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M-Apps in E-Agriculture: An Introduction

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Information and Communications Technology (ICT) is a term commonly used in agriculture, according to Wikipedia, for Information Technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage and audiovisual systems, that enable users to access, store, transmit and manipulate information. ICT in India has evolved over the years.

During the period of the Green Revolution, farmers were advised on latest crop and livestock improvement, production and protection practises using

traditional methods such as the radio, television, input dealers, farmer to farmer and farm fairs. Extension agencies have played an important role in facilitating the adoption of new technologies.

Krishi Darshan was in fact, the first national program televised on agriculture on Doordarshan, six decades ago. Some of these approaches, although effective, have the disadvantage of being a one-way communication. However, technology dissemination using these methods is still popular.

Evolution of ICTS

Modern ICTs that evolved over the years can be categorised as tele-centre based (eg. Kisan call centres, Gol 2004, BSNL Helpline) internet based (eg. Village knowledge centre, 1998, ITC e-Choupal, 1999, e-Sagu, 2004), video based (eg Digital green, 2009) mobile SMS based (eg. Reuter's market light, 2007, Warna rewired, Microsoft 2007, KVKs NAIP, 2009,



GUEST COLUMN

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CAI wishes all its Readers A Very Happy New Year 2020

Kisan Sanchar, 2010), mobile based applications (Fisher friend, MSSRF, 2008, Nokia Life tools, 2009, Tata M Krishi, 2009) and mobile voice message-based applications (eg. IFFCO Kisan Sanchar Ltd. 2007).

Agropedia is a Wiki-type of website developed by seven consortium partners (ICRISAT, IIT Kanpur, IIT Bombay, GBPUAT Pantnagar, UAS Dharwad, IIITM Kerala and NAARM Hyderabad) that also offers a crop-specific library, blog and chat. aAqua is a discussion portal that runs on internet and is an initiative of IIT that first started in cyber cafes in 2003 using Hindi, English and Marathi. Although access to software was free and the investment was low its user base was very narrow. IFFCO Kisan Sanchar Limited (IKSL): Airtel partnered with IFFCO (Indian Farmer Fertilizer Cooperative Ltd) to form the joint venture IKSL in 2007. This company provided information on market prices, farming techniques (including dairy and animal husbandry), weather forecasts, rural health initiatives and fertilizer availability, etc. The project also ran a 24-hour helpline to answer farmers' queries.

Two similar initiatives were launched in India. BSNL and National Fertilizers Ltd (NFL) piloted a project offering crop information services, weather forecasts, soil testing and health information in local languages. Reliance formed a joint venture with Krishak Bharti to retail customised telecom products and farmer-specific, value-added services in rural India.

Some of the agri apps available in India.



In short, agriculture universities and state governments have applications developed for e-agriculture. Now, these methods of communication have advanced further.

Mobile Applications

Sale of smart phones was predicted to surpass the total global population (ITU 2013). Smart phones have tremendous implications on many spheres of life including agriculture. Tele-density is rapidly increasing as younger farmers use smart phones and tablets for farming decisions. This development has huge ramifications for the outreach of mobile applications particularly in the developing nations. Recent mobile applications are fairly easy to use and understand and in agricultural extension can be clustered into two broad categories viz M-learning and M-farming.

'M-learning' provides the knowhow of farming techniques, enables the subscriber to a service, enables the user to send queries to a database and exchanges experiences among farmers. 'M-farming' on the other hand, supports individual decision support systems and enables the end user to know about specific microclimate patterns, soil conditions, etc. and requires remote sensing equipment and GIS and advise systems such as remote diagnosis by experts.

By and large mobile phone intervention in agriculture helps in hastening the delivery of large volumes of data that has significantly



increased awareness of new practises and the outreach is unbiased as it does not discriminate against farmers of disadvantaged or lower educational backgrounds.

While this is the general presumption, a recent study points out that digital technology dissemination may favour the rich, the men, the younger and the more educated, who have the resources to access the information being provided.

