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Agri-Apps for Smart Agriculture: Tools, Trends and CAU Contributions

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ICTs have become a valuable asset for farmers, with mobile applications significantly accelerating technology transfer in agriculture and allied sectors. The widespread adoption of mobile telephony has enhanced information dissemination, making knowledge-intensive farming more accessible. Farmers can now easily access essential data on seeds, crop selection, cultivation practices, weather patterns, fertilizers, and pesticides through various apps that aggregate information from multiple sources, including producers, processors, and vendors. The limitations of traditional extension services in reaching a vast number of farmers offline, mobile applications serve as an effective solution for streamlined farm management and communication. By providing real-time advisory support and actionable insights, these digital tools empower farmers with knowledge and facilitate informed decision-making, ultimately improving productivity and efficiency in agriculture.

Keywords: Agri. Apps, Farmer apps, ICT, E-farming.

Introduction

Digital agriculture, also referred to as smart farming or e-agriculture, has emerged as a pivotal force in modernizing agricultural systems. Mobile applications serve as transformative tools by enhancing farm productivity, fostering innovation in agricultural research, and optimizing extension services. The Committee on Doubling Farmers' Income (DFI) has acknowledged the potential of digital technologies in streamlining and organizing rural agricultural practices across India.

The widespread adoption of mobile technology plays a crucial role in addressing challenges faced by small-scale farmers, who constitute the majority of the Indian agricultural sector. In 2016, global smartphone users numbered approximately two billion. India's rural regions witnessed significant growth in smartphone penetration, increasing from 9% in 2015 to 25% in 2018, with a 35% surge in usage during the same period (ICEA & KPMG). This increased connectivity facilitates access to digital resources, enabling farmers to leverage mobile applications for informed decision-making.

A study by Kumar and Chandrasekran (2020) identified 746 agriculture-specific mobile applications in India, underscoring their growing significance in farm management, market access, and technology transfer. As mobile-based solutions continue to evolve, their role in supporting sustainable agricultural development and improving rural livelihoods remains increasingly critical.

Importance of Mobile Applications in Agriculture

- Most of the times farmers did not get access to the information available in public domain, but through apps they find it easier to access.
- Farmers can access comprehensive, real-time information on crops, soil conditions, climate patterns, rainfall, seeds, and machinery at their convenience. Digital tools enable

both farmers and agricultural advisors to enhance farm management by systematically recording data, conducting in-depth analysis, and generating evidence-based recommendations to support informed decision-making.

- Farmers can use mobile apps to keep track of their money, including investments, purchases, and bank transactions. These apps also help them stay updated on insurance details and deadlines, allowing them to plan their farm activities more effectively and make smarter financial decisions.
- Mobile technology helps farmers manage their warehouses efficiently by keeping stock records up to date, tracking unsold inventory, and identifying purchase needs. This ensures timely deliveries, maintains product quality, and facilitates smooth distribution to end consumers.
- With rapid spread of internet facility in rural areas ICT now has the potential to significantly contribute towards solving one of the most important major national concern namely Doubling Farmers' Income (DFI). With better internet access in rural areas, digital tools can help farmers increase their income by reducing middlemen in buying and selling. Online platforms make it easier for farmers to buy supplies at lower costs and sell their products directly to customers for better prices. They also offer personalized advice to help farmers improve their productivity and profits.

