



Available Online at EScience Press

International Journal of Agricultural Extension

ISSN: 2311-6110 (Online), 2311-8547 (Print)
<https://esciencepress.net/journals/IJAE>

ANALYSIS OF EFFECTIVE COMMUNICATION PATHWAYS WITH SPECIAL FOCUS ON ICTS FOR AGRICULTURAL INFORMATION DELIVERY: A CASE STUDY OF DISTRICT FAISALABAD

^aMuhammad A. Mushtaq, ^bSadia Aslam, ^cAminah Qayyum*, ^dMuhammad Luqman, ^dMuhammad Usman, ^bImran Riaz, ^eMuhammad Waqar, ^eMoula B. Peerzado, ^fAdeela Manzoor, ^gFazeel Tariq

^a On Farm Water Management, Directorate General Agriculture, Lahore, Pakistan.

^b Institute of Agri. Extension, Education and Rural Development, University of Agriculture Faisalabad, Pakistan.

^c Government College Women University Faisalabad, Pakistan, Pakistan.

^d Department of Agricultural Extension & Rural Studies, College of Agriculture, University of Sargodha, Pakistan.

^e Department of Agricultural Economics, College of Agriculture, University of Sargodha, Pakistan.

^f Department of Home Sciences, University of Agriculture Faisalabad, Pakistan.

^g Department of Agricultural Engineering, Khawaja Fareed University of Engineering and Technology, Rahim Yar Khan, Pakistan.

ARTICLE INFO

Article History

Received: August 20, 2023

Revised: January 11, 2024

Accepted: February 20, 2024

Keywords

ICTs

Communication

Mobile

Radio

Websites

Helpline

ABSTRACT

Information sharing among farmers can occur through various communication channels facilitated by local networks and institutions. While developed countries have recognized the value of Information and Communication Technologies (ICTs) and continue to enhance their ICT tools, the efficient utilization of ICTs in agriculture has yet to be fully embraced and developed. Given the multitude of communication pathways available for agricultural information dissemination, it was imperative to identify and analyze the most effective channels, particularly focusing on ICTs, for delivering agricultural information in District Faisalabad. The study involved interviewing 110 farmers using a structured questionnaire in face-to-face sessions. The collected data was subsequently analyzed using the SPSS (Statistical Package for Social Sciences) computer software. Results revealed that traditional media outlets such as radio and television remain highly favored by farmers, emphasizing their enduring significance in rural information dissemination. However, the study also highlights the comparatively lower preferences for certain traditional channels like newspapers and direct interactions with extension agents. Conversely, modern communication pathways such as agricultural websites and email show promise but still face challenges in garnering widespread adoption among farmers.

Corresponding Author: Aminah Qayyum

Email: aminahqayyum@gcwuf.edu.pk

© The Author(s) 2024.

INTRODUCTION

The agriculture sector, constituting 22.9 percent of GDP and generating 37.4 percent of employment, plays a crucial role in ensuring food security, supplying raw materials to industries, and contributing significantly to

foreign exchange earnings, thus fostering sustainable growth. However, in recent years, the country has experienced climatic shocks that have adversely impacted the agriculture sector. The productivity of this sector is highly vulnerable to the frequency of adverse

climatic events such as floods, droughts, abnormal heat waves, rainfall, and glacial melt. Furthermore, prolonged precipitation patterns have led to increased river and inland water levels, resulting in flash floods and seasonal river and urban flooding, which have been frequently observed in recent times (Government of Pakistan, 2023). Consequently, domestic production has fallen below required levels, leading to historically high prices of essential food items. Urgent and timely action is needed to restore the livelihoods of subsistence farmers and livestock keepers, ensuring that agriculture and livestock activities return to normal levels before the Rabi season. Effective communication between farming communities and agricultural extension staff is paramount in this process of agricultural development. Effective communication between farmers and extension staff is crucial for the sustainability of agricultural development projects and enhancing adoption of agricultural innovations (Moyo et al., 2018). Farmer-to-farmer information exchange can occur through a variety of communication channels utilizing local networks and institutions (Campbell et al., 2006). Agricultural information dissemination through various means is considered a crucial aspect that intersects with other elements of production such as management, capital, labor, and land capability. The effectiveness of these elements can potentially be enhanced by the provision of relevant, useful, and reliable knowledge and information. Consequently, information dissemination from education, extension services, research, and other agricultural institutions has been developed and implemented, particularly aimed at reaching farmers to enable them to make informed decisions, capitalize on market opportunities, and adapt to ongoing changes in production practices (Demiryurek et al., 2008). Communication between farmers and extension staff through personal contacts, group meetings, and method-and-result demonstration sites is important for disseminating improved farm practices (Omoregbee, 1998). Communication between farmers and extension staff through social networks can improve adoption rates of new agricultural technologies (BenYishay and Mobarak, 2013). Despite the widespread use of radio, television, mobile, and computers in the rapidly advancing modern world, Pakistan, as an emerging country, faces various challenges across sectors, including agriculture, and lags behind the progressive global competition. ICT literacy

