frontiers | Frontiers in Communication

TYPE Original Research
PUBLISHED 05 January 2026
DOI 10.3389/fcomm.2025.1709762

OPEN ACCESS

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RECEIVED 23 September 2025
REVISED 18 November 2025
ACCEPTED 01 December 2025
PUBLISHED 05 January 2026

CITATION
Putri LD, Mardiana S, Annisarizki, Hasanah B, Mutoria H and Dhiyaulhaq MN (2026) *Papagahan*: a culturally grounded environmental communication model for strengthening eco-social literacy. *Front. Commun.* 10:1709762. doi: 10.3389/fcomm.2025.1709762

Papagahan: a culturally grounded environmental communication model for strengthening eco-social literacy

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The accelerating global wicked problems—ranging from climate change and environmental degradation to digital disruption and cultural erosion—pose serious obstacles to the achievement of the UN Sustainable Development Goals (SDGs). While policy and technology often dominate the discourse, the communicative dimension of these challenges remains underexplored. This article examines *Papagahan*, a traditional oral and participatory practice of the Baduy community in Indonesia, as a community-based communicative framework that addresses eco-social literacy gaps among youth. Through Participatory Action Research (PAR), ethnography, and participatory observation, five *Papagahan* sessions were implemented to transform local knowledge into collective planning actions, producing tangible outputs such as biopore systems, waste signage, and local technology-use regulations. Findings demonstrate that *Papagahan* revitalizes intergenerational communication, strengthens trust and social cohesion, and equips youth as co-planners of sustainability solutions. Beyond its local context, *Papagahan* illustrates how human communication rooted in cultural wisdom can function as a decolonized communicative praxis for addressing global wicked problems and advancing SDGs 4, 11, 13, 15, and 16. This study contributes to theoretical debates on communication for development and social change by situating local communicative systems as critical enablers of sustainable and equitable futures. Hence, this study offering an alternative lens that challenges dominant paradigms in environmental communication and participatory development.

KEYWORDS

human communication, sustainable development goals (SDGs), eco-social literacy, local knowledge, communication for development, participatory communication, sustainable futures, *Papagahan*

1 Introduction

Environmental communication plays a strategic role not only in shaping literacy—awareness, attitudes, and behaviors—among the public regarding eco-social issues,but also in supporting policy design and planning for sustainable communities (Pezzullo and Cox, 2025). Eco-social literacy is increasingly important for the younger generation because it enhances their understanding of social and environmental issues and encourages them to take an active role in societal change. It addressed global wicked problems such as climate change and biodiversity loss (Pfenning-Butterworth et al., 2024) and even digital divide (Aydin, 2021).

Eco-social literacy needed to successfully embedding sustainability into local development and planning policies (Ardoin et al., 2023; Lopes et al., 2024).

To situate these broader challenges within a concrete socio-ecological context, it is important to examine how eco-social literacy unfolds in communities that negotiate both cultural continuity and modern pressures. One such community is the Baduy. The Baduy people of the Banten region of Indonesia are a unique cultural group that has preserved its traditional lifeways despite close proximity to the metropolitan area of Jakarta (Krisnadi et al., 2024). They are divided into two groups: the Baduy Dalam (Inner Baduy) who adhere to strict anti-technology traditions and the Baduy Luar (Outer Baduy) who have a more relaxed techno-social acculturation with the surrounding community (Silalahi and Purwanto, 2025). The Inner Baduy serve as the central authority governing the lives of the entire Baduy community (Asteria et al., 2021). Many researchers view the wisdom of the Baduy community as key to solving global problems, particularly in the environmental context (Wibowo et al., 2021; Septini and Pramukanto, 2022; Sjöström et al., 2025).

In the place where actions needed to address these problems, such as Indonesia, many younger generation still struggle with basic literacy, including social and environmental literacy (Dayantri and Nasution, 2024). Research in Lombok shows that the social and environmental literacy of rural and urban communities is equally low (Bidarinjani et al., 2023), indicating that this challenge is present in the general population and traditional communities. The Baduy community in Banten faces similar challenges. Even though they have local wisdom based on a sustainable environment, transmission to the younger generation who are starting to understand modern technology, especially smartphones, is hampered (Putri et al., 2024). This makes the Baduy an illustrative case through which to analyze how local communicative systems can respond to global wicked problems while strengthening intergenerational knowledge transmission.

Literacy challenges in the general population are often linked to misinformation (Beauvais, 2022), in local communities, barriers include a lack of qualified educators and culturally appropriate educational methods. Modernization is also eroding the younger generation's commitment to Baduy customs. The internet, for example, has introduced the phenomenon of "technoference" (Dixon et al., 2023), where the use of digital devices disrupts intergenerational interactions and weakening the transfer of cultural-environmental knowledge (Mackay et al., 2022; Liu et al., 2024; Ali and Iqbal, 2025). These dynamics highlight the urgency of planning interventions that integrate local wisdom with modern governance frameworks.

Environmental communication is defined as the intentional exchange of information, knowledge, and wisdom about the environment (Bhanye and Maisiri, 2023), contributes not only to raising awareess but also to shaping collective action and informing local policy directions (Erbaugh et al., 2024). It has pragmatic functions—informing, reminding, encouraging, and promising environmental improvement—as well as constitutive functions, which position the environment not merely as an issue but as an integral part of life (Ceyhan, 2022; Dirgantara et al., 2023). The effectiveness of environmental communication messages increases when emphasizing the proximity of risks in a local context and avoiding the portrayal of overly severe threats (Gong and Chu, 2022). This strategy aligns with the findings, which show that media can shape public perceptions and drive collective action through strategic selection of meaning, priorities, and explanations, as seen in the framing of environmental issues in Egyptian media during COP27 (Radwan et al., 2025).

One relevant approach for traditional communities is *place-based environmental communication* (PBEC), which situates local biophysical and socio-cultural realities at the center of planning processes (Sardi and Skanavis, 2023; Davari et al., 2025; Yemini et al., 2025). PBEC emphasizes authenticity (Karahan, 2024) and connection to real life (Bolick et al., 2024), facilitating place attachment and interaction between learners and their communities (Baars and Zhang, 2023). Examples from Hawai'i (Saffery, 2024), and Australia (Holmes, 2024) show that PBEC-based initiatives can restore environmental stewardship while generating frameworks for community-driven planning.

