

Impact of Information & Communication Technology on agriculture with special reference to Farmers from Maharashtra

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Abstract--Agriculture is one of the far most important sectors of our country. This paper will discuss about how, the Information and communication technologies (ICTs) developments have taken place in Maharashtra's Farming with the significant growth over the past decade. It will look at the evidence on the Impact of emerging ICTs in the agricultural sector in Maharashtra with respect to farmers' access to information and other services that would help improve agricultural productivity, practices, and farmer livelihoods. This Information will help to give more clarity on impact of ICTs in agriculture not just to the organization, but to our people as well.

Keywords--Review State in Maharashtra; E-agriculture; NABARD-IMD project; ICT tools; Production Systems Management;

I. INTRODUCTION

Information and communication technologies (ICTs) are playing an important role in disseminating information to farmers in India. Several national and international initiatives especially by government and non-government organizations (NGOs) are helping in the creation of information products and systems for farmers with the aid of modern technologies. Some of them are e-Arik, e-choupal, Dhar-Gyandoot, PondicherrySwaminathan, CARDHyderabad, Warana-Maharashtra, iKisan, to name a few. These projects aim at giving access to information in local languages about crops and agricultural market prices, employment schemes of government, and educational opportunities [3].

What exactly are ICTs for? [9]. and can they really be useful and cost-effective for poor farmers with restricted access to capital, electricity, and infrastructure and their crop grains? [9] First, an ICT is any device, tool, or application that permits the exchange or collection of data through interaction or transmission. ICT is an umbrella term that includes anything ranging from radio to satellite imagery to mobile phones or electronic money transfers. Second, these ICTs and others have gained traction even in impoverished regions. The increases in their affordability, accessibility, and adaptability have resulted in their use even within rural homesteads relying on agriculture. [9].

New and small devices for farming which can be a sustainable and affordable for farmers (Such as multifunctional mobile phones and nanotechnology for food safety), infrastructure (such as mobile telecommunications networks and cloud computing facilities), and especially applications (for example, that transfer money or track an item moving through a global supply chain) have proliferated. Many of the questions asked by farmers (including questions on how to increase yields, access markets, and adapt to weather conditions) can now be answered faster, with greater ease, and increased accuracy. Many of the questions can also be answered with a dialogue—where farmers, experts, and government can select best solutions based on a diverse set of expertise and experience. The types of ICT-enabled services that are useful to improving the capacity and livelihoods of poor smallholders are growing quickly [9].

Here we discuss about the questionnaire, data analysis and results of the survey. The results were analyzed and converted into contents in the Impact of ICT in Maharashtra state agriculture status. The paper also talks about the design of the database contents to provide right and comprehensive information to these farmers and concludes with a note on the role of librarians and information professionals in disseminating the necessary information to these farmers.

Information and communication technology in agriculture (ICT in agriculture), also known as e-agriculture, is developing and applying innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. ICT in agriculture offers a wide range of solutions to some agricultural challenges. It is seen as an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. In this context, ICT is used as an umbrella term encompassing all information and communication technologies including devices, networks, mobiles, services and applications; these range from innovative Internet-era technologies and sensors to other pre-existing aids such as fixed telephones, televisions, radios and satellites. E-agriculture continues to evolve in scope as new ICT applications continue to be harnessed in the agriculture

sector. More specifically, e-agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. Provisions of standards, norms, methodologies, and tools as well as development of individual and institutional capacities, and policy support are all key components of e-agriculture [11].

II. AIMS AND OBJECTIVES

Study the awareness and extent of use of ICT for agriculture in Maharashtra.

1. To study the level of awareness about ICT in agriculture amongst Farmers.
2. To know the ground level implementation of any Government schemes for Farmers.
3. To find how the ICT tools & techniques help the farmer in agriculture, if any.

