

Environmental Communication in West Sulawesi: The Role of Media and Technology in Nature Conservation Campaigns

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Abstract

This research aims to analyze the role of media and technology in nature conservation campaigns in West Sulawesi and their impact on increasing environmental awareness in local communities. The main focus of the research is how mass media and digital technology are used as ecological communication tools to disseminate information, increase public participation, and encourage behavioral changes in maintaining rich and diverse local ecosystems. This research uses a qualitative method with a case study approach. Data was collected through in-depth interviews with stakeholders, including government officials, environmental activists, local communities, and media and technology practitioners. In addition, content analysis was carried out on ecological campaigns distributed through various media platforms, such as television, radio, and social media, as well as environmental-based technology applications. The research results show that media and technology play a significant role in driving the nature conservation campaign in West Sulawesi. The use of social media and technology applications has proven effective in reaching the community, especially the younger generation, and building collective awareness of the importance of protecting forest, coastal, and other natural resource ecosystems. However, challenges such as limited access to technology in remote areas are still obstacles to expanding the impact of this campaign. Therefore, this research recommends increasing access to technology and further collaboration between governments, NGOs, and local communities to maximize the potential of environmental communications.

Keywords: *Environmental communication; media; technology; nature conservation; West Sulawesi; environmental campaign.*

INTRODUCTION

West Sulawesi is a region rich in natural resources with abundant biodiversity, especially in its coastal, forest, and marine areas. However, like many other regions in Indonesia, West Sulawesi faces various environmental challenges, including deforestation, marine ecosystem degradation, and pollution. Based on data from the Ministry of Environment and Forestry (KLHK), Indonesia lost around 1.1 million hectares of forest annually, most of which occurred in the Kalimantan and Sulawesi forest areas (KKLHK, 2022). This threatens the sustainability of local ecosystems which also affects the lives of people who depend on nature.

In facing this challenge, environmental communication is a key instrument in increasing public awareness about the importance of preserving nature. According to environmental communication theory, as expressed by (Robert Cox, 2015), environmental communication is an effort to convey ecological issues through various media to influence people's attitudes and behavior towards the environment. Effective communication has the potential to change mindsets and encourage people to act more caringly towards the environment.

West Sulawesi is a region rich in biodiversity, including endemic species and critical ecosystems such as mangroves and coral reefs. However, rapid urbanization, deforestation, and unsustainable agricultural practices have posed significant threats to the environment. With technological advancements and the growing influence of media, environmental communication has emerged as a crucial tool for raising public awareness and driving conservation efforts. Despite the potential of these tools, the effectiveness of media and technology in promoting conservation in this region remains underexplored.

Robert Cox defines environmental communication as the use of symbolic action to influence attitudes, policies, and behaviors regarding the environment (Robert Cox, 2015). It encompasses various tools, including media campaigns, community workshops, and digital platforms. Social media platforms like Instagram and Twitter have proven effective in engaging younger audiences in environmental causes (Hawley, 2022). Traditional media, such as community radio, remains critical in reaching remote populations (Díaz-Pont et al., 2020). Mobile apps and geospatial tools are increasingly employed to monitor deforestation and illegal fishing (Nofri, 2013). However, their accessibility and adoption in rural areas like West Sulawesi require further study.

The Agenda Setting Theory by McCombs and Shaw posits that media shapes public discourse by highlighting certain issues over others, thereby influencing what the public perceives as important (Trigueros & Lacasa-Mas, 2018). In the context of environmental

conservation, media can emphasize critical environmental issues like deforestation or marine ecosystem degradation, directing public attention toward conservation initiatives (Kaiser & Meyer, 2017).

This theory explores how messages are designed to change attitudes and behaviors. The Elaboration Likelihood Model (ELM) by Petty and Cacioppo (1986) is particularly useful, describing two routes of persuasion, central (logical arguments) and peripheral (emotional appeals) (Chung & Fink, 2018). Combining these approaches can enhance the effectiveness of conservation campaigns.

