

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 12; December 2025; Page No. 243-247

Received: 19-09-2025
Accepted: 21-10-2025

Indexed Journal
Peer Reviewed Journal

Communication strategies for environmental sustainability: A review

¹Astha Roy, ²Mandeep Sharma and ³Preeti Sharma

¹Ph.D. Scholar, Department of EECM, College of Community Science, Punjab Agricultural University, Ludhiana, Punjab, India

²Assistant Professor, Department of EECM, College of Community Science, Punjab Agricultural University, Ludhiana, Punjab, India

³Associate Professor, Department of EECM, College of Community Science, Punjab Agricultural University, Ludhiana, Punjab, India

DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i12d.2763>

Corresponding Author: Astha Roy

Abstract

Environmental sustainability has become a central concern for agriculture and rural livelihoods as communities face increasing pressure on land, water and biodiversity. Communication links scientific and technical knowledge with the everyday decisions of farmers, consumers, extension personnel and policy makers, yet evidence on how to design effective communication strategies for sustainability is dispersed across different programmes and sectors. This review paper synthesizes literature and documented experiences on communication strategies for environmental sustainability with a specific focus on agricultural extension and rural development. A narrative review approach was followed, drawing on books, journal articles, institutional reports and credible web resources that describe communication processes, outcomes and lessons in environmental initiatives. The material was organized into six major themes: informative communication, participatory communication, behaviour change communication, advocacy communication, media and digital communication, and strategies to address barriers. The review shows that informative strategies, such as advisories, training, and demonstrations, are necessary to build basic awareness. Still, they need to be combined with participatory processes that involve communities in analyzing problems and planning solutions. Behaviour changes approaches grounded in audience research help address social norms, perceived risks and other determinants of practice. Advocacy-oriented communication is important for placing sustainability and environmental justice on public and policy agendas, while media and digital tools extend the reach, speed and interactivity of messages. Across these strategies, common constraints include organizational limitations, technical language, unequal access to media and psychological resistance to change. The paper concludes that multi-channel, context-specific and participatory communication, supported by responsive institutions and continuous feedback, is essential for integrating environmental sustainability into agricultural extension systems and for encouraging long-term environmentally responsible behaviour.

Keywords: Agricultural extension, behaviour change, environmental communication, participatory approaches and sustainability

Introduction

Communication is the process through which information, ideas and attitudes are shared to create common understanding between individuals and groups (Ray, 2011) ^[21]. It is not only the transfer of messages but also a continuous, two-way interaction that shapes how people interpret situations and decide on action in development programmes (Rayudu, 1998; Ray, 2011) ^[22, 21]. In agriculture and rural development, communication plays a central role because farmers, extension workers, researchers and policymakers must regularly exchange knowledge to solve problems and coordinate activities. When communication is weak, even technically sound recommendations do not reach farmers in time or are not adopted in appropriate ways (Sasidhar and Reddy, 2017) ^[22].

Environmental sustainability has become a major concern due to growing pressure on land, water and biodiversity, climate variability, pollution and unsustainable use of natural resources (Paterson 2021; OECD 2023) ^[20, 19]. These

trends threaten agricultural productivity, food security and the quality of life of rural communities whose livelihoods depend directly on natural resources. Extension and development agencies therefore require effective communication strategies to create awareness about environmental problems, motivate people to change unsustainable practices and support collective action for conservation (Shinde and Kanade 2023) ^[24].

A range of communication approaches is used in this context. Informative communication provides factual messages through trainings, meetings, demonstrations, farm literature, radio and television so that people come to know about soil and water conservation, climate-resilient farming and safe waste management (Ray, 2011; Ekka 2024) ^[21, 10]. Participatory communication emphasizes dialogue, group discussion and community involvement in analyzing problems and planning solutions, giving space to local knowledge and encouraging ownership of interventions (Sasidhar and Reddy, 2017; EarthR, 2023) ^[23, 9]. Behaviour

changes communication focuses on specific practices and attempts to modify underlying knowledge, attitudes, perceived risks and social norms through well-researched and repeated messages (Mishra and Sinha 2023; OECD 2023) [17, 19].

