

Stakeholder support for riparian groups in urban river management: communication and collaboration challenges in South Kalimantan, Indonesia

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Abstract. Rivers in urban Banjarmasin, South Kalimantan, face mounting pressures from expanding populations. With 290 rivers weaving through the city, the local government has mobilized riparian communities for river maintenance since 2017 through the Maharagu Sungai program. However, the sustainability of these efforts depends critically on stakeholder support. This study examines support patterns across 31 riparian groups established in 2022-2023. Using Hierarchical Linear Modeling with responses from 186 members, leaders, and deputies, we analyzed the nested structure of individuals within groups. Findings reveal troubling disparities. Roughly 90 percent of groups operate with minimal stakeholder backing, only three secure moderate support, and none achieve strong support. Government agencies dominate with mean score of 2.57, while civil society (1.88) and private sector engagement (1.75) remain notably weak. The significant inter-group variance (ICC = 0.59) indicates disparities in communication and collaboration across riparian groups. These results highlight the need for more inclusive and continuous cross-sector communication strategies to strengthen stakeholder collaboration, enhance group capacities, and promote sustainable socio-economic transformation in urban agromaritime environments.

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1 Introduction

Urban rivers tell stories of human settlement patterns, economic development, and environmental change. In cities across Indonesia, these waterways have witnessed remarkable transformations as populations have concentrated along their banks and industrial activities have reshaped their ecosystems. Banjarmasin presents a particularly complex case, a city where water defines both identity and daily life, yet where that same water faces mounting threats from overuse, pollution, and encroachment.

The degradation of river functions in urban areas typically follows predictable trajectories. Pollution intensifies alongside population density, driven by domestic activities, urban development, and industrial operations [1]. Banjarmasin's 290 rivers bear witness to these pressures. The local government's 2020 decree acknowledging widespread sedimentation and damage caused by community behaviors signals both the scale of the challenge and a recognition that solutions must involve those most directly affected.

Environmental reports from both provincial and city-level agencies in 2022 pointed to a common thread: deteriorating environmental quality, particularly water quality, stems partly from community awareness gaps. While natural factors contribute to environmental degradation, the reports emphasized how insufficient public awareness of maintaining cleanliness and environmental preservation compounds these problems.

Enter Maharagu Sungai, a program name that translates to caring for rivers in the local language. Launched in 2017, this municipal initiative sought to foster love for rivers while revitalizing their functions through community mobilization [2]. The program's architecture reflects a deliberate attempt to institutionalize grassroots stewardship, identify river custodians from local communities, establish groups of 10-15 members, and support collective action to maintain river environments. The program unfolds in three stages: designation of river custodians and group formation, collective river cleaning activities, and group innovation in developing river stewardship.

Until 2023, more than 200 groups had emerged through this process, involving district and sub-district officials, river mentors, custodians, group members, and general residents along riverbanks in coordinated efforts to restore and maintain urban waterways. However establishing groups represents only the beginning. Natural resource management demands sustained engagement from multiple stakeholders, and community organizations constitute just one piece of this larger puzzle.

Research on watershed management globally reveals persistent challenges when communities take the lead. Examining participatory water governance in Turkey, India, and Sri Lanka, researchers found that community involvement frequently fell short of expectations due to micro-level social divisions within communities, elite capture of decision-making, and political interference [3]. These international patterns find echoes in Indonesian contexts. Communication gaps between communities and the government were identified as primary obstacles to effective watershed management in Medan, with low community knowledge combined with weak law enforcement limiting public participation [4].

This brings us to the central question, how robust is the stakeholder support that riparian groups receive? Understanding support patterns matters because external backing, whether through policy frameworks, technical assistance, financial resources, capacity building, or monitoring and evaluation, shapes what community organizations can realistically accomplish. This study examines support levels and variations across 31 riparian groups in Banjarmasin, focusing on groups established in 2022 and 2023.

2 Stakeholder support in community-based river management

2.1 Conceptualizing stakeholder sectors

Stakeholders in environmental management rarely form a monolithic bloc. A three-sector framework helps clarify who brings what to collaborative efforts [5]. The civil sector encompasses organizations operating outside government structures, including civil associations, nonprofit organizations, and environmental clubs contributing to public interests. The private sector comprises individually owned or shareholder-controlled enterprises pursuing commercial objectives. The public sector consists of stakeholders representing collective interests through government institutions and local administrative units.

