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Utilization of ICT tools for agricultural crop practices by the farmers

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Abstract

The Indian farming community is currently grappling with numerous challenges in enhancing crop productivity. Although the application of information and communication technologies (ICTs) in agriculture is extensive and varied, a significant disconnect remains between research advancements and their practical adoption by farmers. In light of these concerns, the present study titled *"Utilization of ICT Tools for Crop Practices by the Farmers of Jaipur District of Rajasthan"* was conducted. The findings revealed that most farmers had a moderate level of access to ICT tools, with mobile phones being the most commonly available, followed by televisions. However, the overall use of ICT tools among farmers was relatively low, even though mobile phones were used daily. A majority of farmers showed a moderate level of engagement with ICT tools across various agricultural and allied activities. Notably, neighboring farmers frequently used ICT tools for pulse crop cultivation, whereas those farther away predominantly used them for organic farming. In terms of specific crop cultivation practices, most farmers consistently used ICT tools for managing manures and fertilizers. Additionally, the use of farming applications was generally moderate, with the *IFFCO Kisan App* being the most widely utilized among them.

Keywords: ICT tools, agriculture, crop practices, farmers

Introduction

ICT Tools in Agriculture

Information and Communication Technology (ICT) tools encompass a wide range of devices and equipment such as computers, mobile phones, cell towers, video conferencing systems, software, radios, televisions, laptops, and more. These technologies utilize instruments like wireless networks, the internet, mobile phones, satellite systems, and broadcasting tools to enable the efficient exchange of information. ICT plays a crucial role across various sectors, including education—supporting platforms like e-learning and online libraries—and simplifies the dissemination of valuable information like never before.

In the context of agriculture and food systems, numerous countries are already leveraging ICTs through diverse actors. These include multinational corporations, agricultural input providers (both large-scale and small to medium enterprises), and machinery manufacturers. They offer a variety of ICT-based services to farmers, particularly in the form of agricultural extension and advisory support. Additionally, stakeholders such as supermarkets and agricultural buyers actively use ICTs throughout the value chain. Farmer cooperatives, civil society organizations, international bodies, and government institutions also rely on ICT platforms to deliver critical farming-related information, including regulatory updates.

In many cases, ICT has evolved beyond merely transmitting information; it is now embedded into core farming and food processing operations. This ranges from conducting soil analysis to employing advanced tools like 3D printing for food processing.

The adoption of ICT has made a significant impact on development and economic growth, particularly in regions and sectors where it is well-integrated. Today, almost 40% of the global population has internet access, and even among the lowest income groups, 70% of households own a mobile phone. This widespread use of ICT has led to reduced costs for information access and transactions, created employment opportunities, enhanced the quality of services, conserved resources, and opened up new income avenues (as reported by the Food and Agriculture Organization of the United Nations on ICT in Agriculture).

Table 1: Some Mobile app and launching organisations

S. No.	Mobile apps	Launching organization
1.	Iffco kisan app	Launched by Indian farmers fertilizer cooperative.
2.	PM kisan app	Launched by Govt. of India
3.	Agri market	Launched by Govt. of India
4.	Krishify kisan app	Launched by farm stock pvt. ltd.
5.	Agri market	Launched by Govt. of India
6.	Agro star	Launched by agro star pvt. Ltd
7.	Crop insurance android app	Launched by Govt. of India
8.	Kisan suvidha	Launched by Govt. of India

Materials and Methods

The Jobner Panchayat Samiti comprises 22 gram panchayats. For the study, two separate lists were created: one included gram panchayats with at least three villages located within a 10-kilometer radius of the SKNAU, Jobner headquarters; the other included those situated beyond this 10-kilometer range. From each list, two gram panchayats were randomly chosen—two from within the 10-kilometer boundary and two from beyond it. Thus, a total of four gram panchayats were selected for the research.

Table 2: Village Wise Information of Selected Gram Panchayats

S. No.	Name of gram panchayat	Type of gram panchayat	Name of selected village	Number of selected respondents
1.	Jorpura Jobner	Adjacent	Machharkhani	15
			Jorpura Jobner	15
2.	Murlipura	Adjacent	Chirnotiya	15
			Murlipura	15
3.	Khejdawas	Distant	Joshiwas	15
			Kuchyawas,	15
4.	Aidan Ka Bas	Distant	Khedi Aloofa	15
			Aidan Ka Bas	15
	Total		8 villages	120

Farming apps are digital applications designed to provide agricultural information and support to farmers. Their usage was assessed through a structured schedule created by the researcher, incorporating feedback from subject matter experts. To evaluate the frequency of app usage, a scoring system was applied: a score of 3 was given for "Always," 2 for "Sometimes," and 1 for "Never."

Results and Discussion

The effective application of information technology in agriculture largely depends on how well farmers utilize ICT resources, as this directly influences their overall efficiency and performance. The study's findings on the use of ICT tools in crop-related practices are outlined in the sections below:

Frequency of Uses ICT tools by the Farmers

In this study, the frequency of ICT tool usage is defined as how often individual farmers engage with these tools for agricultural purposes. The corresponding results are detailed in the subsequent sections.

Levels of ICT Tool Utilization

To categorize farmers based on the extent of their ICT tool usage, an arbitrary classification system was applied. This system grouped usage into three levels: low, medium, and high. The summarized findings for each category are presented in the accompanying table.

