ASSESSING THE IMPORTANCE OF SCIENCE COMMUNICATION THROUGH TRADITIONAL VS. DIGITAL/SOCIAL MEDIA: A CASE STUDY OF MALIHABAD (U.P.) MANGO FARMERS

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ABSTRACT

This research examines the impact of media channels for science communication strategies on mango growers in Malihabad, Uttar Pradesh. It focuses on the effectiveness of traditional versus digital/social media in disseminating scientific information. Using a mixed-methods approach integrating quantitative survey data and qualitative interviews, and literature survey, the study evaluates how these communication channels influence farming practices, particularly in reducing pesticide costs, enhancing market access, and improving overall profitability. The findings reveal that while traditional media, such as radio and agricultural magazines, remains essential for ensuring the credibility and accessibility of scientific knowledge, digital/social media platforms offer significant advantages. These platforms provide timely updates on market trends and innovative farming techniques, enabling farmers to optimize their practices, lower production costs, and expand their market reach. This helps address the issue of low profitability, often linked to reliance on outdated methods and limited access to markets. The study concludes with recommendations for adopting integrated communication strategies that combine the strengths of both traditional and digital media to promote sustainable agricultural practices and enhance profitability among mango farmers.

Keywords: *Science communications; traditional science communication; digital/social media, Malihabad*

INTRODUCTION

Uttar Pradesh, the largest mango-growing state in India, covers 0.274 million hectares and produces 4.39 million tonnes of mangoes annually. Prominent commercial cultivars include *Dashehari, Langra, Chausa, and Lucknow Safeda*, with *Dashehari* occupying the maximum area. The Malihabad region is particularly renowned for its world-famous *Dashehari* mango, cultivated over 28,000 hectares. The region's unique climate and soil conditions— being extremely hot and having rainless summers—contribute to the premium quality of Malihabadi *Dashehari* mangoes, which are superior to those grown in other regions (Gurjar et al. 2017). This variety is conferred with Geographical Indication by India's Geographical Indication Registry, affirming its distinct quality (Mishra et al. 2019). However, this recognition has not significantly improved the livelihoods of local farmers due to a lack of awareness along with diminishing profits from mango cultivation.

Reasons for Low Profitability

Traditionally, farmers in Uttar Pradesh, including those in Malihabad, relied on conventional methods of information dissemination such as face-to-face communication, local markets, and agricultural extension services. These channels, while credible, often failed to deliver to a wider audience or deliver timely information (Chavan, 2014). The advent of digital and social media has transformed this landscape, offering farmers new avenues to access information and connect with consumers. Social media platforms like WhatsApp, Facebook, and YouTube have become crucial tools for farmers, providing real-time updates on market trends, weather forecasts, and farming techniques (Desai,et al 2017). This shift has enabled farmers to make informed decisions, expand their market reach, and participate in virtual marketplaces.

Importance of Science Communication through Traditional vs. Digital/Social Media

The study compares the effectiveness of science communication through traditional versus digital/social media, focusing on their impact on mango growers in the Malihabad region. Results demonstrate that traditional media channels, such as radio, television programs like Krishi Darshan, and agricultural magazines, continue to be crucial in guaranteeing the credibility and accuracy of agricultural knowledge. These channels simplify complex scientific information, making it accessible to farmers who may have limited education or digital literacy.

On the other hand, digital and social media platforms have significantly enhanced the adoption of scientific farming practices among mango growers (Singh, Singh, & Priyadarshi, 2010). These platforms facilitate faster dissemination of information, allowing farmers to reduce pesticide use, lower production costs, and increase their income. For example, farmers who actively use social media reported better access to market information and quicker adoption of sustainable farming practices.

However, the study also identifies challenges associated with digital/social media. Technological barriers, like limited internet access along with digital literacy, can hamper these platforms' effectiveness. Additionally, the overwhelming amount of information available online may lead to confusion and misinformation among farmers.

