Mobile Phone Based Cotton Extension – Evidences from e-Kapas Network

S. Usha Rani[1], S.M. Wasnik[2] and A.H. Prakash[3]

[1]Senior Scientist, Central Institute for Cotton Research, ICAR, Regional Station, Coimbatore, Tamil Nadu, India

[2]Principal Scientist, Central Institute for Cotton Research, ICAR, Nagpur, Maharashtra, India

[3]Project Coordinator and Head, Central Institute for Cotton Research, ICAR, Regional Station, Coimbatore, Tamil Nadu, India

Corresponding author: ushajoshua@rediffmail.com

Abstract

India is the first largest cultivator and second largest producer of cotton in the world. Even though it owns the laurels of being first in world acreage and second in production, it has been facing challenges with regard to increasing and sustaining its productivity for many years. Many technologies released from the cotton research system could not bring out a breakthrough in increasing the productivity. Among the various reasons cited for less productivity, lack of information about available yield enhancing cotton technologies is one among the major ones. The information and communication support for cotton crop in the country during last decades had mainly been conventional. The cotton technologies spread through extension personnel was mostly manual which could not reach majority of the cotton farmers spread across ten states of the country. The needs of cotton farmers in these states are much more diversified and knowledge required to address them is beyond the capacity of the grass root level extension functionaries. Hence, in order to speed up the diffusion of technologies from the research system to the end users, Central Institute for Cotton Research has been executing a novel extension mechanism called "e-Kapas network" for effective knowledge transfer. Disseminating cotton technologies through regular voice SMS alerts in local language to the cotton growers registered with e-Kapas network is the major mandate of this project. Under this project, in Tamil Nadu, 7406 farmers had registered with e-Kapas network from major cotton growing districts. So far 27864 voice SMS alerts have been sent to the registered growers. In order to know the effectiveness of the new extension mechanism, an evaluation was conducted among randomly selected 370 regular attendees of e-Kapas alerts in Tamil Nadu through personal and phone interviews. Majority of them acknowledged the receipt of timely, relevant,

new and actionable information about cotton cultivation. More than one third of them accredited that they had demonstrated the new technologies heard through the alerts. More than half of them agreed that there were changes in their crop management practices due to e-Kapas alerts. Majority of them believed that mobile phones significantly reduced their costs for accessing information on cotton technologies and provided them a chance to use the ICT based extension service. Cent per cent of them expressed their willingness to continue in the network and more than half of them demanded quality information on locality suited genotypes, availability of seeds, weather, price and market along with the production and protection technologies. Majority of them stressed upon the need for location and season specific information alerts. More than half of them demanded for a call back system to clarify their doubts then and there. Less than one third of them suggested reducing the duration of the call from 60 seconds to 30 seconds. For sustaining the service, majority of them suggested to charge a nominal registration fee to the e-Kapas network farmers in near future. Invalid numbers, ring timeout, DND registration and congestion were the major constraints experienced in receiving e-Kapas alerts.

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Introduction

India has been the ancient home for cotton and cotton textiles since time immemorial. In ancient days, cotton played an important role in the history of India, and continues to be an important crop and commodity of the country. Even though India owns the laurels of being first in world cotton acreage and second in production, it has been facing challenges with regard to increasing and sustaining the crop's productivity for many years. Many technologies released from the cotton research system could not bring out a breakthrough in increasing the productivity. Among the various reasons cited for less productivity, lack of information about available yield enhancing cotton technologies is one among the major ones. In general, supply of information to the cotton farmers is the responsibility of cotton extension system of the country. The information and communication support for this crop during last 57 years has mainly been conventional. The cotton technologies spread through extension personnel of the state department of agriculture was mostly manual. This approach has not been able to reach majority of the cotton farmers who are spread across the whole country. This gap remains a challenge for the cotton extension system even today. Hence, in order to speed up the diffusion of technologies from the research system to the end users and to identify the farmers' need to formulate demand driven research developing a novel extension mechanism for effective knowledge transfer and researchable feed back in cotton is inevitable. Today it is possible to find a solution to this situation by using the potential of Information and Communication Technologies (ICT) to meet the location specific information needs of the farmers. The increasing penetration of mobile networks and handsets in India, therefore, presents an opportunity to overcome information asymmetry and to make useful information more widely and swiftly available to all cotton growers. Hence using the modern advancements in ICT and mobile phone technology, the Central Institute for Cotton Research (CICR) functioning under the Indian Council of Agricultural Research (ICAR) has been executing a novel extension mechanism called "e-Kapas network" for effective knowledge transfer among Indian cotton growers in the current plan period. This paper deals the history of Indian cotton, its scenario since independence, country's cotton extension programs and changes in them due to the

development of ICT, current approach of using mobile phones and the success of this mobile phone based cotton extension with empirical evidences.