Table 3: Levels of use of ICT tools by farmers

S. No.	Levels of use of ICT tools	Adjacent farmers (n_1=60)		Distant farmers (n_2=60)		Total farmers (n=120)	
		F	%	F	%	F	%
1	Low (below 20 score)	29	48.33	34	56.67	63	52.50
2	Medium (from 20 to 40 score)	27	45.00	23	38.33	50	41.67
3	High (above 40 score)	4	6.67	3	5.00	7	5.83
	Total	60	100.00	60	100.00	120	100.00

The data presented in the table indicates that the majority of farmers (52.50%) had a low level of ICT tool usage, followed by 41.67% with a moderate level, and only 5.83% with high usage. This limited adoption may be attributed to a lack of awareness or familiarity with modern digital tools such as web portals and mobile applications, as well as inadequate internet connectivity in rural areas.

Among adjacent farmers, the highest utilization of ICT tools was observed for accessing information related to manures and fertilizers (97.77 MPS), followed by variety/seed selection (92.77 MPS), market and marketing information (86.67 MPS), weather updates (81.67 MPS), and weed management (80.00 MPS). Further areas of usage included seedling preparation and sowing (75.00 MPS), plant protection (66.11 MPS), storage and transportation (60.55 MPS), irrigation practices (52.77 MPS), land preparation (48.33 MPS), and finally, harvesting, post-harvest handling, and value addition (42.77 MPS). These areas were ranked from I to XI based on their mean percentage scores (MPS).

Similarly, distant farmers also showed the highest ICT usage for information related to manures and fertilizers (95.55 MPS) and variety/seed (83.33 MPS), followed by market and marketing (82.77 MPS), weather-related information (80.00 MPS), weed management (78.88 MPS), seedling preparation and sowing (73.33 MPS), plant protection (64.44 MPS), storage and transportation (60.00 MPS), irrigation management (49.44 MPS), land preparation (42.77 MPS), and lastly, harvesting, post-harvest practices, and value addition (40.55 MPS), ranked I to XI respectively.

In summary, the findings reveal that most farmers—whether located close to or far from the study center—primarily used ICT tools for accessing information on manures and fertilizers, followed by seeds and varieties. These results align with the findings of Woreta *et al.* (2013) [11]. The data in the table indicates that among adjacent farmers, the IFFCO Kisan App was the most frequently used farming application (80.55 MPS), followed by the M-Kisan Portal (71.67 MPS), Krishify Kisan App (63.88 MPS), Agri App (58.33 MPS), PM Kisan App (54.44 MPS), and Agri Market App (49.44 MPS). In comparison, distant farmers showed a similar pattern, with the IFFCO Kisan App being the most

used (78.88 MPS), followed by the M-Kisan Portal (70.00 MPS), Krishify Kisan App (62.22 MPS), Agri App (57.00 MPS), PM Kisan App (53.33 MPS), and Agri Market App (48.88 MPS).

From the data, it can be concluded that adjacent farmers tended to use farming apps more frequently than distant farmers. This could be attributed to their closer proximity to SKN Agriculture University, which may facilitate regular interactions with agricultural scientists and increased awareness of digital tools and their advantages.

Table 4: Distribution of farmers according to use of farming apps n=120 (multiple responses)

S. No.	Use of farming apps	Adjacent farmers (n_1=60)								Distant farmers (n_2=60)							
		Always (3)		Sometimes (2)		Never (1)		MPS	Rank	Always (3)		Sometimes (2)		Never (1)		MPS	Rank
		F	%	F	%	F	%			F	%	F	%	F	%		
1	Agri App	8	13.33	29	48.34	23	38.33	58.33	IV	7	11.67	30	50.00	23	38.33	57.77	IV
2	IFFCO Kisan app	37	61.67	11	18.33	12	20.00	80.55	I	34	56.67	14	23.33	12	20.00	78.88	I
3	M-Kisan app	19	31.67	31	51.67	10	16.66	71.67	II	18	30.00	30	50.00	12	20.00	70.00	II
4	PM Kisan app	0	0.00	38	63.33	22	36.67	54.44	VI	0	0.00	36	60.00	24	40.00	53.33	VI
5	Agri Market	0	0.00	29	48.33	31	51.67	49.44	VIII	0	0.00	28	46.67	32	53.33	48.88	VIII
6	Pusa Krishi	0	0.00	36	60.00	24	40.00	53.33	VII	0	0.00	35	58.33	25	41.67	52.77	VII
7	Crop Insurance Android app	6	10.00	31	51.67	23	38.33	57.22	V	4	6.67	32	53.33	24	40.00	55.55	V
8	Krishify Kisan App	20	33.33	15	25.00	25.00	41.67	63.88	III	18	30.00	16	26.67	26	43.33	62.22	III

Conclusion

The study found that factors such as education level, annual income, social participation, landholding size, exposure to mass media, occupation, and access to mechanical power were all positively and significantly associated with the extent to which ICT tools were used, with significance at the 1% level. Conversely, age and family size were negatively but not significantly related to ICT usage.

For both adjacent and distant farmers, education, landholding size, mass media exposure, occupation, and mechanical power were positively and significantly correlated with ICT tool usage at the 1% level. Annual income showed a positive and significant correlation at the 5% level for both groups. Additionally, social participation was significantly correlated at the 1% level for distant farmers, and at the 5% level for adjacent farmers. In both groups, age and family size were negatively correlated but not statistically significant.

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