levels are significantly varied and often low. To effectively integrate ICT, the government lacks a secure policy for technology introduction, exploration, and adoption. Rural areas in Pakistan suffer from inadequate technical and physical infrastructure and supportive facilities for Information and Communication Technology (ICT). Addressing this requires establishing basic infrastructure to access contemporary information and facilitating efficient grounds for development (Daniel, 2004). Leveraging Information Communication Technologies (ICTs) can play a pivotal role in Pakistan's socioeconomic development and is key to globalization. Both ICT and globalization are critical factors from a development perspective. ICTs can contribute to development and globalization if aligned with the needs of poor developing countries, addressing the digital divide and promoting their participation in globalization processes (Nwagwu, 2006). ICTs can contribute to poverty reduction by providing education, which imparts knowledge and innovation to impoverished communities, enabling them to increase income, improve health, and acquire information on yield enhancement techniques. However, the evaluation and effective use of ICTs in agriculture are not yet fully embraced and developed. Access to services, land records, market information, farm management, and pest and disease management are essential needs of farmers that can be addressed through ICT usage, yet projects focusing on these services remain limited (Meera et al., 2004). According to Wong et al. (2006), education for future generations will rely on the latest ICT tools, as modern technology offers diverse avenues for educational enlightenment. ICT can significantly enhance learning experiences, allowing students to access knowledge from around the world, while teachers can improve their teaching capabilities. Effective communication between teachers and students, previously challenging, is now feasible due to ICT's capacity to support education across all curricula and facilitate communication (Dawes, 2007). The intervention of ICT in agricultural production and enhancement has the potential to uplift the livelihoods of the poor in remote areas and can directly and indirectly impact agricultural production, marketing, and post-harvest activities, thereby contributing to poverty reduction. Nyika (2020) elucidates that ICT interventions can also benefit credit access, educational endeavors, healthcare facilities, and the enhancement of

rural non-farm businesses. The importance of ICTs cannot be denied and the need to explore further viable options do exist. Therefore, this study holds significant importance in both practical and theoretical domains. By focusing on the agricultural context of District Faisalabad, the study offers valuable insights into the effectiveness of various communication pathways, particularly Information Communication Technologies (ICTs), in disseminating agricultural information. This research contributes to the existing literature by identifying and analyzing the most effective communication channels for delivering agricultural information, thereby aiding policymakers, agricultural extension services, and farmers in optimizing their communication strategies. The theoretical contribution lies in enhancing our understanding of the role of ICTs in agricultural information delivery, shedding light on how advancements in technology can be leveraged to improve knowledge dissemination, facilitate decision-making processes, and ultimately enhance agricultural productivity and sustainability in the region.

METHODOLOGY

The materials and methods section provide a roadmap for the researcher to compile and analyze the data effectively. Its primary objective is to justify the selection and application of tools and methods employed in data collection and interpretation. Given the impracticality of collecting and analyzing data from the entire population within predetermined constraints of time and resources, sampling emerged as the most suitable approach. In this study conducted in district Faisalabad, a sample size of 110 farmers was determined using the website (<http://www.surveysystem.com>), considering a population of seventy-five thousand, with a confidence interval of 9.34 and a confidence level of 95%. The sampling process involved random selection of two tehsils (Jaranwala and Jhumra), followed by random selection of one union council from each tehsil, and subsequently, random selection of one village from each union council. Within each village, 55 farmers were selected using simple random sampling, resulting in the final sample size of 110 farmers. Data were collected through structured questionnaires, validated through face validity, and assessed for reliability via pre-testing, yielding a reliability value of 0.795. Face-to-face interviews were employed for data collection, and the collected data were analyzed using the SPSS software

(Statistical Package for Social Sciences). Various statistical measures, including rank order, mean, percentages, and frequencies, were computed to interpret the data, analyze the results, and draw conclusions, as well as to formulate recommendations.