In the context of Baduy, the PBEC approach is manifested in the practice of *Papagahan*. *Papagahan* is a method of sharing knowledge and providing guidance on customary laws through oral communication and direct practice without written media (Firdaussy et al., 2024). *Papagahan* functions not only as a medium of education but also a planning instrument, teaching communities how to manage agriculture without technology, build sustainable architecture (Sari et al., 2022), understand the landscape (Dede et al., 2021), and maintain river and environmental conservation while adhering to customary prohibitions such as not using motorized transportation and electricity. From an environmental communication perspective, *Papagahan* encompasses elements such as the message source (traditional elders and young facilitators), the message (ecological and social issues within the traditional framework), the medium (face-to-face interaction, oral storytelling, group discussions, simulations, field actions), the recipients (Baduy youth and secondary audiences), and feedback (interactive discussions, reflection, community actions), which can generate actionable outputs for environmental management and spatial planning.

Literature indicates that environmental communication based on local wisdom is rarely discussed internationally. Research in Indonesia shows that for effective environmental education and planning based on local wisdom, traditional philosophy, community participation, and language ecology must be considered (Muslim, 2021; da Silva et al., 2024). Compared to formal approaches, *Papagahan* creates a decolonized planning space (Çelik, 2025), using local language, symbols, and values to convey informative, emotional messages, build collective identity, and shape policy-relevant solutions. A similar approach is seen in mangrove ecotourism communication in Bengkalis, where community participation plays a significant role in environmental promotion and education. However, it sometimes conflicts with ecological carrying capacity (Efni and Hasan, 2025).

The strength of *Papagahan* lies in its ability to revive intergenerational interactions, overcome technophobia, and facilitate a "digital detox" (Li et al., 2025) while transferring environmental values. Thus, *Papagahan* is not merely an educational method but a community-based planning framework that integrates participatory mechanisms and cultural narratives to address ecological and social challenges.

Global environmental communication scholarship has expanded significantly, yet major gaps remain. Research continues to be dominated by Global North epistemologies (Takahashi, 2023; Bera et al., 2025; Bhatti et al., 2025), often overlooking Indigenous, community-driven communicative systems and offering limited

attention to power, agency, and justice-oriented perspectives. Much of the field still focuses on media representations, message effects, and digital communication (Anderson, 2021), with few studies examining how environmental knowledge is negotiated, ritualized, and transformed into collective action within local governance systems. Calls for transformative (Brüggemann et al., 2023) and decolonized (Cox and Depoe, 2022) communication remain largely conceptual rather than empirically demonstrated. Papagahan addresses these gaps by presenting an Indigenous, participatory, and orally grounded communicative praxis that links traditional ecological knowledge to community planning, revitalizes intergenerational dialogue, and demonstrates how communication functions as a mechanism of environmental governance in the Global South.

Accordingly, this study aims to analyze how environmental and social messages are communicated among the younger generation of the Baduy community, examine the implementation of *Papagahan* as a local wisdom–based and community-driven environmental planning model, and evaluate the role of community participation in shaping policy-relevant outcomes. Three research questions guide this inquiry: (1) To what extent do environmental and social issues are the focus of communication messages among Baduy's young generation? (2) How does the implementation of *Papagahan* influences the effectiveness of environmental communication in enhancing eco-social literacy and cultural resilience? and (3) In what ways does active community participation enhances its effectiveness in generating policy-relevant planning outcomes? By addressing these questions, the study seeks to develop a decolonized communication model that bridges traditional ecological wisdom with modern sustainability frameworks. These aims collectively advance the achievement of several Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 16 (Peace, Justice, and Strong Institutions). The novelty lies in positioning *Papagahan* not merely as cultural pedagogy but as an actionable communicative infrastructure that enables participatory governance and contributing fresh theoretical insight to environmental communication and participatory development debates.

2 Materials and methods

This study employed a qualitative design integrating Participatory Action Research (PAR), ethnography, and participatory observation to examine *Papagahan* as a community-driven, local-wisdom–based environmental communication model. Rather than treating these methods separately, they were combined to capture complementary perspectives: PAR provided an emic, change-oriented lens; ethnography allowed passive observation of customary practices without disturbing local norms (Jannesari, 2022); and participatory observation enabled researchers to interact directly with villagers while maintaining respect for cultural boundaries (Szymańska, 2021). Together, these approaches produced a balanced dataset that reflects both insider and outsider viewpoints, formal (PAR) and informal (ethnographic) interactions, and participatory as well as non-participatory processes.

Initial preparations were made by identifying locations and communities and assembling a research team. In addition, initial preparations included approaching traditional leaders (*jaro*) to obtain permission and build trust. If permission was granted, researchers began recruiting research assistants from the local community to assist with the research process and increase community acceptance.

Table 1 shows participants involved in this research, in form of initials, their hamlet, age, gender, and in what step they involved in this research. Six people involved in ethnographic study. Two of them are females and one of the female is the mother of one *Papagahan*'s participant. One of the male is the father of other *Papagahan*'s participant. They are came from four hamlets, one of them is Inner Baduy hamlet and three people came from one hamlet, Cijanar. They average age is 44 years old.

Meanwhile, for *Papagahan*, a total of 16 teenagers were successfully recruited to participate in the activities. These young people represented six hamlets in Baduy Luar and had a range of ages between 14 and 21 years old. Five participants are females, and two of them actually mothers, despite their ages is in youth range (17 and 20 years old). It is customary for females in Baduy to married at early ages and males dominated the activities outside their homes.

PAR implementation consists of three phases: diagnosis, action, and reflection. The diagnosis phase involves identifying challenges and the potential of *Papagahan* as a model for education in collaboration with *Jaro* and local NGO leaders. This stage advances SDG 4 (Quality Education) by diagnosing learning barriers and designing culturally appropriate communication, while also

TABLE 1 Participants.

