INNSPUB

Journal of Biodiversity and Environmental Sciences | JBES
ISSN: 2220-6663 (Print); 2222-3045 (Online)
Website: https://www.innspub.net
E-mail contact: info@innspub.net
Vol. 27, Issue: 4, p. 1-8, 2025

RESEARCH PAPER OPEN ACCESS

Impact of social media campaigns on farmers awareness of environmental conservation practices

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Key words: Social media, Farmers, Environmental, Conservation and sustainable agriculture

DOI: https://dx.doi.org/10.12692/jbes/27.4.1-8 [Published: October 05, 2025]

ABSTRACT

Social media has emerged as a transformative tool in agricultural communication, enabling interactive, real-time, and community-driven knowledge sharing among farmers. Promoting environmental conservation practices, such as effective water use, soil health management, organic and eco-friendly farming, integrated pest management, adoption of renewable energy, and climate-smart agriculture, has become more common on social media platforms like Facebook, WhatsApp, YouTube, Twitter, and Instagram. The function and effects of social media campaigns in increasing farmers' knowledge and promoting behavioural shifts toward sustainable practices are examined in this research. Campaigns include localized message, peer-to-peer interactions, live demonstrations, and multimedia content to make difficult procedures approachable and relatable. Research demonstrates that social media improves farmers' understanding, cultivates optimistic attitudes, and occasionally encourages the adoption of environmentally beneficial practices. Instagram employs visual storytelling to encourage sustainable practices, Facebook helps networking and information sharing, YouTube offers hands-on demonstrations, Twitter links farmers with experts and politicians, and WhatsApp enables real-time guidance and community problem-solving. Despite these benefits, problems such as digital illiteracy, poor internet access, disinformation, language barriers, and cultural opposition impede the reach and efficacy of campaigns. In addition to merging social media with conventional extension techniques, future tactics should incorporate AI-driven tailored content, cooperative marketing, digital literacy training, and localized messaging. Campaigns that are well-thought-out, inclusive, and grounded in data may be quite effective in encouraging farmers to practice sustainable agriculture, climate resilience, and environmental preservation.

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INTRODUCTION

In the twenty-first century, social media has become a crucial tool for agricultural communication, providing real-time updates, peer-to-peer exchange, and localized content at low cost. The communication gap between farmers and extension agents has decreased as a result of this community-driven, interactive, and participatory strategy, opening up new avenues for grassroots education and awareness-raising. Promoting climate-smart farming techniques like crop diversification, agroforestry, and drought-resistant seed variants has been made possible in large part by social media efforts. Additionally, by increasing consumer demand for eco-friendly and organic goods, these initiatives indirectly encourage farmers to use more environmentally friendly practices in order to compete in developing markets.

Ecological imbalances, decreased biodiversity, and climatic vulnerabilities have resulted from agricultural practices such monocropping, excessive groundwater extraction, excessive use of chemical fertilizers and pesticides, and soil erosion. The farming community can get agricultural information through social media platforms (Sandeep *et al.,* 2023). One of the populations most at risk from environmental changes including droughts, floods, and unpredictable rainfall patterns are farmers. Ensuring ecological sustainability and food security requires encouraging environmental conservation methods in agriculture. The reach, cost-effectiveness, timeliness, and interactivity of traditional communication channels including radio, television, print media, and extension services are all constrained. Farmers are more likely to embrace sustainable practices when they actively participate in agricultural groups on social media, strengthening their convictions and increasing their awareness of environmental issues. To encourage farmers to take more proactive environmental measures, governments should specifically use social media as a strategic tool to actively raise awareness among farmers by sharing eco-friendly agriculture practices across multiple social media platforms (Khan *et al.,* 2024).

Social networking sites have developed into important resources for bringing together farmers, professionals, decision-makers, and customers. They offer forums for participatory dialogue, information exchange among peers, and the development of communities centered on agricultural matters. Even smallholder farmers in rural regions are increasingly using Facebook, WhatsApp, and YouTube as information sources due to the widespread use of cellphones and reasonably priced internet connectivity. In addition to being economical, campaigns created using these platforms are dynamic in their ability to engage farmers through live interactions, narrative, and audio-visual material. Today's agricultural industry is at a critical juncture when the need to preserve the environment and boost output must be carefully balanced. Farming methods include careless pesticide usage, overuse of chemical fertilizers, extensive monocropping, and unsustainable groundwater extraction have ruined soils, contaminated ecosystems, and decreased biodiversity for decades. Farmers are more vulnerable to unpredictable rainfall, protracted droughts, and catastrophic weather events as a result of climate change. This dual reality emphasizes the need to support environmental conservation practices in agriculture, such as crop diversification, climate-smart agriculture, integrated pest management, organic and natural farming, soil fertility management, water-use efficiency, and the use of renewable energy. Farmers' opinions and actions toward the environment are influenced by social media sites like YouTube, Facebook, Instagram, and WhatsApp. These platforms' social networking features were proven to be useful for knowledge creation (Patel and Mallappa, 2022). One of the most important tools for advancing environmental conservation initiatives is social media. To disseminate new technology and environmental messages to rural people, agricultural extension systems have traditionally depended on conventional mass media outlets such as newspapers, farm magazines, radio, and television. These channels did, however, have drawbacks, including one-way information distribution, a lack of individualized

