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Anshumali Parashar
Agriculture University, Jodhpur
Jodhpur, Rajasthan, India

Exploring the impact of ICT in agriculture information dissemination: A comprehensive study under

Anshumali Parashar

Abstract

This research paper delves into the impact of Information and Communication Technology (ICT) in the domain of Agromet Advisory through a comprehensive study conducted under the District Agro-Meteorological Unit (DAMU). The study aims to evaluate the influence of various modes of communications particularly electronic communication in enhancing the efficiency, accessibility, and effectiveness of agromet advisory services in agriculture. Through a mixed-method approach, data was collected from farmers and agricultural experts to examine the benefits and challenges associated with the integration of ICT in agromet advisory.

Agromet Advisories are disseminated through a multichannel system encompassing print and electronic media, Door Darshan, radio, internet, SMS, Kisan Portal, Kisan Sarathi Portal, Meghdoot App etc. But social media apps like WhatsApp, telegram, YouTube, Instagram etc. are playing a major role not only in information disseminations but also in receiving feedback (*Source*: Press Information Bureau).

The findings provide valuable insights into the transformative role of ICT in empowering farmers with real-time weather information, tailored recommendations, and sustainable agricultural practices. The study emphasizes the potential of ICT in revolutionizing agricultural decision-making and fostering climate-resilient farming practices for improved food security and farmer livelihoods.

Keywords: ICT, social media, Agromet, DAMU

1. Introduction

Weather profoundly influences agriculture, impacting crop yields significantly. Real-time weather-based crop advisory services offer crucial information on weather patterns, crop health, and optimal management practices, empowering farmers to make informed decisions. District-level Agromet Advisory Services (AAS) initiated in collaboration with ICAR and SAUs, supported by 130 AMFUs across the country, deliver location and crop-specific advisories. With upgraded high-resolution models, the service now extends to the block level through DAMUs at KVKs, promoting weather-based strategies to bolster crop production, food security, and mitigate crop damage caused by unusual weather events. In addition to the biweekly bulletins, Regional Meteorological Centres (RMCs) and Meteorological Centres (MCs) of IMD disseminate daily weather forecasts and now cast information to farmers. Agromet Advisory services utilize Impact-Based Forecasts (IBFs) prepared by AMFUs and DAMUs, incorporating severe weather warnings from National Weather Forecasting Centre (NWFC), New Delhi, and RMCs and MCs of IMD for various districts in States and Union Territories across the country. Farmers have access to district-specific weather information and related agromet advisories via the mobile applications 'Meghdoot' launched by the Ministry of Earth Sciences, and 'Kisan Suvidha' introduced by the Ministry of Agriculture & Farmers Welfare. Social media, particularly 'WhatsApp,' facilitates quick dissemination of weather forecasts and agromet advisories through dedicated farmer groups created by various AMFUs and DAMUs. State Agriculture Department officials at District and Block levels are also included in these WhatsApp groups to extend the outreach of agromet services. With revolution in IT & Communication the information dissemination has become easier. Smart phone reach to every household make this much easier. The feedback mechanism has also improved a lot but major limitations stands are illiteracy, technical unawareness, remote areas where no internet connection, language issues etc.

Corresponding Author:
Anshumali Parashar
Agriculture University, Jodhpur
Jodhpur, Rajasthan, India

2. Objectives

- To recognize which source of communication is effective in information dissemination to farmers
- To assess the level of awareness among farmers about the availability and significance of agromet advisory services.
- To analyze the extent of farmers' utilization of agromet advisory services, including the frequency and types of advisories accessed.
- To identify the constraints and barriers experienced by farmers in effectively utilizing agromet advisory services and implementing weather-based recommendations.

3. Methodology

The research was conducted in Jalore District, Rajasthan, India. To examine the awareness of farmers regarding agromet advisory services, the study focused on Jalore District, Rajasthan, where the agromet advisory office for the district has been functional since 2019. To investigate the utilization of agromet advisory services and the constraints experienced, data was collected from farmers in Jalore who had used agromet advisory services at least once during 2019-22. The database of 4 lakhs farmers has been examined. This database consists of farmers registered on Kisan Sarathi portal and m-Kisan portal and farmers enrolled in WhatsApp, telegram groups and other social media platforms. To collect information on ICT tools adopted, awareness, utilization, and constraints, a structured schedule was developed for the study, and farmer feedback is collected through online and offline ways.