The rapid spread of information and communication technologies (ICTs) has opened new possibilities for environmental communication in agriculture. Studies on ICT-based extension and mobile applications such as PAU Kisan show that digital tools can provide timely, location-specific advisories, improve decision-making and help bridge gaps between research institutions and farmers when combined with the guidance of extension agents (Ekka, 2024; Kehina *et al*, 2025) [10, 16]. At the same time, limitations related to digital literacy, language and connectivity mean that conventional methods like face-to-face interaction, group meetings and mass media continue to be important, especially for small and marginal farmers (Hevi *et al*, 2024; Ekka, 2024) [1, 10].

In this background, the present review paper on “Communication strategies for environmental sustainability” aims to organize and synthesize available literature with special reference to agricultural extension and rural development. It describes the major types of communication strategies reported in research and practice, identifies common barriers that limit their effectiveness and discusses approaches suggested for strengthening future communication initiatives (Ray, 2011; Sasidhar and Reddy, 2017; Shinde and Kanade, 2023) [21, 23, 24].

Materials and Methods

This study adopts a narrative review design. Relevant material was collected from textbooks, peer-reviewed journals, institutional reports and credible web resources related to environmental communication, agricultural extension and sustainability between approximately 2000 and 2025. Search terms included combinations of 'environmental communication', 'agricultural extension', 'behaviour change communication', 'participatory communication', 'advocacy communication', 'sustainability campaigns' and 'India'.

Sources were included if they (i) described communication processes or strategies addressing environmental issues; (ii) reported outcomes in terms of awareness, participation, behaviour change or policy influence; or (iii) provided conceptual or methodological guidance on communication for sustainability. After screening titles and abstracts, selected documents were read in full and information was coded manually. Themes were generated inductively and then organized under seven headings: informative communication, participatory communication, behaviour change communication, advocacy communication, media and digital communication, barriers to communication and strategies to overcome barriers. As this is a narrative rather than systematic review, the aim is depth of insight rather than exhaustive coverage.

Results and Discussion

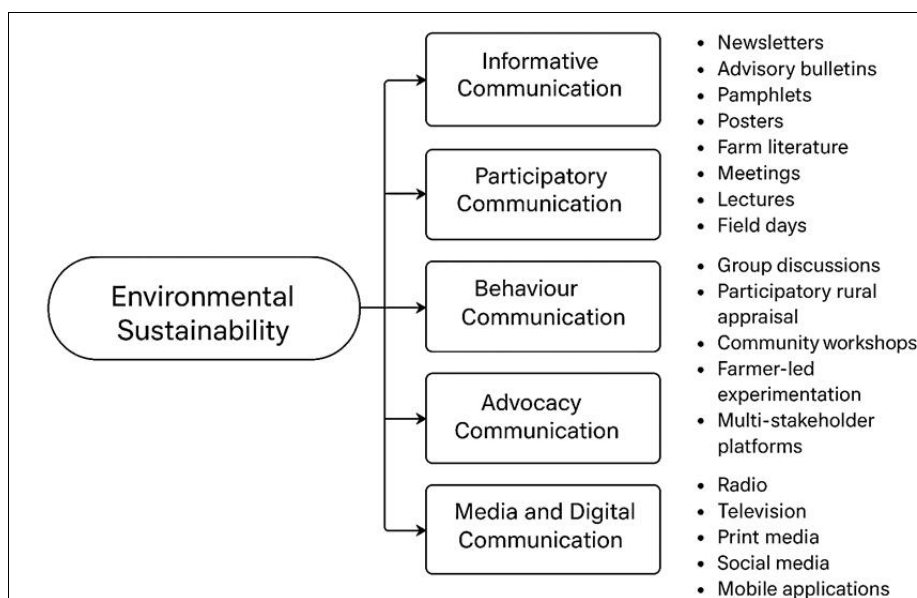


Fig 1: Conceptual framework of communication strategies for environmental sustainability

Informative Communication Strategies

Informative communication strategy is based on the idea that timely, accurate and relevant information enables individuals and groups to recognize environmental problems and consider alternative courses of action (Ray, 2011; Sasidhar and Reddy, 2017) [21, 23]. Extension and development agencies commonly use newsletters, advisory bulletins, pamphlets, posters, farm literature, meetings, lectures, field days and similar didactic formats to share information on soil and water conservation, climate-resilient

practices and safe management of wastes and inputs (Shinde and Kanade, 2023; Ekka, 2024) [24, 10]. These approaches highlight clarity of content, credibility of the information source and appropriate choice of channel according to audience characteristics.

