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Environmental Communication Strategies for Sustainable Environmental Management: A Narrative Literature Review of Campaigns, Education, Advocacy, and Digital Media

Ni Luh Eka Savitri[1a)], Alya Ninditya Utami[2)], Rahmatia[3]

[1,2)] **Mulawarman University**
[3)] **Hasanuddin University**
[a)] author correspondence : ekasavitri@fmipa.unmul.ac.id

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ABSTRACT

Environmental challenges, including waste management, pollution, deforestation, ecosystem degradation, and climate change, require approaches to promote behavioral change and public participation. Environmental communication plays a strategic role in raising environmental awareness, strengthening environmental literacy, and supporting sustainable environmental governance. This study aims to examine the effectiveness of environmental communication methods in environmental management through a Narrative Literature Review. The review analyzed 15 scientific publications retrieved from Google Scholar, Scopus, ScienceDirect, and national journal databases using identification, screening, eligibility assessment, and descriptive-thematic synthesis. The findings indicate that environmental campaigns are effective in increasing public awareness, environmental education contributes to the development of long-term pro-environmental knowledge and behavior, environmental advocacy supports policy reform and environmental governance, while digital media expands communication reach, enhances interaction, and mobilizes community participation. Each communication method demonstrates distinct strengths and limitations, indicating that no single approach is universally effective for all environmental issues. Therefore, this study proposes an Integrated Environmental Communication Strategy Model into a complementary framework for sustainable environmental management. The proposed model offers a conceptual reference for designing more adaptive, participatory, and effective environmental communication programs.

Keywords: *environmental communication; environmental campaign; environmental education; environmental advocacy; digital media*

ABSTRAK

Permasalahan lingkungan seperti pengelolaan sampah, pencemaran, deforestasi, degradasi ekosistem, dan perubahan iklim, memerlukan pendekatan yang mampu mendorong perubahan perilaku dan partisipasi masyarakat. Komunikasi lingkungan berperan sebagai instrumen strategis untuk meningkatkan kesadaran, membangun literasi lingkungan, serta mendukung pengambilan kebijakan yang berkelanjutan. Artikel ini bertujuan mengkaji efektivitas berbagai metode komunikasi lingkungan dalam pengelolaan lingkungan melalui pendekatan Narrative Literature Review. Kajian dilakukan terhadap 15 publikasi ilmiah yang diperoleh dari Google Scholar, Scopus, ScienceDirect, dan portal jurnal nasional melalui tahapan identifikasi, penyaringan, penilaian kelayakan, serta sintesis secara deskriptif-tematik. Hasil kajian menunjukkan bahwa kampanye efektif dalam meningkatkan perhatian dan kesadaran publik, edukasi berperan dalam membentuk pengetahuan dan perilaku pro-lingkungan secara berkelanjutan, advokasi mendorong perubahan kebijakan dan tata kelola lingkungan, sedangkan media digital memperluas jangkauan komunikasi, memperkuat interaksi, dan memobilisasi partisipasi masyarakat. Masing-masing metode memiliki keunggulan dan keterbatasan sehingga tidak ada satu strategi yang paling efektif untuk seluruh isu lingkungan. Oleh karena itu, artikel ini mengusulkan Model Strategi Komunikasi Lingkungan Integratif sebagai pendekatan yang saling melengkapi dalam mendukung pengelolaan lingkungan berkelanjutan sehingga dapat menjadi program komunikasi lingkungan yang lebih adaptif, partisipatif, dan efektif dalam menghadapi berbagai tantangan lingkungan.

Kata Kunci: *komunikasi lingkungan; kampanye lingkungan; edukasi lingkungan; advokasi lingkungan; media digitall*

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INTRODUCTION

Environmental issues have become one of the major challenges to sustainable development in various countries, including Indonesia. The increasing volume of waste, water and air pollution, deforestation, coastal degradation, and the impacts of climate change indicate that environmental degradation is becoming increasingly complex and has wide-ranging consequences for ecosystem quality, public health, economic stability, and social well-being. In addition to reducing environmental carrying capacity, these problems may also weaken national resilience through the declining availability of natural resources, increasing community vulnerability to disasters, and disruption of the balance between humans and their environment (Pramesti & Kusuma, 2026).