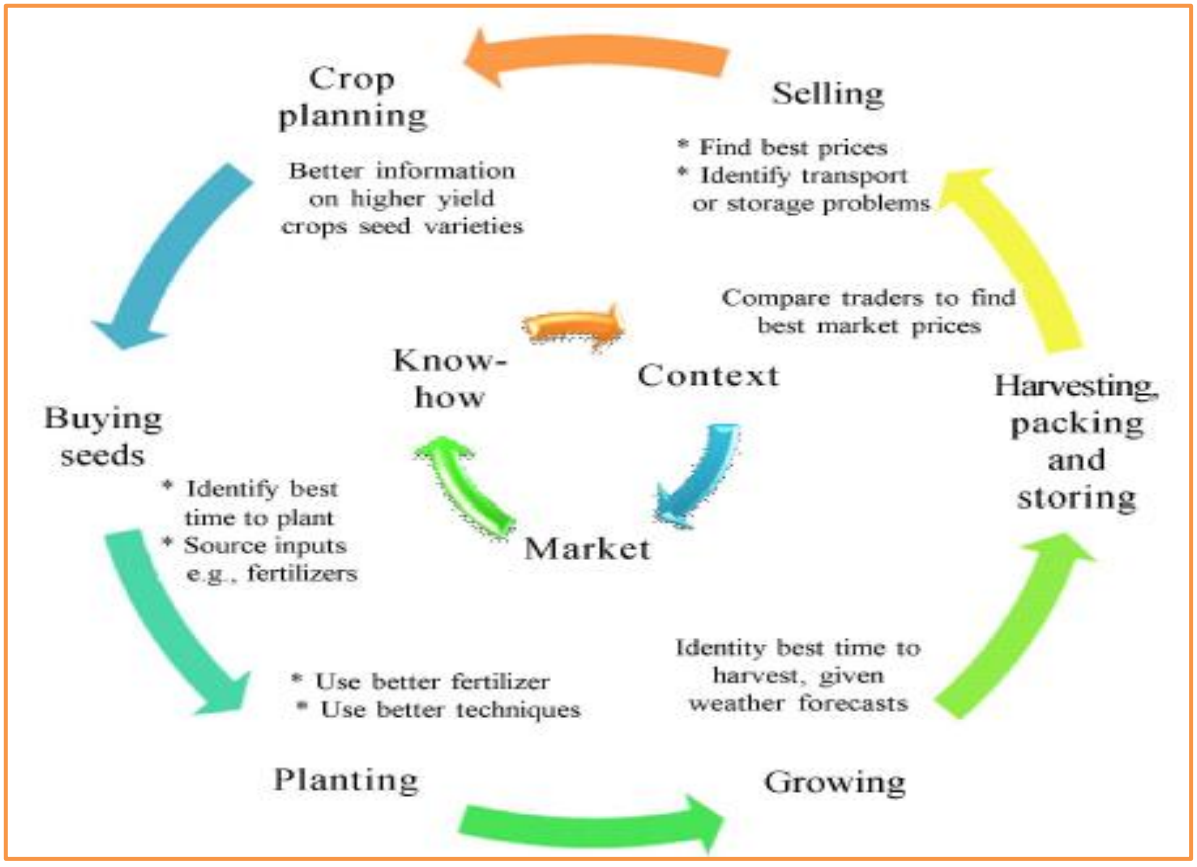

Image 1: Information needs of farmers (Mandi & Patnaik, 2019)

List of mobile applications

The Government of India has introduced a range of web based and mobile based applications, free of charge, for the benefit of farmers and other stakeholders, to disseminate information about agricultural activities. These applications are available for download from official mkisan.gov.in website or from Google play store. The apps produced by agricultural organisations, private sectors and NGOs are also available. These apps are disseminating agricultural research and extension information to farmers and other stakeholders, as well as facilitating information exchange among stakeholders.

List of some of the important mobile based apps and information on portal and expert system developed in agriculture are as follows:

S. No.	App Mame	Features
	Most famous Agri. Apps	
1.	Kisan Suvidha	• Provides information on weather forecasts, market prices, input dealers, plant protection and expert advisories. • Available in multiple Indian languages.
2.	Pusa Krishi	• Offers information on new crop varieties, resource-conserving cultivation practices and farm machinery developed by the Indian Agricultural Research Institute (IARI).
3.	eNAM(Natinal Agriculture Market)	• Online trading platform for agricultural commodities • Facilitates better price discovery and provides facilities for smooth marketing of produce.
4.	BigHaat Smart Farming App	• Personalized crop advice and expert-driven solutions. • Marketplace for high-quality seeds, fertilizers, pesticides and farming tools. • Real-time weather forecasts and alerts.
5.	Agricentral	• Comprehensive crop advisory with GPS and satellite imagery integration. • Real-time market prices and commodity insights. • Updates on government schmes and financial support.
6.	Krishi-e	• Personalized crop calendar • Expert information on land preparation, sowing patterns, fertilizer application and more. • Available in multiple Indian languages.
7.	Kheti Badi	• Promotes organic farming practices. • Information on natural and chemical-free farming methods. • Available in Hindi, Marathi, English and Gujarati.
8.	Shetkari	• Information on government scheme and services. • Best crop management methods and agri-business guidelines. • Market rates of crop produce and success stories in agriculture.
9.	Meghdoot	• Weather related information based on GPS location. • Alerts about extreme weather events. • Developed by IMD and IITM under ICAR.
10.	Agri App	• It helps farmers stay upto date on best farming practices by providing them information on best methods of harvesting and storage and best online markets to buy chemicals. • It has more than 10 Lakh downloads with good customer reviews.
11.	IFFCO Kisan	• The app provides expert information oncustomised agricultural advisory, market prices and suitable weather conditions for crops. It has more than 10 thousand downloads on google playstore.

