

Harnessing the digital technologies

for reaching the unreached: Case of pulse crops

Uma Sah¹, Devraj¹, Jitendra Ojha¹ and G P Dixit^{1*}

¹ICAR-Indian Institute of Pulses Research, Kanpur, Uttar Pradesh 208 024

The digital ecosystem of India is witnessing an exponential growth, offering numerous advantages to different sections of society. Digital initiatives in current times have completely revolutionized the information flow in cost and time effective manner in unprecedented ways, changing people's lives in every sphere. Indian Agriculture has also been impacted by the digital revolution, ushering in positive changes in farmers' capacities for taking informed decisions in timely manner. This article describes the digital tools employed by IIPR for reaching the farmers.

Keywords: App, Digital, Pulses, Technologies

THE dynamic, vast and varied nature of information needs of farmers operating in different socio-economic as well as agro-climatic conditions in the country, superimposed with regional and personnel preferences for agricultural crops and allied sectors, warrants a complex and efficient flow of information between the information generation nodes and its utilization centres. Information empowerment of farming community with respect to the outcomes of scientific experimentation and their applications in real field conditions is the crux of improved productivity and sustainability of Indian agriculture. This is particularly relevant in context of the need to minimize the time lag between technological advancement and their application at field conditions.

Several path breaking initiatives have been taken in the country for leveraging the transformative potential of digital tools for improving efficiency, efficacy, effectiveness and wider reach of agricultural technologies to producers' community for desired outcomes of development in agriculture and allied sectors. The

main focus of these initiatives is meeting the farmers' needs for information. A plethora of digital tools/platforms have been structured around meeting the information related to market price updates of agricultural commodities, latest agricultural production techniques, Government initiatives for rural development and subsidies, weather forecasting, agricultural events, insurance / claim processing, input prices and availability, early warning and management of diseases and pests and so on. In this regard, a wide range of tools including online platforms in form of websites or web portals, mobile advisory services, village knowledge centres, community radio, mobile applications are in place for use. Digital videos have also come up in a big way as a means of information dissemination as well as capacity building in many domains including agriculture. Smart farming, commonly referred to as precision agriculture, is a modern agricultural method that maximizes crop productivity and animal management through use of Internet of Things (IoTs) is now gaining momentum. IoTs include use of robots, drones, sensors, and

computer imaging integrated with analytical tools for getting insights and monitoring the crop fields.

Digital tools for sharing of information on pulse production technologies

Pulses have multifaceted role in Indian agriculture and food systems. Pulses-the nutritionally dense seeds contribute to nutrition, food security, soil health, economic livelihoods, and environmental sustainability in the country. They form an important source of affordable proteins for Indian populace and occupy a prominent place in the practiced cropping pattern in the country. A wide variety of pulses are cultivated in the country, collectively occupying about 30 million hectares area. For addressing the domestic demand of pulses in the country, application of on-shelf technological options in field conditions is a precursor. The technological options relating to pulse crops generated through research and development efforts in the country, need to be efficiently delivered among the pulse growers for them to impact the pulse production in the country. The pulse growers are spread across the country and operate in complex diverse agro-production systems,

with their preferences for pulse crops.

In this direction, several initiatives have been taken by ICAR-Indian Institute of Pulses Research, Kanpur for leveraging digital technologies for sharing timely, reliable and relevant knowledge on pulse production technologies to farmers at reasonable cost. These digital tools include are described in detailed below.

Mobile phone based platforms

Mobile based advisory service:

To cater to the demand of farming community for credible time bound crop specific information and advisories regarding pulse crops, mobile phones based information delivery platform was developed and validated. Voice based mobile advisory service '*Dalhan Sandesh*' has been initiated wherein farmers are directly linked to farmers through validated voice advisories on production technologies of chickpea, field pea, pigeon pea and mung bean pulse crops. Need based crop specific real time advisories were provided to 3500 farmers from 7 districts i.e., Jalaun, Fatehpur, Chitrakoot, Hamirpur, Kanpur dehat, Balia, Kanpur nagar districts of Uttar Pradesh. More than 2.0 lakh advisories were sent on pulse crops through the service to partner farmers.