Research phase	Participant code	Community type	Age range	Gender
Ethnography	E1	Outer Baduy	45–55	Male
	E2	Outer Baduy	45–55	Female
	E3	Outer Baduy	35–45	Male
	E4	Outer Baduy	45–55	Male
	E5	Outer Baduy	45–55	Female
	E6	Inner Baduy	25–30	Male
Papagahan	P1	Outer Baduy	15–20	Male
	P2	Outer Baduy	15–20	Female
	P3	Outer Baduy	15–20	Male
	P4	Outer Baduy	15–20	Female
	P5	Outer Baduy	15–20	Male
	P6	Outer Baduy	15–20	Male
	P7	Outer Baduy	15–20	Male
	P8	Outer Baduy	15–20	Male
	P9	Outer Baduy	15–20	Male
	P10	Outer Baduy	15–20	Male
	P11	Outer Baduy	15–20	Female
	P12	Outer Baduy	10–15	Female
	P13	Outer Baduy	20–25	Female
	P14	Outer Baduy	15–20	Male
	P15	Outer Baduy	10–15	Male
	P16	Outer Baduy	20–25	Male

Source: Authors' own analysis.

contributing to SDG 11 and SDG 16 by strengthening community participation in local planning and governance.

The action phase is the implementation of *Papagahan* in five structured environmental communication sessions: (1) problem identification, (2) learning from elders, (3) field action, (4) social collaboration, and (5) implementation of solution infrastructure. This phase embodies SDG 13 (Climate Action) and SDG 15 (Life on Land) by applying ecological knowledge to local actions such as forest conservation, waste management, and sustainable agriculture, while supporting SDG 11 through community-based environmental planning.

In the reflection phase, researchers discuss the action's results with participants and traditional leaders to evaluate the effectiveness of communication and analyze feedback to measure the extent to which the message is understood, accepted, and internalized by participants while identifying improvements in message delivery. This stage supports SDG 4 by improving learning processes and SDG 16 by strengthening community-based decision-making structures and accountability.

In this study, each PAR cycle was not limited to evaluating communication but also generated concrete planning outputs, such as waste management infrastructure (biopore holes, trash bins, signage systems) and community-driven rules on technology use that could potentially be integrated into local sustainability planning and policy frameworks. The ethnographic study was conducted using visual and narrative ethnography.

To clarify the participatory techniques used in each PAR phase, the study employed one primary method per stage. In the diagnosis phase, participatory mapping was used to identify and spatialize key eco-social issues related to waste and technology across the Baduy area. During the action phase, role-play simulations served as the core activity through which youths explored cultural meanings, negotiated solutions with elders, and generated concrete actions such as biopore installation, signage, and draft technology-use regulations. In the reflection phase, collective sense-making workshops enabled participants to jointly evaluate the outcomes, discuss observed changes, and refine future plans. These selected techniques ensured that each stage of the PAR cycle was structured, culturally grounded, and consistent with the collaborative nature of Papagahan.

The researcher documented visual media (posters, signs, videos) and local narratives used in communication. Participatory observation followed all *Papagahan* sessions, noting communicator interactions with the audience, audience responses, and message dynamics. The researcher made detailed notes about their experiences, including event descriptions, dialogues, and personal reflections.

The data analysis followed a thematic approach guided by Colaizzi's seven-step method (Luo et al., 2024). Four researchers (the second to fifth authors) were divided into two independent teams. Each team began by thoroughly reviewing all interview transcripts and field notes, after which they extracted significant statements related to the phenomena under investigation. The meanings embedded in these statements were then articulated, refined, and organized into themes, theme clusters, and categories based on shared concepts and characteristics.

Theme extraction was structured around four core issues aligned with the stages of PAR: (1) eco-social issues, (2) specific problems identified during the diagnosis stage, (3) actions undertaken during the action stage, and (4) observed changes emerging during the reflection stage. This structure enabled a comprehensive interpretation of the dynamics of environmental communication within the Papagahan practice and the Baduy context.

After the themes were identified, both teams connected the thematic patterns to the research phenomena to develop a coherent narrative. The essential structure of the phenomenon was then constructed and subsequently returned to the participants for member checking to ensure interpretive accuracy. The results from the two teams were compared and synthesized under the coordination and supervision of the first author. Any disagreements were reviewed and resolved with the corresponding author until full consensus was reached. All data were anonymized throughout the process to minimize researcher bias.

The communication process was analyzed by tracing how messages were generated, delivered, and negotiated throughout the Papagahan sessions. Message content emerged from collective discussions in the diagnosis phase and was further refined through role-play activities where youths tested how environmental and technological issues should be framed for their peers. Media selection—such as posters, verbal storytelling, and locally produced signs—reflected Baduy preferences for oral and visual communication. Several signs, in particular, were directly inspired by statements from Baduy residents regarding the solutions they proposed for waste handling and technology use. Interaction patterns, feedback loops, and the ways participants accepted, rejected, or reformulated messages were examined across PAR, ethnography, and participatory observation.

The coding and organization of the dataset were supported by NVivo software, which facilitated the systematic management of field notes, interview excerpts, and PAR documentation, ensuring rigor and transparency in the analytic procedure. Credibility and analytic rigor were ensured through member checking with Papagahan participants, anonymization of all transcripts prior to coding, and cross-checking of codes among the research team to confirm consistency. Coding decisions and theme development were also documented systematically in NVivo, allowing an auditable trail and reducing individual researcher bias. Triangulation across PAR cycles, interviews, and field observations further strengthened the trustworthiness of the findings.

As an external academic team entering an Indigenous governance system, we positioned ourselves as learners who relied heavily on cultural brokers (jaro, elders, and local facilitators). Our interactions reveal asymmetries in knowledge, mobility, and institutional expectations, but these were continually negotiated through respect, linguistic adaptation, and shared decision-making. The fieldwork unfolded not as an extractive inquiry but as a co-navigated process shaped by Baduy temporalities, spatial boundaries, and epistemic authority.

3 Results

3.1 Diagnosis stage: identifying eco-social issues

As explained above, PAR is implemented in three stages: diagnosis, action, and reflection. In the diagnosis stage, the research

team established the theme "Us and nature" to explore the initial experiences of adolescents from changing socio-ecological conditions. This diagnostic stage was implemented through in-depth interviews with traditional leaders of Baduy. The interviews aimed to identify social and ecological issues from the perspective of traditional leaders while also seeking permission and an overview for recruiting Baduy adolescents to participate in the *Papagahan* activities.

