A Study of Farmer's Awareness Level and Usage of Different ICT Tools

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ABSTRACT

ICTs refer to a wide range of technological tools and resources that are specifically developed for the creation, storage, evaluation, and management of information. ICTs have experienced substantial changes in recent years, becoming crucial instruments for expediting agricultural development, especially in developing countries like India. This study examined Haryana farmers' ICT knowledge and use. Agriculture farmers and individual interviews were used in the study. Every farmer underwent thorough interviews to assess their level of knowledge and utilization of ICT resources, such as email, radio, kiosks, computers, and mobile phones. The study analyzed data from 480 farmers, indicating that every participant owned mobile phones that lacked internet connectivity. The findings revealed that all the farmers possess knowledge of fundamental mobile features such as making phone calls and sending SMS messages. However, the majority of respondents reported not utilizing email, radio, kiosks, and computers for agricultural purposes. Surprisingly, 33% of the participants demonstrated proficiency in accessing different online sites, office documents, and presentations. Farmers are increasingly utilizing information and communication technologies (ICTs), like as mobile phones and kiosks, to access precise information regarding crop yield, daily wholesale rates at mandi markets, climatic conditions, crop diseases, and other pertinent agricultural knowledge. It is clear that there is a technology divide in the contemporary era dominated by ICTs, which poses issues for a significant portion of the farming community. The study highlights the importance of implementing focused interventions, such as conducting needs assessments and involving farmers directly, in order to effectively address this disparity. Although cell phones have become essential for farmers, there is still untapped potential for the broad use of various ICT technologies to improve agricultural practices and overall output.

Keywords: ICT Awareness, Mobile Usage, internet Usage and Participation of Farmers in ICT.

INTRODUCTION

ICTs have changed significantly and become important drivers of agricultural development, especially in emerging nations like India. Since the late 1980s, the ICT (ICT) industry has grown, with usage rising throughout the 1990s. Meanwhile, the Indian agricultural sector is feminizing, with women and men increasingly driving growth and development (Sife et al., 2010). As the global population is predicted to exceed 9 billion by 2050, agricultural production must increase by 60% from 2005/2007 levels to meet food demand. ICT solutions could greatly contribute to future global food needs (Kiondo & Lyimo, 2010). Sharing agricultural knowledge, skills, and information is the main purpose of agricultural extension services. Farmers need efficient agricultural knowledge distribution from research institutes to adopt productivity-boosting innovations (Meso et al., 2005). The study highlights the urgent requirement for farmers, particularly in developing nations, to have access to pertinent and up-to-date knowledge regarding novel agricultural methodologies. ICT can meet this requirement by gathering and disseminating up-to-date and precise data about weather conditions, resources, markets, and prices. Furthermore, it can make valuable contributions to research and development endeavors, facilitate the dissemination of knowledge to farmers, establish connections between producers and customers, and fulfill several other objectives. This study aims to evaluate the availability and ease of access to various ICT hardware options for farmers. ICT tools are deemed valuable when they are cost-efficient, have a wide market reach, and can collect significant information in a short period of time (Duan et al., 2009; Meena et al., 2011).

This study investigates the usage of mobile phones by farmers, with the objective of comprehending their effectiveness, user-friendliness, and the distinct objectives for which they are utilized. Collecting data on farmers' knowledge and utilization of mobile phones serves as a valuable asset for efficiently teaching them in agricultural and related tasks. Mobile technology is acknowledged for its ability to offer numerous advantages to agricultural communities, including facilitating communication, enhancing accessibility, and enabling the rapid sharing of current information (Soja & Soja, 2017).

RESEARCH METHODOLOGY

This study examines farming community ICT use and knowledge. Understanding how farmers use mobile phones for various purposes and how they improve agricultural knowledge became crucial. These technologies are readily available, but the agricultural community is not using their vast knowledge and information on new and creative farming technology. In order to tackle this issue, the research was carried out in the Indian state of Haryana, renowned for its exceptionally fertile farmland in contrast to other states in the northern region. The region is accountable for the production of a wide array of crops, fruits, and vegetables. The research design is a predetermined structure that prioritizes the presentation of study data,