RESULTS AND DISCUSSION

The general objective of this study was to identify and analyze the effective communication pathways with special focus on ICTs for agricultural information delivery: a case study of district Faisalabad. In this section the results are interpreted and discussed in order to draw conclusion and to formulate appropriate suggestions in the light of the results obtained.

Demographic attributes of the respondents

The Figure 1 provides demographic information about the respondents, shedding light on their age distribution, educational background, landholding size, tenancy status, farming experience, and primary sources of income. In terms of age distribution, the majority of respondents fall within the age range of 31-40 years (51.8%), followed by those above 40 years (24.5%), with a smaller proportion aged up to 30 years (23.6%). Regarding education, the largest percentage of respondents have primary education (34.5%), followed by those with secondary education (20.9%) and intermediate education (17.3%). A smaller percentage of respondents are either illiterate (18.2%) or have a graduation level education and above (9.1%).

Majority of respondents own land in the range of 5.1-10 acres (65.5%), followed by those with land up to 5 acres (24.5%), and a smaller proportion owning land above 10 acres (10.0%). Additionally, the majority of respondents are owners of their land (89.1%), with a smaller percentage being owner-cum-tenants (7.3%), and the least being tenants (3.6%). When considering farming experience, respondents are relatively evenly distributed across different experience brackets, with notable percentages in the 11-15 years (31.8%) and above 25 years (27.3%) categories. Finally, the primary source of income for the majority of respondents is agriculture (88.2%), with smaller percentages deriving income from a combination of business and agriculture (5.5%), government service and agriculture (.9%), or job and agriculture (4.5%). This is deduced that there was diversity in the demographic condition of farmers.

