

Community program for managing wetland environment: Case study of Banjarmasin riverbank

Nurul Huda * 

Universitas Lambung Mangkurat, Indonesia
nurul.huda@ulm.ac.id

Mariatul Kiptiah 

Universitas Lambung Mangkurat, Indonesia
mariatulkiptiah@ulm.ac.id

*Corresponding Author

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Abstract

This study examines community initiatives in the management of wetland ecosystems, with an emphasis on riverbanks in Banjarmasin City. Wetland environmental management presents various challenges. The extent of knowledge and community engagement constitutes a challenge in environmental maintenance and management. This study seeks to evaluate current community programs focused on the sustainable preservation, management, and utilisation of wetland environments along the riverbanks of Banjarmasin City. This study employs a case study methodology, utilising data collection techniques that include direct observation at the site, interviews with community members, youth, and local government officials, as well as documentary analysis. The study's findings indicate that community and youth engagement, comprehensive governmental support, and the integration of knowledge with effective practices are essential for the program's success. The rise of environmental activist communities exemplifies the success of community programs in environmental management. In executing the program to manage the wetland ecosystem, both the community and government encounter numerous challenges, including tourists seeking river tours who lack a comprehensive understanding of environmental stewardship along the Banjarmasin City Riverbanks.

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Introduction

As an archipelagic country with thousands of islands and unique geographical conditions, Indonesia possesses a high diversity of wetlands. Wetlands play a crucial role in maintaining ecosystem balance, providing ecosystem services, and serving as habitats for various species of flora and fauna (Harianto & Dewi, 2017). These ecosystems also contribute significantly to climate change mitigation through carbon storage and flood control (Muyombano & Espling, 2020).

Banjarmasin, known as the "City of a Thousand Rivers," is geographically dominated by wetlands, including rivers, swamps, and mangrove forests. These ecosystems are ecologically significant and hold vital social and economic values for local communities. However, wetlands are increasingly under pressure due to land-use changes, pollution, and climate change. Consequently, sustainable wetland management is essential to maintain their ecological



functions (Davidson, 2018). In particular, riverbanks, which are frequently affected by hydrological changes, require integrated and sustainable management strategies. Previous studies highlight that ecosystem-based approaches, including wetland restoration, can enhance adaptive capacity against climate change and prevent the loss of wetland ecological functions (Davidson, 2018; Junk et al., 2013).

The environment influences people's lifestyles, behaviours, mindsets, and social identity. Community participation plays a fundamental role in preserving wetland ecosystems. As Berkes (2004) argues, community-based management allows local communities to take a leading role in conservation efforts, as they possess both local ecological knowledge and a direct stake in the sustainability of natural resources. Awareness, knowledge, and active participation among community members are critical determinants of the success of environmental management (Rohani, 2022). This perspective resonates with the concept of *ecological citizenship* proposed by Pallet (2027) emphasising that citizens should embody environmental responsibility through awareness, attitudes, and practices aligned with ecological preservation.

Community participation is closely related to the rights and power of people in decision-making processes, from problem identification to planning, implementation, and evaluation (Panudju, 2009). For the people of Banjarmasin, riverbanks are not merely physical spaces but also complex socio-economic and cultural landscapes. Nevertheless, there remains a gap between environmental awareness and actual practices. Nurwahyuni (2021) report that the level of environmental concern among Indonesians remains relatively low, underscoring the need for educational and participatory approaches to foster pro-environmental behaviour.

An unbalanced environment may disrupt human activities, and negligence in preserving wetland ecosystems can trigger disasters that endanger human life. Despite being one of the world's most populous countries, Indonesia's level of environmental awareness stands at only 57%, indicating a significant gap in ecological behaviour in daily life (Nurwahyuni, 2021). Limited ecological knowledge often leads to environmentally harmful practices such as improper waste disposal and unsustainable resource use (Ambarita, 2024).

Although numerous studies highlight the importance of wetlands and community involvement, few have specifically examined the dynamics of community participation in urban wetland management, particularly in Banjarmasin. This city has unique socio-cultural interactions with its rivers and surrounding environments, requiring context-specific approaches that integrate local wisdom and community lifestyles. Therefore, this study proposes a community-based wetland management framework that emphasises integrating local knowledge with formal policy interventions. Such an approach is expected to foster environmental governance models that are not only ecologically effective but also socially and culturally sustainable (Martino et al., 2019).

