by RBI in 2010 for faster clearing of cheques across the banks. It stops the flow of cheques issued by the drawer to drawee branch and instead an image of the cheque is sent to the drawee branch with important information like MICR code, date of presentation of cheques etc. This helps in physical transfer of cheques ad thus save time and cost and ensures smooth flow of transactions.

NEFT and RTGS

It is a nation-wide payment scheme launched by RBI in 2005 which facilitates one to one transfer of funds where individuals can transfer funds electronically from any bank branch to any other individual's bank branch in the country. NEFT supports the quick transfer of money with enhanced security thus saving time, cost as well as ensuring security. Similarly, RTGS simply stands for transfer of funds from one bank to another on a real time and on gross basis without any waiting period and without clubbing any other transaction.

Core Banking Solutions

CBS lead to the computerization of banking branches to automate the functioning of the highly trafficked bank branches. CBS is a system which brings all the networking of bank branches under a single platform and enables the customer to operate their accounts from any bank branch disregarding the fact that in which branch they have opened the account. It also helps in maintaining data and aids in mobile based internet service.

ATMs

They were introduced in India around 1990s and is considered as one of the most revolutionized aspect of virtual banking. It is the most convenient mode of depositing, withdrawing cash with the help of plastic card with magnetic strips issued by the bank. It is a substitutive of bank branch and is installed in various locations.

Internet Banking

This innovation enables the customers to do banking transactions through internet on bank's internet website. This is a most easy and convenient method of availing of banking services regardless of wherever you are. You can access banking services anytime and anywhere.

Mobile Banking

It has become popular with the growing popularity and use of smart phones in our daily life. Now these days, we can easily avail the banking services, we can easily transfer and receives funds without physically going to the bank branch. With more easy and user friendly features, more and more people who were financially excluded due to various reasons like lack of accessibility to the bank branches, higher transaction cost, complex paper work and procedure can also now participate in financial transaction.

4. Impact of efficient banking system and Financial Inclusion on economy

Sound financial system of the country with the help of IT will boost the growth of the Indian economy in the following manner:

4.1 Promotion of financial Inclusion

Financial inclusion may be determined in terms of penetration of banking sector with respect to credits, savings and deposits accounts, accessibility to financial services in relation to penetration and availability of ATMs and bank branches spread over geographical boundaries and the extent of usage of banking services by the general public. [9] With the help of Information and Communication technology, the penetration power of banking sector and related services and its accessibility to the wide section of society can be enhanced and achieved and such easy, affordable and accessible financial services helps in capital accumulation and transfer of capital and money from depositors to borrowers.

In this regard, technological advancements can help in financial inclusion of all those people who were earlier remain secluded to banking services and would facilitate the channel through which people to invest in financial activities, deposit the surplus money to the banks and this participation and deposition will channelized the money to the needy sectors such as enterprises and industries which will ultimately helps them to expand business and create more job opportunities and thus boost the growth of economy. Further India has witnessed 22.51 million active mobile banking users in 2012-13 which was only 2.5 million in 2009. This shows the positive relationship between the ICT and financial inclusion. [10]

4.2 Development of Enterprises

The financial inclusion will ultimately leads to capital formation and accumulation and thus provides funds and credits for investment in enterprises and productive activities. [11]

Accessibility to banking facilities and banking penetration is crucial for driving country's economic growth. The more people will open bank accounts, deposit money and avail financial services, the more it will be available for distribution and channelization to productive investments and the more it will help in building of enterprises. The lack of financial penetration may lead to funds or money being remain idle in the hands of the people, may lead to the lack of availability of funds and credit with the bank and with reduced supply of credit, the cost of borrowing becomes very high which restricts the enterprises especially micro enterprises and new enterprises to raise and borrow money from bank. Either they have to borrow at a very rate of interest or to remain contended with their own capital funds.

Financial inclusion has a significant impact on the growth of the small scale industries and new enterprises because for these small ventures to grow they need financial capital and one of the important source of raising financial capital is through banks. The more people will participate in financial and banking activities, the more it will raise the supply of credit and reduce the cost of borrowing.

4.3 Beneficiary to small and marginal farmers and rural people

Financial inclusion will make the lives of rural poor, small and marginal farmers easy and much better. [12] When an easy access to banking services is available to people living in rural areas at cheaper rates, then they are no longer required to depend on moneylenders who exploits them in terms of charging high interest rates and misuses their power to suppress weak and fragile farmers and poor rural people. It is generally observed that rural population is highly dependent on informal mode of availing of credit, loan and other financial services because of unavailability of banking services in remote areas, complex process of opening bank accounts and high paperwork for availing of credit and loan facilities discourages the farmers to avail financial services.

Thus in rural areas, accessibility is a significant factor and this accessibility to banking and financial services could be made available to rural section on easy, affordable and cheap terms with the help of establishment of ATMs where banking branches are difficult to establish and maintain.[13] Further mobile banking services can be used to penetrate wide section of rural population and thus help them to avail banking services more easily without involving any complex procedure and paperwork. Thus the best way to include the financially excluded rural population to the formal banking system is to take the aid of technological support and improvement and provide the banking services at lower cost to rural society.

