



## RESEARCH PAPER

# Study on mobile applications for irrigation in agriculture field

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**Abstract :** Water is a crucial input for agriculture, for good crop production. In today's scenario, application of technology in agriculture field is very much needed as the time and resources are becoming limitation and costly. Mobile applications are becoming handy for any kind of work which can be done using mobile, internet and various softwares. This study is based on a detailed study of Mobile applications for irrigation scheduling for farmers' field. The result of study reveals that real time use of Mobile application on agricultural field helps farmers to be aware about irrigation methods, irrigation water amount, crop water requirement, irrigation time etc. Also, real time application of Mobiles, connect farmers with current global scenario. Mobile applications are found effective Information Technology measure for extension of information and service provider for farmers of Digital India.

**Key Words :** IT, Mobile application, Irrigation

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## INTRODUCTION

In India, agriculture sector involves labour intensive and time consuming practices, in today's fast world. Majority mass of agriculture sector in India is still following traditional practices for field work for crop cultivation. For field preparation use of tractor drawn ploughs, rotavator etc., for seed sowing seed drill or seed cum fertilizer drill, and the list goes on. All these are done with combine efforts of human and machineries to match the time period of crop cultivation. Delay in a single step makes delay in execution of next operation or some time loss in crop production. Information and communication technology (ICT) can be an answer to the said problem

by improving quality and increasing speed of technology transfer (Singh *et al.*, 2018). Food and Agriculture Organization (FAO, 2009) defined ICT as technologies which are utilized for data and information collection, processing, storing, retrieving, disseminating and implementation using televisions, computers and mobiles.

Smart phones are surfaced as powerful tool for each and every work of daily life. Market is full of various mobile applications which are free and paid as well. Use of these mobile applications makes job fast and quality work (Nierinck, 2008). Mobile application can be defined as software which mainly developed software to work in the environment of mobile software instead of computer and laptops (Constantina *et al.*, 2016) and

