

Digital Divide: A constraint of Accessibility or Engagement of Agricultural Information

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ABSTRACT

Information and Communication Technology (ICT) is used as an overarching term incorporating all modes of transmission like electronic devices, networks, mobiles, services and applications which helps to disseminate information with the help of technology. In the recent years, ICT has proved to be extremely beneficial for farmers including small land holders, marginalized and poor farmers. It has helped them in production, marketing, precision farming and improved profits. But because of digital illiteracy, farmers are unaware of different data of agriculture available for them, in spite of numerous efforts taken by Government. The prime focus is on improving the usability of knowledge shared through different digital media, then only it's possible to minimize of digital divide in rural areas will take place. The American Library Association (ALA) defines the digital divide as the differences due to geography, economic status, gender and physical ability in access to information through the Internet and other information technologies and services which includes Tele-density, mobile and Internet divide between the rural and urban areas. The concept of the digital divide basically focuses on three areas Infrastructure, capacity building and focus on resource usage. The lack of an adequate and need based information system for farmers attributed as one of the reasons for the information divide resulting small-scale farmers are deprived from accessing need based information (advisory or time tested). Unequal access to digital content and less knowledge about the latest technology, non-availability of relevant and localized content has led to the digital divide among rural people especially the farmers. The key issue in digital divide is not unequal access to digital devices but rather the unequal ways that digital devices are used. Digital inclusion of farming community is the need of the hour by providing universal telecommunication access in rural and remote areas as it enables the dissemination of requisite information based on farmers needs in user friendly form through ICT's which will be easy to access, local need based and cost-effective ways at the right time.

Key Words: Digital Divide, ICT, Digital illiteracy.

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INTRODUCTION

The agricultural sector is playing a significant role for socio-economic growth because most of the rural poor in developing countries depend on agriculture. India is an agrarian country with 68.84% of population is living in rural areas and agriculture is the primary source of livelihood for about 58 per cent of India's population. The Gross Value Added by agriculture, forestry and fishing is 17.4% in FY18 (Financial Year) (agricoop.nic.in 2018). But because of digital illiteracy, farmers are unaware of different data of agriculture available for them, in spite of numerous efforts taken by Government. The prime focus is on

improving the usability of knowledge shared through different digital media, then only it's possible to minimize of digital divide in rural areas will take place.

Information and Communication Technology (ICT) is used as an overarching term incorporating all modes of transmission like electronic devices, networks, mobiles, services and applications which helps to disseminate information with the help of technology. In the recent years, ICT has proved to be extremely beneficial for farmers including small land holders, marginalized and poor farmers. It has helped them in production, marketing, precision farming and improved profits. Online bank accounts can provide the income and spending data that farmers need to qualify for cheaper credit from banks. Digital land-registry records could make crop insurance available to more farmers. After harvest, farmers could use variants of online market places for agricultural produce to transact with a larger pool of potential buyers. One such platform, the government's electronic National Agriculture Market (e-NAM) is available in 585 locations in 16 states and shows potential to increase prices realised by farmers by 15 percent. But in addition to the exponential growth of industrial and service sector, lack of an adequate information system for farmers attributed as one of the reasons for the information divide resulting small-scale farmers are deprived from accessing information on current and local market prices or timely need based information (advisory or time tested) which can enable them to decide in harvesting the crops. Developing countries like India however, have been experiencing low agricultural productivity due to many factors, such as poor infrastructure, lack of markets, inadequate policies, adverse weather, lack of access to knowledge and information etc. To bridge the knowledge divide between small scale farmers and productive and competitive markets, public access ICTs interventions targeting rural poor can be effective in improving agricultural production and remunerative markets.

