Application of ICT for Information Access and Dissemination of Oil Palm Technologies

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ABSTRACT

To address field problems in oil palm instantly, ICAR-Indian Institute of Oil Palm Research is using Information Communication Technology (ICT) channels to disseminate oil palm technologies more effectively. Advisories on recommended practices of oil palm cultivation are published through SMS and voice calls in English and vernacular languages. Video conferencing is used to impart training to stakeholders. Increase in smart phone usage enabled development of static mobile apps on Oil Palm Cultivation Practices, Nutrient Management, Pest Management and Disease Management in three languages. Developed an interactive app as Oil Palm Crop Doctor to solve field level problems faced by the farmers in oil palm cultivation.

KEYWORDS : *ICT, Mobile message services, Mobile apps, Oil palm, SMS, video conference*

Oil palm crop has potential of 19.33 lakh hectares in India and is cultivated in an area of 3.30 lakh hectares. Different channels are used by various organizations to disseminate technologies at various levels to reach the farmers. To make dissemination more effective, faster and to enable oil palm growers receive or access the technology on oil palm from a single source to suit to their location specific requirements, channels of Information Communication Technology are being used by ICAR-Indian Institute of Oil Palm Research (IIOPR). Advisories on recommended practices of oil palm cultivation are published using mobile message services as SMS and voice calls in English and vernacular languages to stakeholders (Mary Rani *et. al.,* 2011).

One-to-one interaction with and between stakeholders of different places is done through video conference system established at IIOPR during 2014-15 thereby reducing the time, effort and cost in transfer of oil palm technology from lab to land (Mary Rani and Prasad 2017).

Observing the usage and applications of mobiles, four static mobile apps viz., Oil Palm Cultivation Practices, Oil Palm Nutrient Management, Oil Palm Pest Management and Oil Palm Disease Management were developed during 2015-17 in English, Hindi and Telugu languages to provide instant support to farmers to manage the crop (Prasad and Mary Rani, 2016).

The downloads of these apps motivated to develop an interactive mobile app Oil Palm Crop Doctor which enables stakeholder to send queries and receive response through the app and acts as a ready reckoner in oil palm cultivation practices.

ICT interventions of mobile message services (Mary Rani *et. al.,* 2011), video conference (Mary Rani and Prasad, 2017) and mobile apps (Prasad and Mary Rani, 2016) are highlighted in this paper for dissemination of oil palm technology effectively and efficiently to farmers and stakeholders to manage the crop so as to obtain higher yields, thereby aiding in oil palm development in the country.

MATERIAL AND METHODS

Mobile Message Services (text and voice messages)

Unique numbers are retrieved based on state / district / block for publishing messages as text SMS and voice calls from the database of oil palm grower's mobile numbers collected from state departments, oil palm processors, oil palm growers associations and farmers themselves and maintained at IIOPR .

Based on queries received by IIOPR from farmers through telephone calls, emails, letters, queries raised in group meetings, trainings, seminars, interface meets etc., 92 message contents, based on the above need (Fig 2), were developed as text SMS in English and translated to vernacular languages viz., Hindi, Kannada and Telugu. These SMS contents were recorded as individual audio files of d" 30 seconds / d" 60 seconds duration for publishing voice messages.