Informative strategies are grounded in the assumption that access to timely, accurate and relevant information enables individuals and groups to recognize environmental problems and consider alternative courses of action. Extension and development agencies use newsletters, advisory bulletins,

pamphlets, posters, farm literature, meetings, lectures, field days and other didactic formats to convey information on issues such as soil and water conservation, climate-resilient practices and safe management of wastes and inputs. These approaches emphasize clarity of content, credibility of source and appropriate choice of channel according to audience characteristics.

Participatory Communication Strategies

Participatory communication views people as co-creators of knowledge rather than passive recipients of messages (EarthR 2023; Sasidhar and Reddy, 2017)^[9, 23]. Strategies in this category rely on dialogue, joint analysis and collaborative decision-making through group discussions, participatory rural appraisal, community workshops, farmer-led experimentation and multi-stakeholder platforms. Such approaches recognize local knowledge systems, encourage reflection on lived experiences and support communities to articulate their own priorities, which strengthens ownership, social learning and the sustainability of environmental initiatives (Shinde and Kanade, 2023)^[24].

Behaviour Change Communication Strategies

Behaviour change communication (BCC) is a systematic, research-based process designed to influence specific behaviours by addressing determinants such as knowledge, attitudes, perceived risks, social norms and structural barriers (Mishra and Sinha, 2023; OECD 2023)^[17, 19]. Typical BCC cycles include formative research, audience segmentation, development of tailored messages, use of multiple interpersonal and mass-media channels, and ongoing monitoring and reinforcement. In environmental sustainability work, BCC strategies promote practices such as pollution reduction, efficient resource use and adoption of clean technologies, with studies emphasizing the importance of careful formative assessment, message consistency and adequate duration of interventions for measurable behavioural outcomes (Shinde and Kanade, 2023)^[24].

Advocacy Communication Strategies

Advocacy communication focuses on influencing policies, institutional practices and allocation of resources in favour of environmental sustainability (Paterson, 2021; OECD 2023)^[20, 19]. It uses evidence, strategic framing and alliances to draw attention to neglected issues and demand accountability from decision-makers. Standard tools include policy briefs, public statements, expert testimonies, media engagement, public hearings and networking among civil society organizations, professional bodies and affected communities. Effective advocacy connects local realities with broader policy debates and frames sustainability in terms of rights, equity and long-term public interest (Centre for Science and Environment 2002; Sasidhar and Reddy, 2017)^[8, 23].

Media and Digital Communication Strategies

The rapid expansion of mass media and digital technologies has reshaped environmental communication in agriculture. Radio, television and print media continue to provide important information for both rural and urban populations, while social media, mobile applications, SMS alerts and interactive voice response systems enable more interactive

and personalized communication (Ekka, 2024; OECD 2023)^[10, 19]. Digital platforms support real-time dissemination of advisories, crowd-sourcing of observations, peer-to-peer sharing and formation of virtual communities around environmental issues. However, gaps in connectivity, affordability and digital literacy limit the reach of such tools, indicating the need to integrate digital media with conventional channels to ensure inclusive access (Kehina *et al*, 2025)^[16].

Barriers to Communication for Environmental Sustainability

Several studies indicate that communication for environmental sustainability is constrained by interacting organizational, semantic, personal and psychological barriers (Ray, 2011; Sasidhar and Reddy, 2017; Shinde and Kanade, 2023)^[21, 23, 24]. These barriers reduce the flow of accurate information, limit participation and weaken the effectiveness of behaviour-change and advocacy efforts (OECD 2023)^[19].

Organizational Barriers

Organizational barriers arise from policies, structures and administrative routines within extension and development agencies. Common issues include inadequate staff and budgets for communication work, lack of training in environmental topics, weak coordination between departments and highly centralized decision-making that leaves little flexibility at field level (Ray, 2011; Sasidhar and Reddy, 2017)^[21, 23]. Frequent transfers, overlapping responsibilities and absence of clear guidelines for communication planning further disrupt continuity of outreach activities (Shinde and Kanade, 2023)^[24].

Semantic and Language Barriers

Semantic barriers occur when technical terms, complex language or messages in non-local languages make information difficult to understand. Environmental messages are often framed using scientific jargon, unfamiliar units or abstract concepts that do not connect with farmers' day-to-day realities (Hevi *et al*, 2024). Low literacy levels, multiple local dialects and poor quality of printed or audio-visual materials can also lead to misinterpretation or loss of key ideas, especially where extension materials are translated without adequate adaptation (Ekka, 2024)^[10].