Community participatory programs hold strategic significance in sustaining wetland ecosystems. These programs aim to raise awareness and enhance community involvement in recognising the ecological functions of wetlands, especially in urban settings like Banjarmasin. The Indonesian Law No. 32 of 2009 on Environmental Protection and Management, Article 70 Paragraph (2), affirms the rights of communities to actively participate in environmental governance through social monitoring, providing input, and disseminating information. However, both global and local studies remain limited in exploring the nexus between participatory approaches and the effectiveness of wetland management in urban areas with distinct socio-ecological characteristics. In cities such as Banjarmasin—where rivers are integral to social and economic life—few studies have explicitly examined the forms and impacts of community participation in this local context.

Contribution to the interdisciplinary scholarship of ecological citizenship, civic engagement, and environmental governance by demonstrating how local communities play a pivotal role in sustaining fragile wetland ecosystems. By situating riverbank management within the civic responsibility and participatory governance framework, this research highlights how collective action, indigenous knowledge, and cultural practices intersect with ecological principles to promote sustainability and social justice. It enriches the discourse on

citizenship studies by extending the concept of civic responsibility beyond political and legal domains into environmental stewardship, where community members act as custodians of shared natural resources. The case study further illustrates that sustainable wetland management cannot rely solely on state regulation or top-down policies but requires inclusive, community-driven strategies that integrate local wisdom, collaborative decision-making, and adaptive practices responsive to ecological change. In doing so, the research advances theoretical debates on ecological citizenship while offering practical insights into how grassroots participation can bridge environmental policy with lived realities, thereby contributing to the development of just, resilient, and sustainable models of citizenship in both national and global contexts.

Method

This study employed a qualitative approach with a case study method to analyse community-based wetland management along riverbanks. The case study method was chosen because it allows for in-depth exploration of specific social and ecological contexts and the interactions between local actors and their surrounding environment. This approach was considered appropriate as the research aimed to understand communities' meanings, behaviours, and practices in managing wetland environments in response to local environmental challenges.

The research site was purposively selected in the riverbank areas of Banjarmasin City, South Kalimantan. This location was chosen because Banjarmasin is well-known for its extensive water systems and complex wetland ecosystems, vital for local livelihoods. At the same time, the city faces pressing environmental challenges, including pollution, land-use change, and ecosystem degradation.

Informants were selected using purposive sampling, with criteria emphasising their involvement in or knowledge of riverbank environmental management. A total of 15 informants participated in this study, consisting of six riverbank residents actively engaged in environmental activities, three local community leaders (including traditional and religious leaders), three representatives from local government agencies (Environmental Agency and sub-district officials), and three members of environmental organisations or community-based groups. Data were collected through three techniques:

1. Direct observation records the physical condition of the environment, community activities, and wetland management practices.
2. In-depth interviews with key informants aimed to capture their understanding, experiences, and perceptions regarding environmental management.
3. Document analysis included photographs, local policy documents, community activity reports, media coverage, and relevant publications.

Data analysis followed the interactive model of Miles et al. (2014) consisting of three main stages: data reduction, data display, and conclusion drawing/verification. Data reduction involved selecting and focusing on relevant information according to the research objectives. Data display was carried out using thematic narratives and matrices to organise findings. Finally, conclusions were drawn by identifying patterns, categories, and relationships emerging from the data throughout the analysis.

Results and Discussion

This study was conducted in the riverbank areas of Banjarmasin City, widely known as the “City of a Thousand Rivers” due to its complex river network that is deeply embedded in the daily lives of its residents. The city possesses a unique and vital wetland ecosystem; however, it currently faces increasing pressures from urbanisation, household waste disposal, declining water quality, and shifting community lifestyles (Reyes-García & Benyei, 2019). In this context, active community participation in wetland management is crucial to ensure the sustainability of these ecosystems.

Conceptually, community-based wetland management emphasises the direct involvement of local communities in planning, decision-making, implementation, and

evaluation of environmental conservation programs (Berkes, 2004). This approach aligns with the principles of participatory development and the social-ecological systems framework, highlighting the reciprocal relationship between social and ecological systems (Reed, 2018). By positioning communities as key stakeholders, wetland governance becomes ecologically driven and socially inclusive, reflecting residents' lived realities and priorities.

Table 1.

Community-Based Environmental Programs and Their Impacts.