Rogers' Diffusion of Innovations Theory (1962) explains how new ideas or technologies spread within a community (Gulbrandsen, 2020). Environmental tools, like mobile apps for deforestation monitoring or community-based conservation programs, can be promoted through influential community leaders to accelerate adoption.

Berger and Luckmann's (1966) Social Construction of Reality theory argues that shared understandings of reality are built through communication (Elder-Vass, 2012). In this context, media constructs narratives about the importance of conservation, shaping public awareness and collective action. These communication theories provide a robust framework for analyzing and designing effective environmental campaigns in West Sulawesi. By integrating agenda-setting, persuasion, innovation diffusion, social construction, and framing approaches, conservation efforts can be tailored to engage diverse audiences, promote awareness, and encourage sustainable practices.

Empirical research shows that the use of media and technology in nature conservation campaigns in various regions has proven effective. A study by (Thanya & C., 2023) shows that social media, such as Instagram and Facebook, are able to build environmental awareness massively and quickly among the younger generation. In addition, research by (Tian, 2024) found that digital technology based environmental conservation campaigns were successful in increasing community participation in reforestation activities through online platforms.

Study from (Varni et al., 2024a) explored the Instagram campaign significantly increased knowledge, perceived social norms, and intention to engage in sustainable behavior among college students, suggesting that social media can effectively increase environmental awareness quickly within the younger generation. (Varni et al., 2024b) analyzed the effectiveness of Instagram and Facebook, significantly influence the formation of environmental awareness among the younger generation by facilitating information sharing, promoting environmentally friendly living, and encouraging responsible attitudes towards the use of natural resources, as highlighted in this research.

However, until now, there has not been much research that specifically examines the role of media and technology in environmental campaigns in West Sulawesi. In fact,

geographical, cultural, and technological literacy differences between regions in Indonesia can influence the effectiveness of environmental communication.

This research offers a new contribution to the literature with a focus on West Sulawesi as the study context. In the context of West Sulawesi, which still has many remote areas with limited access to technology, this study will reveal how these limitations are overcome through local initiatives and how media and technology approaches can be adapted to the needs of local communities. Additionally, this research provides insight into how environmental conservation campaigns can be integrated with local wisdom to achieve more effective results in regional contexts.

Thus, this research not only complements the literature on environmental communication in Indonesia but also provides a deeper understanding of how media and technology can play a role in maintaining natural sustainability in West Sulawesi, taking into account local challenges and potential.

Existing literature largely focuses on national or regional contexts, with little attention to localized efforts in areas like West Sulawesi. Additionally, while global studies have explored the use of media, few have examined how a combination of traditional media (e.g., radio) and modern technology (e.g., social media, mobile apps) can synergistically enhance conservation outcomes in Indonesia.

With this backdrop, the study aims to address key questions, articulated in the research problem statement, which will serve as the foundation for this investigation. 1)How do media and technology currently contribute to environmental communication efforts in West Sulawesi? 2)What are the most effective media platforms for promoting nature conservation campaigns in this region? 3)How can traditional and modern communication tools be integrated to maximize their impact on conservation?

RESEARCH METHODS

A qualitative research design is chosen for this study to deeply explore the experiences, perceptions, and meanings attributed by individuals and groups to environmental communication efforts in West Sulawesi. This approach allows for a detailed understanding of how media and technology influence public awareness and behavior related to environmental conservation. With phenomenological approach, the study will focus on how people (community members, media practitioners, and environmental organizations) experience and interpret media messages related to environmental conservation.

The author uses techniques *Purposive Sampling* which is based on certain objectives or criteria set by the researcher. Semi-structured interviews will be conducted with key informants including Media Practitioners, NGO Representatives, and Local Community Leaders and Activists. Content analysis will be conducted on various media platforms to understand how environmental messages are framed and communicated. This includes traditional media, and digital media.