History of Indian Cotton

In ancient days, cotton played an important role in the history of the British Empire, the United States, and India, and continues to be an important crop and commodity in India. The Indus Valley Civilization spun cotton since at least 3000 BCE, as indicated by the ruins of Mohenjo-Daro (Lisa, 1993) and cotton was mentioned in Hindu hymns in 1500 BCE (Julian, 1994). Herodotus an ancient Greek historian mentions Indian cotton in the 5th century BCE as "a wool exceeding in beauty and goodness that of sheep." When Alexander the Great invaded India his troops started wearing cotton clothes that were more comfortable than their previous woolen ones (Rudi, 1999). Strabo another Greek historian, mentioned the vividness of Indian fabrics, and Arian told of Indian–Arab trade of cotton fabrics in 130 CE (Brain, 2009). History says that Christopher Columbus in his explorations of the Bahamas and Cuba, found natives wearing cotton ("the costliest and handsomest... cotton mantles and sleeveless shirts embroidered and painted in different designs and colors"), a fact that may have contributed to his incorrect belief that he had landed on the coast of India (Stephen, 2005).

Scenario of Indian Cotton since Independence

India is the first largest cultivator and second largest producer of cotton in the world. It had 5.88 M ha area under cotton in 1950-51 and now has more than 11.5 M ha area under this crop. The production increased from a meager 3.04 M bales (170 kg lint/bale) in 1950-51 to a record production of 37.5 M bales during 2012-13. It occupies the first place in worldwide by occupying 35.29 per cent of the world cotton area and second place by contributing 24 per cent of the world cotton production (AICCIP, 2013). Even though it owns the laurels of being first in world acreage and second in production, it has been facing challenges with regard to increasing and sustaining its productivity for many years. Many technologies released from the cotton research system could not bring out a breakthrough in increasing the productivity. Among the various reasons cited for less productivity, lack of information about available yield enhancing cotton technologies is one among the major ones.

Cotton Extension Programs in India

In general, supply of information to the farmers belongs to the agricultural extension system of the country. There is a criticism about the practicing of agricultural extension in the current context of globalisation and changing paradigm. The technology transfer was often looked into with a narrower perspective, perhaps only into the prism of adoption despite the scope and claim of broad spectrum of sensitizing the society, identifying the researchable

problems and commercialising the research output from the research institutions. Indian cotton extension was not an exception for that and it also was criticized that the results of cotton research did not reach the farmers in time and similarly the requirements of the cotton stakeholders to formulate demand driven research were less identified. The Indian Council of Agricultural Research has always underlined the importance of Scientist- Farmer linkage for the effective transfer of latest agricultural technologies. Towards this goal, several programmes viz., Lab to Land Programme, Operational Research Project (ORP), Front Line Demonstrations (FLD), Integrated Pest Management (IPM), Integrated Resistance Management (IRM), Institute Village Linkage Programme (IVLP), Intensive Cotton Development Programme (ICDP), Farmers Field Schools (FFS) etc., have been launched and are being implemented for cotton extension by Central Institute for Cotton Research.

Analysis on all these cotton extension programs revealed that they were effective in some aspects viz., in increasing the yields, sharing the knowledge but handicapped due to lack of professional execution and non-availability of latest technological dissemination tools for ready transfer. Many of them excluded the novel extension innovations viz., cyber extension, market led extension, farmer-led extension and environmental extension for a wider reach. Technology forecasting is another major area where our cotton extension programs attempted very less initiatives. Market intelligence surveys for commercializing our technologies and institutional arrangements for freeing indebtedness had never found a significant place in those programs. Media utilization and efforts to organize the cotton growers were the other areas where our cotton extension programs created a meager impact. Also the major cotton Transfer of Technology (TOT) efforts tried so far to disseminate the innovations and bridge up the gap viz., Front Line Demonstrations, Farmers Field Schools etc., were basically developed for other crops in other countries and later replicated in cotton. Also, the Indian cotton sector is facing serious challenges posed by the changes viz., changing technology “Bt cotton”, changing demands of the textile industries and non woven sectors and changing scenario of retaining the top position in acreage and second position in production at world level. All these changes could not impact much on our productivity which is a major setback (Usharani *et al.*, 2011).