counseling, and a growing divide between information "haves" and "have-nots." Because interactive material more successfully encourages emotional connections and group action than text-based messaging, social media campaigns help to establish environmental awareness as a cultural value. While localized WhatsApp groups offer forums for community discussion about common concerns, platforms like Instagram and TikTok have enhanced involvement with issues like biodiversity protection and plastic waste reduction. YouTube channels are sharing a lot of farm information in video format to help the farm community, social media platforms like WhatsApp were well-known at the field level for connecting farmers with other farmers and local extension agents, and networking sites like Facebook were well-known for connecting farmers' networks. Knowledge creation was found to be facilitated by social networking (Nain *et al.*, 2019). Compared to top-down communication from extension organizations alone, the participatory character of these platforms also enables farmers to share their experiences, making the process more democratic and reliable. But there are drawbacks to the increased dependence on social media for environmental and agricultural awareness. Since many farmers in isolated or marginalized regions lack dependable internet connectivity, reasonably priced cellphones, or the necessary digital skills to participate fully in campaigns, the digital gap continues. Access is further limited by language hurdles, and social media's viral nature makes it easier for false information to proliferate, confusing farmers or encouraging destructive behaviors. Digital campaigns are positioned to become key tools for promoting environmentally friendly practices as farmers grow more tech-savvy and governments, non-governmental organizations, and business players realize the importance of social media in sustainable development. Farmers said that the information they got or could access on social media platforms was helpful and efficient in helping them implement optimal agricultural practices (Sandeep *et al.*, 2022). Through social media, people may communicate more quickly, more affordably, and provide recipients with timely information.

Because WhatsApp, Facebook, and YouTube are the social media platforms that extension workers are most familiar with on a field level, they should provide material for these platforms that will reach farmers more efficiently (Sandeep *et al.*, 2020). The function of social media sites like YouTube, Instagram, Twitter, and Facebook in advancing sustainable farming methods. Mass media encourages farmers to embrace techniques that increase productivity while preserving the environment by promoting sustainable practices (Darji and Yadav, 2024). The data analysis showed that there was a significant amount of material about sustainable agriculture on these platforms, along with strong user interaction and a range of consumer opinions. The most talked-about topic on social media was organic farming, indicating how well-liked it is in the conversation around sustainable agriculture. The study highlighted how social media may be used to spread knowledge, start conversations, and influence how consumers see sustainable agriculture. By promoting information exchange, increasing awareness, and cultivating a community of stakeholders dedicated to sustainable agriculture, an understanding of and ability to use social media can help promote sustainable agricultural methods (Jabeen and Gul, 2023).

Social media campaigns

Social media campaigns are coordinated attempts to disseminate information, sway public opinion, and promote behavioral changes using digital channels. Social media enables user-generated content, two-way engagement and quick information distribution across networks, in contrast to conventional one-way communication. Multimedia material, live demos, webinars, and influencer-led projects are all possible components of campaigns.

Environmental conservation practices in agriculture

Environmental conservation in agriculture includes a wide range of practices aimed at protecting natural

resources and ensuring sustainability. Examples include:

1. Efficient irrigation methods (drip, sprinkler)
2. Soil conservation practices (mulching, contour farming)
3. Organic and natural farming techniques
4. Integrated Pest Management (IPM)
5. Renewable energy use (solar pumps, biogas)
6. Crop diversification and agroforestry
7. Climate-smart agriculture practices

Awareness and behavioural change

The first stage in implementing long-lasting behavioural change among farmers is raising awareness. Rogers' Diffusion of Innovations Theory states that information generated by awareness may influence attitude development, decision-making, and the ultimate acceptance of an innovation. Social media speeds up this process by fusing interactive information that speaks to farmers' experiences with testimonials and visual evidence.