DIGITAL DIVIDE

The American Library Association's (ALA) defines the digital divide as the differences due to geography, economic status, gender and physical ability in access to information through the Internet and other information technologies and services. However, the term "digital divide" also refers to the disparities between societies and nations in unequal and disproportionate pace of development in societies in having access to digital infrastructure and services. It essentially means Tele-density, mobile and Internet divide between the rural and urban areas. The concept of the digital divide basically focuses on three areas: **Infrastructure, capacity building and focus on resource usage**. Term 'digital divide' essentially describes three distinctive divides: a geographical digital divide (between regions and countries), a social digital divide (between social classes) and an upgraded digital divide (between technology and humans). Four forms of digital divide are access to internet, use of different devices, extent of usage and engagement in different internet activities. These multiple differences in access, duration, content, relevance, meaning, and application are in turn associated with short- and long-term actual and perceived outcomes and consequences.

Access to digital information is defined as the opportunity of obtaining or retrieving information from different sources i.e. ICT tools like mobile, internet, television and radio etc.

In IT, the term "Engagement" refers to user interactions over an interface. It is commonly applied to social media, but engagement can be measured on any platform or website. Indicators of engagement include page views, time spent on a site, user tracking etc.

Engagement seeks to measure more than just the number of times that people have visited a website. It takes into account user actions. For example, one of the best illustrations of social media engagement is the use of the Facebook "like" button. By quickly pressing the "like" button, the user is indicating his or her preference for a particular item or post. This is a solid indicator of engagement.

Telecom network in India:

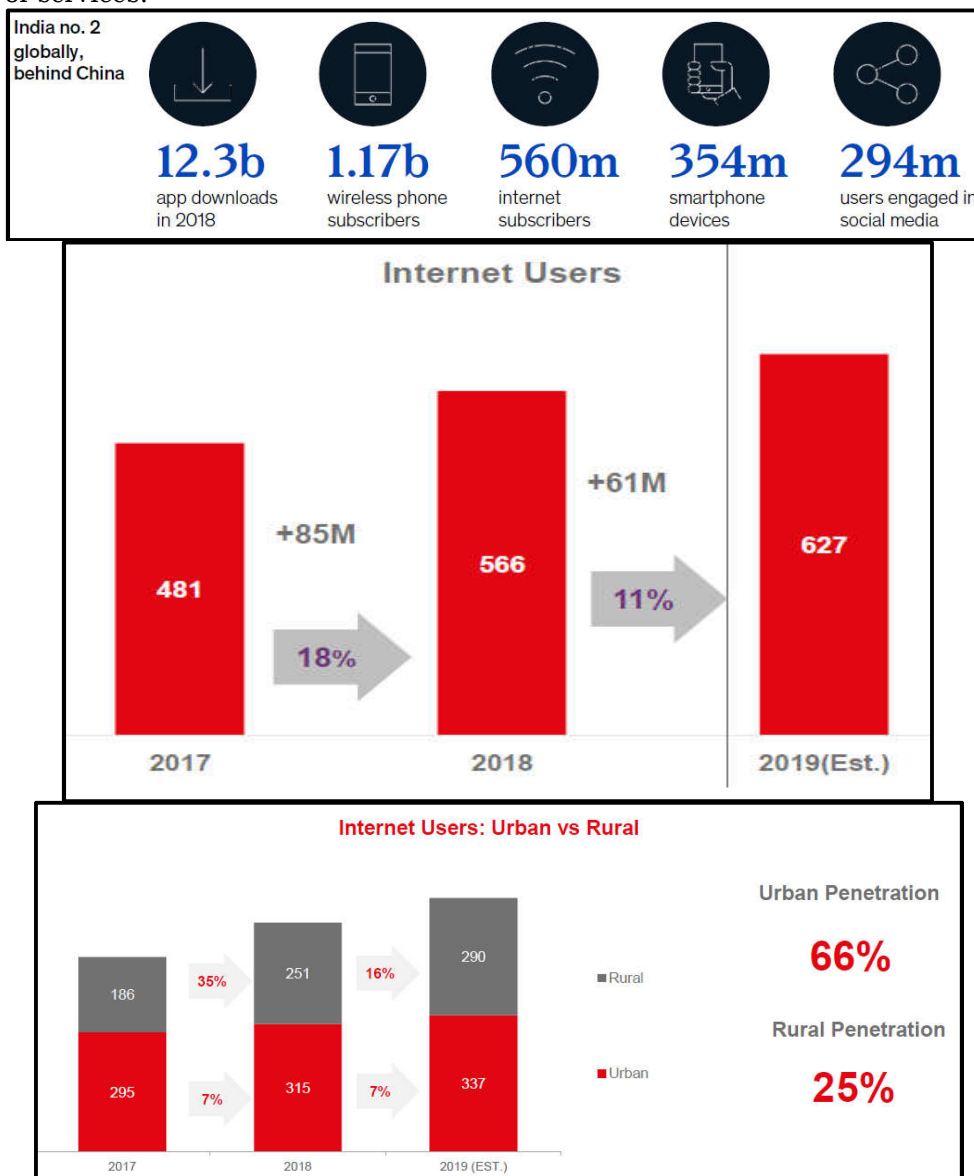
The Indian telecom sector is the second largest in the world in terms of the number of subscribers. The number of telephone subscribers in India increased from 1,197.87 million at the end of Dec-18 to 1,203.77 million at the end of Jan-19 with 560 million internet subscribers in 2018, second only to China. Indian mobile data users consume 8.3 gigabits (GB) of data each month on average, compared with 5.5 GB for mobile users in China and