Science Communication in Agriculture

Agronomy encompasses more than the mere commercialisation of agricultural commodities to farmers, nor does it include the resolution of individual technical challenges in production. Agronomy is the integrated and holistic perspective of agriculture and "*agronomists are specialists in crop and soil sciences, as well as ecology*" (Hunt,et al 2019). Although scientific research and discovery are crucial for comprehending the behaviour of systems, the concrete advantages of our knowledge arise from its practical use in problem-solving. Effective communication is crucial for facilitating stakeholders' comprehension of the significance of research and enabling scientists to have insight into the difficulties encountered by stakeholders. Nevertheless, in order to effectively use scientific knowledge, it is necessary for solutions to include the whole system and align with the agricultural principles followed by farmers. For this, strategies need to be customized after detecting, accurately diagnosing and prioritizing the problems along with challenges inside agricultural systems. These protocols are not feasible to execute remotely or by anyone who lacks the necessary skills or understanding. Instead, they should be executed by those who are highly skilled and knowledgeable, capable of converting knowledge into practical methods. Moreover, stakeholders must have confidence in the accuracy and relevance of the advice specifically to their system, thereby highlighting the crucial function of the trusted advisor. The trusted advisor is an individual with the expertise and abilities to evaluate the whole system, along with access to scientists and a thorough understanding of the research. It is important for them to comprehend the requirements and difficulties encountered by the stakeholder farmers and establish their confidence. These trustworthy advisors have a crucial role in enabling agriculture to effectively address climate change, and population growth, and develop sustainable management methods.

The channels that have historically played a crucial role in spreading scientific knowledge to farmers, particularly those who are often poor and uneducated. Traditional methods of communication include:

1. **Krishi Darshan on DD National**: Launched in 1967, Krishi Darshan is one of the longest-running television programs in India dedicated to providing agricultural information. It airs on Doordarshan and has been a primary source of farming-related knowledge, offering advice on crop management, pest control, and modern agricultural techniques.
2. **Agricultural Magazines and Journals**: Publications such as *"Choupal Sagar," "Indian Farming," "Krishi Jagran,"* and *"Kheti"* have been widely read by farmers. These magazines provide information on farming practices, government schemes, market trends, and scientific advancements in a language that is accessible to the farming community.
3. **Radio Programs**: All India Radio (AIR) has been another vital medium for farmers, with programs like "Kisan Vani" that broadcast agricultural advice, weather forecasts, and market prices. These programs are especially valuable in rural areas where television and internet access may be limited.

These traditional methods of science communication were vital for the expression and spread of scientific knowledge in a manner that was not only credible but also comprehensible to farmers. The content was usually simplified and translated into local languages to ensure that it was accessible to its intended audience. (Šūmane, et al 2018).

However, times have changed, and we now have social and digital media platforms like WhatsApp, Facebook, YouTube, and Instagram that spread information quickly and easily. These platforms have become new-age tools for disseminating agricultural knowledge, offering instant access to information, and connecting farmers with experts

and markets. While these digital platforms are increasingly popular, it's essential to recognize the enduring importance of traditional channels that have been the backbone of agricultural communication for decades.

The critical role that science communication plays in agriculture

- **Knowledge Transfer**

Traditional Science Communication in agriculture serves as a conduit for the transfer of knowledge from the research realm to the agricultural sector. Scientific research conducted by agricultural scientists yields valuable insights, innovations, and best practices that have the potential to revolutionize farming techniques and enhance agricultural productivity. However, this knowledge is only as impactful as its dissemination to those who can put it into practice. Effective science communication ensures that farmers and agricultural stakeholders have access to the latest research findings, enabling them to make informed choices about soil health, pest management, crop selection, and sustainable farming practices. (Nair, & Nair, 2014).

- **Bridging the Gap**

Farmers often operate in environments where access to scientific information is limited or challenging. Language barriers, low levels of education, and a lack of technological infrastructure can all hinder the flow of knowledge from researchers to farmers. Science communication plays a vital role in bridging this gap by translating complex scientific jargon and concepts into accessible, practical advice that farmers can readily understand and apply to their daily farming activities.

- **Enhancing Agricultural Resilience**

In a time of climate change and increased environmental pressures, farmers face a growing need to adapt and build resilience into their farming practices. Science communication equips farmers with the information and tools they require to mitigate climate-related risks, optimize water and resource management, and adopt climate-smart agricultural techniques. This is particularly crucial for smallholder farmers in vulnerable regions (Lipper et al., 2014).

- **Promoting Sustainable Agriculture**

Sustainable agriculture is at the head of global efforts to address food security and environmental sustainability. Scientific research often leads to the development of sustainable farming practices, like precision agriculture, integrated pest management, and organic farming. Effective science communication facilitates the adoption of these practices, reducing the environmental impact of agriculture while promoting long-term food security.

