Agro Economist - An International Journal
Citation: AE: **9**(01): 61-67, March 2022
DOI: 10.30954/2394-8159.01.2022.9

A A E B M
ASSOCIATION OF AGRICULTURAL ECONOMICS & AGRI-BUSINESS MANAGEMENT

Adoption of Information and Communications Technology (ICT) by Farmers in Kashmir Division of Jammu and Kashmir

Yawar Abbas Wani, Omar Fayaz Khan and Bilal Ahmad Sheikh*

School of Agricultural Economics and Horticulture Business Management Shere-e-Kashmir University of Agricultural Science and Technology of Kashmir, J&K, India

*Corresponding author: bilalsheikhphd@gmail.com

Received: 19-12-2021 **Revised:** 28-02-2022 **Accepted:** 10-03-2022

ABSTRACT

The Information and Communication Technology (ICT) enhanced extension systems are acting as a key element for improving agrarian situation and farmers' lives by providing access to information and exchanging knowledge. The term Information and communication technology was proposed by Stevenson in 1997. The present study was carried in Anantnag, Shopian Baramulla and Ganderbal districts of Kashmir valley. One block were selected from each district, three villages from each block were selected for the study. Respondents are selected by Stratified multistage random sampling technique. As a result, a total of 180 farmers were sampled for the analysis. The data was gathered using a structured interview schedule. The detailed review of profile characteristics revealed that the majority of farmers were medium aged (55%), illiterate farmers (51.7%), marginal farmers (63.9%), had 20-30 years of farming experience (31.7%), and had below 3 lac income from agriculture (54.4%).TV programme -Helo Kissan has greater awareness among farmers for seeking information related to agriculture activities. Farmers are less aware about Smart Phone (27.2%), different apps related to agriculture (Kisan Suvidah (6.7 %), Maghdoot (0%), Damani (0%)). The education level of respondents showed significant relationship with awareness of ICT tools (Television, Smart Phone, Internet). Also income from agriculture showed significant relationship awareness of smart phone and internet. One of the possible explanations is that people gain their expertise through formal schooling, which makes them more confident and self-reliant in every decision-making process. The educated family has higher decision-making skills due to formal education, and their awareness of ICT tools. Farmers with more education would have more awareness of ICT tools and, as a result, a more favorable attitude toward ICT tools.

Keywords: Information and communications technology (ICT), usage, awareness

The world's population is projected to reach the 9 billion mark by 2050, and agriculture needs to increase the production of nutritious food to meet rising demand and ensure food security for everyone. It has to build jobs, raise wages, and make a positive impact in the cities and towns in developing countries. It is necessary to protect our natural resources because they play an integral role in sustaining future generations. The vast majority of increased food production will occur in developing countries. Agriculture is becoming increasingly knowledge intensive across the globe and challenges faced by smallholder farmers include inadequate access to markets, low levels of human

How to cite this article: Wani, Y.A., Khan, O.F. and Sheikh, B.A. (2022). Adoption of Information and Communications Technology (ICT) by Farmers in Kashmir Division of Jammu and Kashmir. *Agro Economist - An International Journal*, **09**(01): 61-67.

Source of Support: None; **Conflict of Interest:** None

and physical resources, poor access to education and weak information flows. With markets lacking, low skills and poor ability, agriculture in the developing world will have to resolve a range of challenges in the future. In developing and developed countries, farmers' information needs will only increase as they have to make more and more complicated decisions about how to use their land, what crops to produce and how to buy inputs and in which markets sell their produce. Their decisions, which often include choices about how to fund their business and minimize the risk they face, have an effect on the livelihoods of their families and society.

Information and Communication Technologies (ICT) serve as an empowerment mechanism that has broken all cost, space and time constraints. The growth of Internet technology has increased the connectivity and understanding between people and has brought new actors into the rural region. ICT contributes to empowerment, social growth, sustainable development and improvements in the livelihoods of rural people. It also plays an important role in climate change, natural disasters, water supply, food security, hurricane management, drought management, local capacity building (individual and organizational) sharing of knowledge and the convergence of indigenous and modern knowledge. There is a potential for technology to be used in rural areas and to take advantage of its positive effect on the many and varied resources and opportunities available to rural communities. In particular, the development of information and communication technologies (ICT) as a possible means of overcoming the worsening situation in marginalized rural and physical distances between communities and rural businesses. ICTs have contributed greatly to the growth and socio-economic development in the business sectors, countries and regions where they are well-received and incorporated. Nearly 40% of the world's population have access to the Internet, and 7 out of 10 households have cell phones in the bottom fifth of the poor (World Bank Group, 2016). The widespread adoption and incorporation of ICTs has reduced information and transaction costs, increased service quality, created new jobs, developed new revenue streams and saved money.