4. Finding and Discussion

4.1 District Profile of Jalore

Jalore district is located in the southwestern part of the state of Rajasthan. It is situated between the Aravalli Range and the Thar Desert. It is a part of the Jodhpur division in Rajasthan. According to the Census 2011, Jalore district has a total population of 1,828,730, out of which urban population in Jalore accounts for 8.3 percent (*Source: Census of India, 2011*). The overall literacy rate is 55.97 percent, with male literacy at 69.50 percent and female literacy at 42.35 percent. The primary language spoken in Jalore is Rajasthani, with several dialects used by the local population (*Source: www.jalore.rajasthan.gov.in*). The primary sector accounted for the highest share of 41 percent in the Gross District Domestic Product (GDDP). Out of total work force of the district 'Cultivators' form about 63.67 percent of all workers, while agricultural labourers form 20.12 percent. Lies in the agro climatic zone II-B Pearl Millet, Cluster Bean, Moth, Cumin, Isabgol, Mustard etc. are major crops cultivated here (*Source: www.jalore.kvk2.in*). The District comprising nine blocks, namely Ahore, Jalore, Sayla, Bhinmal, Jaswantpura, Raniwada, Sanchore, Chitalwana and Bagoda, hosts a Krishi Vigyan Kendra (KVK) located in the Sayla block's Keshwana village. Within the KVK, six Subject Matter Specialists (SMS) actively engage in activities aimed at enhancing farmer welfare.

4.2 Source of information about Agromet Advisory Services

The DAMU project has become very popular and more and more farmers are getting benefitted with this. Study done in Karnataka state shows that majority of farmers who followed the weather related agromet advisories expressed that they

were able to reduce the crop losses. (Ramachandra *et al.*, 2018) ^[1] The study's findings shed light on a noteworthy trend wherein a substantial proportion of farmers actively engage in various social media platforms.

Table 1: Source of information about Agromet Advisory Services

S. No.	Variables	Source of Information (Percentage)
1	Agricultural Extension Workers	15%
2	Training Organised by KVK	9%
3	Friend/Neighbours	2%
4	Newspaper	18%
5	T.V.	2%
6	Radio	2%
7	Social Media Platforms	51%
8	Website	1%

The increasing prevalence of Information and Communication Technology (ICT) tools, particularly social media, has emerged as a popular and among farmers. The implementation of training programs by Krishi Vigyan Kendras (KVKs) has also played a significant role in enhancing awareness about these agricultural services. Additionally, the District Agro-Meteorological Unit (DAMU) has also undertaken awareness programs aimed at educating farmers about a diverse array of agromet services, including the utilization of the 'Meghdoot' mobile application and Damini mobile application. Moreover, the KVK has further expanded its outreach efforts by creating a YouTube channel, where they regularly post daily weather updates. This initiative has garnered considerable interest among farmers and younger generations alike, fostering greater engagement and participation in the agromet services provided by DAMU and KVKs. The data presented highlights the various sources of information about agromet advisory services. Among the surveyed population, it is evident that the most significant source of information is social media platforms, accounting for a substantial 51%. This finding reflects the growing influence and reach of digital platforms in disseminating agricultural information and advisories to farmers and stakeholders. Additionally, agricultural extension workers play a crucial role in providing information, accounting for 15%. Their direct interaction with farmers and on-field experience makes them a valuable resource in delivering timely and localized agromet advisory services.

The population of district is 1,828,730 where newspapers also contribute significantly to disseminating agromet information, constituting 18% of the sources. This traditional medium remains relevant in reaching rural communities and individuals with limited access to digital technologies.

Training organized by Krishi Vigyan Kendras (KVKs) provides vital knowledge and resources, contributing 9% to the information dissemination process. These training programs equip farmers with the skills necessary to utilize agromet advisory services effectively.

It is worth noting that digital media plays a significant role, with television and radio each contributing 2% to the sources of information. Although their reach might be limited in comparison to social media, they still play a part in reaching certain demographics.