The more recent modes of communication also have limitations. For example, Text short Mail Messages need to be converted into the local languages, need to be concise and farmers require a certain level of literacy to read them. Voice mail messages are costly to deliver and the efficiency of receiving messages at the pre-defined time is poor. Internet costs should also be kept low and growers should have internet connectivity even in remote areas, for the recent modes of communications to be economical and effective. A very recent scientific paper reveals that mobile technologies enhanced adoption of recommended agricultural inputs by 22% and yields by 4% in Africa and India which is very encouraging.

The Ministry of Agriculture and Farmers Welfare, Government of India, hosts a link to some of the available public sector mobile applications. These apps are accessed by the simplest of mobile phones and are free of intellectual property rights and are downloaded

free of cost. Categorized as apps for agriculture, horticulture, and animal husbandry, these include Kisan Suvidhaa, Pusa Krishi, M Kisan application, Shetkari Masik, Farm-O-Pedia, Bhuvan, Crop Insurance and Agrimarket.

Kisan Suvidha provides 5 day weather data and warns against impending extreme weather along with crop wise advisories while Pusa Krishi, promotes agri-buisness ventures for individual farmers or corporate and links researchers to end users. M Kisan application facilitates all stakeholders to access advisories and information sent by experts. Shetkari Masik is an e-version of a popular monthly magazine. Farm-O-Pedia enables the farmer to get advice of the kind of crop to be grown given the soil type and season while Bhuvan enables to assess crop losses due to hail and Agrimarket provides market price of a given commodity within a range of 50 km.

Some ICT Initiatives in Cotton

E- Kapas is a voice-based messaging system initiated by ICAR-Central Institute for Cotton Research, Nagpur, that advises registered cotton farmers on impending management steps that need to be taken. CICR cotton app, currently available in Hindi and English, advises on the A to Z of cotton production on a daily and weekly basis for the benefit of farmers, researchers extension officials and students. Kapus a mobile application, in Marathi, for cotton stakeholders to facilitate production, was developed by the VNMKV. Parbhani. Plantix was launched



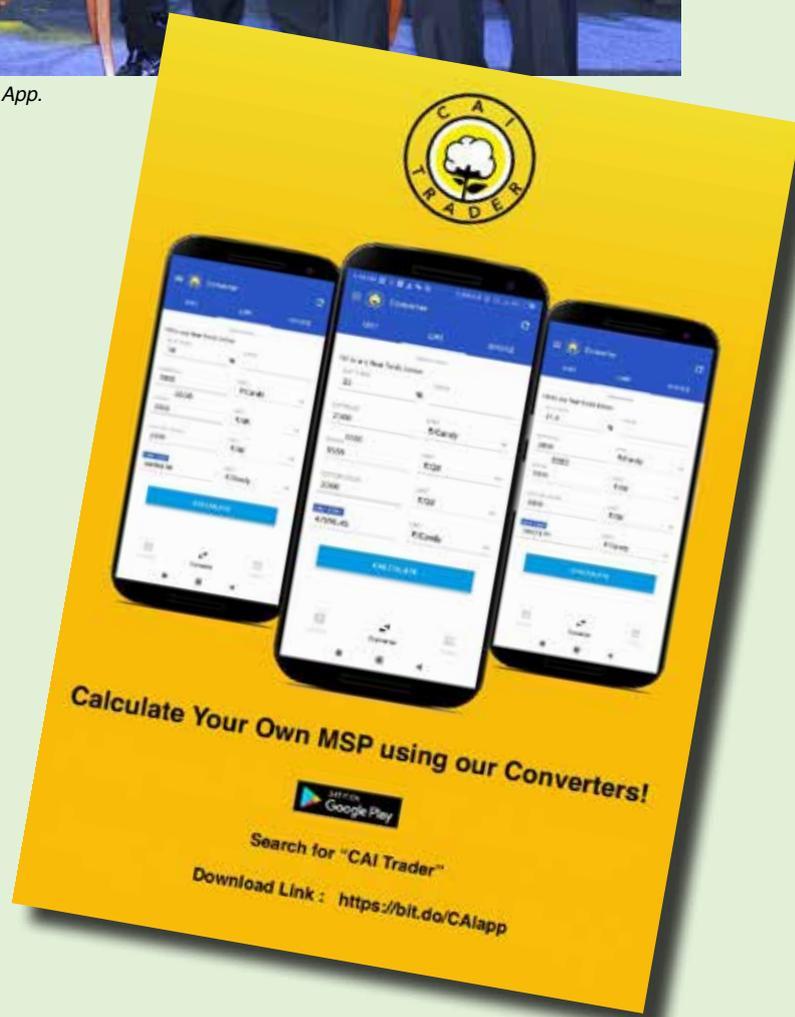


Shri. Atul S. Ganatra, President CAI, launches the CAI Trader Mobile App.