The research team conducted two in-depth interviews with the *jaro* (head) of two hamlets. During the interviews, the research team was accompanied by the head of an NGO that assists the Baduy community in health. The interviews revealed several themes. The most dominant problems however, are waste management and technology-related social transformation.

3.2 Waste management narratives

The interview with the *jaro* of Cibeo revealed that the community produces half of the waste in Baduy, while tourists produce the other half. Cibeo is the Baduy village that receives the most tourists, with a volume reaching up to 500 people per week. Some stay in Baduy, bringing various items that generate waste. This waste is disposed of in bags placed near the houses. Residents also use plastic-based products, such as snacks and cakes. There has been a shift from packaging made of leaves to plastic.

Residents are urged to separate plastic waste from other types of waste to prevent mixing and littering. *Jaro* has approached local businesses about regular waste processing, but they have not been able to provide a sufficiently large facility to accommodate the waste. Proposals have also been submitted to the government, but no action has been taken. Occasionally, some people dispose of waste in rivers despite the ban.

Plastic waste is generally processed by burning. In the past, waste from every house was collected for a year, piling up to the size of a house. When it was to be disposed of at the border in Ciboleger, the disposal site refused to accept it because it was already full. As a result, the large amount of waste was burned.

Meanwhile, an interview with *Jaro* other *Jaro* revealed that the community lacks awareness of the harmful effects of waste, despite the traditional leaders having provided information and held regular discussions on waste management. As one traditional leader noted, "Actually, with the problem of waste, people sometimes do not understand how detrimental it can be. We hold discussions constantly, never getting bored. According to tradition, there's no shortage of information to raise awareness among the community."

On average, Baduy residents conduct community clean-up efforts three times a year, especially after many visitors arrive. After collection, plastic waste is generally burned, while leaf waste is disposed of in a special location on the outskirts of the village. Since the Baduy community does not have a written culture, the prohibition on littering for tourists and residents is only verbal. However, in Ciboleger, which serves as the entrance to the Baduy area, there are already waste bank activities and scavenging efforts to tidy up trash. These activities cannot be carried out in Baduy because they are too costly for professional waste collectors who travel around using vehicles. The idea has emerged to create posters prohibiting littering or bringing trash back into the Baduy village and informational banners urging visitors to dispose of trash in designated bins.

3.3 Technology and social ties

The next prominent social problem is the impact of technology. The theme of the impact of technology that emerged from the interviews revealed several phenomena. The strict ban on mobile phone ownership has now been relaxed for the Baduy Luar community because mobile phones are important for communication. One NGO leader described the tension: "It's hard now, because technology cannot be avoided. But at least if you go to Baduy again, you'll just have to be a Baduy person. Like before, people who work outside, yes, this custom cannot forbid it, but when they come from outside, they go to Baduy again and they still have to be Baduy people, regardless of their clothes too. Do not bring culture from the city here."

Despite this, smartphones have many negative impacts. One form of negative impact is fraud against Baduy residents. NGOs reported four incidents of fraud targeting Baduy residents, with the motive of purchasing agricultural products such as durian and ginger. NGOs identified this as occurring because Baduy residents' distrust what is requested on social media.

The ease of using mobile phones surpasses the ability to use other important technologies daily. The head of an NGO stated that a Baduy resident worked as a domestic helper, whose mobile phone was thrown away by their employer because the employer was frustrated that the helper only played with the phone while not knowing how to use other tools, like an iron. Another case involved a teenager who got lost in Jakarta during the pandemic while trying to find work to buy a mobile phone. Cases of rape resulting from meeting someone through a smartphone have also been reported in Baduy.

Efforts to mitigate the negative impacts of information technology include verbal warnings, not strict prohibitions. There have been discussions to establish rules against the misuse of mobile phones, but their effectiveness in practice remains low. The NGO has proposed a written ban on visitors activating their mobile phones in Banduy Dalam. So far, the ban has only been verballing. This written ban indirectly targets children because they have learned to read through mobile phones, cigarette, and biscuit packaging. The ban was established in the border area on the Baduy Luar side because modern technology, such as writing and banners, is not permitted in Baduy Dalam.

Health issues are emerged. Interviews revealed complaints about tuberculosis (TB), stunted babies (bujil) who cannot grow properly, epilepsy, and complaints that people only go to traditional healers or health centers when they are sick. The interviews also found water pollution problems, indicating that residents were dumping trash into rivers despite this being prohibited by custom. These health and ecological problem is not particularly prominent.

3.4 Action stage: *Papagahan* sessions and youth participating

The team then sought participatory recommendations from local leaders. *Jaro* and NGO leaders recommended the names of young people who they considered to be active in community activities, capable of bridging the values between generations, and having the potential to become *local agents of change*. The research team began recruiting Baduy youth to participate in the *Papagahan*.

In the first session, the activity was aimed at exploring the young people's initial understanding of the changing environment and social relations. After an introduction and identity games, the participants were divided into three groups, with groups I and II consisting of five people each and group III consisting of six people. Each participant was asked to discuss with their group facilitator to select the most pressing ecological and social issues they faced in their daily lives. This local issue map was created collectively using symbols and drawings on large sheets of cardboard spread out on the ground. Following this, participants took turns selecting que cards representing the issues they faced most frequently.

Table 2 shows the results of the participants' choices. In the ecological group, 63% of participants chose waste disposal as the biggest ecological problem, while the other three problems (forest destruction, health, and water pollution) were each chosen by only two people (13%). For social problems, the impact of technology was the biggest problem, with half (50%) of participants identifying it as the main social problem. Other choices had significantly fewer voters, including broken social ties (25%), abandoning traditions (19%), and land disputes (6%).

After gathering the issues, it was decided that the next *Papagahan* session would focus on waste issues from the ecological aspect and the impact of technology on the social aspect. This second stage is the action stage of PAR, focusing on learning from ancestors about values in the daily practices of the Baduy. This focus aims to revive knowledge from the first meeting through stories and advice from elders. Therefore, this session explores the meaning and solutions to the two issues selected from the first meeting. In this session, Baduy elders are present to provide various teachings and a broader picture of the issues to the participants. The activity is closed with a game about types of waste by making quiz cards with pictures of different types of waste.