somewhere in the range of 8.0 to 8.5 GB in South Korea, an advanced digital economy. The sector has witnessed exponential growth over the last few years which was due to many factors such as affordable tariffs, wider service availability, roll out of new facilities and services such as Mobile Number Portability (MNP), 3G and 4G, evolving consumption patterns of subscribers, and conducive regulatory environment.

The Government’s “Digital India” project launched on 1st July 2015 envisions empowering citizens with e-access to government services and livelihood related services, among others. The project has three core components, viz. digital infrastructure, digital services and digital literacy.

The project will benefit small farmers and it seeks to:

- [i] Transform rural India into a digitally-empowered knowledge economy
- [ii]. Provide universal phone connectivity and access to broadband in 250,000 villages
- [iii]. Extend timely services to farmers through information technology and its tools
- [iv]. Enhance efficiency in agricultural governance through digital literacy and electronic delivery of services.



Source:(Kantar IMRB, ICUBE 2018 December estimate, All India)

Information Need of farmers in Agriculture:The farmers need diverse information about

- Details of location-specific crop production technology.

- Authorized sources of timely availability of standard quality inputs [seeds, fertilizers, pesticides etc.
- Commodity prices, weather, measures to minimize impact of drought and climate change.
- Detailed procedure for availing bank credit, crop and livestock insurance cover, government subsidies, land records etc.
- Government’s programs providing subsidy and other facilities for prevention and control of pests and diseases, bio-gas, minimum support prices.
- Information about crop-specific reasonably priced standard quality production inputs [seeds, fertilizers, pesticides, etc.] and farm equipment and machinery along with sources of availability.
- Institutional services like Land records, farm credit, insurance, marketing, weather, farmer-producers’ organizations, market yards, procurement centers.
- Government facilities: Availability of subsidies, assistance available to mitigate effects of climate change, drought, floods, earthquake, cyclones.

Advantages of ICT in Agriculture:

- It will initiate new agricultural and rural business like e-commerce, rural business, and virtual corporation of small scale farms.
- It helps to improve farm management and farming technologies by economical farm management, risk management, effective data or data transfer etc., realizing competitive and property farming with safe product.
- Digital extension services can provide real-time advice to help farmers transition to new crops. Mobile phones, especially through the use of WhatsApp, make it possible for farmers to determine the price and time at which to sell their crops and possibly to enter into sales contracts.
- Improved productivity and profit of farmers through higher consultation.
- ICTs can provide quick access to relevant knowledge and information that may improve agricultural productivity.