with ICRISAT and ANGRAU as knowledge and extension partners, where a farmer takes a picture of the affected plant, which is geotagged, uploads it onto the app which using artificial intelligence identifies the problem and provides management through a free, reliable and quick real time diagnosis.

Punjab Agricultural University has launched Cotfly app for the management of whiteflies on cotton with the purpose of reducing insecticide use in Punjab. The Government of Gujarat Agriculture and Cooperation Department has launched 113 mobile apps including one on cotton cultivation.

The International Cotton Advisory Committee, USA along with Cotton Incorporated, USA, has developed a multilingual voice and video based m-app 'The cotton soil and plant health app' links soil, weather, biotic and abiotic stress symptoms and its management in real time for lowering input costs, not only at individual farmer level but also across a community and is aimed at enhancing cotton yields in a sustainable manner



for use across Asia and Africa. The app shares videos on the stresses with detailed information in the portable document format for the benefit of the user. Recently, 'CAI Trade App' has been developed by the Cotton Association of India, Mumbai, for the benefit of traders of Indian cotton.

Designing of M-Apps

Latest voice-based m-apps are developed usually by subject matter specialists jointly with software developers. One does not fully comprehend the science behind the other and yet needs the collaboration. What is displayed and heard on the mobile screen involves intricate technicalities in photo and videography, designing the outlay, voice modulation and synchrony of image with the voice. For this to occur, backend programming is involved. The weight of the files ought not to exceed a defined level so that the app functions efficiently.

Having an open back ended program makes it easy for the app developer to make any changes in due course of time to prevent the app from becoming redundant. M-apps in India also work on an android operating system while for most countries iOS is the mobile operating system created and developed by Apple Inc. exclusively for its hardware.

Apps that are used across different countries need to operate in both systems, which in turn add to the costs of its development. In m- agriculture, most of the recent apps are categorised as being 'medium complex' where systems that include location-based services for decision-support based on local climate and soil information (e.g. crop disease warnings), involve complex content development.

Limitations of M-Apps in Crop Production

The future of m apps in agriculture in India is interesting and may be affected by one or all of the following:

1. The impact of changing mobile and internet services in the country. Domination of the private sector with little intra competition may increase costs of M-apps use.

2. Also, climate change appears to be impacting not only the stresses that occur in crops but also their time of occurrence, as seen in cotton. M-apps must take cognisance of climate change and suggest suitable short term and long term remedial measures, in real time.
3. Globalisation of agriculture coincided with the occurrence of at least 10 invasive insect pests and weeds in the country in the last decade. If such exotic pests establish, their location specific management need to be part of m apps.
4. Also lack of clarity in diagnosis of a mix of biotic stresses and biotic and abiotic stresses using M-apps may make pest management redundant and expensive.
5. Usually the developer of the app is paid for developing it. The interest in the app for the developer ends once he/she is paid for developing it. Development of the M-app is not an end. It is a beginning as the app has to reach the end user. This involves good stewardship, planning and refinement, if necessary.
6. Also many M-apps in e-agriculture need regular updating. An M-app that is developed with authentic, verified, relevant, scientific yet simplified content and taken to the farmers with the intent of popularising it for the benefit of the end user, preferably by the developer himself, at a cost, would be desirable.

Mobile applications have enormous opportunity for cotton production and trade as it is a commercial commodity whose production, although constrained by biotic and abiotic stresses, is yet called 'white gold' by virtue of the trade ramifications it has for the country.

(The views expressed in this column are of the author and not that of Cotton Association of India)



Since 1921, we are dedicated to the cause of Indian cotton.

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The Cotton Association of India (CAI) is respected as the chief trade body in the hierarchy of the Indian cotton economy. Since its origin in 1921, CAI's contribution has been unparalleled in the development of cotton across India.