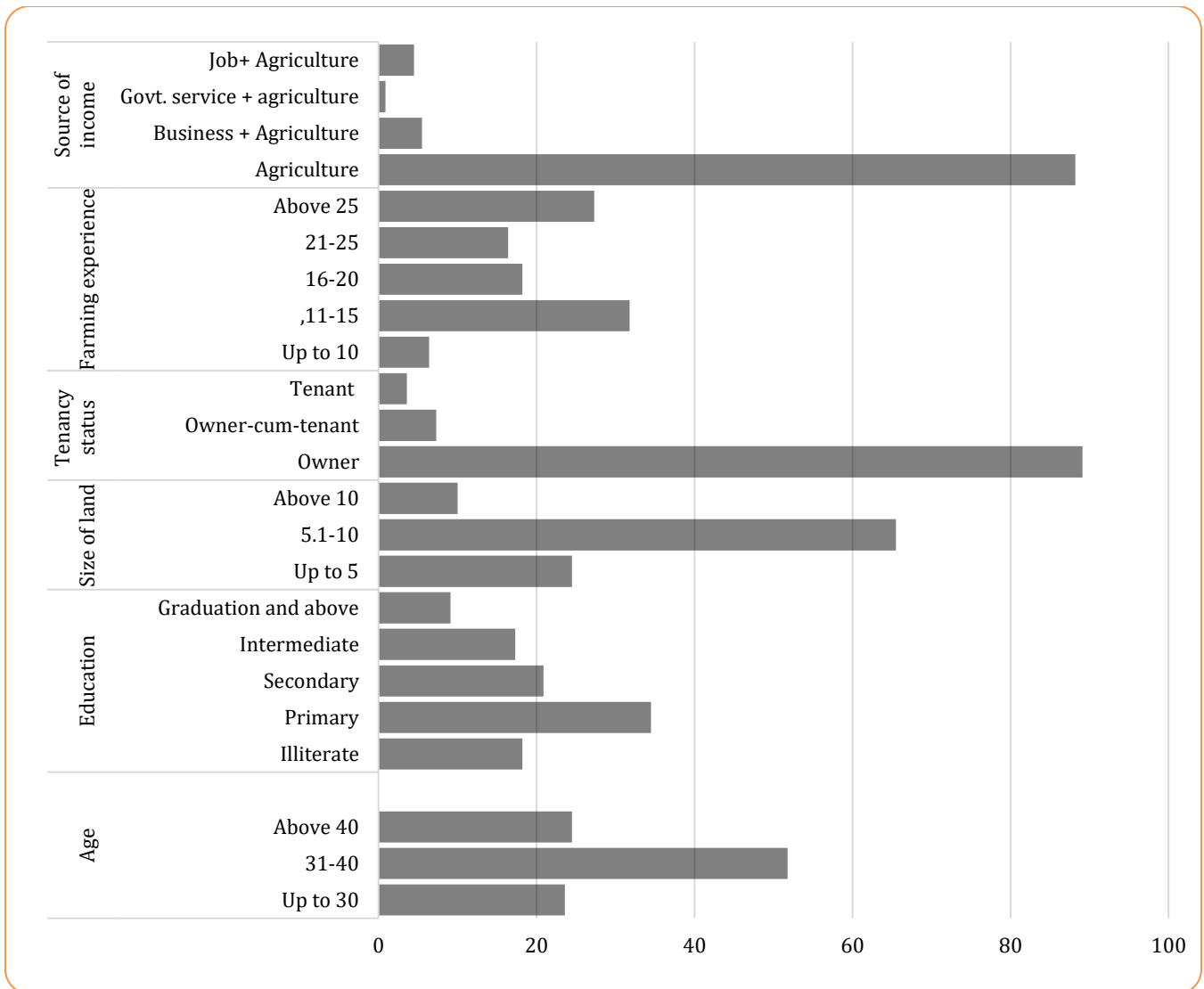


Figure 1. Demographic profile of respondents.

Extent of information obtained from traditional communication pathways

Figure 2 illustrates the utilization of various communication channels among respondents for agricultural information acquisition. A notable portion, representing 42.7% of respondents, did not utilize radio for obtaining agricultural information. Similarly, 19.1% of respondents did not use Zirat Nama, while 20% were unfamiliar with the agricultural magazine "Zarai Digest". Depending on the nature of the information sought, respondents employed diverse sources, as highlighted by Riesenbergs and Gor (2006). Nearly all respondents were aware of television, with 63.6% reporting a "very high" extent of information obtained through this medium. Additionally, half of the respondents indicated

receiving high information from fellow farmers. However, Iqbal (2004) noted that the most commonly used sources of information were printed materials, family, friends, neighbors, and farm organizations, albeit this research was conducted approximately twelve years ago, with a subsequent shift from print to electronic and social media. With the advent of 4G technology and the expansion of television cable networks, electronic sources are becoming increasingly prevalent even in remote areas. Public extension agents were also deemed important, as 42.7% of farmers indicated a "high" extent of information obtained from them, aligning with the suggestion by Pisante et al. (2012) that farmers should be equipped with the latest farming techniques and innovations. Among traditional communication

pathways, television was predominantly utilized, as evidenced by its highest weighted score of 485. Fellow farmers ranked second with a weighted score of 433, indicating their significance as a reliable source of agricultural information, particularly when other sources are limited in availability or cost. Agricultural

magazines such as "Zarai Digest" and "Ziraat Nama" were utilized by only a small percentage of farmers, ranking second to last and last, respectively. "Zarai Digest" is published by the University of Agriculture, Faisalabad, while "Ziraat Nama" is published by the Directorate of Agricultural Information, Lahore.