This sectoral thinking has been applied specifically to watershed contexts, describing watershed partnerships as formally organized assemblages of public, private, and nonprofit stakeholders working at watershed scales toward ecosystem-oriented goals [6]. Research found no statistically significant differences among these three sectors in their support for addressing environmental issues, suggesting that sectoral distinctions may matter less than other factors in predicting stakeholder engagement under certain conditions [7].

2.2 Forms and patterns of stakeholder support

Support manifests in multiple forms, each addressing different organizational needs. Policy support creates enabling frameworks. Stakeholder motivation to support alternatives to degraded levees was found to be shaped by risk perceptions, environmental impact beliefs, and personal and economic interests [8].

Technical support provides practical assistance with implementation challenges. Governance and institutional support in Tisza River water management in Hungary identified education and training, enhanced community participation, monitoring systems, and infrastructure maintenance as key support elements [9].

Financial support enables action at scale. Stakeholder support intensity and forms for river restoration in Finland were shown to guide more efficient future funding allocation [10]. However, not all stakeholders provide financial backing. Research in Turkey revealed stakeholder willingness to offer advisory support exceeded their willingness to provide financial resources, with NGOs and village councils particularly facing budget constraints [5].

It has been emphasized that public officials, policymakers, and academic researchers can contribute to environmental problem-solving through monitoring programs, establishing uniform standards, and applying adaptive management approaches that treat activities as learning experiments [11].

3 Methods

3.1 Research setting and sample

We conducted this research among riparian groups in Banjarmasin, selecting organizations formed during 2022 and 2023 that remained active at the time of data collection. This yielded 31 groups representing recent initiatives still navigating their early operational years. From each group, we gathered perspectives from six representatives: the chairperson, vice-

chairperson, and four members, providing 186 respondents whose experiences and perceptions inform our analysis.

3.2 Data collection

We developed a questionnaire employing seven-point semantic differential scales to measure stakeholder support strength. Respondents evaluated support across multiple dimensions, rating each on a scale from weak (1) to strong (7). The instrument assessed support from stakeholders across the civil, private, and public sectors, examining multiple forms, including policy backing, technical assistance, financial resources, capacity building, and monitoring and evaluation. Table 1 summarizes the measurement instruments used in this study, including the stakeholders assessed within each sector.

Table 1. Summary of stakeholder support measurement instruments

Stakeholders Assessed	Scale	Forms of Support Measured
Public Civil Private	7-point semantic differential scale (1 = weak, 7 = strong)	(1) Policy support (2) Technical assistance (3) Financial resources (4) Capacity building (5) Monitoring and evaluation

3.3 Analytical approach

Our analysis proceeded in two stages. First, descriptive statistics characterized overall support levels and distributions across groups. Second, we employed Hierarchical Linear Modeling (HLM) to test whether there is significant variation between groups in support levels. HLM suits this research design because our data exhibits a nested structure where individuals exist within groups.

We fitted an empty model (null model) without predictors to partition variance into individual-level and group-level components. This baseline model estimates the grand mean of stakeholder support while quantifying how much variation occurs within groups (individual differences in perception) versus between groups (actual differences in support received). The Intraclass Correlation Coefficient (ICC) derived from this model indicates the proportion of total variance attributable to group-level differences.

4 Results and discussion

4.1 Support levels

The distribution of stakeholder support across the 31 riparian groups reveals a sobering pattern. As shown in Table 2, approximately 90.3 percent of groups (28 groups) operate under conditions of low support. Only three groups, representing 9.7 percent of our sample, achieved moderate support levels. Most telling, not a single group reached what we would classify as high support.

Table 2. Number and percentage of groups by stakeholder support category

Support category	f	%
Low (18-53)	28	90.3
Moderate (54-89)	3	9.7
High (90-126)	0	0
Total	31	100

These numbers demand interpretation beyond their face value. Low support does not necessarily mean complete abandonment, as groups continue operating. However, it does suggest that most organizations operate with minimal external backing, relying heavily on internal resources and member commitment. The absence of any highly-supported groups points to ceiling effects in the current support system.

4.2 Sectoral patterns in stakeholder support

Breaking down support by stakeholder sector reveals sharp imbalances. Public sector support averages 2.57 on our seven-point scale, the highest among the three sectors examined, yet still falling well below the midpoint of 4.0 that might indicate moderate support. Civil sector support averages 1.88, while private sector engagement registers even lower at 1.75.