Data from interviews, focus groups, and media content will be analyzed using thematic analysis. This involves identifying recurring themes and patterns in the data, which will then be categorized into broader themes, than Themes will be identified through a coding process, where data from interviews and FGDs are categorized based on key concepts. This approach allows for a deep understanding of participants' perspectives and media impact.

Narrative analysis will be used to understand the stories told through media campaigns and in participant interviews (Herman, 2019). This approach examines how environmental issues are framed through storytelling, such as personal narratives of local conservation heroes or media stories about environmental challenges. The analysis will focus on the narrative structure, the portrayal of local communities as active participants, and how these narratives influence public perceptions of environmental responsibility.

RESULTS AND DISCUSSION

Increased Public Awareness through Media Platforms

Traditional media outlets such as radio and television remain vital for reaching rural populations with limited digital connectivity (P. Ma et al., 2023). Campaigns broadcast in local languages on these platforms have been effective in spreading messages about conservation practices (Hunt et al., 2019). For instance, radio programs featuring local environmental leaders and community stories have increased the relatability and credibility of the messages.

Social media platforms like Facebook, Instagram, and WhatsApp have emerged as essential tools for engaging urban and younger demographics (Sullivan et al., 2019). Visual storytelling through infographics, short videos, and interactive posts have proven highly effective in drawing attention to pressing environmental concerns such as deforestation and plastic pollution (Pinto et al., 2019). Campaign hashtags and challenges on platforms like Instagram have further amplified the reach, encouraging user-generated content and fostering a sense of collective responsibility (Hanafy & Mostafa, 2024)

Personalized media content, such as geotagged updates on local environmental activities, has increased community participation (Yén, 2023). By tailoring campaigns to specific regional concerns, such as mangrove conservation in coastal areas, media organizations

have successfully connected global environmental challenges to local contexts (Patalo et al., 2023). Documentaries and special news segments focusing on environmental topics have also enhanced public understanding of complex issues. For example, broadcasts on the benefits of mangrove forests have helped communities appreciate their ecological and economic significance (Sianipar et al., 2024).

Barriers to Effective Communication

Environmental communication in West Sulawesi, a significant challenge arises from cultural and language differences. Conservation messages often fail to achieve their intended impact because of insufficient localization of content. This occurs when campaign materials, whether videos, infographics, or narratives are not aligned with local cultural norms or use languages that are unfamiliar to specific communities.

“Hambatan utamanya cukup beragam. Pertama, ada kendala bahasa. Di sini, kami memiliki berbagai bahasa daerah, seperti Mandar, Mamasa, dan Toraja. Sering kali, pesan yang disampaikan dalam bahasa Indonesia tidak sepenuhnya dipahami oleh masyarakat lokal.”(Sukduk, 2024).

West Sulawesi is home to communities speaking various local languages such as Mandar, Mamasa, Toraja, and others. Bahasa Indonesia, the national language, is sometimes not well understood, particularly by older generations or those in remote areas. As a result, messages delivered in Bahasa Indonesia may not be fully comprehended or correctly interpreted.

“The second challenge is the low literacy level in some areas. Even when we use visual materials like posters and videos, not everyone has the access or ability to fully understand them.”(Arruan,2024).

While translation can bridge gaps, some concepts are difficult to translate due to the absence of direct equivalents in local languages. For example, terms like sustainability or ecosystem may require extended explanations to ensure they are understood. This slows down the communication process and complicates message delivery.

table 1
Barriers to Effective Communication

No.	Barriers	Explanation
1.	Cultural Context	Messages that adopt global perspective may overlook the unique cultural values and traditions of West Sulawesi's communities. This can lead to messages being dismissed or perceived as irrelevant.
2.	Language Barriers	Many communities in West Sulawesi speak local

languages or dialects. Conservation content that is only available in Indonesian or foreign languages may fail to engage or educate these populations effectively.