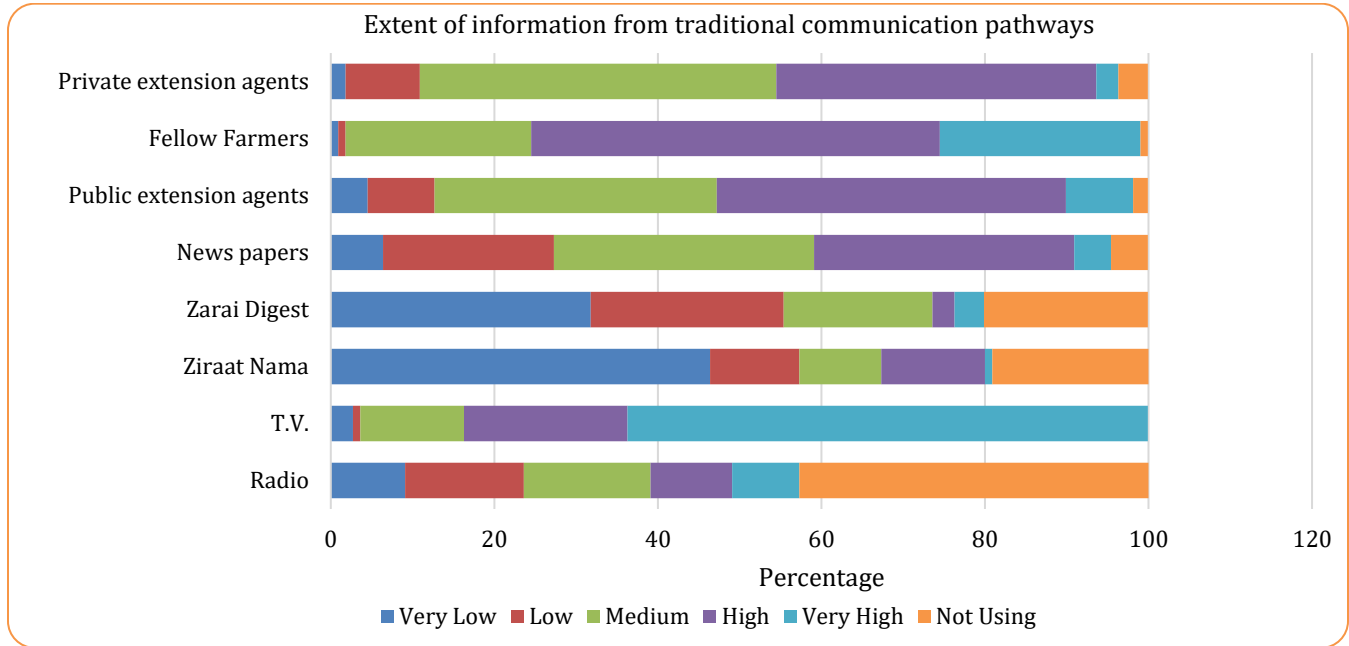


Figure 2. extent of information obtained from traditional pathways.

Table 1. Preference of information obtained from traditional communication pathways.

Communication pathways	Mean ± SD
Radio	4.41±0.941
T.V.	3.97±0.775
Ziraat Nama	3.43±0.929
Zarai Digest	3.33±0.765
News papers	3.08±1.007
Public extension agents	2.89±1.284
Fellow Farmers	2.03±0.088
Private extension Agents	1.90±1.197

Table 1 illustrates the preferences of farmers regarding information obtained from traditional communication pathways. The mean values, accompanied by their standard deviations, provide insights into the perceived importance of each communication channel. Radio emerges as the most preferred communication pathway, with a mean score of 4.41 ± 0.941, indicating that farmers highly value information disseminated through this medium. Television follows closely behind, with a mean score of 3.97 ± 0.775, suggesting that visual

content broadcasted via television is also considered significant by farmers. Ziraat Nama and Zarai Digest, which are agricultural publications, are rated slightly lower but still hold substantial importance, with mean scores of 3.43 ± 0.929 and 3.33 ± 0.765, respectively. These findings highlight the reliance of farmers on traditional media outlets for acquiring agricultural information, emphasizing the enduring significance of radio and television in reaching rural communities. In contrast, communication pathways such as newspapers,

public extension agents, fellow farmers, and private extension agents exhibit lower mean scores, indicating comparatively lower preferences among farmers. Newspapers received a mean score of 3.08 ± 1.007 , suggesting that while some farmers still value print media, its importance is somewhat diminished compared to radio and television. Public extension agents and fellow farmers are ranked even lower, with mean scores of 2.89 ± 1.284 and 2.03 ± 0.088 , respectively, implying that direct interactions with these sources are less favored by farmers. Private extension agents receive the lowest mean score of 1.90 ± 1.197 , indicating that farmers place minimal importance on information provided by private extension services. Overall, these results underscore the significance of understanding farmers' preferences in accessing agricultural information through various communication channels, thereby informing strategies for effective knowledge dissemination and extension services in rural areas