The public sector's relative prominence reflects both its formal responsibilities and program design. Sub-district offices (Kelurahan) provide the strongest support at 4.31, followed by the Environmental Agency (DLH) at 3.89. These government entities occupy central positions in the Maharagu Sungai program architecture.

DLH provides financial allocations of two million rupiah annually to each participating group, alongside consumption support during river maintenance activities. Groups use these funds for operational needs: creating environmental messages for riverbank areas through banners, posters, and billboards. Kelurahan contributions include cleaning equipment such as grass cutting machines, river dredging tools, biofil toilets, garbage bins, and refreshments during group activities.

Civil sector engagement, while higher than the private sector, still registers as weak. Two community-based environmental organizations form the backbone of civil sector participation in this study: the River Care Communities (Komunitas Peduli Sungai/KPS) and the Green Community Forums (Forum Komunitas Hijau/FKH). Both are locally-rooted organizations operating independently of government structures, focused on environmental stewardship and river conservation in Banjarmasin. They were included as assessed stakeholders in the civil sector of the research instrument, and their support scores were derived from respondents' ratings of the strength of assistance they received from each organization across the five measured support forms. KPS provides support averaging 2.73 on the seven-point scale, while FKH contributes a lower score of 1.69. The civil sector composite score of 1.88 reflects the averaged ratings across all six civil stakeholders assessed, with KPS and FKH scores weighted equally alongside other civil actors. These environmental organizations participate in river cleaning events, tree planting, and public awareness campaigns, though the scope and consistency of their involvement remain limited.

Private sector absence stands out most starkly. Media outlets average 1.74 in support provision, local businesses 1.71. Some groups receive financial contributions from nearby businesses, including home-based enterprises. Local media offer news coverage when groups

achieve notable accomplishments or conduct maintenance activities, but these sporadic contributions fall far short of systematic engagement.

This sectoral imbalance matters for sustainability. Over-reliance on public sector support creates dependencies that can prove fragile when political priorities shift or budgets tighten. Weak civil society engagement means groups lack connections to broader environmental movements that might provide knowledge exchange, advocacy support, and solidarity. Private sector disengagement represents a failure to tap potential resources from businesses that benefit from healthy urban rivers.

4.3 Between-group variation in support

Our hierarchical linear modelling reveals that stakeholder support varies significantly across groups. The variance component analysis demonstrates substantial between-group differences. Individual-level variance (Level-1) estimates at 148.17 with high statistical significance ($p < .001$), reflecting differences in how individuals within the same group perceive support levels. More importantly, the between-group variance (Level-2 intercept) proves even larger at 212.87, also highly significant ($p < .001$).

The Intraclass Correlation Coefficient quantifies this pattern strikingly: $ICC = 212.87 / (212.87 + 148.17) = 0.59$. Approximately 59 percent of the total variance in stakeholder support stems from differences between groups, while only 41 percent reflects individual variation within groups. This ICC of 0.59 indicates a strong hierarchical structure in which group membership matters enormously for the support one experiences.

This finding carries important implications. With 59 percent of variance at the group level, we are observing real differences in the support environments that different groups navigate. Some groups genuinely receive more stakeholder backing than others. This pattern suggests that support does not flow equitably across the population of riparian groups, raising questions about the fairness and efficiency of current stakeholder engagement approaches.

Several mechanisms might generate these inequalities. Geographic location could matter, with groups in more visible or accessible areas attracting more stakeholder attention. Leadership capabilities may play roles, as groups with leaders skilled in networking and proposal writing might secure resources that elude others. Historical relationships could create path dependencies, in which groups in communities with stronger pre-existing ties to government agencies or civil society organizations leverage those connections more effectively.

4.4 Missing elements: capacity building and evaluation

Perhaps most concerning, groups report receiving virtually no support in two areas critical for long-term sustainability: capacity building and monitoring and evaluation. This conclusion is grounded in the instrument data: beyond the rating scale, respondents were asked to identify which of the five forms of support — policy backing, technical assistance, financial resources, capacity building, and monitoring and evaluation — they had actually received from each stakeholder. Analysis of these responses shows that the majority of groups received financial and technical support, particularly from the public sector. However, capacity building and monitoring and evaluation were selected by only a negligible proportion of respondents, with most groups indicating they had received no support of these types from any stakeholder. This distributional pattern substantiates the claim that while basic operational support exists, the more developmental and evaluative forms of stakeholder engagement are effectively absent across the population of riparian groups. While stakeholders provide some financial resources and occasional technical assistance,

systematic efforts to enhance group capabilities or track progress remain conspicuously absent.