Surprisingly, friends and neighbors have only a minor role, constituting 2% of the sources. This suggests that while informal networks remain important, their influence in disseminating agromet advisory services may not be as dominant as other sources.

Websites, on the other hand, account for a mere 1% of the sources of information. This indicates that the adoption of websites as a means of accessing agromet advisories is relatively low, possibly due to limited digital literacy or access to internet resources in rural areas.

4.3 Mode of Communication used by farmers

The information disseminated by agro meteorological helped farmers to take short term decision on farming activities (Dupdal *et al.*, 2020) [2]. Therefore the mode of information must be quick and efficient as it is required for fast decision making. The data clearly indicates that WhatsApp is the most widely utilized platform for accessing agromet advisory services, with an impressive 90% of users relying on it for valuable agricultural information.

Table 2: Mode of Communication used by farmers of information about Agromet Advisory Services

S. No.	Variables	Source of Information (Percentage)
1	Whatsapp	90
2	Public News Portal App	30
3	Facebook	10
4	Youtube	15
5	Instagram	5
6	Website	2
7	GKMS App including Mkisan, Kisan Sarathi and Meghdoot	70

Public News Portal, a local news application for Jalore District only follows with 30% of users seeking agromet advisories through this platform. Facebook and Instagram emerge as not much significant contenders, with 10% and 5% of users respectively utilizing these social media platforms for agricultural updates. On the other hand, Twitter and the official GKMS App including M-kisan, Kisan Sarathi and Meghdoot apps exhibit relatively higher utilization rates, with 70% of users accessing agromet advisories through these apps. YouTube stands as a prominent medium, with 15% of users turning to this video-sharing platform for weather and agricultural insights. The DAMU owns its youtube channel for dissemination of agriculture information. The dominance of messaging applications like WhatsApp, Miksan, Meghdoot etc. highlights the importance of real-time communication in delivering weather forecasts and agricultural recommendations to farmers. The significant presence of social media platforms like Facebook, Instagram, and YouTube signifies the potential of multimedia approaches to engage farmers in receiving agromet advisories. Even in remote region like Leh–Ladakh mobile communication stands first in dissemination of agriculture information (Y. Kumar *et al.*, 2021) [3]. It is evident that in the digital age, diverse communication channels play a crucial role in disseminating timely and relevant information to farmers. Policymakers and agricultural authorities should leverage the popularity of these platforms to enhance the accessibility and reach of agromet advisory services, ultimately empowering farmers with the knowledge needed for better decision-making and improved agricultural practices

4.4 Satisfaction of farmers

With respect to the data a positive sentiment among farmers towards agromet services, with a majority of respondents expressing satisfaction can be seen. Specifically, 57% of farmers reported being highly satisfied with the agromet

services they receive. A substantial 22% of farmers indicated being satisfied with the services, signifying a significant level of contentment among the user base. On the other hand, a relatively lesser percentage (15%) reported dissatisfaction with the services, highlighting the importance of addressing their concerns to enhance user satisfaction. A smaller proportion of farmers (6%) expressed a neutral stance, suggesting room for potential improvement in certain aspects of the agromet services to better cater to their needs. Overall, the high satisfaction levels among a considerable majority of farmers indicate that agromet services have proven to be valuable and effective in supporting agricultural decision-making. The positive feedback from the user community reflects the relevance and impact of these services in empowering farmers with timely weather information and expert guidance, leading to improved agricultural practices and increased productivity.

Table 3: Satisfaction of farmers

S. No.	Category	Percent
1	Highly Satisfied	57
2	Satisfied	22
3	Less Satisfied	15
4	Neutral	06
5	Dissatisfied	00

Moreover in most of cases studies suggests that the farmers expressed their happiness on getting block level agricultural weather advice (Surya Prakash Singh *et al.*, 2020) [4]. While the findings demonstrate the success of the current agromet services, it is crucial to continually seek feedback from farmers and implement any necessary improvements to ensure these services remain efficient, reliable, and farmer-centric. By continually adapting and enhancing the agromet services based on user feedback, agricultural authorities can better serve the farming community and contribute to their long-term prosperity and resilience in the face of weather-related challenges.