Information and Communication Technology (ICT) is an extension term for information technology (IT) that emphasizes the role of unified communications and integration of telecommunications (telephone lines and wireless signals) and computers, as well as the requisite enterprise software, middleware, storage and audiovisual systems that allow users to access, store, distribute and manipulate data. The term ICT is often used to refer to the integration of audiovisual and telephone networks with computer networks via a single cable or connected system. Margaret Rouse (2005) says, Information and Communication Technology is an umbrella concept that covers any communication device or application, encompassing: radio, television, cellular phones, computers and network hardware and software, satellite systems and so on, as well as the various facilities and applications associated with them, such as videoconferencing and distance learning. ICT is a broader term used to refer to gadgets, tools, apps, internet, etc. The use of agricultural information and communication technology (ICT) tools is referred to as e-Agriculture. ICT tools are primarily classified as online gadgets and offline gadgets. Offline gadgets can only be used with the help of the internet, which includes mobile and laptop apps such as kiosks, portals, e-mails, websites, agricultural applications, blogs, Whats app, Facebook, Instagram, Twitter, Hikes, Messengers, etc., the added advantage of which is to download photos, videos, audios and data files, and can be viewed offline at any number of times. Whereas offline tools can be used without an internet connection, such as CD drives, storage devices and text messages in mobile devices. ICTs are quite often related in a specific sense, such as ICTs in education, health care or libraries. According to UNESCO, "ICT is a scientific, technological and engineering discipline and management technique used in the handling of information and application and in association with social, economic and cultural issues."

In agriculture and food sectors around the world, not only ICT firms, multinational farm input companies, major machine manufacturers, but also small and medium-sized farm input suppliers provide a range of ICT services to farmers, including extension advice. Downstream, supermarkets and agricultural commodity consumers are also active in the food supply chain through ICT, where technology is also used by farmers' cooperatives, international organizations, civil society and governments provide

effective information on many aspects of agriculture, including regulation. ICTs are transforming how companies run, people communicate, and governments function. They reduce the cost of transactions and make contact simpler. People can be consulted and interacted at much lower cost than before. With this, digital technologies encourage productivity and convergence–many activities can be carried out at low cost and many programs can meet people who have previously lacked access. In rural Niger, agricultural prices are mainly informed by cell phones, thereby reducing search costs by 50 percent (World Bank Group 2016). In Senegal, a website promotes vulnerable communities' access to information on climate change adaptation. It supports an international community of practice where participants can share their insights, perspectives, and best practices online.

In India, accurate weather information is crucial for smallholders to manage uncertainty and danger in their farm production. From a wider viewpoint, digital technology tapping into satellite imagery is providing a breakthrough in the way countries are being able to determine, track and plan the use of their natural resources, including tracking deforestation and desertification. Access to digital tools that monitor land-use trends and their changes will become increasingly necessary as countries around the world adopt steps to respond to and mitigate climate change. In developing countries, ICTs will have a profound effect on productivity, resilience and inclusion in emerging economies and the Internet of Things, Cloud Computing and Big Data are revolutionizing agriculture in developing economies. With the aid of remote sensors, farmers can collect data on the soil moisture, temperature, crop growth and livestock feed levels, allowing them to achieve better yields by improving crop management and reducing the use of fertilizers, pesticides and water. Increased efficiency is also the consequence of remote management and control of machinery and irrigation systems using satellite positioning, while data from farm operations are gathered and analyzed, often in combination with information on whether to provide new efficient decision-making tools that encourage agricultural production and manage natural resource effectively. In developed countries, major agricultural companies, through their digital channels, provide their customers with a wealth of private knowledge on agricultural technology. On the distribution side, e-commerce platforms enable farmers to directly connect with retail outlets for their produce. The livelihood of the majority of the population of Jammu and Kashmir revolves around agriculture and allied sectors. More than 70% of the population, or over 1.25 crore citizens, rely on agriculture and allied sectors. The average size of the land holding is very small (0.545 hectares) compared to 1.66 hectares at national level, with more than 93% of the owners of those farms subsisting on agriculture and related sectors. Kashmir Valley is falling behind in the adoption of ICT, as we do not have adequate financial strength and financial backing to facilitate the efficient installation and smooth functioning of ICT in our valley, which could otherwise help bypass obstructive physical barriers to the development of new technology (Wani, Hakeem, Wani, & Rishu, 2017). The ICT supports all elements of the value chain in making the exchange of services and products more efficient. For example, in the Kashmir Valley, ICT may probably be the most effective tool to solve issues that pose a major challenge to the Convention's face-to-face method of extension. Some of the factors that continue to drive ICT in the Kashmir Valley are the remoteness of pockets/ villages, hilly terrain, low extension-farmer ratio, weak infrastructure arrangements between scientists, line departments and growers.