Social media use in agriculture

The rise of social media has transformed communication in rural areas. Farmers are no longer passive recipients of information; they actively engage, question, and share experiences with peers. Some platforms have proven particularly impactful:

Facebook: Used for farmer organizations, awareness films, and campaign pages. Facebook was found to have the most posts about sustainable agriculture, demonstrating its important role in advancing sustainable agricultural methods. Likes, shares, comments, reach, and other engagement data showed that users were actively interacting with information about sustainable agriculture across all platforms. The usefulness of social media in creating interest and involvement in sustainable agricultural themes was demonstrated by Facebook's notable levels of interaction (Abbas *et al.*, 2019; Deo and Prasad, 2020). Organic farming was also found to be the most talked-about issue on social media, according to the survey of popular sustainable agricultural themes. This implied that the conversation on sustainable agriculture on social media placed a high value on organic agricultural methods. Growing global demand for healthier and more ecologically friendly farming methods coincided with the rise in popularity of organic farming (Janker *et al.*, 2018).

WhatsApp: Farmers may share conservation suggestions, market data, and real-time guidance via WhatsApp. Learning becomes relatable due to its simple sharing of voice notes, videos, and messages in the local language. This promotes group problem-solving and a greater understanding of sustainable agricultural methods. In order for agricultural development authorities to communicate information, messages, and circulars via WhatsApp, the Karnataka government's Department of Agriculture mandated that they have cellphones (Khajane, 2016). Nowadays, farmers rely more and more on WhatsApp to acquire instant assistance, particularly from forward-thinking farmers and agricultural specialists (Thakur, 2016).

YouTube: Farmers may view hands-on examples of conservation farming, soil maintenance, and water-saving methods on YouTube. Their experiences are reflected in visual lessons in local languages, which simplify difficult procedures and encourage long-lasting improvements through online success stories. offers learning via demonstrations (how-to manuals for organic pesticides, composting, and drip irrigation). To help the farming community, YouTube channels are sharing a lot of farm-related videos. Knowledge creation was found to be facilitated by social networking (Nain *et al.,* 2019). YouTube showed high levels of interaction, demonstrating how social media may effectively spark interest and participation in themes related to sustainable agriculture (Abbas *et al.*, 2019; Deo and Prasad, 2020).

Twitter (X): Twitter (X), which provides instant information on markets, climate, and conservation, links farmers with peers, experts, and politicians. Discussions, hashtags, and brief messages raise awareness, give farmers' opinions more weight, and

encourage group action in support of environmentally friendly and sustainable farming methods.

Significant levels of involvement were shown on Twitter, demonstrating how well social media works to spark interest in and participation in issues related to sustainable agriculture (Abbas *et al.*, 2019; Deo and Prasad, 2020). Used to broadcast environmental initiatives by NGOs and agricultural ministries. Social media sites like Twitter have developed into online gathering places for people, groups, and communities interested in sustainable agriculture to exchange knowledge, spread awareness, and work together. These platforms can facilitate the sharing of ideas, best practices, and success stories by bringing together farmers, researchers, policymakers, and consumers from around the world (Onitsuka, 2019; Ihsaniyati *et al.*, 2023).

Instagram: Instagram connects farmers with images, videos, and narratives that highlight conservation advice, eco-friendly farming, and success stories. While interactive elements encourage learning, motivation, and community support for environmental stewardship, visual storytelling in local contexts encourages the adoption of sustainable practices and useful for promoting sustainable agricultural companies and communicating stories visually. Social media sites like Instagram have a big part to play in advancing sustainable farming methods. According to data research, these sites have a significant amount of material about sustainable agriculture, with strong user interaction and a range of customer opinions (Jabeen and Gul, 2023). Significant levels of involvement were seen on Instagram, demonstrating how well social media works to spark interest in and participation in issues related to sustainable agriculture (Abbas *et al.*, 2019; Deo and Prasad, 2020).

Impact of social media campaigns on environmental awareness

Soil conservation practices: Campaigns that use infographics and movies to emphasize soil health have taught farmers about decreased tillage, mulching, and composting. In certain areas, awareness has resulted in a decrease in reliance on chemical fertilizers and an increase in the usage of organic manure.

Water use efficiency: In regions with limited water resources, WhatsApp-based campaigns have been effective in educating farmers about sprinkler and drip irrigation systems. Farmers have been encouraged to use water-efficient practices via short films that demonstrate cost savings and increased yields.

Organic and eco-friendly farming: Communities around organic farming now congregate on social media. Campaigns endorsing natural agricultural practices, bio-pesticides, and bio-fertilizers are presented to farmers. Campaigns led by consumers have also raised awareness of the market's need for organic products, encouraging farmers to adopt more environmentally friendly methods.