Extent of information obtained from ICT based communication pathways

Figure 3 indicates a low utilization of modern communication pathways among farmers, as evidenced by a significant portion receiving minimal information

through mail, apps, and agricultural websites. Specifically, 97.27% of farmers reported not using apps, with only 2.73% indicating familiarity with them. Figure 3 further reveals that few farmers fall within the categories of receiving high or very high levels of information, with the majority categorized as receiving low, very low, or not using these pathways at all. An agriculture officer attributed this trend to widespread illiteracy among farmers, coupled with limited awareness and access to modern technology. However, the officer expressed optimism about the future of modern communication pathways, suggesting that with increased availability and awareness efforts, these challenges could be overcome in future. The main agricultural helplines (0800-15000, 0800-29000) were found widely utilized by respondents, getting assistance on crop and animal-related issues. Automated calls delivering pertinent audio messages about crop conditions were also received by farmers, while SMS helpline service provided technical guidance to farmers in Punjab upon sending messages to 0304-4000172. Rhoades et al. (2008) emphasized the growing role of internet technology in education, suggesting a need for expanded internet access and education on internet usage in educational institutions to further enhance knowledge dissemination.

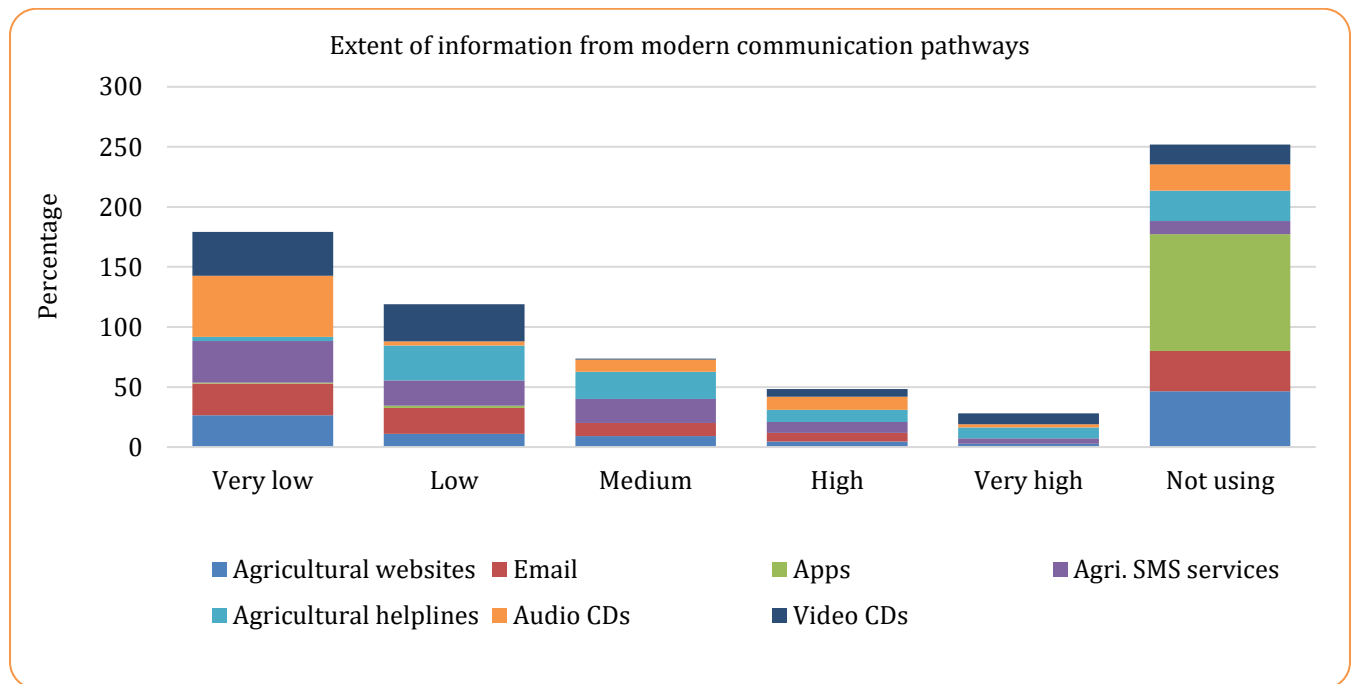


Figure 3. extent of information obtained from ICT based communication pathways.