4.5 Constraint in information dissemination

The low IT literacy and low literacy were the other major barriers in such type of ICT tool while disseminating information (Singh *et al.*, 2015) [5]. The data reveals several significant constraints in the dissemination of agromet information in Jalore district, which hinder effective communication and outreach to the farming community. Illiteracy emerges as a substantial barrier, with 40% of respondents facing challenges in accessing and comprehending agromet information due to limited reading and writing skills. Another critical constraint is the non-availability of signal or internet connectivity, impacting 25% of respondents, particularly those in remote and rural areas with limited access to modern communication infrastructure.

Table 4: Constraints in information dissemination

S. No.	Constraints	Percent
1	Illiteracy	40
2	Non Availability of signal/internet	25
3	Dependency on conventional system of agriculture	42
4	Dependency on private players	51

This limitation restricts farmers' ability to receive real-time weather updates and relevant agricultural advisories promptly. Moreover, the heavy reliance on conventional agricultural

practices by 42% of respondents poses a hindrance to the adoption of modern agromet services. The adherence to traditional methods may prevent farmers from fully benefiting from the advanced technological solutions offered by agromet advisories. Additionally, the dependence on private players for accessing agromet information, reported by 51% of respondents, may introduce commercial interests that could influence the availability and quality of services. Farmers relying on private entities may encounter limitations in accessing unbiased and comprehensive agromet advisories. Addressing these constraints requires a multi-faceted approach. Initiatives to improve literacy levels among farmers, especially in remote regions, are crucial to enable better understanding and utilization of agromet information. Efforts to expand internet connectivity and ensure reliable signal coverage in rural areas can enhance farmers' access to real-time data and advisory services. Promoting the adoption of modern agricultural practices and sustainable farming techniques can help farmers overcome the dependency on conventional methods, making them more receptive to agromet advisories. Moreover, encouraging the development and dissemination of agromet information by reputable public institutions can enhance the availability and reliability of services, reducing the dependence on private players. Overall, recognizing and addressing these constraints will be instrumental in enhancing the effectiveness and impact of agromet services, fostering informed decision-making among farmers, and promoting sustainable agricultural practices for improved productivity and resilience in the face of changing weather patterns.

5. Conclusion

Study conducted at Udipi district of Karnataka shows that that majority of the farmers are facing lack of practical problem as the scientist are sending the messages to the farming communities but they are not providing practical exposure to them and in a short message the farmers are hard to understand the information properly and carry out the activities (Navin Kumar *et al.*, 2018) ^[6]. With the analysis done at Jalore district we can say that data underscores the importance of using social media platforms for information dissemination in agromet advisory services. The findings reveal a substantial percentage of farmers engaging with social media, particularly WhatsApp, Telegram, Facebook, Instagram, and YouTube, to access crucial weather and agricultural updates.

Given the widespread usage and popularity of these social media platforms among farmers, incorporating them into agromet advisory services can significantly enhance the outreach and accessibility of weather information and expert guidance. By leveraging these platforms, agricultural authorities can bridge the gap between weather forecasts and the farming community, delivering timely advisories directly to farmers' smartphones and devices. The data also highlights the lower utilization rates of traditional websites and the official GKMS App, suggesting the need for agromet services to adapt and align with farmers' preferences for real-time, interactive, and user-friendly communication channels.

Social media offers a dynamic and interactive medium for engaging farmers, allowing for quick dissemination of weather forecasts, agromet advisories, and educational content. Additionally, these platforms enable farmers to ask questions, share experiences, and actively participate in discussions, fostering a sense of community and empowering

them with relevant and localized information.

To fully harness the potential of social media, agricultural authorities must focus on raising awareness about the availability of agromet advisory services on these platforms. Educational campaigns and targeted promotions can be instrumental in encouraging farmers to adopt and utilize social media for accessing agromet information.

Incorporating social media into agromet advisory services can lead to a more inclusive and effective approach, ensuring that vital weather and agricultural information reaches even the most remote farming communities. By embracing digital platforms and social media channels, agromet advisory services can enhance farmer engagement, facilitate sustainable agricultural practices, and ultimately contribute to improved food security and farmer livelihoods.

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