Digital divide in agriculture:

Unequal access to digital content and different technologies has led to the digital divide among rural people. However, not everyone has access to this digital data or aware about how to use it. Especially the farmers are lacking behind in using the devices and the technology and the digital data available.

Sr. No	Name of Website/portal/apps	Features	Observation
1	Farmer.gov.in	<ul style="list-style-type: none"> • Farmer Portal provides solution to the farmers and stakeholders to disseminate the information regarding fertilizers, seeds, pesticides etc. 	<ul style="list-style-type: none"> • Navigation issue. • Map is limited to district level. • No disease diagnosis system. • No proper language support.
2	Mahagri.gov.in	<ul style="list-style-type: none"> • This is a web portal of Agriculture Department of Maharashtra State (India) is developed to provide information related to farming. 	<ul style="list-style-type: none"> • Limited to only two languages i.e, English and Marathi • Clumsy view of website • Navigation issues
3	Krishiworld	<ul style="list-style-type: none"> • It provides information about agriculture and agriculture products, crops, fertilizers, floriculture vegetables and fruits 	<ul style="list-style-type: none"> • More no. of ads • Bad UI • No diagnosis system • Registration issues
4	KisanSuvidha	<ul style="list-style-type: none"> • Latest information • Call to kisan credit card 	<ul style="list-style-type: none"> • Language issue • Frequent crashes are seen
5	Mkisan	<ul style="list-style-type: none"> • Latest information 	<ul style="list-style-type: none"> • App crashes

[1].

Factors contributing digital divide:

- Less knowledge about the latest technology.
- No availability of relevant and localized content.
- Available systems focus on only one problem.eg: disease diagnosis, weather report, soil report etc.
- Language issues.
- Navigation issues.
- Lots of digital information but farmers are not able to make use of it.
- Factors influencing digital divide vary from region to region the digital divide is depending and the differences in the usage of communication resources between countries and regions intensifying.
- It encompasses a variety of social issues and addresses the heart of the digital divide. The key issue in digital divide is not unequal access to digital devices but rather the unequal ways that digital devices are used. Most important issue that addresses the digital divide is the awareness.

Elements of Digital Divide:

1. **A gap in access to use ICT:** Measured by the number and spread of ICTs.
2. **A gap in the ability to use ICTs:** Measured by skill base and presence of resources.
3. **A gap in actual use:** Measured by the telecommunications for various purpose, the number and time of online users, the number of internet hosts and the level of e-commerce, e-business and e-governance.
4. **A gap in the impact of use:** measured by returns (Production and economic).
A level of satisfaction is the highest when farmers/ users find a web site is useful with meaningful information and usable. Usability of information in agriculture has an important role to play in order to engage more and more farmers with newer digital data and technologies.

There is a limiting factor in use with many of the applications in agricultural with respect to new technology called as “User acceptance”. Farmers tend to become very conservative generally while choosing the technology. So with a mindset of reducing risks they tend to choose traditional or any old methods or techniques. The farmer also needs to trust on the reliability of data and accuracy of the information available. (Sumanjeet,2010).

DIMENSIONS OF DIGITAL DIVIDE

The difference is not necessarily determined by the access to the Internet, but by access to ICT (Information and Communications Technologies) and to Media that the different segments of society can use. With regards to the Internet, the access is only one aspect, other factors such as the quality of connection and related services are to be considered.