Table 2. Preference ranking of information obtained from modern communication pathways

Communication pathways	Mean \pm SD
Agricultural websites	2.89 \pm 1.00
Email	2.19 \pm 1.157
Apps	2.05 \pm 1.129
Agri. SMS services	1.86 \pm 1.038
Agricultural helplines	1.99 \pm 1.260
Audio CDs	2.00 \pm 1.251
Video CDs	0.04 \pm 0.06

Table 2 presents the preference ranking of information obtained from various modern communication pathways among farmers. The mean scores, accompanied by their standard deviations, provide insights into the perceived importance of each communication channel. Agricultural websites emerge as the most preferred modern communication pathway, with a mean score of 2.89 ± 1.00 , indicating that farmers value the information accessed through online platforms dedicated to agriculture. A website for agricultural marketing enables farmers to ensure the most profitability and reduce middlemen's roles in marketing farm products (Ragavi et al., 2022). Email follows closely behind, with a mean score of 2.19 ± 1.157 , suggesting that electronic mail remains a significant channel for receiving agricultural information. However, both apps and agricultural SMS services exhibit lower mean scores of 2.05 ± 1.129 and 1.86 ± 1.038 , respectively, indicating relatively less preference among farmers for these communication channels. Despite this, agricultural helplines also garner a mean score of 1.99 ± 1.260 , suggesting that they remain a viable source of information for farmers seeking assistance with agricultural issues. Helpline services in agriculture can improve technology dissemination, but require improved connectivity, awareness, and relevant technical information for effective on-line information dissemination to farmers (Singh et al., 2018). Helplines are user-friendly, cost-effective, and time-efficient, making resolving farming problems easier, faster, and cheaper for farmers (Deshmukh and Patil, 2018).

In contrast, video CDs receive the lowest mean score of 0.04 ± 0.06 , indicating a negligible preference among farmers for obtaining agricultural information through this medium. This suggests that video CDs are perceived as less effective or accessible compared to other modern communication pathways. While audio CDs also exhibit a

relatively low mean score of 2.00 ± 1.251 , they still maintain a modest level of preference among farmers. In contrast, Mobile phone-based animated videos were as effective as traditional methods in inducing learning and understanding among low-literate farmers in Burkina Faso (Maredia et al., 2018). Overall, these findings highlight the varying degrees of preference among farmers for different modern communication pathways, underscoring the importance of understanding farmers' communication preferences to disseminate agricultural information and services effectively. In a study, Khan et al. (2010) identified that the use of electronic media as agricultural information sources was not substantial among farmers, but future preferences showed an improving trend.

CONCLUSION

In conclusion, the study provides valuable insights into farmers' preferences regarding information obtained from both traditional and modern communication pathways. Traditional media outlets such as radio and television remain highly favored by farmers, emphasizing their enduring significance in rural information dissemination. However, the study also highlights the comparatively lower preferences for certain traditional channels like newspapers and direct interactions with extension agents. Conversely, modern communication pathways such as agricultural websites and email show promise but still face challenges in garnering widespread adoption among farmers. Based on these findings, several recommendations can be made to enhance agricultural information dissemination and extension services. Firstly, there is a need for continued investment in and promotion of modern communication technologies, including apps and agricultural SMS services, to improve accessibility and relevance for farmers. Secondly, efforts should be made to bridge the digital divide by providing training and resources to increase farmers' digital literacy and access to online information. Finally, collaborative initiatives between agricultural organizations, government agencies, and private sector stakeholders are essential to develop tailored communication strategies that address the diverse needs and preferences of farmers, ultimately enhancing the effectiveness of agricultural extension services and knowledge dissemination efforts. This is also suggested that Agriculture Officers (AOs) and field assistants (FA) who are the change agents should use

social media tools to disseminate information among farmers.