The CAI is setting benchmarks across a wide spectrum of services targeting the entire cotton value chain. These range from research and development at the grass root level to education, providing an arbitration mechanism, maintaining Indian cotton grade standards, issuing Certificates of Origin to collecting and disseminating statistics and information. Moreover, CAI is an autonomous organization portraying professionalism and reliability in cotton testing.

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COTTON ASSOCIATION OF INDIA

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UPCOUNTRY SPOT RATES (Rs./Qtl)													
Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]								Spot Rate (Upcountry) 2018-19 Crop December 2019					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Gravimetric Trash	Strength /GPT	23rd	24th	25th	26th	27th	28th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 – 7.0	4%	15	-	-	H	-	-	-
2	P/H/R (SG)	ICS-201	Fine	Below 22mm	5.0 – 7.0	4.5%	15	-	-	-	-	-	-
3	GUJ	ICS-102	Fine	22mm	4.0 – 6.0	13%	20	9083 (32300)	9139 (32500)	-	9139 (32500)	9139 (32500)	9111 (32400)
4	KAR	ICS-103	Fine	23mm	4.0 – 5.5	4.5%	21	10095 (35900)	10095 (35900)	-	10095 (35900)	10095 (35900)	10039 (35700)
5	M/M (P)	ICS-104	Fine	24mm	4.0 – 5.5	4%	23	-	-	O	-	-	-
6	P/H/R (U) (SG)	ICS-202	Fine	27mm	3.5 – 4.9	4.5%	26	-	-	-	-	-	-
7	M/M(P)/SA/TL	ICS-105	Fine	26mm	3.0 – 3.4	4%	25	-	-	-	-	-	-
8	P/H/R(U)	ICS-105	Fine	27mm	3.5 – 4.9	4%	26	-	-	-	-	-	-
9	M/M(P)/SA/TL/G	ICS-105	Fine	27mm	3.0 – 3.4	4%	25	-	-	L	-	-	-
10	M/M(P)/SA/TL	ICS-105	Fine	27mm	3.5 – 4.9	3.5%	26	-	-	-	-	-	-
11	P/H/R(U)	ICS-105	Fine	28mm	3.5 – 4.9	4%	27	-	-	-	-	-	-
12	M/M(P)	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	-	-	-	-	-	-
13	SA/TL	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	-	-	I	-	-	-
14	GUJ	ICS-105	Fine	28mm	3.7 – 4.5	3%	27	-	-	-	-	-	-
15	R(L)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	-	-	-	-	-	-
16	M/M(P)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	-	-	-	-	-	-
17	SA/TL/K	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	-	-	D	-	-	-
18	GUJ	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	-	-	-	-	-	-
19	M/M(P)	ICS-105	Fine	30mm	3.7 – 4.5	3.5%	29	-	-	-	-	-	-
20	SA/TL/K/O	ICS-105	Fine	30mm	3.7 – 4.5	3%	29	-	-	-	-	-	-
21	M/M(P)	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	-	-	A	-	-	-
22	SA/TL/K/TN/O	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	-	-	-	-	-	-
23	SA/TL/K/TN/O	ICS-106	Fine	32mm	3.5 – 4.2	3%	31	-	-	-	-	-	-
24	M/M(P)	ICS-107	Fine	34mm	3.0 – 3.8	4%	33	-	-	Y	-	-	-
25	K/TN	ICS-107	Fine	34mm	3.0 – 3.8	3.5%	33	-	-	-	-	-	-

(Note: Figures in bracket indicate prices in Rs./Candy)