Information support for Indian cotton growers

The information and communication support for this crop during last 57 years has mainly been conventional. The cotton technologies spread through extension personnel of the Department of Agriculture was mostly manual. This approach has not been able to reach majority of the cotton farmers who are spread across the whole country. This gap remains a challenge for the cotton extension system even today. To reach over 1.2 million hectare farms,

spread over ten states is an uphill task. The diversity of agro-ecological situations in all these ten states adds to this challenge further. The needs of cotton farmers in these states are much more diversified and the knowledge required to address them is beyond the capacity of the grass root level extension functionaries. Hence, in order to speed up the diffusion of technologies from the research system to the end users and to identify the farmers' need to formulate demand driven research developing a novel extension mechanism for effective knowledge transfer and researchable feed back in cotton is inevitable. Today it is possible to find a solution to this situation by using the potential of ICT to meet the location specific information needs of the farmers. The increasing penetration of mobile networks and handsets in India, therefore, presents an opportunity to overcome information asymmetry and to make useful information more widely and swiftly available to all cotton growers.

Changes and Challenges in Indian Agricultural Extension System due to ICT

The recent advances in ICT have changed the way knowledge is produced, processed, stored, retrieved and disseminated to different stakeholders in agriculture (Ansari et al., 2013). The country has the huge potential of harnessing ICT for agricultural development. e-Mails, Expert Systems – Information system, Decision Support System and Crop Doctor, Video Conferencing, Interactive multimedia, Web search tools, Social media, Pedia, Video and Data base are the major ICT tools used for disseminating the agricultural information in the country. The ICT initiatives in Indian agricultural extension system were Web portals – Knowledge Repositories based online advisory and market services, Village Knowledge Centres (VKCs) & Village Resource Centres (VRCs), Mobile based advisory services and Hybrid initiatives. Despite the huge potential of harnessing ICT for agricultural development, only a few isolated projects have been initiated in India due to various grass root level challenges. Many villages in India lack facilities for communication backbone. Educating and catering to the information needs of farmers in the villages in India would require immense financial investment. Insufficient power availability in some rural areas, poor ICT infrastructure, ICT illiteracy, non availability of timely advisory, relevant content, non-integration of services, poor advisory services and lack of localization were the major challenges faced in implementing ICT based advisories.

Mobile phone – An advantageous ICT tool for TOT in India

Among the various ICT tools, majority of the Indian farmers own mobile phones. The availability and accessibility of mobile phones among the farmers was higher than any other ICT tools. India's telecommunication network is the second largest in the world based on the total

number of telephone users (both fixed and mobile phone) (Economic times, 2012). It has one of the lowest call tariffs in the world enabled by the mega telephone networks. The mobile subscriber base has grown by a factor of over a hundred and thirty, from 5 million subscribers in 2001 to over 929 million subscribers as of May 2012 (Subscriber Statistics, 2012). Mobile phones have the advantages of having many additional services in addition to the standard voice function such as SMS for text messaging, email, packet switching for access to the Internet, gaming, Bluetooth, infrared, camera with video recorder and MMS for sending and receiving photos and video. The advent, acceptance and proliferation of mobile phones have democratized opportunities and avenues for millions of farmers in the country. The farmers in the rural areas are now interconnected to other areas due to cellular communication technologies. The voice SMS option in the mobile phones facilitates the illiterate farmers to get the information without any difficulties.

e-Kapas Network - Mobile phone Based Cotton Extension Model

Viewing the modern advancements in ICT and advantages in mobile phone technology, the Central Institute for Cotton Research functioning under the Indian Council of Agricultural Research has been executing a novel extension mechanism called “e-Kapas network” for effective knowledge transfer among Indian cotton growers in the current plan period. “e” meant for electronic and “Kapas” in Hindi (one of the major Indian languages) means cotton. ‘e - Kapas’ essentially refers to the utilization of electronic devices - mobile phones for delivering cotton technologies to farmers, extension workers and other development workers engaged in cotton sector. The project is functioning under Technology Mission on Cotton-Mini Mission I, a novel approach of the Government of India, to increase the productivity of cotton in the country. The project has been functioning in 17 centres across the ten cotton growing states of the country under the leadership of Central Institute for Cotton Research, Nagpur. Farmers interested in e-Kapas network register with their local state centres by registering their mobile numbers. Centres send regular Voice SMS about cotton genotypes, production and protection technologies in their local languages to the registered growers.