Various efforts have been undertaken to address these problems through regulatory approaches, technological innovations, and technical programs, including the implementation of environmental protection policies, waste management, ecosystem rehabilitation, and the application of bioremediation technologies. Nevertheless, the effectiveness of these approaches is often suboptimal when they are not supported by active community participation. Even well-designed regulations may face implementation challenges when communities do not understand the urgency of the policies, while environmental technologies are unlikely to generate significant impacts if they are not accepted and consistently adopted by users. These conditions indicate that successful environmental management depends not only on technical aspects but also on changes in public knowledge, attitudes, and behavior through effective communication processes (Fadilah et al., 2026)

In this context, environmental communication serves as a strategic instrument that connects governments, academics, civil society organizations, the private sector, the media, and local communities in building awareness and encouraging collective action on environmental issues (Fadilah et al., 2026). Environmental communication functions not only as a means of disseminating information but also as a process of education, persuasion, advocacy, social mobilization, and public opinion formation, all of which can influence individual behavior and public policy (Arifin & Herningtyas, 2025).

Along with the development of communication approaches, various strategies have been implemented in environmental management, including environmental campaigns, education, advocacy, and the use of digital media. Each strategy has different characteristics, strengths, and limitations, and its outcomes are influenced by the communication objectives, audience characteristics, social context, and environmental issues being addressed (Kurniawan et al., 2025).

Although research on environmental communication continues to develop, many studies still focus on the outcomes of individual communication strategies in isolation. Such approaches provide an in-depth understanding of each strategy but do not yet offer a comprehensive picture of the relative contributions of different methods or the potential for integrating various communication strategies to support

environmental management. However, the multidimensional nature of environmental problems requires a communication approach that is not limited to a single strategy but instead combines complementary approaches according to the objectives, target groups, and implementation contexts.

Based on this research gap, this article presents a narrative literature review to examine environmental communication strategies, namely campaigns, education, advocacy, and digital media, in supporting sustainable environmental management. Unlike studies that focus on a single communication approach, this article synthesizes findings from various studies to compare the strengths, limitations, and contextual relevance of each strategy, while also developing a more integrative environmental communication model. The findings are expected to provide a conceptual contribution to the development of environmental communication and serve as a reference for governments, academics, civil society organizations, and practitioners in designing communication strategies that are more participatory, adaptive, and sustainable.

METHODS

This study examines environmental communication strategies in supporting sustainable environmental management. This approach was selected because it enables the authors to conduct a conceptual synthesis of research findings with diverse characteristics, contexts, and approaches. Unlike a *Systematic Literature Review*, which emphasizes a rigorous synthesis of evidence, a *Narrative Literature Review* (NLR) aims to provide a comprehensive understanding of conceptual developments, research findings, and relationships among topics, thereby enabling broader interpretations of the phenomenon under investigation.

The literature search was conducted from January to April 2026 using several academic databases, including Google Scholar, Scopus, ScienceDirect, and accredited national journal portals. The keywords included *environmental communication*, *komunikasi lingkungan*, *environmental campaign*, *kampanye lingkungan*, *environmental education*, *edukasi lingkungan*, *environmental advocacy*, *advokasi lingkungan*, *digital media*, *social media*, and *environmental management*. The searches used combinations of Boolean operators, namely AND and OR.

The literature considered in this review consisted of peer-reviewed scientific journal articles, scientific proceedings, and policy documents relevant to environmental communication and management, published in either Indonesian or English. Priority was given to journal articles indexed in Scopus or classified as SINTA 1–2. The proceedings considered in this review were required to have undergone peer review, provide a complete manuscript (*full paper*), and be published by credible academic institutions or organizations. Policy documents were limited to official documents issued by governments, international organizations, or relevant institutions with authority or substantive relevance to environmental issues.

In addition to publication characteristics, the literature was selected based on its relevance to the focus of the review, namely environmental communication in support of environmental management. Particular attention was given to studies addressing environmental campaigns, environmental education, advocacy, participatory communication, digital media, behavioral change, community participation, and environmental governance.

To maintain the relevance and currency of the review, priority was given to publications issued between 2015 and 2026. This period was selected to capture developments in environmental communication research over approximately the past decade, particularly the shift from conventional communication approaches toward more participatory, community-based, and digitally mediated approaches. The period was considered relevant for identifying developments in campaigns, education, advocacy, participatory communication, social media, social learning, and communication approaches oriented toward behavioral change and community engagement in environmental management. The year 2015 was selected as the starting point to obtain relatively recent literature representing developments in contemporary environmental communication, while 2026 was selected as the endpoint to include the latest research available during the review period.