3.5 From reflection to co-action

In the third session, teenagers in a group are asked to find trash around them and bring one piece of trash. The teenagers then create a role-play simulation related to the problem. The solution that emerges is the creation of biopori holes for ecological waste problems. Meanwhile, for technological problems, the mentors deliver material on digital literacy to improve the digital literacy of teenagers.

TABLE 2 The biggest eco-social problems in the Baduy society according to *Papagahan* participants.

Group	Score	I	II	III	Total	Percentage
Ecology	Littering	4	5	1	10	63%
	Deforestation	1	0	1	2	13%
	Health	0	0	2	2	13%
	Water pollution	0	0	2	2	13%
Social	Loss of customs	1	1	1	3	19%
	Impact of technology	4	3	1	8	50%
	Broken ties	0	1	3	4	25%
	Territorial disputes	0	0	1	1	6%

Source: Authors' own analysis.

The final session of this *Papagahan* meeting involved creating a documentary video featuring statements from Baduy residents discussing the solutions they proposed regarding waste and technology issues. Through this activity, participants not only socialized with older Baduy residents but also built social connections through collaborative problem-solving.

The idea for biopores surfaced when participants collected waste during the third session and, together with elders, discussed ecologically appropriate disposal methods rooted in customary ecological knowledge. The development of signs emerged from two sources: (1) youths' field observations that tourists and children continued to litter despite verbal prohibitions, and (2) statements from Baduy residents recorded during the documentary-making session, where community members proposed clearer visual reminders to reinforce waste and technology-related norms. Draft regulations on mobile phone use arose during digital literacy discussions, as youths and elders reflected on incidents of fraud, misuse, and social disruption, prompting them to outline preliminary guidelines that leaders could later refine. These outputs were therefore not externally imposed but generated through dialogic learning, intergenerational negotiation, and collective problem-solving embedded within the Papagahan process. After the session concluded, the next activity was planned: creating signs related to waste, providing trash bins, distributing biopore tools, and drafting preliminary guidelines for mobile phone use.

3.6 Reflection stage: collective evaluation and lessons learned

After the final session, the research team, traditional leaders, community members, and participants evaluated the workshop outcomes and reflected on various issues such as effectiveness, challenges during implementation, lessons learned, and future plans. Three key insights emerged. First, the revival of *Papagahan* demonstrates how oral tradition can reframe sustainability from within local epistemologies and enhancing place-based identity. Two, the process fostered trust between elders and youth, and transforming communication from one-way instruction into dialogic learning. This supports long-term eco-social literacy and community resilience. Third, tangible results included the installation of biopore systems, local waste bins, and draft community rules for mobile phone use. Table 3 summarizes the key empirical findings based on themes.

4 Discussion

4.1 *Papagahan* as a form of place-based environmental communication (PBEC)

The *Papagahan* results showed a high degree of consistency with the findings from the interviews. Waste and technology were indeed the main issues highlighted by the youth participants, as they were by the traditional leaders. These findings serve as data triangulation that validates the identification of the eco-social problems faced by the Baduy community.

TABLE 3 Thematic summary table.

Eco-social issue	Specific problems (diagnosis stage)	Action taken (action stage)	Observed changes (reflection stage)
Waste management	Tourist and resident waste, plastic packaging, dumping waste into rivers, children littering, inadequate disposal facilities	Youth selected waste as priority issue, elder storytelling on ancestral norms, ecological mapping, waste-sorting game, roleplay activities, biopore creation, trash collection	Biopore holes installed, trash bins placed, signage planned, improved youth awareness and youth-elder communication
Water pollution	River used as dumping site despite adat prohibition	Included in waste discussion, mapped as ecological hotspot	Awareness increased, included in planned signage and rules
Health issues	TB, epilepsy, stunted infants (bujil), low health-seeking behavior, connection to waste and water	Identified in interviews, elders emphasized hygiene, youth reflections integrated health with environmental concerns	Youth recognized link between waste, sanitation, and health; proposed as next PAR cycle topic
Technology impact	Relaxed phone bans, exposure through tourists, social media misuse, fraud cases, rule violations	Youth identified tech as key issue, elder narratives on custom preservation, digital literacy session, documentary making on community responses	Draft rules for phone use, improved digital literacy, better intergenerational negotiation on tech adoption
Erosion of customs and social ties	Youth secretly breaking customers, desire for phones and work outside, reduced interaction due to gadgets	Cultural identity games, group discussion on adat values, joint-problem-solving with elders	Increased trust between youth and elders, youth reframed as "eco-social stewards," improved cultural pride
Youth-elder relations	Elders see youth as drifting from customs, youth desire for technology and money	Leaders nominated active youth, dialogic facilitation, shared learning sessions across generations	Shift from one-way instruction to mutual dialogue, stronger place identity, collective ownership of solutions

Source: Authors' own analysis.

Papagahan's output in the form of biopores, signage, and technological regulations is the output of a place-based environmental communication process. In this way, *Papagahan* places the biophysical and socio-cultural realities of the Baduy at the center of the communication process, aligning with PBEC theory (Davari et al., 2025; Yemini et al., 2025). The outcomes of *Papagahan* may indicate a movement from cultural reflection toward forms of localized policy innovation, although further evidence would be needed to confirm how these outputs interact with formal governance structures.

4.2 Eco-social literacy and social learning through *Papagahan*

Literacy models generally categorize literacy levels from awareness to advanced change management. For example, Bayley and Phipps (2019) categorize impact literacy from basic awareness to critically engaged. Meanwhile, Stanley et al. (2022) categorize digital food and nutrition literacy from basic functional skills based on knowledge to ability to adapt and transfer healthy behavior with new technologies, context, and situations. Similarly, we developed five levels of eco-social literacy, starting from awareness and progressing to the highest level of literacy, which is leading community to change, based on what we found in the Baduy community. Table 4 shows the five levels of eco-social literacy that a Baduy youth can achieve.

Baduy youngsters are generally at Level 1 (Basic Awareness). At this level, knowledge is still passive and does not influence behavior. They know that littering in rivers is prohibited, but they do not always follow this rule. In addition to communication, some Baduy people use mobile phones to become famous outside Baduy through applications such as TikTok. Children's interest in mobile phones is triggered by contact with tourists who bring mobile phones.