The Green, White, Yellow and Blue Revolutions serve as reminders of the positive improvements traditionally made. At the same time, India has effectively embarked on the "Cyber Revolution." Despite the progress made in agriculture, the integration of information technology and the cyber revolution in order to ease these constraints is still incomplete. The agricultural information system will serve as a crucial pedagogical tool in the transformation of India into a secure and productive democracy in the 21st century.

REVIEW OF LITERATURE

Balaji *et al.,* (2007) investigated the effect of ICT on agricultural extension service delivery through rural e-services and examined two indices: the quality index (QI) and the awareness – information index (AKI), which included agricultural knowledge, awareness of new methods, and knowledge

of funding sources while as Mittal and Mehar (2012) investigated the rapid growth of mobile telephony and the implementation of mobile-enabled information services to find ways to boost information transmission in the knowledge-intensive agriculture sector, which could aid in overcoming information asymmetry among farmers. Also, Olaniyi *et al.,* (2013) studied ICT tools (ICT) use, understanding, and relevance among cassava farmers in Osun State, Nigeria. The findings showed that on average, the survey respondents had approximately 17 years of farming experience and 45 years of age. Radio, television, video recording, audio recording, computer, and personal camera were classified as being of high knowledge and access.

Okello *et al.,* (2014) investigated the factors that affect smallholder farmers' understanding and use of ICT-based "Business Information Services" (MIS) in Kenya. The researchers looked into the factors that affect smallholder farmers' knowledge of market information services provided by ICT-based projects and their use of those services in Kenya. Similarly, according to Robert *et al.,* (2014), increased understanding is crucial for the acceptance of ICTs for extension purposes. The use of ICTs will allow extension officers and agriculturalists to extend their practical knowledge and information technology for learning. The use of ICTs by extension staff is widespread to disseminate instructional materials all over the world. while as, according to Syiem and Raj (2015), E-agriculture sends agricultural information to farmers via SMS via an SMS gateway and recommends switching to E-agriculture. Additional information, including daily, seasonal and other data can be submitted to farmers. The day-to-day warning can be sent to all farmers in the database.

OBJECTIVE OF THE STUDY

O1: To study awareness of ICT tools among farmers

Hypothesis

H0 there will be no significant relationship between the selected profile characteristics of farmers and Awareness of Software/Apps & Networking Technology for agriculture information

MATERIALS AND METHODS

In order to ensure that the researcher responds to the research problem, a detailed description of the procedures and methods used to carry out the research is explained systematically. This portion provides descriptions of study design, sampling technique, variables and their analytical estimation, data collection instruments, data collection methods employed and statistical tests used to analyze data.

Geographic location: The present study is carried in Anantnag, Shopian Baramulla and Ganderbal districts of Kashmir valley the sampling design adopted in the study was Stratified multistage random sampling technique.

Sampling Design

Stratified multistage sampling is based on grouping units into subpopulations called strata and then using a hierarchical structure of units within each stratum.

Survey Instrument and Data collection

The present study utilizes primary data for addressing the specific objectives of the study. The primary data for the present study were collected by using an interview schedule through a survey of sample respondents. Interview schedule containing general demographic data, education level and information concerning household income and their agricultural activities.

RESULTS AND DISCUSSION

Awareness of Software/Apps & Networking Technology for agriculture information

The data were analyzed with help of chi-square technique and the results are summarized in the table below;

The effort was made to determine the awareness of Gadgets & Print Media for agriculture information. The results are summarized in the table given below;

Table 1 indicates that farmers are not much aware about software or apps for seeking agriculture related information. Only 27.2% farmers are aware about whatsapp, followed by Facebook (22.2%) and Internet (15%). Farmers are very less aware about android apps related to agriculture. Only 6.7%

farmers are aware about Kisan Suvidah app. No one is aware about Magdoot and Damanai app.