REFERENCES

- BenYishay, A. and Mobarak, A. 2013. Communicating with Farmers Through Social Networks (August 1, 2013). Yale University Economic Growth Center Discussion Paper No. 1030, Yale Economics Department Working Paper No. 121, Available at SSRN: <https://ssrn.com/abstract=2315229>
- Campbell, K.L.I., Garforth, C., Heffernan, C., Morton, J., Paterson, R., Rymer, C. and Upton, M. 2006. Smallstocks in Development. DFID Livestock Production Programme. Kent: Natural Resources International Ltd.
- Daniel, J. 2004. Information and Communication Technology in Education. United Nations Educational, Scientific and Cultural Organization.
- Dawes, L. 2007. What stops teachers using new technology? Issues in Teaching using ICT London: Routledge 61-79.
- Demiryurek K., Erdem H., Ceyhan V., Atasever S., Uysal O. 2008. Agricultural Information System and Communication Networks: The Case of Dairy Cattle Farmers in Samsun Province of Turkey. Information Research, 13: 343.
- Deshmukh, P. and Patil, M. 2018. Impact of Help Lines on Farmers with Respect to Jalgaon District. International Journal of Trend in Scientific Research and Development, 2(4): 2407-2412
- Government of Pakistan. 2023. Economic Survey of Pakistan 2022-23, Finance Division Wing Islamabad, Pakistan.
- Iqbal, Z. 2004. A study of the role of sources of information and adoption of agricultural innovations in union councils of district Faisalabad. M.Sc. Thesis, Dept. of Rural Soc., Univ. of Agri., Faisalabad, Pakistan.
- Khan, G., Muhammad, S., Chaudhry, K. and Khan, M. 2010. Present status and future preferences of electronic media as agricultural information sources by the farmers.. Pakistan Journal of Agricultural Sciences, 47: 166-172.
- Maredia, M., Reyes, B., Ba, M., Dabire, C., Pittendrigh, B. and Bello-Bravo, J. 2018. Can mobile phone-based animated videos induce learning and technology adoption among low-literate farmers? A field experiment in Burkina Faso. Information Technology for Development, 24: 429 - 460.
- Meera, Shaik N., Jhamtani, A, and Rao, D.U.M 2004. Information and communication technology in agriculture, a comparative analysis from three projects of India. AgREN network paper No.135, ODI, January 2004.20p.
- Moyo, R. and Salawu, A. 2018. A survey of communication effectiveness by agricultural extension in the Gweru district of Zimbabwe. Journal of Rural Studies, 60, 32-42.
- Mujahid, Y. H. 2002. Digital opportunity initiative for Pakistan. The Electronic Journal of Information Systems in Developing Countries, 8(1): 1-14.
- Nwagwu, W. 2006. Integrating ICTs into the Globalization of the Poor Developing Countries. Information Development, 22: 167-179.
- Nyika, G. 2020. Use of ICTS for socio-economic development of marginalised communities in rural areas: Proposals for establishment of sectoral Rural Entrepreneurial Networks. Journal of Development and Communication Studies, 7(1-2): 126-147
- Omoregbee, F. 1998. Communication of Improved Farm Practices to Rural Women Farmers in Benue State, Nigeria. Outlook on Agriculture, 27: 53 - 56.
- Pisante, M., Stagnari, F. and Grant, C. 2012. Agricultural innovations for sustainable crop production intensification. Italian Journal of Agronomy, 7: 40.
- Ragavi, T., L, Karthikeyan, T. Vignesh, N. Sriraman and J. Chitteshwaran. 2022. Development of a website for agricultural marketing. International Journal of Engineering Technology and Management Sciences, 6: 333-336.
- Rhoades, E. B., T. Irani, R. Telg, and B. E. Myers. 2008. Internet as an information source; attitudes and usage of students enrolled in a college of agriculture course. Journal of Agricultural Education, 49(2):108-117.
- Richardson, D. 2005. ICTs Transforming Agricultural Extension – Summary Report of CTA's 6th Consultative Expert Meeting of its Observatory on ICTs. CTA, Netherlands. Forthcoming.

Riesenberg, E. L. and O. C. Gor. 2006. Farmers' preferences for methods of receiving information on new or innovative farming practices. *Journal of Agricultural Education*, 30(4):7-13.

Singh, A., Singh, L. and Riyajuddeen. 2008. Role of Helpline Services in Technology

Dissemination. *Indian Research Journal of Extension Education*, 8: 1-4.

Wong, A. F. L., C.L. Quek, S. Divaharan, W.C. Liu, J. Peer, and M. D. Williams. 2006. Singapore students' and teachers' perceptions of computer-supported Project Work class room learning environments, 38(4):449-479.

Publisher's note: EScience Press remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.