This gap matters because financial support alone rarely sustains community organizations. Without deliberate capacity building, groups may struggle to use even the limited resources they receive effectively. The two-million-rupiah annual allocation represents a modest sum; maximizing its impact requires organizational competencies that do not emerge spontaneously.

The absence of monitoring and evaluation proves equally problematic. Without systematic tracking of activities and outcomes, neither groups nor stakeholders can assess what works, what doesn't, and why. Learning opportunities go unrealized. Accountability remains unclear. Groups may continue ineffective practices simply from inertia, unaware of alternatives. Stakeholders lack feedback that might inform adjustments to their support approaches.

The literature on adaptive management emphasizes treating interventions as experiments designed to maximize learning [11]. This requires monitoring that generates usable information and evaluation processes that feed back into decision-making. Banjarmasin's riparian groups appear to operate without these feedback loops, limiting their adaptive capacity. They may mobilize for river cleaning or tree planting, but whether these activities translate into measurable improvements in river health remains unknown, unmeasured, and therefore unmanaged.

This research shows that stakeholder support that is more instructive and administrative tends to limit dialogue space within groups. Consequently, groups function more as program implementers rather than social actors with autonomy in managing their rivers. This pattern reflects broader challenges in participatory governance, where community involvement falls short due to limited institutional support and capacity building [3].

A closer examination of communication dynamics reveals that the barriers are structural in nature. Communication between stakeholders and riparian groups flows predominantly in one direction: the Maharagu Sungai program arrived with pre-determined instruments, targets, and procedures designed at the government level, leaving little room for groups to articulate their own needs or priorities in watershed management. Interaction between the public sector and riparian groups occurs almost exclusively during scheduled field visits to river sites, rather than through continuous, dialogic channels. Outside these occasional visits, groups receive minimal guidance and have no formal mechanism to raise concerns, request resources, or negotiate the terms of their participation.

These communication barriers originate primarily from the public sector, particularly the government agencies that designed and oversee the program. The absence of two-way communication means that information flow, feedback mechanisms, and coordination quality are largely determined by government schedules and agendas rather than by community needs. Civil society and private sector stakeholders, already weakly engaged, contribute little to filling this communication gap. The practical consequence is profound: when the program cycle ends and field visits cease, groups lose their primary point of contact with external stakeholders and subsequently cease their activities. The sustainability of the groups is therefore contingent on the continuity of government-initiated communication, rather than on the groups' own internal cohesion or externally supported capacity.

5 Conclusions and implications

This study reveals three interconnected challenges facing community-based river management in Banjarmasin. First, stakeholder support levels remain low across the vast majority of riparian groups, with roughly 90 percent operating with minimal backing and none achieving strong support. Second, support distribution shows sharp sectoral imbalances,

with public agencies dominant (2.57), civil society engagement moderate (1.88), and private sector participation barely registering (1.75). Third, significant between-group variation in support ($ICC = 0.59$) indicates systematic inequalities in how stakeholder resources flow to different community organizations.

These patterns illuminate gaps in areas critical for sustainability. Financial support exists but remains modest and temporary. Technical assistance appears sporadically. Capacity building and systematic monitoring and evaluation, elements that might transform short-term activity into long-term capability, remain largely absent. The result: community organizations mobilized for river conservation but were inadequately equipped for sustained stewardship.

Current approaches concentrate support in narrow channels, primarily government agencies providing financial inputs. Strengthening community-based river management requires broadening and deepening this support base through developing inclusive cross-sector platforms, moving beyond financial aid toward comprehensive capacity building, establishing monitoring and evaluation systems for adaptive management, and addressing inequities in resource distribution.

Beyond immediate implications for river management in Banjarmasin, this research speaks to broader questions about achieving sustainable socio-economic transformation in urban agromaritime environments. Community organizations require supportive ecosystems to flourish. The gaps documented here, inadequate capacity building, minimal monitoring and evaluation, sectoral imbalances, and inequitable resource distribution, likely characterize many community environmental initiatives beyond Banjarmasin. Addressing these systemic weaknesses is essential to realizing the potential of community-based approaches more broadly.

Ultimately, sustainable transformation in urban agromaritime environments depends on strengthening the connective tissue linking community action to broader support networks. Riparian groups in Banjarmasin demonstrate willingness to take responsibility for river stewardship. Whether that willingness translates into lasting impact depends substantially on whether stakeholders provide the resources, skills, and sustained engagement these organizations need to succeed.

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