Although taking photos is prohibited in Baduy Luar, young children often gather out of curiosity about the technology that tourists bring. Tourists also occasionally violate the rules. Traditional customs prohibit video recording in Baduy Dalam. Tourists who post videos or photos of Baduy on social media platforms like Instagram are promptly warned by NGOs and Baduy residents, leading to the removal of the content or the closure of their accounts.

In line with this, there is another form of social threat: the risk of the Baduy community abandoning their customs. Interviews indicate tension between traditional rules and modern practical needs, such as cell phones, plastic, and motorcycles. Thus, even though the rules prohibit it, some people are still allowed to hold cell phones for important communication and use motorcycles if someone is sick. The results indicates a shift in values and a compromise toward customs that is not overt. Other social problems that have emerged include the breakdown of social ties, which has led young people to abandon their customs to seek work outside Baduy, and the severing of relationships between communities since they have become preoccupied with their gadgets, as well as territorial disputes in certain areas around Baduy. The latter two problems are not discussed in depth, indicating that they are minor issues.

The goal of *Papagahan* is to raise the level of these young people from basic awareness to the highest level, which is leadership. To achieve this, students must move from level 1 to level 2 (understanding), where they understand the reasons behind the customary rules related to the environment. Next, they are raised further to level 3 (application), where they follow customary rules and are able to modify their habits in accordance with new challenges.

TABLE 4 Eco-social literacy levels of Baduy Youngsters.

Level	Terms	Description
Level 1	Basic awareness	Young people are aware of social and ecological problems in their environment, such as waste, health, and the impact of technology.
Level 2	Understanding	Young people begin to understand the cause-and-effect relationship between human actions and their impact on the environment or society.
Level 3	Application	Young people apply behaviors consistent with the principles of social-ecological sustainability.
Level 4	Analysis	Young people are able to analyze existing policies or practices, assess their effectiveness, and offer alternatives.
Level 5	Leadership	Youth become agents of change, leading social-ecological initiatives based on local wisdom and innovations.

Source: Authors' own analysis.

Papagahan will continue to push young people to level 4 (analysis), where they consider traditional values and modern needs in making decisions. At its peak, *Papagahan* leads to the highest level, which is the ability to invite the community and outside parties to collaborate. The results of our ethnography, participatory observation, and internal discussions led to the formulation of five *Papagahan* sessions, as shown in Table 5.

Each *Papagahan* session has a strong relationship with each level of youth eco-social literacy. The first session will trigger awareness and form initial understanding, which will be further sharpened in the second session, when traditional leaders are introduced to the youth. In this session, the youth deepen their understanding and begin to apply local values. In the third session, they refine practical application and problem analysis. The fourth session solidifies analysis, and the fifth session brings forth leadership and innovative solutions. This relationship can be seen in Table 6.

The relationship between *Papagahan* sessions and the eco-social literacy of Baduy youngsters relationship indicates that *Papagahan* has the potential to be a sustainable solution for improving the eco-social literacy of Baduy youngsters, thereby helping to preserve their culture and increase the resilience of the Baduy community across generations, even without the intervention of the formal education system. The involvement of traditional leaders in *Papagahan* and how the youth engage themselves in the community as agents of change enables intergenerational communication to be reestablished without them having to abandon the technology that has assisted them in various aspects of their lives.

Papagahan is effective in improving students' eco-social literacy because it is in line with social learning theory (Bandura, 1977). According to social learning theory, people learn through observing the behavior of others and its consequences (modeling). In the case of *Papagahan*, Baduy youngsters not only receive information, but also see firsthand the practices exemplified by elders and facilitators, such as how to make biopores or sort waste. Observation and direct practice reinforce the formation of new habits. Facilitators in this case must be able to use the local language.

Furthermore, the effectiveness of *Papagahan* in improving the socio-ecological literacy of Baduy youngsters can also be understood through a combination of Iqani (2025) perspective on the emotional dynamics of the younger generation towards environmental issues and (Çelik, 2025) concept of *justice-seeking communication*. From a psychological perspective, as found by Iqani (2025) in an African context, young people often find themselves aware of ecological problems but trapped in negative emotions—avoidance, fear, and feelings of powerlessness—that hinder active engagement. *Papagahan* intervenes in this condition by creating a safe and collaborative space for dialogue, enabling young people to articulate issues, process emotions, and build a sense of ownership over the solutions generated.

From a cultural perspective, *Papagahan* represents a decolonized form of public communication as described by Çelik (2025). Baduy youngsters can discuss and resolve issues by referring to the language, values, and social mechanisms born from their traditions. The synergy between the processing of negative emotions into collective motivation and the existence of a communication space rooted in local wisdom is what makes *Papagahan* effective in promoting a shift in socio-ecological literacy from passive awareness to sustainable action. It demonstrates how cultural traditions clean be reframed as communicative systems capable of generating actionable solutions for sustainability, rather than being reduced to symbolic heritage.

The Baduy strongly maintain their traditions, despite being located only 130 km from the metropolitan city of Jakarta. Consequently, the presence and behavior of the Baduy people convey a sense of exoticism from the perspective of the general public. They live in mountain villages without modern technology, living in harmony with the dense forest. When they leave their area, their appearance contrasts sharply with their surroundings. They wear no footwear, wear simple clothing in either black or white, and carry only a woven bag. Their skin tends to be lighter than that of the general population. This contrast gives rise to various myths surrounding the Baduy people: they are immune to disease, possess vitality above that of normal humans, and are in perfect harmony with nature (Figures 1, 2).

The perspectives of the *Jaro* and NGOs on the younger generation of Baduy can also be abstracted from the interview results. One group that is considered difficult to educate is children, as they tend to dispose of waste indiscriminately: "small children. They tend to litter. There have been discussions in the past, but they do not understand the law, so they litter." The younger generation is seen as more relaxed towards customs. They dare to secretly violate customs in Inner Baduy, such as smoking cigarettes. They have a desire to own technology such as mobile phones and are willing to work to earn money to buy them. Suppose the younger generation can contribute to mitigating social and ecological problems in Baduy and provide significant benefits to the Baduy community. In that case, perceptions of them may change, and they may be seen as an important generation for maintaining the eco-social resilience of the Baduy community.