Global Agri. Apps		
12.	Plantix	• AI-powered image recognition for diagnosing plant diseases, nutrient deficiencies and pest infestations. • Fertilizer calculation and cultivation tips. • Access to a community fir knowledge sharing.
13.	Aeroview InField	• Insights from high-resolution drone data. • Identification and management of pest and disease threats. • GPS-referenced data mapping and offline fuctionality.
14.	Agtrinsic	• AI-based scouting and harvesting analytics. • Monitoring of disease pressure with multiple data layers. • Structured scouting inputs and drone pilot routing.
15.	Agmatix	• Agronomic trial management with On-Farm Experimentation.
16.	Farm Manager	• The management of small farms, designed and developed to respond to the needs and Characteristics of farmers of Greek. It can store database, do farm customization, easy field management, land field data, easy job recording process, employees and equipment.
17.	AgroMobile	• Develop Especially for the Indian farmers to assist them in agricultural needs. It is used for botanical species recognition and disease detection using a simple mobile phone with camera.
18.	Krishi Ville	• agricultural commodities, weather forecast updates, agricultural news updates. The application has been designed taking Indian farming in consideration.
19.	Agriculture Supply Chain Management	• The complete package for farmers who want to do farming on sugarcane and obtain good production with proper management.
20.	Scheduling, Controlling and Monitoring of Agricultural Devices	• Used to farmer in controlling the motor and pesticides proportion, monitoring the farming Agricultural Devices activities going on in the farm remotely and also allow for improving the efficiency of the irrigation process.

S.no	Categories	No. of. Apps		Total
		Free	Paid	
1.	Livestock	67	23	90
2.	Crops	94	14	108
3.	Technology	100	18	118
4.	Weather	20	02	22
5.	Pest	27	-	27
6.	Education	38	12	50
7.	Business	139	09	148
8.	News	53	-	53
9.	Machinery	44	02	46
10.	Spraying	30	05	35
11.	Events	25	-	25
12.	Gardening	17	07	24
	Total	**654**	**92**	**746**

Image 2: Subject matter wise distribution of apps based on the nature of accessibility (Kumar & Karthikeyan, 2019)

Central Agricultural University made mobile applications and portals for farmers

The Central Agricultural University (CAU), headquartered in Imphal, Manipur, has developed several digital tools and mobile applications to support farmers, students and staff across the northeastern region of India. These initiatives aim to enhance agricultural productivity, streamline academic processes and improve administrative efficiency.

1. **ARUNKISAN App-** The ARUNKISAN App is CAU's first android-based mobile application designed specifically for farmers in Arunachal Pradesh. Developed by faculty members Dr. Senpon Ngomle, Dr. Y. Disco Singh and their team, the app was funded by the National Mission on Himalayan Studies. It aims to empower farmers with knowledge and promote sustainable agricultural practices in the region. The app addresses challenges faced by farmers in remote border villages by providing accessible agricultural information.
2. **Academic and Administrative Digital Platforms-** CAU has implemented several digital platforms to facilitate academic and administrative operations-

- **Academic Management System(AMS)-** An online system developed to automate and streamline all academic activities of the university.
- **eOffice CAU-** A digital platform for official file work, promoting effective and transparent governance within the university.

Conclusion

Modern agriculture has evolved into a complex business, requiring timely expertise and data-driven decision-making. However, farmers often struggle to access immediate advisory support. To bridge this gap, they should adopt ICT tools like mobile apps, portals, and AI-driven expert systems, ensuring they provide credible, up-to-date information tailored to farm-specific needs.

The COVID-19 pandemic exposed vulnerabilities in agricultural marketing, as farmers faced economic losses due to dependence on middlemen and lack of direct market access. ICT tools, particularly mobile applications and e-portals, can empower farmers by providing real-time market intelligence, enabling independent transactions and fair pricing. By leveraging digital solutions, farmers can enhance their knowledge, improve livelihoods, and ensure sustainable growth in agriculture.

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