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<b>Table 1 : Apps for natural resource management</b>				
Sr. No.	Name of apps	Developer	Information	Language
<b>Developed by institutes of ICAR and State Agriculture Universities</b>				
1.	Plant nutrition	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra	<ul style="list-style-type: none"> <li>Major and minor plant nutrients essential for crop growth and</li> <li>Symptoms of nutrient deficiency in plants.</li> </ul>	<ul style="list-style-type: none"> <li>Marathi</li> </ul>
2.	Soil nutrient manager	ICAR - Research Complex for Eastern Region, Patna, Bihar	<ul style="list-style-type: none"> <li>Provides answers of question regarding fertilizer recommendations based on nutrition requirement of crop to be grown and status of specific soil fertility.</li> </ul>	<ul style="list-style-type: none"> <li>Hindi</li> <li>English</li> </ul>
3.	Nutrient deficiency diagnose and manager for apple (NDDMA)	ICAR - Central Institute of Temperate Horticulture, Srinagar, Jammu and Kashmir	<ul style="list-style-type: none"> <li>Provides information regarding soil region, physiographic, sub physiographic, landform and land management units etc. for Apple cultivation.</li> </ul>	<ul style="list-style-type: none"> <li>Hindi</li> <li>Urdu</li> <li>English</li> </ul>
4.	MGR-Portal (Microbial Genetic Resource)	ICAR-National Bureau of Agricultural Important Microorganisms, Mau, Uttar Pradesh	<ul style="list-style-type: none"> <li>Search of microbial accessions by accession number or by name in NAIMCC database,</li> <li>List of microbial accessions in core collection developed based on agriculturally important traits,</li> <li>Procurement of microbial cultures from NAIMCC and</li> <li>Opinion for query related to microbial germplasm at ICAR-NBAIM, Mau, Uttar Pradesh.</li> </ul>	<ul style="list-style-type: none"> <li>English</li> </ul>
5.	Urvara	ICAR - Research Complex for Eastern Region Patna, Bihar	<ul style="list-style-type: none"> <li>Dose of fertilizer for users filed and its cost for field, vegetable and fruit crops for the Eastern plateau and hill region of India.</li> </ul>	<ul style="list-style-type: none"> <li>English</li> </ul>
6.	Fertilized calculator – Goa	ICAR – Central Coastal Agricultural Research Institute, Goa	<ul style="list-style-type: none"> <li>Fertilizer dose can be calculated for area or per plant, specifically for Goan farmers.</li> </ul>	<ul style="list-style-type: none"> <li>English</li> </ul>
7.	Digital Soil Health Card	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	<ul style="list-style-type: none"> <li>Agro advisory and fertilizer dose recommendation based on soil health card of the farmer for various crops.</li> </ul>	<ul style="list-style-type: none"> <li>English</li> </ul>
8.	Saur Shakti ICAR	ICAR - Research Complex for Eastern Region, Patna, Bihar	<ul style="list-style-type: none"> <li>Farmer can select appropriate hp of pump for irrigation based on crop, filed size, water table level and drawdown.</li> <li>Discharge requirement and number of plots can be irrigated during a day.</li> </ul>	<ul style="list-style-type: none"> <li>English</li> </ul>
9.	VNMKV	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra	<ul style="list-style-type: none"> <li>Rainwater harvesting methods for artificial groundwater recharge</li> </ul>	<ul style="list-style-type: none"> <li>Marathi</li> </ul>
10.	mKRISHI Paws - IISWC	ICAR-Indian Institute of Soil and Water Conservation, Dehradun, Uttarakhand in collaboration with Tata Consultancy Services Limited	<ul style="list-style-type: none"> <li>Best practices for agriculture and soil and water conservation for north western Himalaya region farmers.</li> <li>Seeds, fertilizer and weather forecasting</li> <li>Swachh Bharat Mission</li> <li>Natural Resource Conservation and Management.</li> </ul>	<ul style="list-style-type: none"> <li>Hindi</li> <li>English</li> </ul>
11.	GypCal-Sodic Soil Reclamation	ICAR Central Soil Salinity Research Institute, Karnal, Haryana	<ul style="list-style-type: none"> <li>ESP (exchangeable sodium percentage), depth of water for leaching can be estimated for sodic soil reclamation.</li> <li>Yield of rice and wheat crop of both, salt tolerant and traditional varieties can be estimated.</li> </ul>	<ul style="list-style-type: none"> <li>Hindi</li> <li>English</li> </ul>
12.	Havaamaana-Krishi	University of Agricultural Sciences, Dharwad, Karnataka	<ul style="list-style-type: none"> <li>Information about weather</li> <li>Forecast of short range weather</li> <li>Agromet advisory for 7 districts under University of Agricultural Sciences, Dharwad, of north Karnataka zone</li> </ul>	<ul style="list-style-type: none"> <li>Kannada</li> <li>English</li> </ul>
13.	MAA Jharkhand Weather	Birsa Agricultural University, Ranchi, Jharkhand	<ul style="list-style-type: none"> <li>Hourly (6 hour) and 3 days weather information including surface runoff, underground runoff, downward short-wave flux at ground surface, and total cloud cover.</li> </ul>	<ul style="list-style-type: none"> <li>Hindi</li> <li>Nagpuri</li> <li>English</li> </ul>

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14.	LRIS Goa	ICAR – National Bureau of Soil Survey and Land Utilisation Planning, LRIS GOA	• Location specific land resources data within Goa state.	• English
15.	PCZ Mapper	ICAR – National Bureau of Soil Survey and Land Utilisation Planning, LRIS GOA	• Information can be gathered like soil region, physiographic, sub physiographic, landform and land management units.	• Hindi • English
16.	Soil Health Card	ICAR – National Bureau of Soil Salinity & Land Use Planning, Nagpur	• GIS based application to get information about fertilizer dose for crops based on soil chemical properties of specific location	• Hindi • English
17.	Fertilizer calculator	KVK Banavasi	• Recommend fertilizer dose based on soil of Andhra Pradesh state.	• English
<b>Developed apps by private companies and individuals</b>				
18.	Rainwater harvesting	Pravin Khandve	• Awareness created about rainwater harvesting methods with photos, videos and literature	• Marathi • English
19.	TN Soils	Raghnath Kaliaperumal with Tamil Nadu Agriculture University	• Provides information about soil of Tamil Nadu state • Fertilizer doses based on soil condition	• English

mobiles applications are also known as Apps (Mani and Vasanth, 2019). Now, Indian farmers are also getting benefits from different mobile application for gathering information about required agricultural work. But, they are still lacking in their use in agricultural work. Due to compact information system farmers can avail information fast without wasting any time (Sarkar *et al.*, 2021 and Kirk *et al.*, 2011).