Thus the financial inclusion of poor and marginal farmers will stop the vicious cycle of debt trap and would help in making farmers more prosperous. Similarly, the financial inclusion with the help of technology would encourage the savings and deposits in the bank and thus will ultimately help in pooling up of the funds which were earlier remain idle in the hands of financially excluded rural population.

4.4 Helps Government in implementation of social Security Schemes and Subsidies

The more people are actively participating in financial activities and availing banking services, the more easier it will be for the Government to implements its social security schemes like Old age pension, widow pension and likewise distribution of subsidies directly to the beneficiary’s account and thus avoiding the intermediaries in the distribution of subsidies and curbing the possible leakage in the distribution channel. Thus financial inclusion with the technological support the benefits in terms of monetary terms can be reached to the rightful deserving beneficiary and helps in funding the unfunded and deserving beneficiary by directly transferring funds to the beneficiary’s account without any wastage or leakage of funds.

4.5 Poverty Reduction

The sound financial system of the country gives opportunity for the easy access to savings, borrowings and also for investing the money. The easy and affordable saving and investment services will encourage people to save money and invest it in a right manner will be equivalent to the money working for you and increasing the income and living standards. The more section of population will be financially included, the more will be the availability of the money with the banks and hence it will reduce the cost of borrowing and will help the poor households, small entrepreneurs to easily borrow credit from the bank which will help them in expanding the business [14] and thus will also offer employment and earning opportunities to others.

CONCLUSION

The Information and Communication technology of today is capable of bringing a positive revolution and can impact the life of the people by making it more convenient and easy. In any sector, the role of information cannot be ignored. Every sector, every industry in the economy needs information for the development. With this backdrop, the effect of IT industry on agriculture and banking industry and its positive impact on the economy cannot be ignored.

Although agriculture being the important sector of the Indian economy but the issues of crop failure, lack of market information in relation to price, nearest agricultural markets and lack of farm productivity always revolve around the farm sector in India. The role and services of IT can provide the solutions for these crop failures and lack of access to market information.

ICT can help the agricultural sector by giving correct market information as to the price can be disseminated to the farmers so that they can know the real and actual prices prevailing in the market and therefore can sell the produce at much better price, by providing accurate weather information, giving them information related to the warehouses, transportation and agricultural markets, communication of government schemes to the farmers.

The positive effects of farm productivity can be seen on economy. Increased agricultural productivity helps the farmers to earn better income and revenue. Although income of the farmers decreases with the increased productivity but this decrease is being compensated with enhanced productivity gains which can raise total revenue over total cost of production and therefore improve the welfare of farmers. The productivity gains will come in terms of reduced cost of production by using technological advances and support further greater access to markets, increased tradability of food products in liberalized market and revenue generated from surplus production will definitely outweigh fall in income of farmers due to reduced price of farm output. The other positive impact will be on the industrialization where he increased agricultural productivity due to linkage effects will lead to industrialization by increasing the domestic demand for industrial goods produced by the domestic industries. The other positive effect on the economy will be reduction in urban and rural poverty as increased supply of food results in lower food prices hence the urban poor will be better off. The rural poverty can also be reduced to a large extent by reaping the benefits of economies of scale by mass production lowering the cost of production and thus selling the outputs at better prices. Simultaneously the landless laborers and farmers will be better off due to increased agricultural employment opportunities and higher wages.

The impact of ICT on banking sector also cannot be ignored. Circulation and mobilization of money is the crucial requirement for development of an economy in which bank act as major intermediary between borrowers and savers. For the success of banking and financial institution, it is necessary to include large chunk of population known as financial inclusion. Thus here comes the role of Information Technology to act as stimulant and provides banking services to even the vulnerable and weaker sections of society, to the most remote places where the physical branch of banks cannot be established. Information technology has greater population penetration power and has the ability to reach serve in remote areas at lower cost which is necessary requirement for financial inclusion.

The major innovations of ICT on banking sector can be observed in the introduction of MICR technology, Cheque Truncation system, NEFT, RTGS, Core banking solutions, ATMs, Internet banking, Mobile banking. All these innovations and contributions are helping the banking services to penetrate to large section of society and helps in providing the baking services at lower cost on easy terms.

The positive influence of ICT on the banking sector can be seen in the economy in terms of development of enterprise. The financial inclusion will ultimately leads to capital formation and accumulation and thus provides funds and credits for investment in enterprises and productive activities. It can benefit the small and marginal farmers as it will help them to become free. When an easy access to banking services is available to people living in rural areas at cheaper rates, then they are no longer required to depend on moneylenders. Similarly it will help in the effective implementation of government social security schemes and subsidies in the sense that the benefits in terms of monetary terms can be reached to the rightful deserving beneficiary The financial inclusion with the technological aid can help in reducing the poverty. The easy and affordable saving and investment services will encourage people to save money and invest it in a right manner which can be used for the unplanned expenses. It will also help the small entrepreneurs to easily borrow credit from the bank which will help them in expanding the business and thus will also offer employment and earning opportunities to others.

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