Table 1: Farmers response on awareness of Software/ Apps & Networking Technology for agriculture information

Software/Apps & Networking Technology		Scale		
		L	NT	H
(i) Whatsapp		125	6	49
		69.5	3.3	27.2
(ii) Facebook		137	3	40
		76.1	1.7	22.2
(iii) SMS		153	9	18
		85.0	5.0	10.0
(v) Android apps related to agriculture	(a) Kisan Suvidah	162	6	12
		90.0	3.3	6.7
	(b) Maghdoot	180	0	0
		100	0	0
	(c) Damani	180	0	0
		100	0	0
(vi) Internet		131	22	27
		72.8	12.2	15.0

Source: Field survey; **Note:** Value in Parenthesis shows percentage; L: Low, NT: Neutral, H: High

The probable explanation may be the lack of knowledge about the presence and usage of ICT tools; reliability on informal sources such as neighbours, family members and advanced farmers for information on agricultural and non-agricultural issues rather than structured information sources and mass media and lack of interest on the part of farmers in using ICT tools. The results were in line with Kavitha's (2015) research study.

It is evident from the table 2 that chi square value = 37.33 of education background is significant at 0.05 level with df = 4. Hence the null hypothesis (H_0) that "there is no significant association with socio-economic status (educational background) and awareness of TV programme- Krishi Darshan" is rejected. Thus, it can be said that awareness of TV programme- Krishi Darshan differs in socioeconomic characteristic of Education background. Illiterate farmers have more awareness of TV programme- Krishi Darshan for seeking information about agriculture activities as compared to illiterate farmers.

Moreover, it is clear from that table that chi-square value(s) are not statistically significant at 0.05 level with df = 4. Thus the null hypothesis (H_0) that "there

Table 2: Association between selected profile characteristics and Awareness level of TV programme- Krishi Darshan

Variable	Category	Awareness level of TV programme- Krishi Darshan					H_o
		L	NT	H	N	Chi square	
Age	Young age (Below 40)	17	02	09	28	2.139	Accepted
	Middle age (40 to 60 years)	60	07	32	99		
	Old age (Above 60 years)	38	02	13	53		
Education	Illiterate	48	01	44	93	**37.331****	Rejected
	Primary/JHS	19	05	05	29		
	Sec/HS	30	04	05	39		
	Grd/PG	18	01	00	19		
Income from agriculture	Below 3 Lac	67	04	27	98	14.289	Accepted
	3-6 Lac	33	05	13	51		
	Above 6 lac	14	01	14	29		
	None	01	01	0	02		
Farming Experience	Upto 10 years	22	04	11	37	7.13	Accepted
	10-20 years	30	02	12	44		
	20-30 years	31	04	22	57		
	Above 30 years	32	01	09	42		
Agriculture Land	Less than 1 hac (Marginal Farmers)	80	03	32	115	9.465	Accepted
	1-2 hac (Small Farmers)	30	07	17	54		
	2-4 hac (Semi-Medium)	05	01	05	11		

** 0.05% level of Significant; S- Non Significant; L: Low; NT: Neutral; H: High; N; total no. of respondents.

is no significant association with socio-economic status (Age, Income from agriculture, Farming experience, Agriculture land) and awareness of TV programme- Krishi Darshan" is failed to reject. It indicates that that farmers do not differ in their awareness of TV programme- Krishi Darshan in terms of their socio-economic status- Age, Income from agriculture, Farming experience, Agriculture land. Therefore, it can be said that awareness of TV programme- Krishi Darshan is not associated with socio-economic status (Age, Income from agriculture, Farming experience, Agriculture land).

Majority of sub-hypothesis are failed to reject thus we conclude that null hypothesis (H_0) that there will be no significant relationship between the selected profile characteristics of farmers and awareness of TV programme- Krishi Darshan is failed to reject.

FINDINGS

- TV programme –Krishi darshan has not greater awareness among farmers for seeking information related to agriculture activities.
- Farmers are less aware about Smart Phone (27.2%), different apps related to agriculture (Kisan Suvidah (6.7 %), Maghdoot (0%), Damani (0%)).
- The education level of respondents showed significant relationship with utilization of ICT tools (Television and Smart Phone).
- Formal education also enables people to process knowledge rationally, which is a requirement for making well-grounded decisions. ICT proficiency is an essential in usage, which can be obtained by education.
- The education level of respondents showed significant relationship with awareness of ICT tools (Television, Smart Phone, and Internet). Also income from agriculture showed significant relationship awareness of smart phone and internet. One of the possible explanations is that people gain their expertise through formal schooling, which makes them more confident and self-reliant in every decision-making process. The educated family has higher decision-making skills due to formal education and their awareness of ICT tools. Farmers with more education would have more awareness of ICT tools and, as a result, a more favorable attitude toward ICT tools.