Papagahan involves not only the younger generation of Baduy but also traditional leaders (*kokolot*) and the Baduy community in general. Figure 3 shows how these stakeholders are involved in *Papagahan*. The *kokolot* are involved as providers of traditional knowledge, ensuring that young people understand Baduy customs and the eco-social environment more comprehensively. The youth, guided by academic facilitators, begin to develop solutions that consider both formal traditional aspects and technical-empirical considerations, ensuring

TABLE 5 Papagahan sessions.

Session	Theme	Description
Session 1	Problem identification	Exploring young people's initial understanding of environmental and social change, creating a collective problem map, and selecting priority issues.
Session 2	Learning from elders	Listening to stories, advice, and traditional values related to selected issues; discussing meanings and traditional solutions; playing waste classification games.
Session 3	Field action	Collecting trash in the surrounding area, role-playing problems and solutions, designing biopore holes, and digital literacy for technology-related issues.
Session 4	Social collaboration	Creating a documentary video with community statements, building social connections, and planning follow-up actions.
Session 5	Implementation of solution infrastructure	Creating no-littering signs, providing trash bins, and installing biopore devices.

Source: Authors' own analysis. These sessions progress from identifying real problems (session 1), exploring causes and solutions according to customs (session 2), practicing solutions in the field (session 3), developing joint actions and campaigns (session 4), and building solution infrastructure (session 5).

TABLE 6 Relationship between *Papagahan* sessions and the eco-social literacy level of Baduy youngsters.

Papagahan sessions	Literacy level	Explanation of the relationship
Session 1—Problem identification	Level 1—Basic awareness	Participants begin to recognize issues in their environment, understand that these problems are shared, and recognize the differences between ecological and social issues.
Session 2—Learning from elders	Level 2—Understanding	A local wisdom perspective deepens participants' understanding; they begin to learn about relevant traditional practices and how to apply them.
Session 3—Field action	Level 3—Application	Participants practice ecological solutions and begin to analyze social problems.
Session 4—Social collaboration	Level 4—Analysis	Role play trains critical thinking and collaborative problem-solving.
Session 5—Implementation of solution infrastructure	Level 5—Leadership (real action)	Participants present solutions publicly, engage other community members, and lead action plans. Based on the workshop's results, they become agents of change by initiating real program ideas.

Source: Authors' own analysis.

FIGURE 1
Implementation of the first *Papagahan* session. Source: Authors' own analysis.

they can be implemented without normative or practical obstacles in the field. These solutions are then brought back to the community for further input while also building connections with the youth.

4.3 *Papagahan* in the context of global wicked problems

Community-based traditional frameworks such as Kauluakalana inHawai'i (Saffery, 2024), Dadirri in Australia (Holmes, 2024), and *Papagahan* in Indonesia's Baduy community share a foundation in local knowledge, intergenerational learning, and participatory engagement, yet they differ in orientation and policy outcomes. Kauluakalana emphasizes narrative transformation and cultural revitalization, using *mo'o* (genealogies) and *mo'olelo* (stories) to restore identity and inspire ecological stewardship, while Dadirri centers on "deep listening" within learning circles to foster reflection, relational awareness, and application of theory to practice (Sharmil et al., 2021). In contrast, *Papagahan* advances beyond cultural renewal and reflective practice to become an action-oriented planning model that generates concrete outputs—such as biopore systems, waste signage, and local technology regulations—directly applicable to environmental management and spatial planning. This positions *Papagahan* as potentially distinctive in its policy relevance, insofar as its outputs could be considered for institutionalization in village regulations or incorporated into district initiatives. While such possibilities align with the nature of the solutions generated, empirical evidence would be required to demonstrate actual uptake within governance systems.

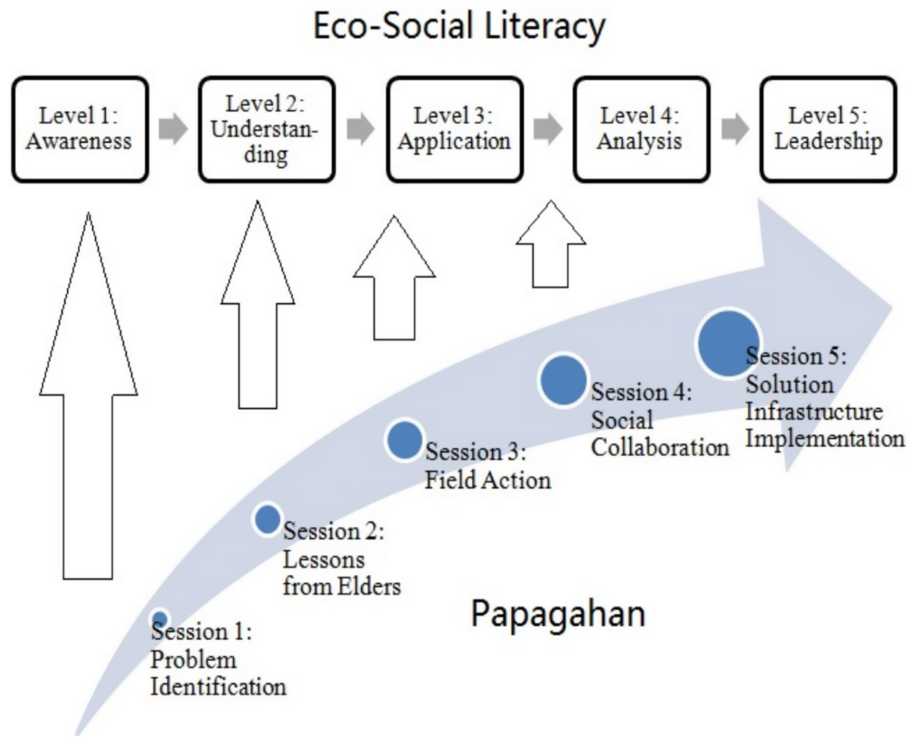

FIGURE 2
Papagahan and improving eco-social literacy among Baduy youngsters. Source: Authors' own analysis.

The integration of *Papagahan* into community practice suggests that local traditions may evolve into planning frameworks for environmental management and spatial design. The instruments produced—such as waste infrastructure, and informal technology guidelines—could serve as potential entry points for participatory policy discussions at village or district levels, although evidence of formal policy adoption remains limited at this stage.