By connecting the cotton growers nationally through e-Kapas network, timely and relevant information with regard to cotton technology is disseminated in swift manner. Warning and alert services are issued to the registered cotton growers for taking proactive measures. It is the ‘anywhere and anytime’ availability of cotton technologies and services to users. The project also helps in intensive pest monitoring, overcoming pest epidemic situation through awareness and quick advisory provided direct to farmers in vernacular languages (Wasnik et al, 2013)

e- Kapas Network at Tamil Nadu – Case study

As a cooperating centre for e-Kapas network in Tamil Nadu state, the Central Institute for Cotton Research, Regional Station, Coimbatore has been actively participating in the project. At the initial stage, the centre identified the cotton growers in the state and registered them as beneficiaries in e-Kapas network, Tamil Nadu. The centre also collected the data of cotton growers and developed a data base of e-Kapas network beneficiaries with some essential details about the farmers using one page questionnaire. Simultaneously the centre collected and documented the Frequently Asked Questions (FAQs)in Cotton from nearby Kissan Call Centres and also by conducting Focus Group Discussions among cotton growers at regional level. The collected questions were documented with answers as bulletin entitled "FAQs in Cotton" in local language (Tamil). A "Kapas Panchang (Cotton Calendar)" was developed for each cotton growing district in Tamil Nadu for sending the voice SMS at the proper time of field operations. Keeping the FAQs and Kapas Panchang as basis, content was developed for 30 voice SMS of 60 seconds each for the entire cotton season. The content was recorded in Tamil Language and pushed to all registered growers at regular interval. During the year 2013-14, a total of 7406 farmers had registered with e-Kapas network from major cotton growing districts of Tamil Nadu. Until March 2014, a total of 27864 voice SMS alerts on cotton production technologies have been sent to them.

Empirical Analysis of the Effectiveness of e-Kapas network

In order to know the effectiveness of the new extension mechanism, an evaluation was conducted among randomly selected 370 regular attendees of e-Kapas alerts in Tamil Nadu through personal and phone interviews. Majority of them (94.59 %) acknowledged the receipt of timely, relevant, new and actionable information about cotton cultivation. More than one third of them (34.86 %) accredited that they had demonstrated the new technologies heard through the alerts. More than half of them (54.32 %) agreed that there were changes in their crop management practices due to e-Kapas alerts. Majority of them (77.29 %) believed that mobile phones significantly reduced their costs for accessing information on cotton technologies and provided them a chance to use the ICT based extension service. Cent per cent of them expressed their willingness to continue in the network and more than half of them (55.94 %) demanded quality information on locality suited genotypes, availability of seeds, weather, price and market along with the production and protection technologies. Majority of them (87.56 %) stressed upon the need for location and season specific information alerts. More than half of them (58.10 %) demanded for a call back system to clarify their doubts then and there. Less than one third of them (28.91 %) suggested reducing the duration of the call from 60 seconds to

30 seconds. For sustaining the service, majority of them (84.32 %) suggested to charge a nominal registration fee to the e-Kapas network farmers in near future.

Challenges in Implementation

The major challenge faced in sending voice SMS was the DND (Do Not Disturb) registration done by majority of the farmers with their mobile service providers. Few of them have given invalid numbers unknowingly. At many occasions, "ring timeout & congestion" were the major constraints experienced in sending e-Kapas alerts to the registered cotton farmers. Moreover, some farmers were hesitant in adopting the technologies that they hear through mobile phone based advisories. Creating awareness about the service among farmers was also seemed to be a challenge.

Future Prospects

Creating awareness about e-Kapas network among all cotton growers in the country and sending advisory to one lakh cotton growers in ten states of the country will be done in the near future years. To change the attitude of farmers towards the fidelity of mobile phone advisory and to win the confidence of the cotton growers, efforts will be taken earnestly. Along with dissemination of technologies, efforts will also be taken to document the cotton related information using ICT tools for future retrieval.

Conclusion

The technologies released from the cotton research system should reach the farmers in time to bring out a breakthrough in the productivity of Indian cotton. The advent, acceptance and proliferation of mobile phones among millions of Indian farmers paved a way for dissemination of yield enhancing cotton technologies to the end users under the umbrella of e-Kapas network in India. The relevant, understandable and need based information in local languages and reach in time facilitated the cotton growers to take timely crop management decisions. For further reaching the unreached through mobile phone based cotton extension, awareness must be created among all levels of Indian cotton growers. Replicating the success of this novel mobile phone based cotton extension model in other crops of the country and in other cotton growing countries of the world will pave way for profitable and sustainable cotton farming in the coming years.

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