Personal and Social Barriers

Personal barriers are linked to the characteristics and circumstances of individuals. Many people face heavy workloads, limited time, low perceived self-efficacy and competing livelihood priorities, which reduce their ability or motivation to engage with environmental messages (Shinde and Kanade, 2023)^[24]. Social factors such as gender norms, caste, age and power relations influence who attends meetings, who speaks in discussions and whose knowledge is recognized, creating inequalities in access to information and voice in decision-making (Sasidhar and Reddy, 2017)^[23].

Psychological Barriers

Psychological barriers involve attitudes, emotions and

beliefs that resist change. People may distrust information from government agencies because of negative past experiences, or may doubt the benefits of recommended practices when short-term costs appear high (Paterson 2021)^[20]. Fear of failure, attachment to traditional methods, perceived risk to income and social pressure to conform to prevailing practices can all delay adoption of environmentally friendly behaviours, even when awareness and knowledge are present (Mishra and Sinha, 2023)^[17].

Strategies to Overcome Communication Barriers

Literature on extension management and environmental communication suggests multiple strategies to address these barriers (Ray, 2011; OECD 2023)^[21, 19].

1. Strengthening Organization and Training

Regular capacity-building for extension and frontline workers on environmental topics, participatory methods and use of multimedia tools improves confidence and quality of communication (Ray, 2011; Ekka, 2024)^[21, 10]. Clear role definitions, supportive supervision and dedicated budgets for communication activities help embed these functions within routine programme work (Sasidhar and Reddy, 2017)^[23].

2. Use of Simple, Local Language and Culturally Relevant Messages

Technical information should be translated into local language using familiar examples, stories, visuals and demonstrations so that diverse audience groups can relate content to their own experiences (Shinde and Kanade, 2023)^[24]. Pre-testing materials with target users helps identify confusing terms and improve clarity (Ekka, 2024)^[10].

3. Careful Timing and Choice of Channels

Aligning communication with agricultural calendars, local events and preferred media (e.g. community meetings, radio, mobile messages or social media groups) increases exposure and relevance while reducing opportunity costs for participants (Ekka, 2024; Kehina *et al*, 2025)^[10, 16]. Combining mass media with interpersonal communication ensures both broad reach and space for clarification and feedback.

4. Participatory Approaches and Relationship Building

Engaging communities in problem analysis, planning, implementation and monitoring builds trust, recognizes local knowledge and addresses personal and psychological concerns more effectively than one-way information transfer (Sasidhar and Reddy 2017)^[23]. Long-term presence of extension agents, respectful communication and transparent sharing of benefits reduce suspicion and resistance to change (Paterson 2021)^[20].

5. Feedback Mechanisms and Adaptive Management

Establishing channels such as helplines, farmer groups, digital platforms and periodic review meetings allows communities to express concerns, report constraints and suggest improvements. This feedback enables agencies to adapt messages, methods and policies in response to real-world conditions, gradually lowering barriers over time (OECD 2023; Kehina *et al*, 2025)^[19, 16].

Conclusion

Communication strategies are central to promoting environmental sustainability in agriculture and rural development. Informative approaches build basic awareness, participatory methods strengthen community ownership and learning, behaviour change communication addresses deeper determinants of practice, advocacy communication helps to shape supportive policies, and media and digital tools expand the reach and interactivity of messages. When these approaches are planned and implemented in isolation, their impact remains limited.

Barriers such as weak organizational support, technical and language-related difficulties, personal constraints and psychological resistance often reduce the effectiveness of environmental communication efforts. Overcoming these barriers requires systematic capacity-building of extension personnel, use of simple and locally relevant messages, careful choice and integration of multiple communication channels, and creation of strong feedback mechanisms between communities and institutions. Integrating informative, participatory, behavioural, advocacy and digital strategies within responsive organizational systems is essential for encouraging long-term, environmentally responsible behaviour in agricultural systems.