The text and voice messages were published based on respective vernacular language of state using the web panel provided by the service provider and subsequently through Farmers portal that was launched by Government of India during 2013 and voice messages were published through a service provider. Text and voice message were published in English to
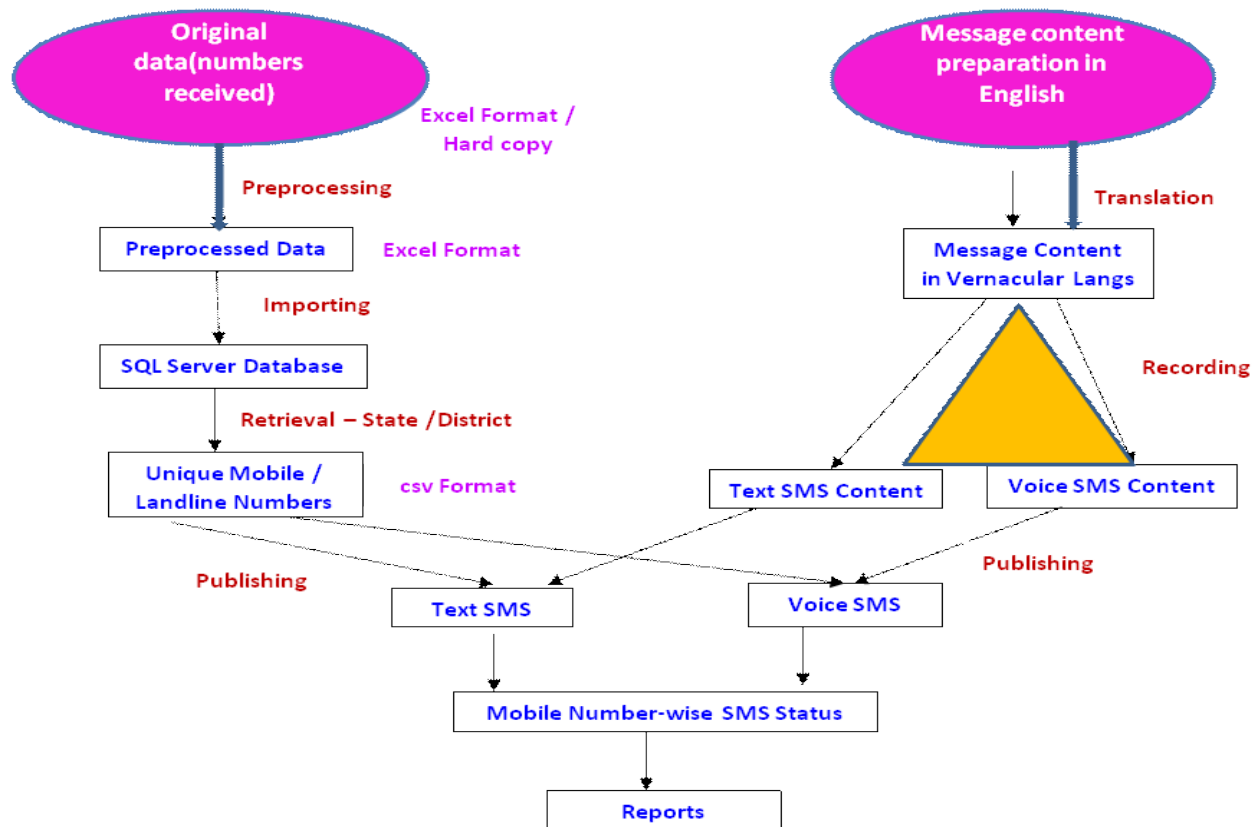
Fig 1. Flowchart of Oil Palm Kisan Mobile Message Services (OPKiMMS)

farmers belonging to Goa, Mizoram, Arunachal Pradesh, Nagaland, Meghalaya and Assam; in Hindi to Gujarat, Maharashtra, Odisha and Chhattisgarh; in Telugu to Andhra Pradesh and Telangana and in Kannada to Karnataka. Reports of published messages were downloaded / received from service providers (Fig.1) and delivery percentage was recorded and queries raised by the recipients to the contact number given at the end of text / voice message were attended over phone to clarify their doubts on oil palm cultivation. Feedback was collected on usefulness of mobile message services through structured questionnaire (Prasad *et. al.,* 2015).

Video conference

To disseminate oil palm technology through video conference system, pre-video conference sessions were held to elicit the requirements of oil palm stakeholders and the topics for training were identified. Video conference sessions were conducted in which scientists of concerned discipline imparted technical training through power point presentations and addressed the queries raised by the stakeholders in the form of discussions which included farmer representatives (as trainer cum facilitator) to share their knowledge and experience.

Mobile apps

Increase in usage of smart phones and penetration of internet connectivity to rural areas enabled the conceptualization of mobile apps on oil palm for android systems. Content for static mobile apps was developed in English, Hindi and Telugu on different aspects of oil palm such as planting, irrigation, fertilizers, intercultural operations, intercropping, nutrients, pest and disease management, harvesting etc. in the form of text, images and short video clips (Fig. 3). These apps being static requires bandwidth connectivity only at the time of downloading from Google Play Store and smart phones having android software can freely download and use these mobile apps.

Considerable downloads of static mobile apps led to development of an interactive app in android and with content on pest, diseases and disorders in oil palm specifically enabling user to communicate through internet connectivity in the form of text, image, audio and video.