Integrated pest management (IPM): Farmers' knowledge of environmentally friendly pest control has improved thanks to YouTube advertisements that demonstrate pheromone traps, neem-based treatments, and biological control agents. According to certain research, the use of chemical pesticides appears to be decreasing in regions where farmers actively participate in these digital efforts.

Renewable energy adoption: Facebook and Instagram campaigns by public and private organizations emphasize the advantages of biogas plants and solar-powered irrigation pumps. Farmers exposed to these advertisements indicate higher understanding of cost savings and environmental advantages.

Climate change adaptation: Climate-smart agriculture-related social media campaigns have increased knowledge of drought-resistant cultivars, crop diversity, and adaptation techniques. More and more farmers from poor nations are taking part in internet forums that debate methods for coping with climate change.

Challenges

Social media campaigns are being used by farmers more and more to spread the word about environmental conservation techniques. These efforts do, however, encounter a number of difficulties. Small and marginal farmers, who frequently require knowledge on conservation methods, are limited in their involvement due to the digital divide, a major problem in rural regions. Another significant issue is digital literacy, since many farmers find it difficult to use cellphones, navigate social media, or understand digital material. On social media, false information travels quickly, creating confusion and inefficient strategies. Due to farmers' preference for regional languages, language and cultural hurdles can reduce the effectiveness of advertisements. Since many agricultural communities still use old methods and could be hesitant to embrace new conservation strategies that are pushed online, cultural resistance is still a problem. Another issue with digital platforms is short attention spans; farmers frequently prefer brief, useful material than in-depth technical explanations. These difficulties highlight the necessity of social media tactics that are trustworthy, localized, and inclusive in order to successfully encourage farmers to undertake environmental conservation.

Future prospects and recommendations

The use of social media campaigns to raise farmers' awareness of environmental conservation practices is expected to expand significantly in the future, as digital platforms continue to penetrate rural communities. However, certain tactics and innovations need to be sought in order to increase their efficacy. Combining data analytics with artificial intelligence (AI) is one exciting avenue. With the use of these technologies, campaign material may be tailored to farmers' geographic location, farming systems, and regional environmental issues. For example, farmers in locations experiencing soil degradation might obtain customized material on managing soil health, while farmers in drought-prone areas could receive focused counsel on rainfall gathering and water conservation. Additionally, AI-driven analytics may assess interaction trends, spot awareness gaps, and recommend enhancements for next initiatives. The encouragement of cooperative campaigning is yet another crucial suggestion. When governments, non-governmental organizations, agricultural institutions, and private businesses collaborate, social media outreach has a far greater impact. Working together guarantees message coherence, establishes trust, and expands outreach to a variety of farming groups. These collaborations may also provide knowledge supported by research to farmers at the grassroots level, guaranteeing the spread of trustworthy and useful conservation techniques. Building capacity via training in digital literacy is also essential for the future. Farmers need assistance learning how to access, understand, and use digital material, especially those in their later years. Village-level training programs can enable farmers to use cellphones with assurance and make knowledgeable judgments about protecting the environment. Localized content generation is equally vital. Regional languages should be used for campaign translations, and culturally appropriate images should be used for illustrations. Farmers are more receptive to communications that are locally relevant, which improves their understanding and confidence in the information presented. It is also necessary to set up a robust monitoring and assessment system. Refinement of methods requires regular evaluations of the impact of campaigns, both in terms of awareness raised and actual adoption of conservation behaviours. Future projects that are more successful should be designed with input from farmers. Lastly, it will be crucial to implement a mixed communication strategy. Even though social media is quite effective, it should be used in conjunction with village meetings, farmer field schools, community radio, and local protests. This guarantees that the conservation movement includes those who do not have access to digital technology.

CONCLUSION

Social media initiatives, which provide interactive, economical, and extensive communication, have become revolutionary instruments for increasing

farmers' understanding of environmental conservation methods. Governments, non-governmental organizations, and agricultural institutions are now able to share information about soil health, water-use efficiency, organic farming, renewable energy, and climate-smart agriculture thanks to platforms like Facebook, WhatsApp, YouTube, Twitter, and Instagram. Research demonstrates that these initiatives not only increase awareness but also have a beneficial impact on attitudes and, in some situations, the adoption of environmentally friendly behaviours. However, obstacles including inadequate internet access, cultural opposition, disinformation, and digital illiteracy still prevent them from reaching their full potential. Future development hinges on using AI, forming partnerships, making sure material is localized, and fusing social media with conventional extension techniques. Social media may significantly contribute to the advancement of sustainable agriculture and the development of resilience to environmental issues when used in conjunction with inclusive, evidence-based, and farmer-centric strategies.

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