References

1. Anonymous. Plastic free challenge. 2016. <https://plasticfreechallenge.org>.
2. Anonymous. Swachh Pare we want in practice. 2024. <https://www.greenobiz.agency/blog/top-environmental-campaigns-2024>.
3. Anonymous. Chipko Movement. 2025. https://en.wikipedia.org/wiki/Chipko_movement.
4. Anonymous. Narmada Bachao Andolan. 2025. https://en.wikipedia.org/wiki/Narmada_Bachao_Andolan.
5. Alvi M, Hussain T. Moderating role of digital media on environmental awareness and beliefs to shape farmers' behavioural intentions towards sustainable land conservation. *J Environ Manage*. 2024;360:120-215.
6. Badavath A, Singh K. Bridging knowledge gaps in climate-smart agriculture through tailored communication approaches. *Curr Res Environ Sustain*. 2025;6:100-307.
7. Bhandal S, Kaur M, Bhatia J. Climate change and food security. *Int J Agric Ext Soc Dev*. 2023;7(1):11-16.
8. Centre for Science and Environment. The fight for clean air in Delhi. New Delhi: CSE; 2002. <https://www.cseindia.org/delhis-right-to-clean-air-849>.
9. EarthR. Neighbourhood sensitisation: A hub for community engagement. Mumbai: EarthR; 2023. <https://earthr.org>.
10. Ekka R. Role of radio/ICT and information and communication technology in agriculture extension: Lessons from tribal and Khandi district of Jharkhand, India. *Environ Socio-Econ Stud*. 2024;14(2):75-96.
11. Gerba D, Zikargae MH. Exploring participatory communication implemented to improve agricultural production in Ethiopia. *Humanit Soc Sci Commun*. 2023;10(1):1-12.
12. Grow Billion Trees. Baba Shri Balbir Singh Seechewal: Transforming landscapes and waterways through

- citizen-led conservation. 2023.
<https://growbilliontrees.com/blog/sant-balbir-singh-seechewal-transforming-landscape-and-waterways-through-citizen-led-conservation>.
13. Hindustan Times. Introducing stubble-burning policy: Punjab government initiative to manage paddy residue burning. Hindustan Times. 2023.
 14. Havi O, Grasu D, Kravtsivkikh N, Beloshyk V, Honlia I. The role of grassroots environmental movements in India. *J Environ Hist*. 2024;7(2):270-289.
 15. Hameed S, Khan R. Use of social media for environmental advocacy: A study of recent movements in India. *Int J Res Innov Soc Sci*. 2025;9(5):112-119.
 16. Kehina U, Kaur L, Kumar P, Kumar G. Content analysis of PAU Kisan app for major crops. *Int J Agric Ext Soc Dev*. 2025;13(1):45-58.
 17. Mishra N, Sinha R. Communicating climate change: A journey from awareness to mobilisation. *Climate Commun Rev*. 2023;3(1):33-52.
 18. Nyakuni A, Ayo C. Framing behaviour change for sustainable agriculture: Themes from recent empirical studies. *J Environ Manage*. 2024;362:120-456.
 19. OECD. The strategic communication of communication networks. Paris: OECD Publishing; 2023. <https://www.oecd.org/publications>.
 20. Paterson M. Anger, joy, justice and communication for climate justice: Integrating distributional, recognitional and procedural justice in climate change communication. *Environ Plan I*. 2021;45(3):295-315.
 21. Ray GJ. Extension communication and management. Ludhiana: Kalyani Publishers; 2011.
 22. Rayudu CS. Media and communication management. Mumbai: Himalaya Publishing House; 1998.
 23. Sasidhar B. Media, policy and environmental awareness: A historical overview of major environmental movements in India. *J Environ Hist*. 2017;8(1):63-78.
 24. Shinde S, Kanade S. Effectiveness of environmental education conducted through extension methods in India. *J Environ Educ*. 2023;54(2):160-170.
 25. Singh N, Ghuman A, Goyal R. PAU smart seeder: A novel approach for conservation agriculture in Punjab, India. *Int J Agric Eng*. 2023;15(1):31-44.
 26. The Tribune. Respecting women, protecting Mother Earth, says Seechewal. 2023.
<https://www.tribuneindia.com/news/punjab/respecting-women-protecting-mother-earth-says-seechewal-xxxx>.
 27. Times of India. Punjab Agricultural University's hiring initiative to reduce paddy crop residue burning. 2024.
<https://timesofindia.indiatimes.com/city/chandigarh/pu-hires-students-to-contain-paddy-stubble-burning/articleshow/xxxx>.
 28. Umehai MC, Okeke MN. Communication models in agricultural extension for sustainable rural development. *Int J Agric Ext Soc Dev*. 2024;8(5):301-308.
 29. Vaishnav A, Nandi A, Khalid S. The role of NGOs in the protection of environment: A case study of India. *Int J Multidiscip Educ Res*. 2015;4(1):8-15.