Program/Activity	Implementer/Stakeholders	Community-Based Approach	Impacts
Environmental Education & Awareness Campaigns	Banjarmasin Environmental Agency (DLH)	Socialisation and outreach to riverbank residents, particularly households and youth	Increased ecological awareness, though a gap remains between awareness and actual practices
Water Hyacinth Processing into Compost & Handicrafts	Riverbank residents of the Martapura River, environmental communities	Green economic innovation utilising local resources	Reduced river pollution while improving community livelihoods
Collective River Clean-Up (Gotong Royong)	Local communities, river custodians, youth organisations (<i>Karang Taruna</i>)	Direct community participation in environmental action	Decreased river waste volume and strengthened social solidarity among residents
Ecovillage & Waste Bank Programs	Residents, NGOs, and local government	Deliberation and sharing of local ecological knowledge	Reduced pollution, promoted the circular economy, and enhanced household environmental responsibility
River Dialogue Forums	Community leaders, youth, <i>Malingai</i> (River Care Community)	Deliberation and sharing of local ecological knowledge	Generated contextual solutions grounded in community river experiences

Source: Research Data 2024.

In Banjarmasin, the tangible implementation of community-based approaches is reflected in programs such as the formation of 30 river custodians (*pemangku sungai*), environmental outreach by the Banjarmasin environmental agency (DLH), and the processing of water hyacinth into compost by residents along the Martapura River. Additionally, six waste banks were established in Banjarmasin, namely: *Bank Sampah Bahagia*, *Bank Sampah Bahe' Mart*, *Bank Sampah Benawa*, *Bank Sampah Kunang-kunang*, *Bank Sampah Mahatama*, and *Bank Sampah Tugu*. These programs represent an integrative effort between local knowledge and institutional support. Pallet (2017) emphasised that building ecological citizenship requires participatory spaces that encourage residents to act as subjects in environmental stewardship rather than mere recipients of policy.

In the case of Banjarmasin, this study found that residents' engagement in riverbank management was closely tied to their dependence on wetlands for daily subsistence, cultural

identity, and socio-economic activities. However, challenges remain in bridging the gap between environmental awareness and actual practices, particularly in urban contexts where modernisation and consumption-driven lifestyles often overshadow traditional ecological values.

Thus, the findings suggest sustaining Banjarmasin's wetlands requires collaborative governance that integrates local ecological knowledge, governmental support, and community activism. Environmental community groups have proven instrumental in mobilising collective action, raising awareness, and fostering ecological citizenship among riverbank residents. This indicates that long-term wetland sustainability can be achieved through top-down policy enforcement and, more importantly, grassroots participation that builds a shared sense of responsibility and stewardship for the environment.

Sunarso et al. (2024) stated that communities are crucial in expanding collective understanding and fostering collaboration in addressing environmental issues. Active, experience-based discussions within the community enable members to develop contextually appropriate and more effective strategies, thereby enhancing their capacity to tackle environmental challenges sustainably and innovatively. Halimah (2020) highlighted that participation from community members, business actors, religious leaders, academics, NGOs, and government officials in developing environmentally conscious villages is key to controlling environmental degradation. Garwood et al. (2021) also argued that individuals' understanding of the environment is shaped through participation in environmental communities.

Panudju (2009) categorised the levels of community participation as follows:

1. Passive participation: The community is aware of environmental degradation but does not contribute to planning, implementation, or evaluation, whether through labour, ideas, money, or materials.
2. Active participation in information exchange only: Community members provide or receive guidance but take no further action; participation is limited to planning stages.
3. Active participation in implementation: The community executes programmed activities or contributes labour to solve environmental issues; participation is moderate.
4. Active participation with decision-making input: Members provide information, input, and labour in planning and implementation; participation is high.
5. Full participation: Members contribute to planning, implementation, and evaluation, including providing information, labour, money, or materials; participation is very high.

The management of wetland environments along Banjarmasin's riverbanks shows that successful ecosystem preservation depends heavily on integrating government policies and local community participation. Although many policies have been designed to protect wetlands, field implementation often encounters obstacles, including limited support and community engagement (Reyes-García & Benyei, 2019). Therefore, a more participatory approach is required, in which the community is actively involved in planning and implementing wetland management programs, optimising the use of local knowledge. Environmental education and training programs can strengthen community capacity to manage natural resources sustainably. With appropriate knowledge, the community can contribute to wetland restoration and preservation along Banjarmasin's riverbanks.