III. REVIEW OF LITERATURE

Study conducted by Shaik. N. Meera, Anita Jhamtani, and D.U.M. Raon Information and communication technology in Agricultural development, concludes that a organizations and departments concerned with agricultural development need to realize the potential of ICT for the speedy dissemination of information to farmers [2]. Dr. PDKV, conducted a study on Impact of ICT and mobile technology in agriculture in Maharashtra: a study of in rural Maharashtra, various successful e-governance initiatives, the improvement of ICT infrastructure and many ICT projects have empowered the rural people [4]. Study conducted by Mr. Nitin Bhagachand Bachhav, a survey on Information Needs of the Rural Farmers: A Study from Maharashtra, This study has provided a first look at the potential of information in affecting the agricultural sector as a whole. The study has reported there is growing awareness importance of information and its use among the farming community [6]. It has found by Surabhi Mittal and Gaurav Tripathi in the study of Role of Mobile Phone Technology in Improving: The study has reported many examples of the benefits created by the characteristics of mobility, customized content delivery and convenience of mobile phones [8]. Also Naomi J. Halewood and Priya Surya in their research work titled Mobilizing the Agricultural Value Chain: As information becomes more accessible through the use of mobile devices for stakeholders throughout the agriculture value chain, people are gradually moving toward more efficient ways of producing agricultural products, increasing incomes, and capturing more value by linking fragmented markets. Key benefits include increases in productivity and income for farmers and efficiency improvements in aggregating and transporting products [10]. Anvesha Banerjee conducted a study on the ICT in agriculture: bridging Bharat with India: As government is thinking and formulating the policy for the betterment of the agricultural

community with special focus on marginal and small farmers, ICT has to be the key for that. It should be embedded in the agricultural activities [12].

IV. METHODOLOGY

The research survey was conducted at the Vasai and Naigao, Mumbai, India which represents one of the important agricultural sector in Maharashtra to deliver food supplies to people from all walks of life.

The literature review does not support sufficient data to understand the use and awareness of Information Technology amongst agriculture in the Indian scenario. Hence, Quantitative approach was implemented to understand the same. Survey method was used to get data. Questionnaire and Face-to-face Interviews were conducted to get appropriate information from the respondents. The specific candidates are selected to do the survey on the allotted Area to collect the up to date status review of the Maharashtra farmers. The sample respondents comprised of local farmers, Laborers, Government schemes etc.

An initial consent was acquired from the dean to carry out the well-designed survey. A written communication was sent to various supporting teams so as to carry out the survey department wise. Before the start of the survey the respondents were made aware about the study and its relevance to them in their respective domains. A proper date and time was decided to conduct the survey so as to get the desired and relevant responses.

The sample size of respondents was calculated as 100. Stratified Random sampling method was implemented to select the required respondents. The respondents comprised of local Farmers, Laborers, agricultural market food crops distributor.

A well designed pretested questionnaire was administered amongst the respondents so as to gather knowledge, about awareness and use of ICT, amongst Farmers. The Questionnaire had majorly objective responses. Out of 100 samples only 77 respondents were able to submit information by answering the questionnaire. 23 respondents were unable to submit their responses due to various job responsibilities. The data submitted by the respondents was fed through affiliated file format so facilitate analysis work.

V. INFORMATION TECHNOLOGY IN MAHARASHTRA

A. Review State in Maharashtra

Maharashtra government has developed 37 public Information Technology (IT) parks. For getting private participation in creating world-class infrastructure for IT industry, 479 private IT parks have been approved, out of which 122 have started functioning with an investment of



2,712 crore, thereby creating employment of about 3.2 lakh. The remaining 357 IT parks with proposed investment of ₹ 11,994 crore have been given LoI and are expected to generate 16.0 lakh employment opportunities. The private IT parks are mainly concentrated in Greater Mumbai (176) followed by Pune (168), Thane (125) and Nagpur. During 2011-12, total 31 private IT parks were approved. The proportion of households in the State having TV was 56.8 per cent. The proportion of households having computer/laptop with and without internet was 5.8 per cent and 7.5 per cent respectively. Around 69.1 per cent households had telephone/mobile phone.

B. Energy for agriculture

Without reliable energy services, farmers and agribusinesses in developing countries are less able to increase food production and engage in value-added processing. New technologies, such as solar food dryers and solar water irrigation, allow farmers living off-grid to replace expensive diesel generators with cheaper and cleaner technologies. This segment of the energy access market is still in the early stages of development but much progress is being made in our work with companies that offer modern energy solutions to boost productivity and economic growth.



Future Pump has developed a low-cost solar-powered irrigation system able to mitigate the impact of low and unpredictable rainfalls among small-scale farmers in

Maharashtra. Their portable irrigation pumps can lift enough water to irrigate half an acre per hour, enabling farmers to grow greater and more consistent volumes of produce year round [14].