A total of 15 publications were selected as the primary literature for the narrative synthesis based on their relevance to the review focus and selection criteria. These 15 publications were not intended to represent the entire body of research on environmental communication. Therefore, the synthesis was not used to produce statistical generalizations regarding the effectiveness of any communication strategy or to claim that one strategy is universally superior to another.

The information extracted from the selected publications was organized into a synthesis matrix to facilitate comparison across studies. Data were analyzed using a descriptive-thematic approach by identifying patterns, similarities, differences, strengths, and limitations of each environmental communication strategy. The findings were then synthesized to explain their contributions to sustainable environmental management and to formulate a more integrative, adaptive, and sustainable environmental communication strategy.

Tabel 1. Literature Inclusion and Exclusion Criteria

Aspect	Inclusion Criteria	Exclusion Criteria
Publication type	Research articles, review articles, full-paper proceedings, and relevant policy documents	News articles, blogs, popular opinion pieces, and non-academic editorials
Language	Indonesian and English	Other languages
Publication period	2015–2026, with limited use of classical references as a conceptual foundation	Publications outside the specified period without strong conceptual relevance
Focus	Environmental communication and environmental management	Communication unrelated to environmental issues

Aspect	Inclusion Criteria	Exclusion Criteria
Strategies	Campaigns, education, advocacy, participatory communication, digital media, or combinations thereof	Studies that do not contain relevant communication components
Outcomes	Awareness, knowledge, attitudes, behavior, participation, collective action, and policy/governance	Studies that do not provide information relevant to the objectives of the review
Availability	Full-text publications accessible for review	Abstract-only publications or publications with insufficient information

Source: Primary Data (Analyzed, 2026)

RESULT AND DISCUSSION

Result

A total of 15 publications that met the inclusion criteria were analyzed to identify the characteristics of the studies, environmental issues examined, communication strategies employed, and key findings related to the effectiveness of environmental communication. The reviewed literature covered a range of environmental management contexts, including waste management, air and water pollution, ecosystem rehabilitation, forest conservation, climate change, natural resource governance, and the development of pro-environmental behaviors. The synthesis of the literature provided a basis for identifying patterns in the effectiveness of different communication strategies and conducting a comparative analysis in the Discussion section. A summary of the characteristics of the reviewed literature is presented in Table 2.

Tabel 2. Characteristics of the Reviewed Literature

No.	Author(s) (Year)	Environmental Issue	Communication Strategy	Key Findings	Contribution to Communication Effectiveness
1	(Wonneberger & Vliegenthart, 2021)	Climate change litigation (the Urgenda case)	Media and political agenda setting	Media attention to the Urgenda lawsuit increased parliamentary attention and broadened policy attention to climate change.	Supports the role of agenda setting in linking media attention with the political agenda; however, changes in public behavior were not measured.
2	(Arifin & Herningtyas, 2025)	Environmental clean-up and waste management	Digital campaigns and citizen diplomacy	Collaboration between Pandawara Group and Sài Gòn Xanh expanded the movement through clean-	Expanded the reach of the movement and encouraged public engagement; however, its long-term behavioral impacts require further assessment.

No.	Author(s) (Year)	Environmental Issue	Communication Strategy	Key Findings	Contribution to Communication Effectiveness
				up activities and social media content dissemination.	
3	(Cellu et al., 2024)	Mangrove rehabilitation	Participatory communication and extension activities	Community involvement increased the success of mangrove rehabilitation efforts.	Effective in increasing community participation and fostering a sense of community ownership.
4	(Novaria & Rohimah, 2019)	Single-use plastic reduction	Social marketing and education	Environmentally friendly innovations were more readily adopted through community and school-based initiatives.	Effective in promoting long-term behavioral change.
5	(Ahmad, 2016)	Cikapundung Clean Movement	Diffusion of innovations and interpersonal communication	Direct communication was more persuasive than mass media in encouraging participation.	Effective in accelerating the adoption of collective behaviors.
6	(Fadilah et al., 2026)	Waste bank management	Direct outreach, community-based social media, and technical training	Structured environmental communication increased public awareness and community engagement in waste bank management.	Supports increased awareness and participation through consistent and participatory communication.
7	(Pramesti & Kusuma, 2026)	Environmentally friendly behavior	Digital campaign using posters on TikTok	Pre-test and post-test evaluations showed increased respondents' understanding and motivation following the campaign.	Supports the short-term effectiveness of digital education; however, the sustainability of behavioral change has not been established.
8	(Herutomo & Istiyanto, 2021)	Forest degradation	Campaigns and education	New narratives about forests shaped public perceptions of conservation.	Effective in fostering changes in public perspectives toward forest conservation.
9	(Nasas & Dirgantara, 2024)	Waste management	Digital media and campaigns	TikTok and Instagram expanded the	Effective in reaching younger audiences and