logical reasoning, and problem-solving methodologies. The process encompasses various stages, including data collection, data analysis, and data interpretation. The current study used a descriptive design, a commonly used approach in social research, to describe the relationships between variables using the gathered data. Sampling is a crucial procedure that acknowledges the impracticability of surveying the entire population due to limitations in time and resources. Sampling is a method that acknowledges the impracticality of certain aspects. A total of six administrative blocks were identified in the state of Haryana, with two districts chosen from each of the six divisions. Furthermore, a deliberate choice was made to include two villages from each district, resulting in a total of twenty-four villages selected for the purpose of data gathering. The villages were initially assessed in cooperation with the agricultural extension department in the Haryana district to gather demographic information about the farmers. In the last phase of the study, a sample of 480 respondents was randomly selected from a pool of nine villages, using the methodology given by Yamane (1967). The aim of this sampling methodology was to provide the research project with a dataset that is both statistically robust and accurately reflects the community under investigation. This was achieved by employing a formula to calculate the sample size.

The farmers were surveyed regarding their frequency of mobile phone usage and their awareness of features such as SMS, video calling, WhatsApp groups, Facebook, games, songs, and agricultural technology information. The investigation also examined the rationale behind their utilization of mobile phones. The data was methodically documented in an Excel spreadsheet and then evaluated by calculating frequencies and percentages, presenting the results in a tabular format.

The study was originally intended to evaluate farmers' knowledge and utilization of different ICT tools. However, it was ultimately restricted to solely examine mobile phones because of their widespread availability, with all respondents owning mobile devices. The study's findings can be crucial in strategizing and developing strategies to optimize the utilization of ICT tools for the improvement of knowledge and education in agriculture and related fields. This entails providing farmers with training on how to efficiently utilize mobile phones to enhance their knowledge and skills. Future plans involve creating specialized applications for agriculture with the aim of enhancing agricultural production and efficiency. These apps will offer full sets of techniques tailored to various types of crops. This strategy approach, guided by the results of the study, seeks to customize applications to meet specific agricultural requirements, so promoting improved outcomes in the agricultural industry. Significantly, farmers shown a willingness to collaborate with academics, highlighting their openness to acquiring useful knowledge.

RESULTS AND DISCUSSION

The tabulated data demonstrates that every single respondent owned mobile phones and used them regularly, highlighting the widespread presence of this technology among the polled population. Significantly, 33% of participants had the ability to utilize internet services on their mobile devices. Conversely, a mere 20 percent of participants possessed personal computers or laptops, but they were unable to make use of them because of the lack of internet access.

Table 1 Possession of mobile applications among farmers

	Use of mobile with internet	**Use of mobile without internet**
Personal Mobile	72	100
Family member's mobile	35	20
Individual Computer	22	28
Family member's computer	38	25
Kiosk or common service centers invillage	28	10

Source: Primary Data (Values in Percentage)

Table 1 presents significant trends in the distribution of farmers based on their utilization of ICT technologies. The prevalence of this technology is demonstrated by the fact that 72 percent of farmers who have internet access also own a cell phone. The broad use of mobile phones as a popular means of accessing information and services can be linked to their convenient and affordable nature. Additionally, it is noteworthy that 35% of farmers with internet access employ a mobile device belonging to a family member, thereby illustrating the social aspect of technology adoption within households. Approximately 22% of farmers who have internet connection own personal computers and laptops, demonstrating a notable but not excessive adoption of sophisticated ICT gadgets. The prevalence of communal exploitation of technical resources within households is demonstrated by the fact that 38% of farmers with internet access own family personal computers or laptops that are shared among several household members. Kiosks and shared service centers are widely utilized in rural areas, accounting for 28% of the total utilization. This highlights the necessity of establishing centralized access points to address the issue of the digital divide among farmers. The findings underscore the need of taking into account both individual and collective ownership of ICT (ICT) devices. Furthermore, they stress the importance of employing inclusive tactics to promote digital literacy and improve accessibility to technology in rural agricultural regions.

The reason for the uniform possession of mobile phones by all participants might be ascribed to the belief

that mobiles have become a necessary commodity, promoting a feeling of continuous contact among persons without the need for extensive technological abilities. The poll findings indicate a disparity in internet usage, with certain individuals utilizing mobile devices with internet capabilities, while others primarily using them for making calls and sending messages.