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Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Gravimetric Trash	Strength /GPT	23rd	24th	25th	26th	27th	28th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 - 7.0	4%	15	10629 (37800)	10517 (37400)	H	10404 (37000)	10320 (36700)	10320 (36700)
2	P/H/R (SG)	ICS-201	Fine	Below 22mm	5.0 - 7.0	4.5%	15	10770 (38300)	10657 (37900)		10545 (37500)	10461 (37200)	10461 (37200)
3	GUJ	ICS-102	Fine	22mm	4.0 - 6.0	13%	20	-	-		-	-	-
4	KAR	ICS-103	Fine	23mm	4.0 - 5.5	4.5%	21	-	-		-	-	-
5	M/M (P)	ICS-104	Fine	24mm	4.0 - 5.5	4%	23	9870 (35100)	9842 (35000)	O	9842 (35000)	9842 (35000)	9842 (35000)
6	P/H/R (U) (SG)	ICS-202	Fine	27mm	3.5 - 4.9	4.5%	26	10629 (37800)	10686 (38000)		10686 (38000)	10714 (38100)	10742 (38200)
7	M/M(P)/SA/TL	ICS-105	Fine	26mm	3.0 - 3.4	4%	25	-	-		-	-	-
8	P/H/R(U)	ICS-105	Fine	27mm	3.5 - 4.9	4%	26	10770 (38300)	10826 (38500)	L	10826 (38500)	10854 (38600)	10882 (38700)
9	M/M(P)/SA/TL/G	ICS-105	Fine	27mm	3.0 - 3.4	4%	25	-	-		-	-	-
10	M/M(P)/SA/TL	ICS-105	Fine	27mm	3.5 - 4.9	3.5%	26	-	-		-	-	-
11	P/H/R(U)	ICS-105	Fine	28mm	3.5 - 4.9	4%	27	10826 (38500)	10882 (38700)		10882 (38700)	10911 (38800)	10939 (38900)
12	M/M(P)	ICS-105	Fine	28mm	3.7 - 4.5	3.5%	27	10854 (38600)	10854 (38600)	I	10854 (38600)	10854 (38600)	10854 (38600)
13	SA/TL	ICS-105	Fine	28mm	3.7 - 4.5	3.5%	27	10882 (38700)	10882 (38700)		10882 (38700)	10882 (38700)	10882 (38700)
14	GUJ	ICS-105	Fine	28mm	3.7 - 4.5	3%	27	10854 (38600)	10854 (38600)		10854 (38600)	10882 (38700)	10882 (38700)
15	R(L)	ICS-105	Fine	29mm	3.7 - 4.5	3.5%	28	10939 (38900)	10911 (38800)	D	10911 (38800)	10911 (38800)	10939 (38900)
16	M/M(P)	ICS-105	Fine	29mm	3.7 - 4.5	3.5%	28	11079 (39400)	11023 (39200)		11023 (39200)	11023 (39200)	11023 (39200)
17	SA/TL/K	ICS-105	Fine	29mm	3.7 - 4.5	3%	28	11135 (39600)	11107 (39500)		11107 (39500)	11107 (39500)	11107 (39500)
18	GUJ	ICS-105	Fine	29mm	3.7 - 4.5	3%	28	11051 (39300)	11023 (39200)	A	11023 (39200)	11051 (39300)	11051 (39300)
19	M/M(P)	ICS-105	Fine	30mm	3.7 - 4.5	3.5%	29	11220 (39900)	11135 (39600)		11135 (39600)	11135 (39600)	11135 (39600)
20	SA/TL/K/O	ICS-105	Fine	30mm	3.7 - 4.5	3%	29	11304 (40200)	11248 (40000)		11248 (40000)	11248 (40000)	11248 (40000)
21	M/M(P)	ICS-105	Fine	31mm	3.7 - 4.5	3%	30	11445 (40700)	11417 (40600)	Y	11417 (40600)	11417 (40600)	11417 (40600)
22	SA/TL/K / TN/O	ICS-105	Fine	31mm	3.7 - 4.5	3%	30	11501 (40900)	11501 (40900)		11501 (40900)	11501 (40900)	11501 (40900)
23	SA/TL/K/ TN/O	ICS-106	Fine	32mm	3.5 - 4.2	3%	31	12063 (42900)	12007 (42700)		12007 (42700)	12007 (42700)	12007 (42700)
24	M/M(P)	ICS-107	Fine	34mm	3.0 - 3.8	4%	33	15325 (54500)	15325 (54500)		15325 (54500)	15410 (54800)	15410 (54800)
25	K/TN	ICS-107	Fine	34mm	3.0 - 3.8	3.5%	33	15607 (55500)	15607 (55500)		15607 (55500)	15691 (55800)	15691 (55800)

(Note: Figures in bracket indicate prices in Rs./Candy)