No.	Author(s) (Year)	Environmental Issue	Communication Strategy	Key Findings	Contribution to Communication Effectiveness
				dissemination of ecological messages.	increasing participation.
10	(Ayu, 2021)	Deforestation associated with oil palm expansion	Advocacy and campaigns	Communication is needed to balance economic interests and conservation objectives.	Effective in developing narratives of sustainable development.
11	(Shen et al., 2023)	Online green communities	Digital media	Interactions within digital communities increased pro-environmental behavior.	Effective in strengthening social learning.
12	(Zhang et al., 2022a)	Low-carbon behavior	Social media and gamification	Gamification encouraged sustained engagement in low-carbon actions.	Effective in maintaining behavioral change.
13	(Antwi et al., 2025)	Water governance	Advocacy and public participation	Stakeholder engagement improved the quality of decision-making processes.	Effective in strengthening collaborative governance.
14	(Venturi et al., 2025)	Recycling	Digital media and gamification	Positive reinforcement and social norms increased recycling behavior.	Effective in sustaining pro-environmental behavior.
15	(Van de Wetering et al., 2022)	Vehicle-related air pollution	Education and community empowerment	Education increased public understanding of the impacts of vehicle emissions.	Effective in increasing environmental awareness and encouraging environmentally friendly actions.

Source: Primary Data (Analyzed, 2026)

A total of 15 studies that met the inclusion criteria were analyzed to identify patterns in communication strategies, environmental issues, and reported outcomes. Unlike the study-by-study descriptive presentation in Table 2, the synthesis stage grouped the studies according to communication strategies, dominant environmental issues, communication outcomes, behavioral and participation outcomes, and policy and governance outcomes. A single study could be categorized under more than one communication strategy when it employed a combined or integrative approach.

The resulting patterns indicate that environmental communication research in the reviewed literature tends not to rely on communication strategies in isolation. Several studies combined campaigns with digital media, education with participatory communication, or advocacy with community engagement. These findings suggest a tendency toward multidimensional communication approaches, particularly when communication objectives extend beyond increasing awareness to promoting behavioral change, participation, and engagement in environmental governance.

Tabel 3. Distribution of Studies by Communication Strategy

Communication Strategy	Number of Studies	Proportion*	Primary Orientation
Digital media	7	46.7%	Reach, interaction, social learning, and mobilization
Education	6	40.0%	Knowledge, understanding, attitudes, and skills
Campaigns	5	33.3%	Awareness, public attention, and initial mobilization
Participatory communication/empowerment	4	26.7%	Engagement, ownership, and collective action
Advocacy	2	13.3%	Stakeholder engagement, policy, and governance

Note: A single study may be included in more than one category

Source: Primary Data (Analyzed, 2026)

Tabel 4. Distribution of Studies by Dominant Environmental Issue

Dominant Environmental Issue	Number of Studies	Proportion
Waste, recycling, and environmental cleanliness	6	40.0%
Pro-environmental and low-carbon behavior	3	20.0%
Forests, deforestation, and plantations	2	13.3%
Mangrove rehabilitation	1	6.7%
Water resource governance	1	6.7%
Air pollution	1	6.7%
Climate change and policy agenda	1	6.7%
Total	**15**	**100%**

Source: Primary Data (Analyzed, 2026)

Tabel 5. Synthesis of Environmental Communication Strategies, Outcomes, and Contextual Conditions

Strategy	Communication outcome	Behavioral/participation outcome	Policy/governance outcome	Key contextual conditions
Campaigns	Awareness, attention, issue salience	Initial mobilization; behavioral adoption under certain conditions	Public/political agenda setting in specific contexts	Engaging, relevant, and repetitive messages with clear follow-up actions

Strategy	Communication outcome	Behavioral/participation outcome	Policy/governance outcome	Key contextual conditions
Education	Knowledge, understanding, attitudes, motivation	Skills, intention, pro-environmental behavior	Capacity building	Context-specific and sustained approaches, learning by doing, and supporting facilities
Digital media	Reach, interaction, social learning	Mobilization, participation, and pro-environmental behavior	Public support and networking	Relevant and interactive content, active communities, and connections to real-world actions
Participatory communication	Dialogue, shared understanding, trust	Participation, ownership, collective action	Collaborative governance	Early community involvement, spaces for dialogue, and engagement of local actors
Advocacy	Issue framing, stakeholder awareness	Collective engagement	Policy attention, governance, stakeholder engagement	Scientific evidence, networks, institutional support, and the political context

Source: Primary Data (Analyzed, 2026)

Discussion

The Role of Environmental Communication in Environmental Management.