In addition, Stec et al. (2014) emphasized that a limited understanding of ICT (ICT) in rural regions may create a barrier between individuals and ICT services such as the internet and telephony. This might potentially lead to a negative perception of these technologies. This highlights the significance of tackling the digital divide and guaranteeing fair access to ICT resources in order to promote favorable perceptions and universal acceptance among rural people.

Table 2. Usage of mobile and computer services

Mobile without internet	**Aware**		**Use of applications**	
	Yes	**No**	**Yes**	**No**
Calling	100	0	100	0
SMS	100	0	91	9
Mobile with internet				
Video Calling	87	13	71	29
SMS	79	21	63	37
Memory stick/ Memory card	79	21	53	47
WhatsApp	73	27	63	37
Facebook	55	45	45	55
Games/ movies/ songs	67	33	43	57
Accessing different internet sites	51	49	33	67
Computer without internet				
Office documents/presentations etc.	42	58	32	68
Computer with internet				
Office documents/presentations etc.	39	61	15	85
Facebook, social media	19	81	27	85
Accessing different internet sites	19	81	27	85

Source: Primary Data (Values in Percentage)

The findings from Table 2 emphasize that every participant, who owned mobile phones without internet access, demonstrated knowledge about fundamental features including making calls, sending SMS, and using memory sticks. In addition, a significant majority of individuals participated in these activities, with 100 percent using calling features and 91 percent using SMS services. In contrast, participants who possessed mobile phones with internet capabilities (ranging from 51 to 87 percent) exhibited a more extensive understanding, which included making calls, sending messages, using memory cards, utilizing WhatsApp and Facebook, playing games, watching movies, listening to songs, and accessing various online platforms. Nevertheless, the practical usage rates differed, spanning from 33 to 71 percent, with a significant tendency of relying on their offspring for aid in these tasks.

The results align with the findings of a study conducted by Roztocki et al. (2017), which showed that 80.63 percent of farmers were aware of information technology, but only 19.38 percent actively sought agricultural knowledge using ICTs. In a similar vein, Hasan et al. (2019) found that a significant proportion of farmers (50.67 percent) had a good understanding of ICT services and regularly utilized them to get information. Roztocki & Weistroffer (2016) found that farmers exhibited different levels of expertise, with around one third displaying a moderate level of awareness regarding ICT instruments. One fourth of farmers were moderately aware of ICT use in farm activities, according to Nesse (2014). Additionally, 60% of farmers had little awareness and 12.7% had very low awareness. The study supports the claim made by Leeuwis and Van den Ban (2004) that information sources and media play a crucial role in raising awareness among farmers about new agricultural technologies. The mass media plays a crucial role in spreading agricultural innovations to farmers more quickly than personal connections. This emphasizes the impact of information distribution channels on the adoption of technology in agriculture (Jabir, 2011; Syiem, 2015).

Around 33% of the participants, with percentages ranging from 36% to 48%, exhibited proficiency in accessing a variety of online sites, office documents, and presentations. Nevertheless, only a modest proportion, varying from 12 to 30 percent, actively made use of these amenities, mostly serving respondents involved in jobs linked to documentation. Out of the respondents, 16 percent indicated having knowledge about Facebook, social media, and visiting different internet sites, but only 12 percent really used these platforms when necessary. Nagalakshmi and Narayanaswamy (2011) found that half of farmers had a moderate comprehension of ICTs and two third farmers were highly favorable about them. Kabir (2015) found that roughly 50% of participants had moderate ICT tool and service awareness. Most poll respondents knew about the Agricultural Produce Market Committee's mobile advising. Less than 25% of participants knew about touch screen kiosks, however 64% knew about Kisan Call Centre (KCC) services. The varied understanding and use of ICT services by farmers highlights the need for specialized campaigns to promote technology-driven agricultural services.