Service availability	ICT services must be made available freely to individuals for comprehensive use of digital devices.
Awareness	Awareness about the digital devices, their extent of use and other significant features are necessary for farmers as far as use of ICT devices is concerned.
Opportunity to learn and use new media	Opportunity for becoming digitally literate is another most important dimension of digital divide.
Mastery of technologies	Individuals must have understanding of use of technologies and where to use them.
Experience	To fully exploit the capacity of the ICT devices, sufficient experience is required.
Skills	Right skills for the right job are essential to gain benefit from the technology.
Need	It is important to understand farmer’s information needs.
Linguistic	Language should not be hindrance in maximum utilization of the digital devices.
Gender	The other dimensions are adapted as required so that gender is not a barrier to equal enjoyment of the benefits of ICTs. Gender should not be hindrance in maximum utilization of digital devices

[Source: [2]]

Barriers of Digital Divide in Indian Scenario:

- **Low Literacy Rate:**As per 2011 Population Census, India has recorded a literacy rate of 74.0 percent with the rural areas reporting a literacy rate of 68.9 percent and the urban areas registering 85.0 percent literacy; resulting in an absolute difference of nearly 16 percentage points. Even though it seems that the literacy rate is going upwards but when it comes to urban and rural areas there is a difference in the literacy rate which in turn creates a hurdle for digital divide.
- **Age:** According to a study done by Singh (2016) persons aged 15 to 24 (45%) used the internet daily. Older respondents, especially in the 45 to 54 year old category (27%), used the internet once a month. It is clear that a digital divide exists between age groups because the youth are more exposed to technology and are willing to use it, whereas older people are resistant to change and avoid the use of technology.
- **Internet:** Internet is necessity of the present time. People using internet have more advantage in terms of comfort and convenience in the lifestyle than those who do not use internet.
- **Computer/digital literacy:** It is the ability of individuals to use computer and computer related technologies. Disparity in this ability leads to digital divide.
- **Physical access:** The main barriers are lack of telecommunication infrastructure with sufficient reliable bandwidth for Internet connections and the ability to purchase.
- **Attitudinal factors:** In many cultures which place high value on oral culture, personal communication and strong family and kinship networks, therefore the use of modern tools for communication purposes will not be of high priority.
- **Use of information:** Information is received quickly by those individuals who are more prone to digital devices. This can be very well visualized between rural-urban communities. Urban people use information more frequently than the rural one.
- **Working knowledge of English:** Language barrier is one of the important causes of the digital divide in India. Most of the online/digital applications prefer English language and in India there is flood of languages. Many places in India do not prefer English language. In fact they are not very used to English.
- **Economic inequality:** Economic inequality is the unequal distribution of income and opportunity between different groups in society. This inequality does not allow small holder farmers to buy digital devices frequently. Even education is also affected by economic conditions of a particular family.
- **Digital inequality:** The disparities in knowledge and ability of using digital and information technology among individuals with different demographics, socioeconomic backgrounds, and digital and information technology experience and competencies. In India, there is disparity of internet connection between rural and urban internet connectivity.
- **Lack of ICT skills and support:** People in many disadvantaged groups are often precluded from making use of ICTs because of low levels of computing and technology skills and also very importantly literacy skills. This is significant factor in preventing certain people from using the internet technologies.
- **Relevant content:** One of the reasons why farmers do not use internet technologies is because the content is not relevant and interesting to them.
- **Authenticity of Information:** The basic difference between online information and radio and television. All the information present on app or website is not necessary true and authentic.

Initiatives for Bridging the Digital Divide in Agriculture:

- **National E-Governance Plan-Agriculture (NeGP-A):**Ministry of Agriculture & Farmers' Welfare is implementing National e-Governance Plan– Agriculture (NeGP-A). Its aim is to achieve rapid development in India through use of Information & Communication Technology (ICT) for timely access to agriculture related information for the farmers. NeGP-A aims to bridge the gap in communication by using technology. It provides an integrated approach to the delivery of services to the farming community using ICT. Under NeGP-A, around 60 online services have been developed and launched to provide ease of access and timely information to farmers.

Under the National e-Governance Plan-Agriculture (NeGP-A), various modes of delivery of services have been envisaged like internet, touch screen kiosks, agri-clinics, private kiosks, mass media, Common Service Centres, Kisan Call Centres etc., However, mobile telephony (with or without internet) is the most potent and omnipresent tool of agricultural extension.