The synthesis of 15 studies indicates that environmental communication is an important component in supporting effective environmental management. The reviewed studies addressed a wide range of environmental issues, including plastic and urban waste management, river and air pollution, mangrove rehabilitation, forest degradation, oil palm plantation expansion, environmental damage associated with mining activities, and efforts to promote pro-environmental behavior. This diversity of issues indicates that environmental problems are not solely associated with ecological and technical dimensions but are also shaped by social, economic, cultural, and governance factors.

Environmental communication serves functions that extend beyond simply disseminating information about environmental conditions. It contributes to raising public awareness of environmental issues, shaping public perceptions and opinions,

fostering pro-environmental values and attitudes, encouraging behavioral change, strengthening public participation, and influencing policy-making processes. Accordingly, environmental communication can be regarded as a strategic instrument that connects government institutions, academics, civil society organizations, the private sector, the media, and local communities in promoting more participatory and sustainable environmental management. This function is evident in the communication practices of local government agencies reported by (Tan et al., 2019), which combined face-to-face activities in the form of outreach, training, mentoring, group discussions, and the formation of environmental communities with the use of radio, local television, outdoor media, and online media, although implementation had not yet been carried out on a large scale, so that the reach of the messages remained limited.

The literature synthesis further indicates that the reviewed studies employed diverse communication approaches, including agenda setting, environmental campaigns, education, diffusion of innovations, *social marketing*, participatory communication, community empowerment, digital media, and social construction. Although these approaches are described using different terminologies, they share a common underlying objective: to enhance the effectiveness of communication in promoting social and behavioral change that supports environmental conservation.

These approaches were subsequently grouped into four overarching communication strategies: campaigns, education, advocacy, and digital media. This categorization was intended to facilitate a comparative analysis of the effectiveness of each strategy across different environmental management contexts. The four strategies are not mutually exclusive; rather, they are complementary. Therefore, the selection and application of each strategy should be tailored to the characteristics of the environmental issue, the target audience, and the specific environmental management objectives to be achieved.

Strengths and Limitations of Environmental Communication Strategies

Environmental Campaigns

Environmental campaigns are widely used to generate initial public attention to environmental issues. The reviewed literature indicates that campaigns are particularly useful for raising awareness of issues such as plastic waste, forest degradation, pollution, river management, and sustainable oil palm practices. Compared with education, which emphasizes gradual knowledge development, campaigns are generally more effective at attracting attention over a relatively short period through simple, accessible, and emotionally engaging messages.

(Wonneberger & Vliegenthart, 2021), for example, demonstrated the role of media agenda setting in the Urgenda climate litigation case. Media attention to the lawsuit was associated with increased parliamentary attention and broader political

attention to climate policy. This finding highlights the ability of communication to shape issue salience and political agendas, although the study did not directly measure changes in public behavior.

Campaigns can also facilitate the diffusion of environmentally friendly practices. (Novaria & Rohimah, 2019)found that reusable shopping bags, tumblers, and reusable food containers were more readily adopted when promoted through social campaigns involving schools and community groups. Similarly, (Herutomo & Istiyanto, 2021) showed that environmental campaigns can contribute to reshaping public perceptions of forests, while Ayu (2021) emphasized the importance of balanced narratives that consider both economic interests and environmental protection in the context of oil palm expansion.

However, campaigns tend to be more effective in generating awareness than in producing sustained behavioral change. General messages such as reducing waste or protecting the environment may attract attention but do not necessarily provide clear guidance for concrete action. Campaigns are therefore better positioned as an initial stage of environmental communication and are likely to be more effective when followed by education, policy advocacy, and adequate facilities that enable people to adopt environmentally responsible practices.