C. Maharashtra farmers to harvest tech benefits under Nabard-IMD project

PUNE, SEPT 1:

About 50,000 farmers in 10 districts of Maharashtra are expected to benefit from a pilot project which will disseminate weather-related inputs using Information and Communication Technology (ICT) to improve land productivity and boost crop output. It is being launched jointly by the National Bank for Agricultural and Rural Development (Nabard) and India Meteorological Department (IMD), and is to be financed under the Farmers' Technology Transfer Fund.

The project aims at creating awareness, increasing farmers' knowhow and capacity building for enhanced income through adoption of new technologies, reduction of costs, getting better price for produce and securing technical inputs for crop management, Nabard spokesman Subodh Abhyankar said. In addition to Pune, the other districts to be covered under the scheme, to be launched on September 3, include Ahmednagar, Washim, Bhandara, Amravati, Jalna, Gadchiroli, Sindhudurg and Hingoli.

"Nearly 50,000 farmers from 500 farmers' clubs promoted by Nabard will be provided weather-related information and crop advisories by way of free SMSes in the pilot initiative," he said.

The three-year plan envisages using ICT tools for providing need-based agro-meteorological advisory services to ryots in the context of local farming and culture, and ensure a two-way communication between agriculture experts and grassroots level communities, Abhyankar maintained. Under the project, which will mainly focus on ICT initiative for improving productivity of land and production of crop to augment income of farmers, the IMD's Agri-Met field units will provide weather and crop-related advisories right from sowing to harvesting operations with technical expertise [15]. Official apps launched by the Indian governments to the farmers

- 1) KisanSuvidha:-Kisan Suvidha mobile app has been developed to help farmers by providing relevant information on weather of current and next 5 days, dealers, market prices, agro advisories, plant protection, IPM Practices etc.
- 2) PusaKrishiP:-Pusa Krishi app help farmers know the various types of crops and information about those.
- 3) MKisanApplication:-The android app allows farmers and all other stakeholders to obtain advisories and information being sent by experts and government

officials at different levels through mkisan portal without registering on the portal.

4) ShetkariMasik Android App:-The app can be used to download ShetkariMasik magazine and can be read without internet connectivity. “ShetkariMasik” is one of the most popular monthly magazines in the Agriculture sector, under publication since 1965. It is published by Department of Agriculture, Maharashtra.

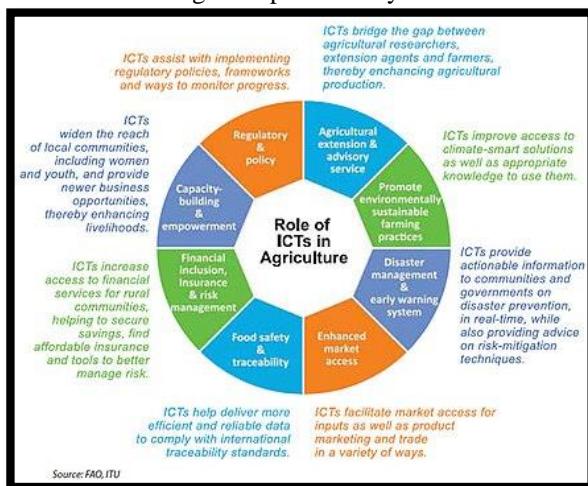
5) Farm-o-pediaApp:-The app is targeted for rural Gujarat and is useful for farmers and anyone involved in agriculture business. The app can be used to get suitable crops as per soil and season, crop wise information, check whether in your area and manage your cattle.

6) Crop Insurance Android App:-Crop insurance mobile app can be downloaded and used to calculate the Insurance Premium for notified crops based on area, coverage amount and loan amount in case of loaned farmer. The app can also be used to get details of normal sum insured, extended sum insured, premium details and subsidy information of any notified crop in any notified area.

7) AgriMarket:- AgriMarket mobile app can be used to get the market price of crops in the markets within 50 km of the device’s location capture by GPS. There is another option to get price of any market and any crop in case person does not want to use GPS location [16].

VI. ICTFORPRODUCTION SYSTEMS MANAGEMENT

Information services provide data that are tied to helping farmers improve their productivity, yields and profitability during the course of their normal business of growing agricultural produce. Information services are one of the most common ICT-related categories for inclusive agricultural value chains. They are broken down into sub-categories of information services that involve short-term and long-term productivity enhancements.