- **Farmers' portal (www.farmer.gov.in):** Farmers' Portal is a “*One stop shop for farmers*” where a farmer can get relevant information on range of topics including seeds, fertilizer, pesticides, credit, good practices, dealer network, availability of inputs etc.
- **Kisan Call Centre:** The Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Kisan Call Centers on January 21, 2004 across the country to deliver extension services to the farming community. The purpose of these call centers is to respond to issues raised by farmers, instantly, in the local language round the clock throughout the year.
- **i-Kisan:** A Nagarjuna Group initiative, I-kisan.com is a comprehensive Agri Portal addressing the Information, Knowledge and Business requirements of various players in the Agri arena viz., Farmers, Trade channel partners and Agri Input / Output companies.
- **E-Sagu IT Based Personalized Agro advisory system:** e-Sagu is a web-based personalized agro advisory system, which uses Information Technology (digital photo based) to help farmers adopt better/scientific management practices in agriculture. In eSagu, rather than visiting the crop in person, the agricultural expert delivers the expert advice at regular intervals (once in one or two weeks) to each farm by getting the crop status in the form of digital photographs and other information.
- **Bhoomi Project:** The Bhoomi Project of Karnataka state covers 6.7 million farmers and holds millions of records of land ownership. The project has earned the goodwill of many people and also international funding agencies. This project has reduced the delays involved in interacting with the bureaucratic hierarchy of the state revenue department. Bhoomi centres are located all over the state. Any land record can be reviewed through a touch screen at these kiosks; the project can also be used as a databank for various projects of public and private sector organizations.
- **Gyandoot Project:** Gyandoot is an intranet in Dhar district connecting rural cybercafes catering to the everyday needs of the masses. This web site of Gyandoot is an extension of Gyandoot intranet, for giving global access. It is the first ever project in India for a rural information network in the Dhar district of Madhya Pradesh. Every village has a computer centre or “soochnalayas” at prominent market places or major roads. People can easily log in and complain or request information on crops, forest fields, water resources, etc. of the district. The projects like Gyanadoot at Dhar (MP), Wired Village at Warna (Maharashtra), MSSwaminathan foundation's project at Veerampattinam (Pondichery), Collectorate of Thiruvavur (Tamil Nadu) reported in have demonstrated how these innovative projects executed by the committed agencies have facilitated in bridging the digital divide.
- **Digital India (DI) Initiatives:** There are various initiatives launched by Digital India project by Government of India in three areas viz. infrastructure, services and empowerment. The project has three core components, viz. digital infrastructure, digital services and digital literacy. The vision of Digital India programme is to transform India into a digitally empowered knowledge society and economy. The project will benefit small farmers. It seeks to:
 - [i] Transform rural India into a digitally-empowered knowledge economy
 - [ii] Provide universal phone connectivity and access to broadband in 250,000 villages
 - [iii] Extend timely services to farmers through information technology and its tools
 - [iv] Enhance efficiency in agricultural governance through digital literacy and electronic delivery of services.
- **Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA):**
- **Objective: To make at least one member of the eligible house digital literate.**