Environmental Education

Environmental education differs from campaigns by focusing on the development of knowledge, attitudes, values, and skills needed to support sustained pro-environmental behavior. Its main strength lies in its ability to connect information with learning, reflection, and practical experience. (Cellu et al., 2024)found that education combined with participatory communication increased community involvement in mangrove rehabilitation, including training, planting, monitoring, and maintenance activities. This suggests that education is more effective when communities are given opportunities for *learning by doing*, rather than simply receiving information. Similarly, (Novaria & Rohimah, 2019) showed that education combined with *social marketing* and innovation diffusion can facilitate the adoption of reusable products by connecting environmental knowledge with everyday practices.

Digital education can also improve short-term knowledge and motivation. (Pramesti & Kusuma, 2026), for instance reported increased understanding and motivation following an educational campaign delivered through TikTok. However, these findings primarily reflect short-term outcomes and do not establish whether behavioral changes are sustained over time. Based on (Van de Wetering et al., 2022) further demonstrated the potential of environmental education to improve knowledge, attitudes, intentions, and pro-environmental behavior, particularly when learning is continuous, contextual, and participatory. Despite its potential to produce deeper outcomes than awareness-oriented campaigns, education does not automatically

result in behavioral change. Adoption may be constrained by limited facilities, social conditions, economic factors, or the absence of continued support. Thus, effective environmental education requires sustained learning opportunities and an enabling environment that allows knowledge and skills to be translated into practice.

(Van de Wetering et al., 2022) show that environmental education is capable of increasing pro-environmental knowledge, attitudes, intentions, and behaviour, particularly among children and adolescents. Environmental education exerts a greater impact when it is implemented on a sustained and contextual basis and incorporates participatory learning activities. The success of education therefore depends not only on the volume of information delivered but also on learners'capacity to connect that knowledge with real experience in real life.

The literature reviewed indicates that education has the potential to generate deeper change than a mere increase in awareness, because it encompasses processes of knowledge construction, attitude development, skill acquisition, and learning experience. Education enables communities to understand the scientific rationale behind a given action, to develop the skills required to adopt environmentally friendly behaviour, and to form the values. However, behavioural change does not necessarily occur mmediately following the acquisition of new knowledge. The processes of knowledge acquisition, attitude change, and behavioural adoption require time, repetition, mentoring, and a supportive environment. Moreover, increased knowledge does not always translate into behavioural change, particularly when communities face limited access to facilities or socio-economic barriers.

Environmental Advocacy

Environmental advocacy focuses primarily on influencing policies, institutions, and environmental governance. It is particularly relevant to complex and structural issues involving multiple stakeholders and competing political or economic interests, such as mining, oil palm expansion, deforestation, and water governance. In the context of environmental conflicts, (Prasetyo et al., 2025) documented the ecological and social impacts associated with mineral resource exploitation, including deforestation, pollution, biodiversity loss, social conflict, and health risks. In this review, the study is used to describe the environmental context that may require advocacy rather than as direct evidence of the effectiveness of communication or advocacy in influencing policy.

(Ayu, 2021) highlighted the importance of developing more balanced narratives around oil palm expansion, while (Antwi et al., 2025) emphasized the role of stakeholder participation in improving water governance. These findings indicate that advocacy can create spaces for dialogue, strengthen stakeholder engagement, and bring scientific evidence into environmental decision-making. Nevertheless, evidence of direct policy outcomes remains more limited in the reviewed literature than evidence of communication and behavioral outcomes. Advocacy processes are often

lengthy and may be influenced by political, economic, and institutional interests. Its effectiveness therefore depends on strong evidence, stakeholder networks, institutional support, and the capacity of actors to communicate environmental concerns effectively.

Digital Media

Digital media has become an increasingly important strategy in environmental communication because it enables rapid, interactive, and participatory dissemination of information. Beyond information delivery, digital platforms can facilitate social learning, community formation, public mobilization, and pro-environmental behavior.(Nasas & Dirgantara, 2024) demonstrated how platforms such as TikTok and Instagram can increase public attention to environmental issues through accessible and visually engaging content. (San Cornelio et al., 2024) provide insight into the mechanisms underlying this effectiveness through an analysis of 60 environmentally themed Instagram accounts. The visual narratives identified in their study tended to avoid fear-inducing imagery and instead emphasised positive messages, personal experiences, and small, practical actions that could be easily adopted in everyday life. Some accounts also incorporated memes and humour to make environmental issues more accessible and engaging to broader audiences. These findings reinforce the argument that the reach and effectiveness of digital media depend not only on the platform used but also on how environmental messages are framed and communicated. Complementing these findings (Shen et al., 2023) further showed that digital green communities can support social learning through information exchange, peer interaction, and the development of social norms that encourage pro-environmental behavior.