Community Driven Technology Adoption

Mobile applications for environmental reporting, such as platforms that enable real-time documentation of illegal logging, have shown promise in empowering local communities to participate in conservation efforts. Community Driven Technology Adoption refers to the process of introducing and integrating technology within a community in a way that is driven by the needs, preferences, and active participation of the community itself (Koschtial, 2021). This approach ensures that the technology introduced is not only relevant and culturally appropriate but also empowers the community to take ownership, manage, and sustain the technology in the long term.

table 2
Key Aspects of Community Driven Technology Adoption

No.	Key Aspects	Explanation
1.	Community Involvement from the Start	The process begins with engaging the community in the planning and decision-making stages. This participatory approach helps ensure that the technology meets the actual needs of the community. It also fosters a sense of ownership and relevance, which increases the likelihood of successful adoption and use.
2.	Contextual Relevance	The technology must be adapted to the community's specific context. This includes considering factors such as the community's literacy levels, infrastructure availability (e.g., electricity, internet), cultural practices, and existing skills. For example, in rural or remote areas with limited internet access, technologies that rely on offline modes or low-tech solutions be more effective.
3.	Sustainability and Maintenance	The goal is for the community to take responsibility for the maintenance and upkeep of the technology, ensuring that it does not become dependent on external support. Involve creating local technicians, developing a local support network, or utilizing community groups to oversee the technology's use.
4.	Training and Capacity Building	One critical component is providing adequate training to community members, so they not only use the technology but also understand how it works and how it can be maintained. This step is crucial for ensuring that the technology remains functional over time, especially in remote areas where technical support may be limited.
5.	Feedback and Adaptation	A community-driven model encourages continuous feedback loops. As the community uses the technology, they can provide insights into its effectiveness, limitations, and potential improvements. This ongoing dialogue helps adapt the technology to better suit the community's evolving needs.

Community driven technology adoption brings numerous benefits, from empowering local populations and fostering innovation to improving sustainability and resilience (Beatrice Adedayo Okunade et al., 2024). It creates a model where technology is not merely an external solution, but a tool developed and managed by the community itself, ensuring that it meets local needs and can be sustained over time. As communities gain ownership and capacity to manage technology, they are better equipped to navigate challenges, adapt to changes, and ultimately thrive in a rapidly changing world (Radhia et al., 2024). The objectives to be achieved from the main concepts above are as follows:

table 3
Benefits of Community Driven Technology Adoption

No.	Sector	Function
1.	Empowerment	It empowers local communities by providing them with the tools to solve their own problems, rather than relying on external intervention
2.	Cultural Relevance	Technologies are tailored to fit the local culture and context, which makes them more likely to be accepted.
3.	Long-Term Sustainability	Community involvement ensures that the technology is maintained over the long term, as the community takes responsibility for it.
4.	Increased Impact	Because the technology is aligned with the needs and preferences of the community, it tends to be more effective in achieving its goals, whether that's in areas like health, education, or environmental sustainability.

The Role of Agenda Setting in Conservation Campaigns

The Agenda Setting Theory, developed by Maxwell McCombs and Donald Shaw, emphasizes that media has the power to influence public perception by highlighting certain issues as priorities (Trigueros & Lacasa-Mas, 2018). In the context of environmental communication in West Sulawesi, this theory is relevant for understanding how conservation efforts can become a public priority, particularly through media and technology. By integrating modern technology, local media, and traditional communication channels, environmental issues can be brought to the forefront of public awareness, prompting collective action for nature conservation.

In environmental communication, media plays a crucial role in selecting and presenting certain issues as important to the public (Díaz-Pont et al., 2020). In West Sulawesi, local media such as community radio, regional television, local newspapers, and social media are the primary channels for disseminating conservation messages.