Dalhan Sandesh Service

Chanamitra: Chanamitra is an android based mobile application designed as an effective and efficient channel for information delivery on improved production technology of chickpea to chickpea growers spread across the country. The application is developed in five languages namely Hindi, English, Marathi, Telegu and Kannada for covering the prominent chickpea producing states of the country. The application provides comprehensive



Chanamitra application

information related to area specific improved chickpea varieties, crop production technologies, crop protection technologies for management of insect pest and diseases, post-harvest technologies as well as information related to market price and weather, which can be easily accessed for farmers and other stakeholders for making informed decisions. The images based disease information and weed management system is also incorporated in the application. The application also functions as channel for flow of information between the farmers and pulse researchers which can be used by chickpea farmers for

receiving solutions to the specific problems faced by them, right from the fields. The queries can be made in video, voice or text format. The unique feature of the app is that it is backed by a strong team of chickpea researchers working across the country for providing solutions to the queries made and related up dates. The application has offline information panel along with online panel for better functionality.

Web based initiatives

Web portal: "e dalhan gyan manch" is a interactive, dynamic and user friendly bilingual web portal (<http://www.dalhangyanmanch.>



e-dalhan gyan manch website

res.in/) designed to share and popularize the available on-shelf technologies of major pulse crops with farmer, extension workers and other stakeholders. The developed portal contains useful validated information on all the major pulse crops including chickpea, pigeon pea, field pea, urd bean, mung bean, rajmas and lentil. Comprehensive information in a well categorized and systematic manner is made available on the platform. A detailed coverage of information on improved varieties of the major pulse crops is embedded in the portal in form of Varietal Information System (VIS) that allows users to retrieve information pertaining to a particular district of the country. Two images based interactive diagnostic tool-Disease and Pest Information (DPISP) and Weed Information System (WIS) on all major pulses are also integrated on the portal. Further, web portal also provides answers to the Frequently Asked Questions (FAQs) pertaining to all the 7 pulse crops. The web portal has integrated video modules developed by institute, feedback window, success stories, and institute publications on the home page of the web portal. It also provides links to other important agriculture related websites and web portals. The Hindi version of *e dalhan gyan manch* was published in public domain on 5th Sept. 2017 while the English version (*e knowledge platform on pulses*) was released on 5th September 2021 in public domain. The web portal is available at <http://dalhangyanmanch.res.in/>. The web portal had been visited by about 3.10 lakh users till date.

Pulses Seed Hub Portal: 'Pulses Seed Hub Portal' was developed with the objective to provide farmers access to quality seed production information for pulses. These data would be pooled and processed to provide/retrieve centre-wise, variety-wise, crop-wise quality seed production individually and in combination. After designing the database, seed information system for pulses (Pulses Seed Hub Portal) has been developed, implemented and hosted on Institute webportal (<https://iipr.icar.gov.in/iiprseedportal/>).



ICAR-IIPR Pulse Farmer Corner

A prototype online software has been developed for retrieval of seed hub information using WAMP (Windows, Apache, Mysql and PHP) technology. Contents on detail of 150 seed hub centres, seed target, seed production, seed lifting, revolving fund, expenditure incurred, seed balance, etc. have been stored in digital format. Dashboard of the system contains real-time information on total users, total centres, total seed production and total seed availability. The users can search/retrieve the desired information using various combinations of fields. The system assists farmers, researchers, exporters and policy makers in various decision making information pertaining to quality seed (Foundation, Certified and Truthfully Labelled) production (centre-wise, crop-wise and variety-wise). The additional feature of the system provides real time information on the seed availability for different varieties of seeds along with sources.