- **Market Access and Value Chains**

Access to information about market prices, demand trends, and quality standards is essential for farmers to make informed choices about what they should produce and how to market their products Science communication, through extension services and technology platforms, can provide farmers with up-to-date market information, enabling them to optimize their crop choices and increase their profitability

- **Empowering Farmers**

Empowering farmers with scientific knowledge gives them greater autonomy and agency in their farming decisions. It allows them to experiment with new techniques, adapt to changing conditions, and innovate within their local contexts. This empowerment contributes to increased food security and economic stability in farming communities. In conclusion, science communication in agriculture is not a mere luxury but a fundamental necessity for the progress of the agricultural sector. It facilitates the transfer of vital knowledge, bridges the gap between research and practice, enhances agricultural resilience, promotes sustainability, supports market access, and empowers farmers to navigate the complexities of modern agriculture effectively (Dolinska, & d'Aquino, 2016).

CASE STUDY

The Malihabad area of Uttar Pradesh is renowned for its exquisite Dashehari mango, cultivated over a vast expanse of land comprising over 28,000 hectares. The particular climatic and soil characteristics of Malihabad, characterised by quite hot and dry summers, contribute to the cultivation of high-quality Dashehari fruit, which surpasses that of other areas (Rajan 2009). The Malihabadi Dashehari type of mango has been granted Geographical Indication by India's Geographical Indication Registry, confirming its unique quality characteristics. Yet, the differentiation made for Dashehari has not been beneficial for farmers in this area so far due to insufficient knowledge and declining earnings from mango products. This study aims to assess the importance of science communication through

traditional versus digital/social media, focusing on their impact on mango growers in Malihabad. By understanding the preferences and effectiveness of these communication methods, the study seeks to provide insights into optimizing agricultural extension services for enhanced productivity and sustainability.

OBJECTIVES

1. To compare the effectiveness of science communication through traditional versus digital/social media, focusing on their impact on mango growers in Malihabad
2. To provide recommendations for optimizing agriculture extension services through integrated communication strategies

METHODOLOGY

A mixed-methods approach was adopted, combining quantitative survey data and qualitative interviews. The study was conducted in the Malihabad block of Lucknow district, covering the period from 2017 to 2019. The sample consisted of 240 mango growers, with 120 farmers randomly designated from three villages, which were Nabipanah, and Mohammad Nagar Talukedari, along with Meethenagar) where digital and social media-based science communication strategies were demonstrated. Another 120 farmers who relied on traditional production and marketing practices served as a control group.

Personal interviews were conducted to gather data on the count of pesticide sprays, and pesticide expenditure, along with harvesting and post-harvest losses, and production costs, fruit sale value, and profitability per acre. A paired t-test was utilised to ascertain the noteworthiness of income changes due to the adoption of science communication strategies.

RESULTS

Table 1.1. Comparison of Production Costs and Income between Traditional Media Users and Digital/Social Media Users

	Traditional Media Users (₹/acre)	Digital/Social Media Users (₹/acre)	Mean Difference (₹/acre)	% Change
Plant Protection Cost	14,178.31	11,232.86	−2,945.44	−20.77%
Total Production Cost	30,962.69	32,125.85	+1,163.16	+3.75%
Net Income	45,890.00	80,080.00	+34,190.00	+74.41%

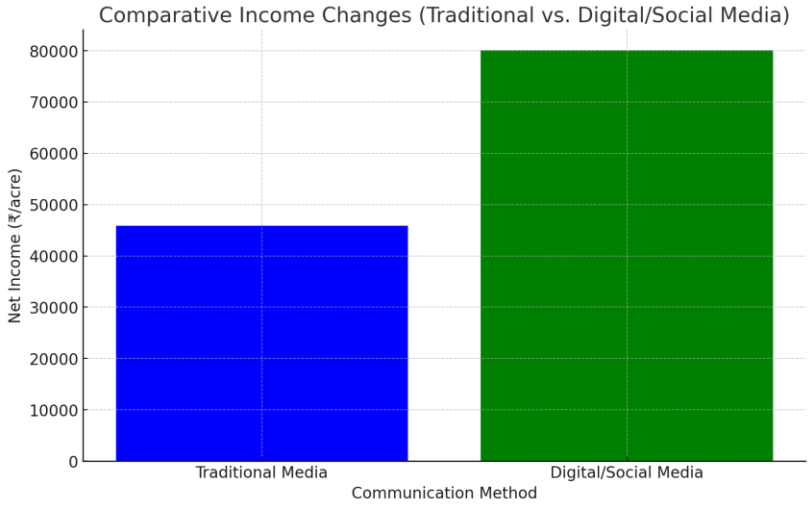

Figure 1.1. Illustrates the significant difference in net income per acre between farmers using traditional media and those using digital/social media for science communication.