Digital media can be particularly effective when combined with gamification. (Zhang et al., 2022) showed that gamified digital platforms can encourage low-carbon actions by linking virtual rewards with environmentally friendly activities. Similarly, (Venturi et al., 2025) found that positive feedback, social norms, and gamification can strengthen recycling behavior. However, digital engagement does not necessarily translate into real-world behavioral change. High numbers of views, likes, comments, or shares may reflect attention rather than actual action. The risk of *slacktivism*, short-lived public attention, misinformation, and oversimplification of complex environmental issues also limits the effectiveness of digital communication when used alone.

Overall, the reviewed literature suggests that no single communication strategy is sufficient for addressing the complex dimensions of environmental problems. Campaigns are useful for generating awareness, education for developing knowledge and skills, advocacy for influencing policy and governance, and digital media for expanding reach and facilitating interaction. Their effectiveness is therefore likely to increase when these strategies are integrated and connected to concrete actions, institutional support, and opportunities for public participation

Synthesis of Environmental Communication Strategies: Toward an Integrative Environmental Communication Model

The synthesis of the 15 studies presented in Table 3 indicates that no single environmental communication strategy is universally effective across all environmental issues. The effectiveness of a communication strategy depends on the characteristics of the environmental problem, communication objectives, target audience, and the social and institutional context in which the strategy is implemented. (Prasanti, 2026) demonstrate that the success of environmental risk communication in rural communities is determined by the selection of credible communicators, such as village officials and community leaders, the formulation of messages in language familiar to the target audience, and the use of media consistent with local habits, including traditional media. These findings confirm that alignment among communicator, message, and channel with audience characteristics is a prerequisite determining the effectiveness of environmental communication strategies.

Tabel 6. Strengths and Limitations of Each Communication Strategy

Strategy	Primary Objective	Strengths	Limitations	Most Effective Conditions
Campaigns	Raise public awareness	Rapidly reach a broad audience	Short-term effects	Issues requiring immediate public attention
Education	Increase knowledge	Can produce long-term behavioral change	Requires time	Schools, communities, and local populations
Advocacy	Promote policy change	Can influence environmental governance	Often involves lengthy processes	Issues requiring regulatory or policy support
Digital media	Expand reach and participation	Interactive, rapid, and cost-effective	Vulnerable to misinformation and information overload	Younger audiences and digitally connected communities

Source: Primary Data (Analyzed, 2026)

Therefore, environmental communication should be viewed as an integrative process. An integrative approach to environmental communication is increasingly important because most environmental problems are multidimensional and involve interactions among ecological, social, economic, cultural, and policy dimensions. Each issue requires a combination of strategies capable of raising public awareness, building understanding, encouraging behavioral change, strengthening public participation, and generating support for sustainability-oriented policies. Accordingly, this study proposes the Integrative Environmental Communication Strategy Model as a conceptual framework to support sustainable environmental management



Figure 1. Integrative Environmental Communication Strategy Model
Source: Primary Data (Analyzed, 2026)

This model illustrates environmental communication as a gradual and interconnected process. Campaigns and digital media serve as initial strategies for raising public awareness of environmental issues through messages that are engaging, accessible, and capable of reaching broad audiences. Once public attention has been established, the communication process needs to be continued through environmental education, which aims to enhance knowledge, shape attitudes, and develop people's skills to adopt pro-environmental behaviors.

The next stage involves encouraging behavioral change through concrete actions and participatory communication. At this stage, communities serve as key actors in environmental management through various activities, such as mangrove rehabilitation, waste sorting, reducing the use of single-use plastics, and participating in car-free day activities. For issues related to natural resource governance, competing interests, and public policy, these processes need to be strengthened through environmental advocacy. Advocacy facilitates dialogue among stakeholders, strengthens community voices, and promotes policy and governance changes that are more supportive of environmental sustainability.

The model also positions digital media as a cross-cutting strategy that supports the entire environmental communication process. In addition to expanding the reach of information dissemination, digital media can strengthen interaction, foster communities, facilitate social learning, and connect diverse stakeholders in collaborative action. The design of communication strategies should also consider community characteristics, cultural values, local languages, trusted actors or community figures, the most widely used communication channels, and various social factors that influence community behavior.