- It is a training program for the Indian citizens from 14 years for age to 60 years to make them capable of operating computer or digital access devices (like tablets, smart phones etc.). After completing the 20 hours in 10-30 days of duration, people will be able to send and receive e-mails, browse Internet, access Government services, search for information, undertake digital payment etc. This training programme aims to work especially for rural communities across states and union territories and make them digitally empowered.
- **Internet Saathi: Improving digital literacy among women:** The programme was launched in 2015 with the objective of improving digital literacy among women in rural India. Google India and Tata Trusts' initiative has benefited 17 million women in rural India, bringing with it economic freedom. The Internet Saathi programme, launched on a pilot basis in 5,000 villages in rural Rajasthan to address this digital divide.
- **Mobile Apps KisanSuvudha and PusaKrishi:** These two android based applications are launched for the benefit of farmers and all the stakeholders associated with agriculture. They can be downloaded from Google Play Store. mKisan is basically a SMS Portal developed to give need based knowledge or information to the farmers to address their concerns and queries. KisanSuvudha is also designed to give information to the farmers. KisanSuvudha deals with topics with necessary details on seeds, fertilizers, market value, weather forecasting, and plant protection practices and dealers information.
- **Plantix App developed by PEAT, Germany:** Plantix is a mobile app for plant disease diagnostics and monitoring. The App provides users worldwide with customized information concerning best practices, information on preventive measures and independent options for action. Plantix offers the possibility to send pictures of affected plants directly via smartphone and guides through an identification process to determine the plant disease in a very simple manner. All pictures sent via the Mobile App are tagged with coordinates, which enables real time monitoring of pest and diseases.
- **Shetkari Masik Android App:** It is one of the popular monthly magazines in the Agriculture sector, published since 1965 by the Department of Agriculture, Maharashtra. The Android app for Shetkari magazine has a very simple interface and requires mobile internet or Wi-Fi connectivity to register and download the issues. Once downloaded, the magazine can be read without internet connectivity.
- **The Electronic National Agriculture Market (eNAM):** It was launched in April 2016 to create a unified national market for agricultural commodities by networking existing APMCs. Up to May 2018, 9.87 million farmers, 109,725 traders were registered on the e-NAM platform. 585 mandis in India have been linked. Other applications like,
 - **APEDA Farmer Connect App**
 - **PashuPoshan: Developed by: National Dairy Development Board (NDDB)**
 - **Soil Health Card (SHC) Mobile App**
 - **Crop Cutting Experiments(CCE)-Agri Mobile App**
 - **Bhuvan Hailstorm App**
 - **Crop Insurance etc. are also developed by GOI.**

How the use of the ICT enables the farmers to confront the challenges they face in agricultural work: ICT is one of these solutions that have recently unleashed incredible potential to improve agriculture in developing countries. With the growing mobile, wireless, and Internet industries, ICT has found a position even in poor smallholder farms and in their activities. Acquiring knowledge from information and making decisions based on that knowledge is the most effective tool for the farmers.

The need of the farmers in regards to the use of ICTs:

ICT has many useful applications in agricultural extension. It can bring new information services to rural areas where farmers, as users, will have much greater control than before over current information channels. So the use of ICT is an important pillar of agriculture extension and in the current scenario of a rapidly changing world, it has been recognized as

an essential mechanism for delivering knowledge (information) and advice as an input for modern farming.

Way forward:

The government has to take some steps because the technology penetration and usage continues to evolve rapidly, while many have yet to reach rural farmers. Ensure low prices for broadband internet connection in rural areas.

Foster public-private partnerships to make market and business information accessible and for cost arrangement and ensure the availability of relevant information useful to farmers.

Effective utilization of ICT has potential to make the rural communities prosperous as it enables the dissemination of requisite information in user friendly form, easy to access, cost-effective ways at the right time.

CONCLUSION

Information and communication technologies (ICTs) are important resources for enabling poor farmers to make informed decision regarding their farming activities, especially in the rural areas. Effective public access ICTs (Television and rural radio) based on farmers needs and with farmers' rural and socio-economic constraints can bridge the knowledge and information divide and contribute to agricultural growth. Public libraries in villages having need based collection of information resources could be a healthy enterprise to spread agricultural and animal husbandry literacy. The milk co-operatives, telecommunication companies and veterinary university may enter into the partnership to provide developing the right or relevant content at the appropriate level has always been a challenge and more efforts are needed in this direction and it is not a one-time process, it needs a continuous approach. There is a need to explore the possibility of mandating district level organizations like KrishiVigyanKendras (KVKs) in developing locally relevant content. Government should introduce and promote the concept of smart villages in the policy making as well as ICT training to farmers, village information kiosk and village digital library to bridge this gap. Digital inclusion of farming community is the need of the hour by providing Universal telecommunication access in rural and remote areas.

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