Short-term productivity: Typically, information such as weather updates is readily available at low or no cost (often subsidized by the local government). However, farmers do not have access to these data, or at least not timely access. Short-term productivity and crisis management information services attempt to fill this void, and are typically the easiest and most commonly offered by service providers

Crisis management: Crisis management information services essentially help prevent losses (rather than raising productivity). Often these services serve as an alert system enabling farmers to react quickly before an oncoming event (often weather- or disease-based).

Long-term productivity: Long-term productivity enhancements and risk management ICT services can have a more significant impact on customers’ livelihoods, through higher income or lower risk of loss. As with shorter-term services, long-term productivity and risk management services are often offered together and overlap. Long-term productivity information services cover topics that take longer to learn and are often offered with other technologies and channels.

Risk management: Risk management information services are also long-term in scope, but as with crisis management, they help farmers avoid losses rather than increasing productivity. These types of service differ from crisis management services in that they take a longer time to absorb and implement, and the benefits are realized much later than are those of crisis management [3].

VII. ICTFORMARKET ACCESS

Market access ICT services comprise any service that provides beneficiaries, especially farmers, with access to information on pricing of agricultural products (inputs and outputs) and on finding and connecting to suppliers, buyers or logistics providers, such as storage facilities and transport companies. Such services include simple pricing services, virtual trading floors (matching services or full commodity exchanges) and holistic trading services.

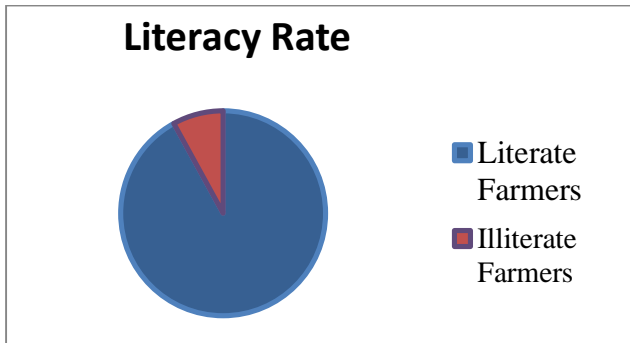
Pricing: The most common ICT intervention for the agricultural value chain is a pricing service in which commodity price information is pushed out to customers on a regular basis. These data are often national or regional in scope, and so may not be entirely relevant for the farmer in the field, depending on his/her proximity to markets. Users (mainly farmers) generally have little interaction with providers, and must digest the information to find and negotiate with buyers.

Holistic trading services: Holistic trading services essentially provide the same services as pricing information services and VTFs, with additional assistance beyond the simple transactions of purchasing and buying agricultural products. Such assistance can include weather information, technical information on agricultural practices, and long-term education.

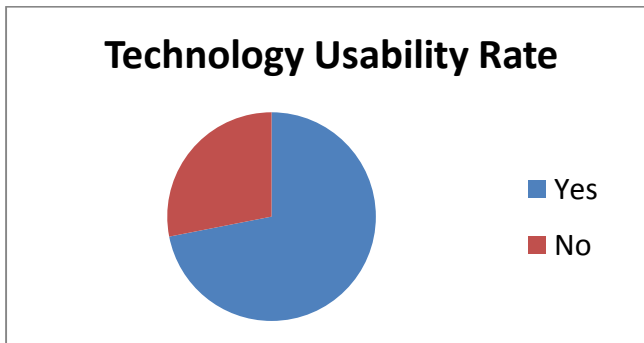
VIII. RESULT AND DISCUSSION

A study was conducted at Vasai & Naigaon. A view of 61 Farmers was taken, to conduct this study of ICT Impact amongst them through questionnaire. A total of 56 Farmers (91.80%) demonstrated that they are using ICT for Plotting the seed in the soil, to grow the crops, maintain records etc. while only 17 Farmers (28%) Not using ICT for their farming. It was also found that most of the farmers using ICT for plotting the seed in the soil(56%) and growing the crops (48%).

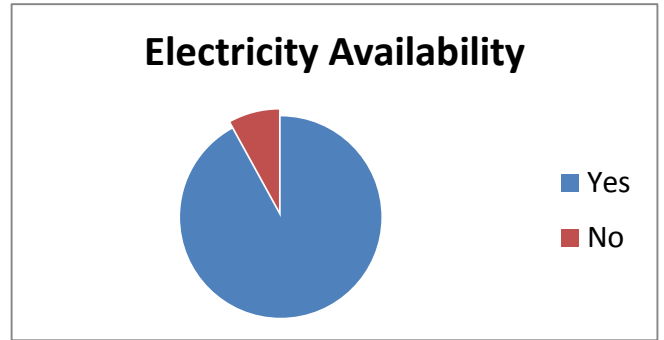
Are You Literate Or Illiterate?