As per International Telecommunication Union statistics approximately 4.9 billion people (63 per cent of the world's population) – are using the Internet in 2021, which shows 17 per cent increase since 2019. In a World Bank study report of year 2012 Christine *et al.* (2012) highlighted benefits of mobile phone technologies are that they can be owned by more than one person, provide information instantly and conveniently, can provide personalized information, cheap and voice communication can be easily done.

Present study is aimed to identify mobile phone applications which are available for irrigation atomization and useful for farmers.

## MATERIAL AND METHODS

For this study author has surveyed Google Playstore for available various mobile apps working under android condition. Apps developed by various government institutes, private institutes, and individual persons were surveyed. In this study only those apps are considered which are useful for natural resource management only,

other apps like providing information about crops, any government schemes, private service provider apps of any purchased items, any kind of consultancy, cannot be used for Indian condition are not included in the study.

## RESULTS AND DISCUSSION

The experimental findings obtained from the present study have been discussed in following heads :

### Mobile apps for natural resource management:

The result of this study is based on survey of available apps on Google Playstore for Android mobiles. Total 17 mobile applications developed by Indian Council of Agricultural Research (ICAR) institutes and State Agricultural Universities (SAUs) and 2 apps developed by private company and individual person where identified for natural resource management which included soil based information, fertilizer dose based on recommendation, rainwater harvesting method based information, awareness creating about soil condition, awareness creating about rainwater harvesting, weather based farming system and weather forecasting based and useful for farmers in the said fields. Sarkar *et al.* (2021) also found mobile apps useful for farmers for weather information, best farming practices, fertilizer dose selection, etc.

### Mobile apps for irrigation on agricultural field:

Mobile apps related to irrigation sector are enlisted

Table 2: Apps related to irrigation				
Sr. No.	Name of Apps	Developer	Information	Language
<b>Developed by institutes of ICAR and State Agriculture Universities</b>				
1.	PhuleJal	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	•Using standard methods evapotranspiration can be estimated by online as well as offline mode for specific location and crop.	•English •Marathi
2.	PIS (Phule Irrigation Scheduler)	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	•Irrigation scheduling •Pump/ irrigation system operation time	•English •Marathi
3.	Oil Palm Water Requirement – Andhra Pradesh	ICAR- IIOPR	•Irrigation water requirement can be calculated for oil palm crop for Andhra Pradesh state.	•English
<b>Developed apps by private companies and individuals</b>				
4.	Pump Selection	Dr. A. K. Jain	•Based on the location specific operating condition farmers can select energy efficient pump.	•Hindi •Punjabi •English
5.	The Irrigation App	iScape	•Irrigation pumps can be controlled for scheduled irrigation	•English
6.	AgSAT	Smart Irrigation	•Irrigation scheduling based on satellite imagery •Daily water requirement and irrigation run time based on crop, area, weather and irrigation system	•English
7.	Solar Water Pumps	Dr. A. K. Jain	•To know the capacity of the solar pump for irrigating crops.	•English

in Table 2. Total 7 apps are found out for irrigation based on selection criteria taken in consideration. Among 7 apps, 3 are developed by ICAR and SAUs and 4 are developed by private companies and an individual. These apps can be used for evapotranspiration calculation of crop filed, irrigation scheduling for particular crop for any irrigation system, irrigation pump selection, solar pump selection, and irrigation water requirement calculation. Oil Palm Water Requirement – Andhra Pradesh is location and crop specific application, where as other application can be used for any location and crop of India.

Based on present survey, it can be observed that mobile apps are limited in number which can be used solely for irrigation. Mani and Vasant (2019) also observed limited Mobile Apps for water quality specifically for irrigation sector.

### Conclusion:

There are many mobile applications are out in the market which are user friendly for farmers. In case of natural resource management total 19 apps are identified for soil, water and weather related to useful for farmers which are developed by ICAR institutes, private sector and individuals. In case of irrigation sector apps number is low, only 7 apps are available regarding. A conclusion from this study can be determined that, there is large

scope for mobile apps to be developed in irrigation sector, which may be free and user friendly.

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