In addition to media, technology serves as a strategic tool in environmental communication (Pinto et al., 2019). Technology enables faster information dissemination, broader audience reach, and direct interaction with communities. Social media platforms such as Facebook, Instagram, and WhatsApp are often used by local communities and environmental activists in West Sulawesi to share information, organize collective actions, and build advocacy networks.

table 4
Levels of Agenda Setting in Environmental Campaigns

No.	Levels of Agenda Setting	Explanation
1.	Defining Important Issues	a. Using community radio to discuss the impact of deforestation on local water sources. b. Launching viral social media campaigns
2.	Framing Solutions	a. Highlighting the role of local communities in preserving customary forests as a community based solution. b. Introducing simple technologies such as household composters to reduce waste.

Agenda setting theory can be seen in reforestation campaigns in West Sulawesi, demonstrating how media and technology influence public priorities. Local media highlights the issue, community radio reports the impact of deforestation on flooding in certain areas. Social media facilitates collective action, activists use Instagram to spread invitations for tree planting events. Technology monitors progress, drones are used to monitor the growth of trees after reforestation activities. As a result, reforestation becomes a top priority in public discourse, with the community feeling a shared responsibility for forest preservation.

Technology as a Diffusion Catalyst

The integration of mobile technology and social media has significantly facilitated the diffusion of conservation innovations in West Sulawesi. This aligns with Everett Rogers' Diffusion of Innovations Theory (1962), which explains how new ideas, technologies, or practices spread within a social system over time (Gulbrandsen, 2020; Pantev, 2020). According to this theory, the diffusion process depends on several key factors, including the innovation's attributes, the communication channels used, the social system, and the time required for adoption. By leveraging mobile technology and social media, conservation campaigns in West Sulawesi have enhanced the spread of information and encouraged greater community participation.

According to Rogers' theory, the success of innovation diffusion depends on five key attributes, all of which are enhanced by the use of mobile technology and social media.

table 5
key attributes of Innovation Difussion

No.	Key Attributes	Eksplanasi
1.	Relative Advantage	Mobile and social media technologies provide clear advantages over traditional communication methods by offering speed, reach, and cost-effectiveness. Conservation messages can be disseminated instantly and widely, reducing the time needed for adoption.
2.	Compatibility	Mobile applications and social media platforms are highly adaptable to local needs and cultural contexts. For instance, messages delivered in local dialects or showcasing regional success stories resonate more deeply with the community.
3.	Complexity	The use of simple, user-friendly tools like WhatsApp or Facebook reduces the complexity of adopting conservation practices. Tutorials, instructional videos, and infographics further lower the barriers to understanding and implementing environmental innovations.
4.	Trialability	Technological tools allow for experimentation before full-scale adoption. For example, farmers can try weather forecasting apps on a small scale to determine their utility before integrating them into their daily practices.
5.	Observability	Social media amplifies the visibility of successful conservation efforts. When communities see tangible results, such as restored mangroves or reduced flooding, they are more likely to adopt similar practices.

The integration of mobile technology and social media as diffusion catalysts aligns with Rogers' Diffusion of Innovations Theory, providing an effective framework for spreading conservation practices in West Sulawesi. By increasing awareness, facilitating participation, and showcasing successful outcomes, these tools have the potential to accelerate the adoption of sustainable practices, ensuring long-term environmental preservation.

Challenges in Persuasion and Message Framing

While persuasive campaigns in environmental communication have achieved notable successes, they often face challenges related to message framing (Z. Ma & Nan, 2019). The way a message is constructed and presented whether as a moral imperative, an economic necessity, or a cultural responsibility can significantly influence its reception by the target audience. However, inconsistencies in framing strategies can dilute the overall impact of the campaigns, especially in regions like West Sulawesi, where audiences are diverse in terms of socio-economic backgrounds, cultural beliefs, and levels of environmental awareness.

The concept of message framing, as articulated by Entman, highlights the importance of selecting specific aspects of perceived reality to emphasize in communication (Pangestu, 2021). Tailored framing strategies are essential to resonate with different audience segments and ensure the effectiveness of environmental campaigns. Entman, proposed that framing involves selection and salience, where communicators highlight specific elements of a story to guide the audience's interpretation (Pangestu, 2021). Effective framing in environmental campaigns must 1) Define the Problem, 2) Clearly articulate the environmental issue in terms relevant to the audience, 3) Diagnose the Cause, 4) Suggest Remedies, 5) Highlight the Benefits.