It has been observed from the study that very few farmers are illiterate within the Maharashtra. The above graph shows the % wise of Literacy Rate in the agricultural farms. Do you anything about Technology and have you used it?

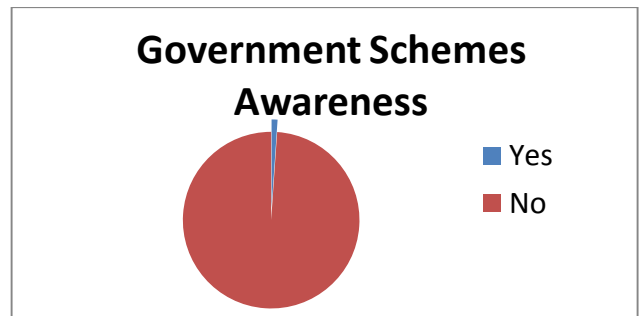


As the graph shows the rate of farmers have technology usability for their farming as per now a day's competitive age. A view of 56 farmers was also taken in order to see ICT awareness amongst them through questionnaire and it was found that 73% farmers know the use of ICT for the agricultural sector. Of which 32% farmers are using the same ICT tool & techniques for improving their productivity. Is Electricity Available in your Area?



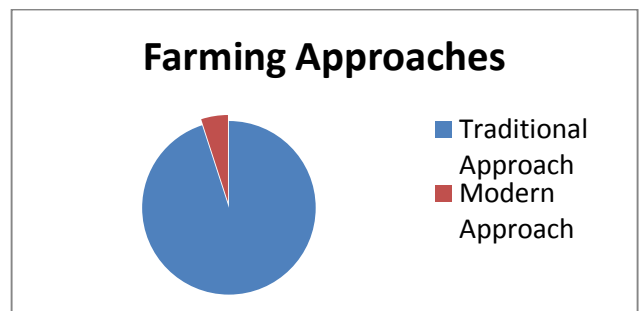
From the above chart we can show the availability of Electricity in the farm side areas. Where amongst farmers was also found low (22%) don't get an on time availability of electricity? On the other side most of the local farmers are using ICT for farming because of the availability of electricity (88%).

Are you aware of any Government schemes for Farmers?



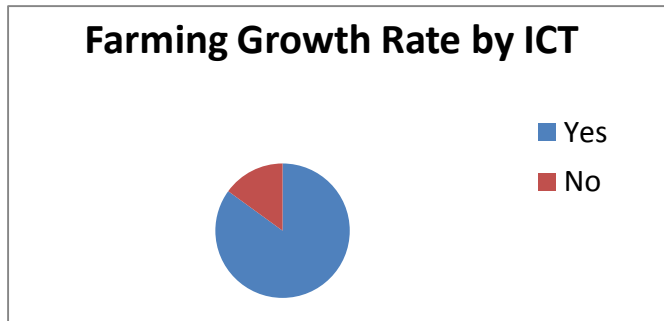
The study also states the Awareness of the Government schemes for improving the farming and for the other farm related works. The graph depicts that 8% of the farmers are aware and using the applications from the government which only 8% farmers. Most of the local farmers are doing their farming on their own.

What Approach do you follow for farming?



The use of farming approach by the farmers is also cover in this report where a total of 63% farmers review have been collected based on their land and their crops.

Even the modern era most of the framers are still using their traditional approach for the farming and the modern approach re still requires more awareness among the framers. Is ICT helping you to improve your farming?



This study shows due to the use of ICT amongst farmers for their agriculture is surly improved their productivity. Based on the current study, it is true that with help of ICT, the farmer's economical state is positively grow.

IX. CONCLUSION AND SUGGESTIONS

After doing research on all the aspect of the Maharashtra Agricultural sector for the farmers along with the survey, it is very much clear that Farmers are having growth after Implementing the ICT on their farming even greater than what they accepted, But the technological beneficial awareness in still not come to the farmers, however the government how tries to help the farmers by launching several schemes and digital sites but they are also unable to reach to the ground level. That is why the government has to take one step further to make the farmers aware about the government schemes based on agriculture in Maharashtra state.

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