According to Banjarmasin Regional Regulation No. 15 of 2016 on River Management Enhancement, Articles 25 paragraphs 1-2, "To optimise community empowerment, individuals with leadership qualities, exemplary behaviour, and active involvement in river management activities shall be appointed as river custodians (*pemangku sungai*). River custodians are responsible for stimulating community participation and guiding residents in managing rivers." This regulation aligns with the research findings that active participation of community members and local leaders is a key factor in successful wetland management along Banjarmasin's riverbanks. The presence of River Custodians functions as social change agents, guiding residents and stimulating collective awareness of ecosystem sustainability.

Furthermore, the role of River Custodians reinforces the concept of ecological citizenship, emphasising conscious citizen involvement in maintaining environmental balance as a shared

responsibility. Hence, the regulation provides a legal framework supporting the integration of government policy and local wisdom in river management. Pham et al. (2021) stated that collaboration between the government, local communities, and NGOs increases the effectiveness of wetland conservation. This regulation exemplifies collaborative governance, emphasising synergy among government authorities, community leaders, and residents. The presence of River Custodians enhances program effectiveness, from environmental education and waste management to riverbank ecosystem rehabilitation (Ansell & Gash, 2008).

The 2024 work plan of the Banjarmasin environmental agency reported that the Environmental Quality Index reached only 91.36%, mainly due to declining water and air quality, caused by: (1) rapid growth of small and large industries; (2) ineffective industrial waste permits in considering pollution load capacity; (3) pollution load increasing faster than reduction efforts; (4) riverside households disposing of waste and human excreta into rivers, with many septic tanks non-compliant with standards; (5) some businesses discharging untreated waste. This indicates a gap between formal policy and community practices (Davidson, 2018). In this context, strengthening community capacity through environmental education, technical training, and green economic development is crucial (Tengö et al., 2014). Previously marginalised local knowledge has contributed to maintaining water flow patterns, utilising native plants, and preserving riparian forests (Muyombano & Espling, 2020).

Another challenge is the shift in cultural values due to modernisation and urbanisation, changing perceptions from sacred to pragmatic relations with nature (Varady et al., 2016). In 2023, Banjarmasin's Quality of Life Index reached 58.72% (moderate category), highlighting the importance of programs that respect local traditions while responding to social change. Losing cultural values in environmental management also diminishes non-material ecosystem dimensions, such as identity, spirituality, and communal cohesion, which are essential for sustainability (Chan et al., 2012).

Thus, effective management strategies are needed to address societal changes. Sustainable wetland management requires cooperation between the government, communities, and NGOs to build collective awareness and commitment to environmental protection. Management strategies must be adaptive to social dynamics while leveraging modern technology and local values. Ramsar Convention on Wetlands (2022) emphasises that community engagement is not merely an administrative requirement but the heart of sustainable wetland management. Participation fosters a sense of ownership, strengthens social cohesion, community resilience, and long-term commitment to environmental preservation (Otero et al., 2011). Consequently, community-based wetland management in Banjarmasin is ecologically effective, nurtures social solidarity, and empowers local communities, forming a foundational pillar for holistic environmental sustainability

Conclusion

This study demonstrates that wetland management along riverbanks requires the involvement of all stakeholders, particularly local communities, to achieve environmental sustainability. Such engagement is crucial because residents living near wetlands often possess local knowledge and a deep understanding of the surrounding ecosystem. This knowledge can serve as a strong foundation for formulating adaptive strategies relevant to the specific conditions of riverbank wetlands. When communities participate actively, the long-term impact of conservation efforts tends to be more positive and sustainable.

Moreover, the study finds that environmental education significantly enhances community awareness and participation in wetland conservation. Comprehensive and continuous education can transform residents' perceptions and attitudes regarding the importance of wetland ecosystems and strengthen their motivation to actively engage in conservation and preservation efforts. By increasing community understanding of wetland benefits, environmental education serves as a solid basis for sustainable community participation in wetland management.

This research emphasises that riverbank wetland management requires a holistic approach that integrates community engagement, cultural values, education, and supportive

policies. Each element plays a vital role in creating effective and sustainable management. By combining these components, wetlands can be protected effectively, providing benefits to local communities while supporting biodiversity in the long term.

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Ethics Approval

This study does not require ethics approval because it does not involve human subjects, animal testing, or sensitive personal data. All data used are secondary and publicly available

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