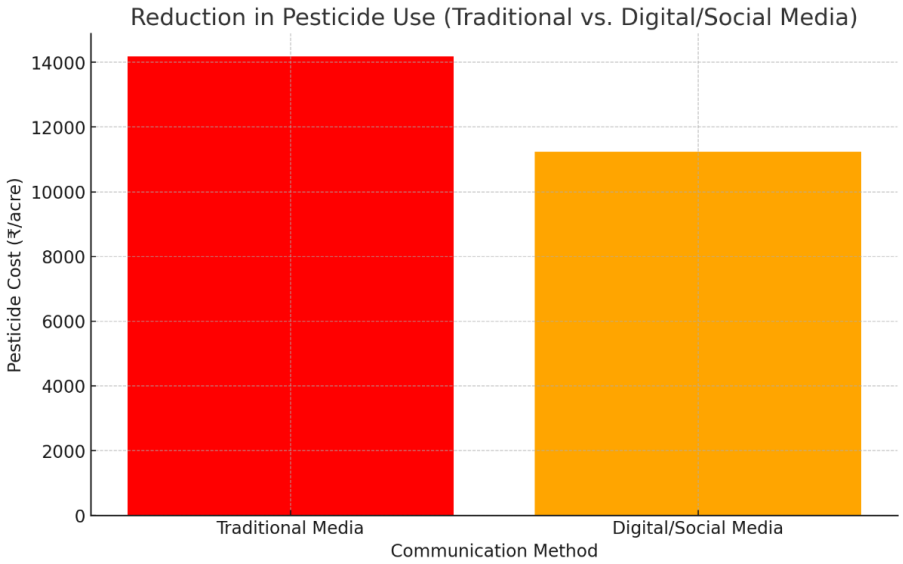

Figure 1.2 Illustrates the reduction in pesticide costs per acre, with farmers using digital/social media spending less on pesticides compared to those relying on traditional media.

DISCUSSION ON RESULTS

The results demonstrate that traditional media guarantees scientific credibility and dissemination of accurate agricultural knowledge in a simplified manner. Digital/social media significantly enhances the adoption of scientific farming practices, leading to reduced pesticide utilisation, lower production costs, along with higher income. Additionally, farmers using digital/social media were better informed about market opportunities and pest management, enabling them to make more profitable decisions.

However, the study also identifies challenges such as technological barriers and information overload, which may hinder the effectiveness of digital/social media. Traditional media, though less dynamic, remains essential for reaching farmers with limited digital literacy or access.

RECOMMENDATIONS

- **Develop integrated communication**

Develop an integrated communication framework that leverages both traditional and digital/social media. This approach guarantees that all farmers, irrespective of their technological access or literacy levels, can benefit from

scientific advancements. Traditional media should continue to provide foundational knowledge, while digital/social media can be used for timely updates, market trends, and immediate feedback mechanisms.

- **Implementing digital literacy**

Implement digital literacy programs targeting farmers who have limited experience with smartphones or internet usage. This includes training on how to access, evaluate, and apply scientific information from digital platforms. Additionally, improving infrastructure to enhance internet connectivity in rural areas is crucial for the broader adoption of digital communication methods.

- **Improved agriculture extension**

Strengthen agricultural extension services by equipping extension agents with digital tools and resources. These agents should act as facilitators who help bridge the gap across traditional practices and modern digital methods, ensuring that all farmers have access to the information they require to improve their practices.

- **Use of pesticides through both traditional and digital channels**

Focus on educating farmers about the judicious use of pesticides through both traditional and digital channels. Reducing pesticide use not only lowers costs but also contributes to environmental sustainability and the production of safer, more eco-friendly produce. Extension services should provide continuous support and monitoring to ensure these practices are effectively implemented.

- **Accessibility of market**

Leverage digital platforms to create more direct market linkages for farmers. By reducing the number of intermediaries in the supply chain, farmers can secure better prices for their produce. Training programs should include sessions on how to use digital tools for market research, pricing strategies, and negotiating with buyers in distant markets.

- **Ongoing research and feedback**

Establish a system for ongoing research and feedback that allows for continuous improvement of science communication strategies. This should include regular surveys and focus groups with farmers to assess communication methods' effectiveness and make necessary adjustments.

CONCLUSION

The adoption of digital/social media in science communication offers substantial benefits for mango farmers in Malihabad, particularly in terms of income and sustainability. However, an integrated communication strategy that combines the strengths of both traditional along with digital/social media is recommended to maximize the dissemination of scientific information and optimize farming practices. Training programs focusing on digital literacy and the judicious use of pesticides are crucial for enhancing the effectiveness of these strategies.

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