Videos modules for information sharing

Increased affordability of smart phones with people has given a major fillip to use of videos for promotion of new agricultural technologies, ideas, especially digital ones, are a relatively new technology. Besides utilizing videos for raising awareness, dissemination of information on technologies with wider reach of successful experiences with agricultural technologies, these may be put to use for capacity building also. For

achieving enhanced comprehension among farmers, 114 videos modules on critical pulse production technologies and successful experiences of partner farmers have been prepared, validated and well treated for enhancing the comprehension among users. This includes videos in Hindi, Bengali, Marathi, Kannada, Tamil languages for wider reach among pulse growers of the country. These video modules are also made available on YouTube channel named 'ICAR-IIPR Pulse Farmer Corner', created for the purpose. The channel has reached 203,386 views with about 3420 subscribers.

Drones for enhanced efficiency

Drones in agriculture offer a range of benefits of increased efficiency, improved yields, and reduced costs to farmers. It is considered as a green technology that helps counter issues of unavailability and high cost of labours, safer option for spray of agro-chemicals in the fields to farmers. In addition, drones in agriculture also provide opportunities to provide employment to people in rural areas. Drones can efficiently cover large fields for application of agro-chemicals, allow farmers



Drone spraying on crops

to effectively monitor crops for the areas that require attention. These all benefits may contribute to reduced costs for farmers. In view of the benefits of drone technology, institute has also geared towards popularizing the use of technology in agriculture by conducting demonstrations of drone spraying in fields of partner farmers. A number of demonstrations on safe spray of agro-chemicals in farmers' fields are being carried out and Institute is targeting to cover a large number of farmers with drone technology in the near future.

Radio Program- 'Dalhan Pathshala'

Radio is an age old digital tool that is popular for accessibility and affordability features for providing information, news, and entertainment to listeners. Radio has also been put to use for connecting farmers to agriculture specialists and technology developers, targeted for supporting farmers for taking informed decisions related to farming. Need-based radio programs have also been used as a complementary tool for extension that complements the existing agricultural information systems. Radio programmes in local vernacular languages, connects the wide range of farming communities to the experts. These programs supports people based in remote areas, having varying literacy levels, and those have difficulty in connecting to the formal extension



ICAR-IIPR, Kanpur facebook account

machinery.

For addressing to the information needs of farmers and knowledge intermediaries, a radio programmes – *Dalhan Pathshala* has been initiated by institute, covering a range of topics and integrate scientific information on pulse production technologies. The radio program is hosted at All India Radio, Kanpur that caters to about 70 lakh population based in Kanpur Nagar, Kanpur Dehat, Unnao, Fatehpur, Hamirpur districts of Uttar Pradesh state of country. A total of 20 episodes on various aspects of pulse production have been planned including improved pulse varieties, pulse production technologies, post-harvest management, crop protection technologies.

Use of Social Media

Besides these, the social media is

also being used for dissemination of information on pulses technologies to the farmers and other users of the country. This includes use of YouTube channel "ICAR-IIPR Pulse Farmer Corner", Institute Facebook (@ https://www.facebook.com/IIPRK_anpur) and Twitter (@ <https://twitter.com/icariipr?lang=en>).

SUMMARY

In current favourable policy and infrastructure support environment in India, digital tools offer tremendous scope for bringing the most desired changes in agriculture landscape in the country. Developing the digital tools need a meticulous planning and insight into the actual requirement of the farming community and the knowledge intermediaries. This would ensure wider acceptance. Developing and customizations of the content for improving its relevance is a crucial skill that decides on the acceptance of the tool among the users.

ICAR-IIPR, Kanpur has made tremendous strides in harnessing the potential of digital tools for reaching to the vast pulse growers based in varying agro-ecological conditions in the country. A multi-dimensional approach in this regard has been followed by the institute, perfectly engaging the web based platforms, mobile applications, radio, drone and videos for sharing the pulse based knowledge resources developed to the end users.

*Corresponding author e-mail: diriipr.icar@gmail.com



Dalhan pathshala radio program