CONCLUSION

The use of ICT in agriculture has emerged as a significant pillar of agriculture extension, with the goal of enhancing agricultural and rural growth through improved knowledge and communication processes. The use of ICT in agriculture has emerged as a significant pillar of agriculture extension, with the goal of enhancing agricultural and rural growth through improved knowledge and communication processes. ICT provided unprecedented opportunities to empower small landholder farmers by improving their marketing and agricultural work capabilities. Despite these advantages, when it comes to fostering confidence and partnership, face-to-face contact remains unrivalled. Because for rural farmers, communication is still primarily about forming personal relationships rather than conveying knowledge. Majority of the Kashmir farmers still use traditional ICT tools like radio, television for getting information related to agriculture activities. Farmers are not aware about many modern application developed for seeking agriculture information. Extension workers should make an effort to aware farmers about different available ICT tools for seeking agriculture information that will help farmers to get adequate, timely and useful information. The farmers believe in the reliable and credible sources of information. The institutions who furnish information through these ICT tools should provide factual and reliable information to the farmers in understandable way. Several issues must still be addressed in light of the suggestions made by farmers for effective use of ICTs. The administrator should combine the ICT tools and extension agents, so that effective transfer of technology is achieved.

REFERENCES

Balaji, V., Meera, N. and Dixit, S. 2007. ICT-enabled knowledge sharing in support of extension: addressing the agrarian challenges of the developing world threatened by climate change, with a case study from India. *Journal of SAT Agricultural Research*, **4**(1): 1-18.

Chhachhar, A.R., Qureshi, B., Khushk, G.M. and Ahmed, S. 2014. Impact of information and communication

technologies in agriculture development. *Journal of Basic and Applied Scientific Research,* **4**(1): 281-288.

Glendenning, C.J. and Ficarelli, P.P. 2012. The relevance of content in ICT initiatives in Indian agriculture. *International Food Policy Research Institute,* pp. 1-40.

Lokeswari, K. 2016. A study of the use of ICT among rural farmers. *International Journal of Communication Research,* **6**(3): 232.

Mathur, S.K. 2009. Financial analysis of the ICT industry: A regulatory perspective. *Journal of Infrastructure Development,* **1**(1): 17-43.

Mittal, S. and Mehar, M. 2012. How mobile phones contribute to growth of small farmers? Evidence from India. *Quarterly Journal of International Agriculture,* **51**: 227-244.

Okello, J.J., Kirui, O., Gitonga, Z.M., Njiraini, G.W. and Nzuma, J.M. 2014. Determinants of awareness and use ICT-based market information services in developing-country agriculture: The case of smallholder farmers in Kenya. *Quarterly Journal of International Agriculture*.

Olaniyi, O.A., Adetumbi, S.I. and Adereti, M.A. 2013. Accessibility and relevance of information and communication technologies (ICTs) among cassava farmers in Nigeria. *African Journal of Agricultural Research,* **8**(35): 4514-4522.

Premkumar, G. and Ramamurthy, K. 1995. The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems. *Decision sciences*, **26**(3): 303-336.

Rouse, M. 2005. ICT (information and communications technology, or technologies. Dostupno na: http: // searchcio-midmarket. techtarget. com/ definition/ ICT (27. 02. 2013).

Singh, S., Ahlawat, S. and Sanwal, S. 2017. Role of ICT in Agriculture: Policy implications. *Oriental Journal of Computer Science and Technology,* **10**(3): 691-697.

Syiem, R. and Raj, S. 2015. Access and usage of ICTs for agriculture and rural development by the tribal farmers in Meghalaya state of North-East India. *Agrárinformatika/Journal of Agricultural Informatics,* **6**(3): 24-41.

Venkataramaiah, P. 1983. *Development of socia economic status scale for rural areas* (Doctoral dissertation, Ph. D. thesis (Unpublished): Uni. of Agril. Sci. Banglore.

Venkataramaiah, P. 1990. *Development of socio-economic status scale* (Doctoral dissertation, Ph. D. Thesis.

Wani, N.U.I., Hakeem, A.H., Wani, R.A. and Rishu, J. 2017. Information and Communication Technology in Agriculture: A Kashmir Perspective. *Asian Journal of Agricultural Extension, Economics and Sociology,* pp. 1-6.

World Bank Group. 2016. *World development report 2016: digital dividends*. World Bank Publications.