RESULTS AND DISCUSSIONS
Oil Palm Kisan Mobile Message Services (OPKIMMS)

To publish oil palm technologies through mobile message services, mobile numbers database

(of stakeholders' viz., oil palm growers, state department officers, staff of oil palm processing units and scientists of ICAR/SAU/KVK) is maintained at IIOPR with 23,907 unique mobile numbers covering 13 states viz., Andhra Pradesh, Telangana, Karnataka, Goa, Mizoram, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Gujarat, Maharashtra, Odisha and Chhattisgarh in the country.
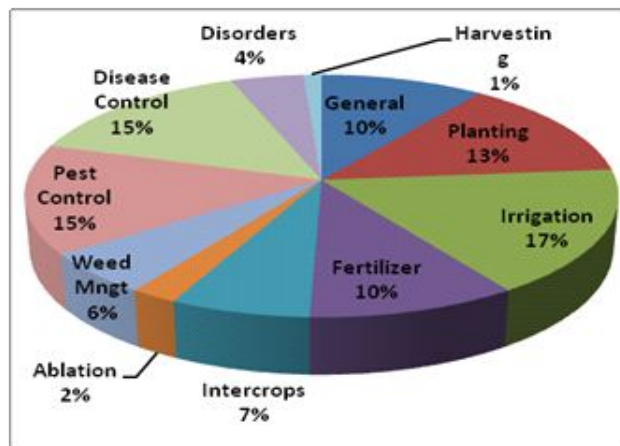

Fig. 2 Content of text and voice messages prepared

Ninety-two message contents were prepared as text SMS and voice messages on recommended oil palm technologies viz., planting of oil palm, irrigation, fertilizers, intercultural operations, intercropping, pest and disease management, harvesting etc. Pertaining to different growth stages of oil palm (Fig.2).

ICT applications of mobile message services were used to disseminate oil palm technology to the oil palm stake holders across the country in the form of text SMS and voice messages in regular intervals i.e. once in a week based on the crop stage, season and climate. During 2012 - 18, text SMS (1,154) were published to 21.53 lakh and voice calls (2,201) were published to 52.63 lakh mobile numbers of stakeholders of 13 states (Table 1). Messages were published in English to Goa, Mizoram, Arunachal Pradesh, Assam, Meghalaya and Nagaland; in Hindi to Gujarat, Maharashtra, Odisha and Chhattisgarh, in Telugu to Andhra Pradesh and Telangana; in Kannada to Karnataka.

The average delivery percentage of text SMS (82.00%) was higher compared to voice message (40.35%) delivery. The delivery percentage of the text SMS and voice messages varied due to various reasons viz., farmer availability, operation feasibility at the operator side, do not disturb conditions etc.

While text SMS is useful for the literates to save and retrieve content later, voice message reinforced the message content and reached even to illiterates. Publishing the same content in the form of text and voice message, not only gives an opportunity

to learn the content, it also stresses the need for practicing the technology disseminated and referred later. Farmer's contacted scientists on contact phone number given at the end of the message, for further clarifications after receiving the SMS / voice message and these queries indicated that majority of the oil palm growers wanted information on requirements for oil palm cultivation during juvenile period, fertilizer management, pest & disease management and management of intercrops etc.

Feedback collected (Table 2) through phone-in survey with a structured questionnaire indicated that messages are accurate, brief and clear. Messages are useful (81.00%); relevant to their crop growth / stage and apt (59.00%); messages are being discussed/ spread among the farmers (81.00%); 33.00% of the farmers responded that they are adopting the practices disseminated through SMS/Voice messages;

Video conference

During the year 2015, after the establishment of video conferencing facility at IIOPR, pre-video conferencing sessions were held with various organizations and stakeholders of different states. Six sessions were held to a total of 129 participants (KVK officials) covering 7 different locations of Mizoram state simultaneously in which training on recommended technologies were imparted by subject matter scientists with the help of power point presentations on the topics of oil palm planting and cultural operations, fertilizer management in oil palm, pest management in oil palm and disease management in oil palm (Table 3). Oil palm farmer participated in the video conference as trainer cum facilitator, shared his experiences in oil palm cultivation.

Mobile apps

Four static mobile apps *viz*., Oil Palm Cultivation Practices, Oil Palm Nutrient Management, Oil Palm Pest Management and Oil Palm Disease Management were brought out in English, Hindi and Telugu in simple understandable language for farmers and field level extension functionaries which can be used meaningfully. Recommended management practices of oil palm cultivation, nutrient management, pest and disease management are the contents narrated through text, photos and videos. Nutrient deficiency symptoms, pest attack and disease incidence symptoms are depicted pictorially along with management practices to be adopted (Fig. 3).