Social Construction of Environmental Values

Media narratives have successfully constructed a collective understanding of environmental values, highlighting the importance of conserving biodiversity for future generations. The concept of social construction of environmental values explores how societal perceptions of the environment are shaped through communication (Ilhan & Yobas, 2019). Media narratives play a significant role in crafting a collective understanding of these values, often emphasizing the need for biodiversity conservation to ensure sustainability for future generations (Cooper & Nisbet, 2016; Daneels, R., & Vanwynsberghe, 2017). This phenomenon aligns with Berger and Luckmann's (1966) theory on the social construction of reality, which explains how shared meanings and norms are created, maintained, and institutionalized through communication processes.

Media platforms, ranging from traditional outlets like newspapers and radio to modern digital tools like social media serve as key agents in constructing environmental values (P. Ma et al., 2023). These narratives highlight the importance of the environment by framing issues in ways that resonate with diverse audiences.

Media coverage often portrays biodiversity as essential to human survival and wellbeing. Stories emphasizing species extinction, ecosystem degradation, or climate change impacts evoke a sense of urgency and shared responsibility. Through consistent messaging, media normalizes behaviors such as recycling, tree planting, and reducing plastic use. By showcasing examples of communities successfully engaging in conservation efforts, media establishes these actions as societal norms.

In regions like West Sulawesi, media often integrates local cultural values with environmental messages. For example, stories linking traditional ecological practices with modern conservation efforts foster a deeper connection between local identities and environmental stewardship.

“We really respect nature as the giver of life. For example, there is a traditional ceremony before cutting down a large tree to ask permission from the ancestors. We

also have myths about sacred forests that should not be destroyed. This tradition teaches people to maintain the balance of nature, although the challenge now is the influence of modernization which is changing the perspective of some of the younger generation.”(Ambun, 2024).

According to Berger and Luckmann (1966), reality is socially constructed through communication. This construction involves three key processes:

table 6
Three Key Processes of Social Construction

No.	Key Process	Explanation
1.	Externalization	Individuals or groups share their understanding of the environment through narratives, creating a shared framework for others to interpret. For example, environmental organizations externalize their values through campaigns and public messaging.
2.	Objectivation	Once shared widely, these values and norms become objectified or accepted as part of reality. For instance, the notion that forests are essential for human survival becomes a universal truth rather than an opinion.
3.	Internalization	Over time, individuals internalize these values as personal beliefs, influencing their behavior and decision-making. For example, people who repeatedly see media campaigns advocating against deforestation are more likely to support or participate in reforestation programs.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Environmental communication in West Sulawesi has demonstrated significant progress through media and technology integration. However, challenges such as accessibility and cultural relevance remain. Addressing these issues requires a multi-stakeholder approach and innovative communication strategies grounded in robust theoretical frameworks. *The Role of Media and Technology in Conservation Campaigns* highlights the importance of media and technology in spreading environmental conservation messages in the region. Both traditional and digital mass media play a vital role in raising public awareness about environmental issues such as deforestation, pollution, and climate change. Technologies like social media and environmental-based apps provide broader and more interactive platforms for conservation campaigns. Through effective communication strategies, the people of West Sulawesi can better understand the negative impacts on the environment and be encouraged to participate in conservation efforts, both individually and collectively.

Suggestion

To enhance the effectiveness of environmental communication in West Sulawesi, a strategy combining the strengthening of local content, community collaboration, and the use of interactive technology is essential. Campaigns can focus on local stories and traditional eco-friendly practices while leveraging digital platforms for environmental reporting and education. Media literacy should be improved through training, enabling communities to accurately disseminate conservation messages and combat misinformation. Partnerships with local media to broadcast regular programs on environmental issues and awarding impactful campaigns can amplify their reach.

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