Table 3. Pattern of usage of mobile devices and its functions

Reading of SMS received				**Answering Calls**			
Messages Seen		**Read messages**		**Picking up all calls**		**Picking calls from Known numbers only**	
Yes	No	Yes	No	Yes	No	Yes	No
85	15	82	18	82	18	92	8
Writing messages				**Availability of memory card in mobile**			
Yes		No		Yes		No	
74		26		94		16	
Capacity of memory card used in mobile							
8 GB		16 GB	32 GB	64 GB	128GB	256GB	
52		28	12	8	0	0	

Source: Primary Data (Values in Percentage)

Table 3 offers valuable information regarding the usage habits of the respondents' mobile phones. Remarkably, 92 percent of participants answered every phone call, whereas 8 percent especially responded to calls from familiar contacts. Regarding the reception of SMS, 85 percent of respondents claimed being able to fully interpret and understand the messages, while 74 percent reported being able to respond to the messages. Farming communities expressed their appreciation for the convenience, quickness, and accessibility of accessing information on many agricultural elements (Philip, 2017).

The figure demonstrates that 85 percent of the participants receive textual communications, with 30 percent receiving phone messages and 54 percent receiving video messages from their family members and friends. Merely 33% of participants indicated that they have received communications from the agriculture department. Interestingly, 74 percent of participants demonstrated proficiency in composing messages, while 94 percent had memory cards with capacities ranging from 8 to 64 GB. The broad adoption and skillfulness in using SMS forwarding can be credited to its simplicity, as well as the availability of free Jio mobile data for nearly a year, which encouraged its extensive use. Children were also involved in tasks such as transmitting, relaying, and accessing SMS messages. Pant (2011) saw a comparable pattern, wherein a significant proportion of household leaders utilized mobile phones to engage in agricultural communication, highlighting the agricultural sector's dependence on mobile devices for the flow of information.

Table 4 Frequency of use of different ICT tools by farmers

	Frequency of usage of ICT Tools			
ICT tools used by farmers	**Never**	**Rarely**	**Sometimes**	**Always**
Kiosk / common service centers	62	4	10	24
Computer	70	6	12	12
Television	0	0	24	76
Internet	26	4	12	58
E- mail	48	4	6	32
Radio	60	0	16	24
Mobile	0	0	2	98

Source: Primary Data (Values in Percentage)

Table 4 indicates that a steady majority of respondents, over 74 percent, utilized both television and mobile phones. 58 percent of respondents reported using the Internet, but usage of e-mail, radio, kiosk, and

computers varied between 26 and 70 percent, suggesting a lower level of prevalence. The widespread availability and simple accessibility of television and mobile phones were identified as factors contributing to their prevalent usage. In their study, Kaske et al. (2018) found that online usage among farmers varied. Specifically, 42 percent reported using websites very often, 33 percent reported using them often, 19 percent reported using them sometimes, 3 percent reported using them seldom, and a small percentage of farmers reported not using websites at all. Shiro's case study on DIY ICT demonstrated the favorable disposition of rural communities towards ICT, despite their restricted understanding impeding regular ICT utilization (Armstrong et al., 2012). The results underscore the necessity of focused ICT education to fully harness the capabilities of these tools in agricultural communities (Hassan et al., 2011).

Kafura et al., (2016) highlighted that regular use and exposure to ICT are pivotal in cultivating a favorable disposition towards ICT. Hassan et al., (2011) emphasized that attitude plays a crucial role in determining the perceived effectiveness of ICT. In their study, Armstrong et al. (2012) observed that although ICT tools have the potential to enhance farmers' livelihoods, not all farmers in the Ratnagiri area have fully adopted them in the agricultural sector.

Table 5. Purpose for using ICT applications

ICT tools	Health	Education	Entertainment	Agriculture	Business	Social welfare
Kiosk /Common Service Centers	0	12	0	0	4	0
Computer	0	18	14	0	0	0
Television	4	22	100	30	0	0
Internet	0	34	62	0	26	0
E- Mail	0	12	0	0	0	0
Radio	0	0	40	12	0	0
Mobile	0	22	96	30	34	0

Source: Primary Data (Values in Percentage)

Table 5 examines the objectives for which respondents utilize ICTs. All respondents used television for amusement, with 30% watching agriculture shows, 22% for educational purposes, and 4% for health-related information. 40% of the participants engaged in radio listening for amusement purposes, while 12% exclusively sought out agriculture-related content. Entertainment was the primary usage of mobile phones for 96 percent of the respondents, while 30 to 34 percent utilized them for business and agriculture, and 22 percent for educational purposes. 12 percent of the respondents utilized kiosk services for educational purposes, while 4 percent used them for business. 14 percent of respondents utilized computers for both educational and leisure purposes. The main factors mentioned for utilizing television and mobile devices

were their uninterrupted availability, convenient accessibility, user-friendly interface, and cost-efficiency as forms of entertainment. This aligns with the findings of Armstrong et al. (2012), which indicate that agriculture is becoming more reliant on information, and having access to information is crucial for agricultural development. The aforementioned insights highlight the various functions that ICTs serve in the life of farmers, encompassing not only entertainment but also education, health, and business-related endeavors (Mittal & Mehar, 2012).