These static mobile apps, shared technical information on oil palm cultivation without any cost thus aiding in solving field level problems and empowering the stake holders by imparting knowledge

Table 1. State-wise Publishing of Text and Voice Messages

State	Published Language	Text SMS		Voice Message	
		Message Count	Mobile Number Count (%)	Message Count	Mobile Number Count (%)
Andhra Pradesh & Telangana	Telugu	168	18,60,684 (86.38)	281	45,93,699 (87.27)
Karnataka	Kannada	107	1,94,124 (9.01)	181	3,72,132 (7.07)
Goa	English	125	20,887 (0.97)	213	71,734 (1.36)
Assam		40	448 (0.02)	204	819 (0.02)
Mizoram		120	18,766 (0.87)	213	20,809 (0. 04)
Meghalaya		111	535 (0.02)	208	475 (0.01)
Arunachal Pradesh		111	1,153 (0.05)	208	1,045 (0. 02)
Nagaland		105	1,364 (0.06)	205	1,304 (0. 02)
Gujarat	Hindi	76	12,308 (0.57)	122	138,799 (2. 64)
Maharashtra		72	9,051 (0.42)	122	6,500 (0. 12)
Odisha		58	25,764 (1.20)	122	11,822 (0.22)
Chhattisgarh		61	8,906 (0.41)	122	44,834 (0.85)
Total		1,154	21,53,990 (100.00)	2201	52,63,972 (100.00)
Delivery Percentage		82.00%		40.35%	

Table 2. Feedback from respondents about mobile message services (n= 32)

Sl. No	Item	Frequency (n)	Percentage (%)
1	Usefulness of the message	26	81
2	Messages are apt to the crop growth stage	19	59
3	Messages are being discussed/ spread among the fellow farmers	26	81
4	Messages are being adopted	11	33

Table 3. **Video conference sessions held during 2015**

Sl. No	Topic of Video Conference Session	No. of Locations connected simultaneously	No. of Participants
1	Stakeholders meet on oil palm area extension in Mizoram	2	12
2	Stakeholders meet on oil palm for improving productivity and area expansion in Mizoram	8	24
3	Planting and Cultural Operations in Oil Palm	8	19
4	Fertilizer Management in Oil Palm	7	30
5	Pest Management in Oil Palm	7	32
6	Disease Management in Oil Palm	4	12
		Total	129

Table 4. Mobile app downloads during 2016 -2019.

S. No	App Name	English	Hindi	Telugu	Total
1	Oil Palm Cultivation	1056	99	335	1490
2	Oil Palm Nutrients	573	20	152	745
3	Oil Palm Pests	500	17	146	663
4	Oil Palm Diseases	735	15	194	944
	Total	2864	151	827	3842

Fig. 3. Screen shots of mobile apps

and skills on oil palm technologies in vernacular languages. Farmers and field level extension functionaries can contact ICAR-IIOPR scientists for technical information and guidance with the help of institute address, contact phone numbers and e-mail details provided in the apps.

During 2016-19 there were 3842 downloads of static mobile apps on oil palm developed by IIOPR (Table 4), which motivated in developing an interactive app *viz*., Oil Palm Crop Doctor having

features of sending queries in the form of text and voice by attaching an image / video. A ready reference on symptoms and control measures of oil palm pests, diseases and disorders was placed. A fertilizer calculator to know the amount of fertilizer to be applied is placed in the apps. Short videos on oil palm cultivation and various cultural practices were also uploaded in this app.

CONCLUSION

SMS is rapid and could reach many at a time and had the benefit of storing and retrieving the contents, voice message overcame the barrier of literacy to reach oil palm stakeholders. Video conferencing further overcame the barrier of literacy, multi location and visibility, as the discussions could be held simultaneously with different persons across for dissemination of technology for different locations to solve location specific problems instantly. Using the video conference, live samples also could be shown and doubts could be clarified. Mobile apps were ready reference for information as the smart phones usage increased.

Thus, ICT helped in disseminating oil palm technology to stakeholders across the country from a single authentic source of technology generation. As all the farmers across the country may not be able to visit the research centre or interact with scientists as and when required, ICT could break this barrier by

reaching the unreached. Thus ICT enables to transfer the technology from lab to land to reach large group of stakeholders rapidly at time by overcoming literacy and distance (remote place) barriers. ICT could be used successfully to disseminate oil palm technologies, which would help in adoption of recommended practices to achieve highest production and pave way for achieving self sufficiency in vegetable oil production in the country.

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