Overall, the success of environmental communication is not determined by the dominance of any single strategy, but rather by the ability to integrate campaigns,

education, participatory communication, advocacy, and digital media synergistically according to the characteristics of the environmental issue and the needs of the community. Such an integrative approach enables environmental communication to evolve beyond mere information dissemination into a process of social transformation that can foster awareness, strengthen community participation, influence policy, and contribute to more effective, adaptive, and sustainable environmental management

Scope and Adaptability of the Model

The Integrative Environmental Communication Strategy Model developed in this study is not intended to apply exclusively to specific types of environmental problems, such as marine pollution or air pollution. Rather, it is designed as a general and adaptive conceptual framework to support various environmental management contexts, including pollution, waste management, deforestation, ecosystem degradation, changes in community behavior, and natural resource governance issues. Thus, the application of the model is determined not solely by the type of environmental problem, but also by the characteristics of the area, target groups, level of urgency, actors involved, barriers to behavioral change, and the need for policy intervention.

The four main strategies within the model, campaigns, education, advocacy, and digital media, do not need to be implemented with equal intensity in every context. Strategy selection should be tailored to the needs and characteristics of the particular environmental problem. For problems primarily associated with low levels of public awareness and pro-environmental behavior, such as reducing plastic waste or promoting waste sorting, campaigns and education may serve as the dominant strategies for building awareness, knowledge, and practical skills. Conversely, for problems involving economic interests, resource-use conflicts, or weak governance, such as mining, deforestation, or pollution associated with industrial activities, advocacy and stakeholder engagement become more important. Under certain conditions, digital media can function as a cross-cutting strategy that reinforces other approaches through information dissemination, social learning, community mobilization, and the development of collaborative networks.

Therefore, the model is not intended to represent a mandatory linear sequence, but rather an integrative framework that allows different communication strategies to be combined according to the context of environmental management. The pathways involving campaigns, education, participation and behavioral change, and advocacy represent functional relationships among components rather than a rigid sequence that must always be followed. In practice, an intervention may begin with education, advocacy, or community participation, depending on the characteristics of the problem and the needs identified in the field. Digital media can likewise be employed across different stages to enhance the reach and interaction of environmental communication.

Through this approach, the model offers flexibility for application across different scales and environmental management contexts. For relatively simple problems that primarily focus on individual behavioral change, one or two communication strategies may serve as the main approaches. In contrast, for complex problems involving multiple actors and competing interests, the integration of campaigns, education, participatory communication, advocacy, and digital media becomes more relevant. Thus, the effectiveness of the model ultimately depends on the alignment between the selected communication strategies and the characteristics of the environmental problem and the local socio-environmental context

CONCLUSION

This study demonstrates that environmental communication strategies produce different outcomes depending on their objectives, the characteristics of the environmental issues, target groups, and the broader social and institutional context. The synthesis of the reviewed literature identified three main levels of outcomes: communication outcomes, behavioral and participation outcomes, and policy and governance outcomes. The evidence in the literature predominantly demonstrates changes at the communication and behavioral levels, whereas evidence of changes in policy and governance remains relatively limited.

Campaigns primarily contribute to generating public attention and awareness, while education strengthens knowledge, understanding, attitudes, and the capacity to engage in pro-environmental actions. Participatory communication is important for connecting understanding with engagement and collective action. Advocacy is particularly relevant to issues involving multiple stakeholders, decision-making, policy, and governance. Meanwhile, digital media functions not only as a communication channel but also as a cross-cutting strategy that reinforces other approaches through information dissemination, interaction, social learning, mobilization, and collaboration.

The synthesis also identified recurring mechanisms, including the development of attention and awareness, enhancement of knowledge and understanding, social learning and motivation, behavioral change and participation, collective action, and engagement at the policy and governance levels. However, these mechanisms do not operate in a linear manner and are influenced by contextual conditions, including the characteristics of target groups, the availability of supporting facilities, the presence of community networks, institutional support, and social, economic, and political interests.

Based on these findings, the Integrative Environmental Communication Strategy Model is proposed as an adaptive conceptual framework rather than a universal formula applicable to all environmental problems. The model helps map the relationships between communication strategies, intended outcomes, and

implementation conditions, thereby allowing campaigns, education, participatory communication, advocacy, and digital media to be combined and adapted to the specific needs of environmental management. Further research is needed using a broader literature corpus and systematic or empirical approaches to examine the relationships among the strategies and outcomes proposed in the model.

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