Kafura et al., (2016) emphasized that the presence of telephone infrastructure has greatly enhanced the accessibility of individuals, including those living in rural regions. This enhancement facilitates the establishment of linkages between farmers and a diverse range of individuals, including extension specialists. Helplines, particularly those utilizing toll-free numbers, function as channels for acquiring information and aid pertaining to individuals' issues. ICT has shown a significant influence on the agricultural industry, particularly in relation to food production operations (Lee et al., 2018). In Dixon's (2009) study, it was discovered that 57.33 percent of farmers utilized information and communication technologies (ICTs) to access agricultural commodity pricing. Conversely, Hassan et al. (2011) discovered that the individuals in their study area made minimal use of ICT technologies. Television is a widely used ICT (ICT) medium among farmers who are looking for agricultural information.

62 percent of individuals reported using the internet for pleasure, while 34 percent used it for educational purposes, and 26 percent used it for business purposes. In addition, 12 percent of the participants used email for educational purposes, specifically to answer competition tests. According to Lim & McNelis (2018), the majority of respondents at the center mostly used information boards, video presentations, and radio programs to obtain information about fertilizer application, harvesting procedures, and market information. In a study conducted by Lopez et al. (2019), it was found that 65.71 percent of the participants used information services provided by KCC. Additionally, 61.43 percent of the respondents utilized services from Krishi Marata Vahini, while 55.71 percent used services from e-Choupal.

Interviews revealed that by providing farmers with these facilities and raising their awareness of the benefits of employing ICT tools, the adoption of these technologies may potentially rise from 12 percent to over 50 percent. Having knowledge and being trained in the utilization of ICT technologies could further amplify their convenience. According to Hardy & Castonguay (2018), teachers enhanced their capacity for knowledge when they were introduced to the concept that using mobile phones may help students collaborate and communicate, regardless of their location or time. The results emphasize the significant impact that ICTs can have on improving connection and access to information in many industries, especially in agriculture (Ashraf et al., 2017).

The research indicates that most respondents abstained from use email, radio, kiosk, and computer.

Regarding Facebook, social media, and visiting other internet sites, 16 percent of respondents indicated being aware, while just 12 percent actively utilized these platforms as required. The surveyed farmers utilized less ICT devices (Lindell, 2020). Nevertheless, enhancing farmers' accessibility to ICT tools could potentially augment their daily utilization. This implies that improving the ease of use and the availability of technology may lead to a higher rate of technology adoption among different user groups. Banmeke and Ajayi (2008) highlight the advantages of using ICT for the distribution of information. A study conducted by Rudroju (2013) revealed that livestock producers in Uttar Pradesh, India, who utilized ICT-based information, demonstrated superior decision-making skills in livestock practices compared to those who did not use such technology. This demonstrates the potential benefits of enhancing farmers' access to ICT tools, as it enables them to make more informed decisions and enhance their operational efficiency.

CONCLUSION

Overall, the results suggest that more than half of the participants routinely utilized television and mobile phones, with usage rates ranging from 64 to 94 percent. In contrast, internet usage was recorded by 46 percent of the participants. In addition, a range of 24 to 70 percent of participants reported receiving written messages, while 30 to 40 percent received voice communications, and 12 to 54 percent received video messages from their family members. Significantly, 96 percent of the participants employed mobile phones for leisure, 34 percent for business endeavors, and 22 percent for educational pursuits. These findings provide significant knowledge for policymakers, app developers, and researchers. Their emphasis lies in the significance of incorporating agricultural information into app development, offering a significant resource for farmers to augment their knowledge and implement these applications in their fields. Consequently, this can result in enhanced output, efficiency, and the acceptance of related endeavors, ultimately resulting in elevated household earnings and an amelioration of living standards. In essence, these efforts strive to enhance the living conditions of farmers and have a beneficial influence on their general well-being.

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