4.4 Theoretical and policy contributions

This study makes three key theoretical contributions. First, it extends Place-Based Environmental Communication (PBEC) by demonstrating how Papagahan operates not only as a context-sensitive communication process but also as an environmental planning mechanism that produces implementable outputs—an expansion not previously emphasized in PBEC literature. Second, it advances the concept of eco-social literacy by proposing a five-level developmental model grounded in Indigenous learning dynamics, showing how communication, intergenerational modeling, and emotional processing collectively move youth from passive awareness toward community leadership. Third, it integrates social learning theory with decolonized communication theory (Çelik, 2025), illustrating how observation-based learning and culturally rooted communicative spaces jointly shape environmental behavior in traditional communities. Together, these contributions offer a more comprehensive theoretical account of how environmental communication, learning, and cultural practice interact to generate policy-relevant outcomes in Indigenous contexts.

For policymakers, *Papagahan* illustrates how local communicative systems might inform or inspire formal governance mechanisms—for example, through village-level guidelines or community agreements—though further institutional evidence would be necessary to substantiate full integration into formal regulatory frameworks,.

Papagahan illustrates a communication position that not only as an instrument for raising awareness but as a structural enabler for achieving multiple Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action, such as plastic pollution mitigation and ecological adaptations), SDG 15 (Life on Land), and SDG 16 (Peace, Justice, and Strong Institutions). Thus, *Papagahan* provides evidence that planning rooted in cultural wisdom can address ecological challenges while reinforcing social cohesion.

5 Conclusion

Papagahan functions as a communicative infrastructure that turns cultural learning into coordinated action. Through five sequential sessions involving youth, elders, and NGOs, it translates traditional ecological knowledge into concrete planning outputs—such as biopore systems, waste signage, and technology-use guidelines—thereby reinforcing eco-social literacy while supporting community-led environmental management.

These outcomes show how localized, decolonized communication practices can bridge cultural resilience with sustainable planning. By moving participants from awareness to co-design and implementation, *Papagahan* situates intergenerational dialogue at the heart of rural

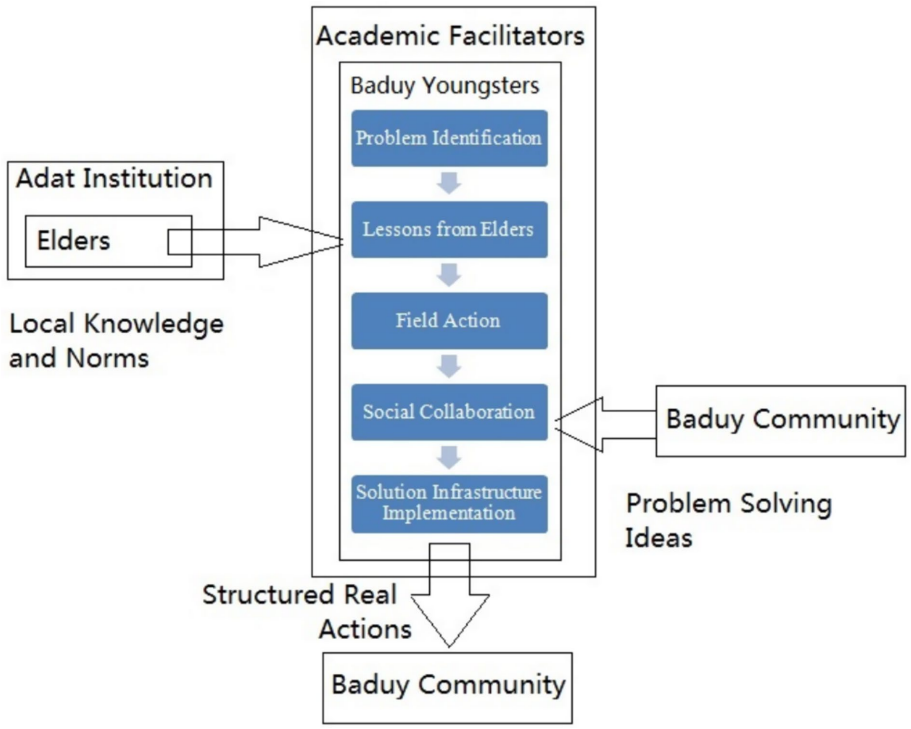

FIGURE 3
Active community participation in *Papagahan*. Source: Authors' own analysis.

governance and offering pathway for integrating indigenous knowledge into formal policy instruments and spatial. Planning framework.

Looking forward, *Papagahan* offers a scalable model that can be adapted to other communities facing socio-ecological pressures. Future work should explore its application to broader issues such as water governance and land stewardship to asses its reliability as a planning framework. As both a cultural mechanism and a planning tool, *Papagahan* illustrates how community-driven communication systems can generate practical solutions while ensuring that sustainability remains grounded in local wisdom.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by Komisi Etik Universitas Serang Raya. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin. Written informed consent was obtained from the individual(s), and minor(s)' legal guardian/next of kin, for the publication of any potentially identifiable images or data included in this article.

Author contributions

LP: Conceptualization, Formal analysis, Supervision, Visualization, Writing – original draft, Writing – review & editing. SM: Data curation, Formal analysis, Writing – review & editing. Annisarizki: Formal analysis, Writing – review & editing. BH: Data curation, Formal analysis, Supervision, Project administration, Investigation, Writing – review & editing. HM: Data curation, Formal analysis, Funding acquisition, Supervision, Writing – review & editing. MD: Data curation, Formal analysis, Supervision, Project administration, Writing – review & editing.

Funding

The author(s) declared that financial support was received for this work and/or its publication. This research was supported by Universitas Serang Raya (Unsera) and funded through the Hibah Dikti Sains dan Teknologi (DIKTI SAINTEK) 2025 program.

Acknowledgments

The authors gratefully acknowledge this support, which has been instrumental in facilitating the successful completion of the study. We also extend our deepest appreciation to the Baduy community for their invaluable participation and insights, and to Sahabat Relawan Indonesia for their assistance and collaboration during the research process.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that Generative AI was not used in the creation of this manuscript.

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