

Green Governance in Urban Spatial Planning: Managing River Buffer Zones for Sustainable Cities in Bali

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ABSTRACT: Urban river buffer zones in Bali are increasingly exposed to pressures generated by urbanization, tourism development, land-use conversion, and competing demands for urban space. Although spatial planning regulation formally recognizes the ecological importance of river buffer zones, their implementation remains constrained by regulatory implementation gaps, fragmented planning instruments, weak spatial monitoring, limited enforcement, and competing economic and environmental interests.

This study examines green governance in urban spatial planning for river buffer zone management in Bali, focusing on Denpasar City as an urban context where development pressure intersects with strong local institutions and cultural values. The study employs a qualitative approach through policy and document analysis, stakeholder analysis, and thematic analysis. The findings indicate that river buffer zone governance in Denpasar is characterized by five interrelated challenges: fragmented spatial and sectoral planning, weak enforcement of river setback regulations, limited integration of spatial monitoring systems, institutional fragmentation, and insufficient translation of local ecological values into operational governance mechanisms. At the same time, *Desa Adat*, *Subak*, *Pekaseh*, *Banjar*, and river care communities constitute important governance resources through social legitimacy, ecological knowledge, social control, and collective action. The study argues that green governance should move beyond government-centered spatial regulation toward an integrated governance framework connecting ecological planning, institutional coordination, spatial monitoring, regulatory enforcement, community participation, and local ecological knowledge. Based on these findings, the study proposes a Green Spatial Governance framework for urban river buffer zone management that integrates formal spatial planning with Balinese local institutions and the principles of *Tri Hita Karana*. The study contributes to the literature by conceptualizing river buffer zones as strategic ecological spaces within urban spatial governance and by demonstrating how local institutions can complement formal planning institutions in pursuing sustainable urban development in Bali.

KEYWORDS: green governance; spatial planning; river buffer zones; urban sustainability; Bali; Tri Hita Karana; local institutions

I. INTRODUCTION

Urbanization has become one of the major drivers of spatial transformation in developing regions. The expansion of urban settlements, infrastructure, commercial activities, and tourism has increased competition for land and placed significant pressure on environmentally sensitive areas. River corridors are among the urban spaces that are particularly vulnerable to these pressures. River buffer zones are frequently transformed into settlements, commercial spaces, roads, tourism facilities, and other urban activities despite their important ecological and hydrological functions. The management of river buffer zones is therefore not merely a technical issue of determining setback distances. It is fundamentally a governance issue involving the interaction of government institutions, communities, private actors, customary institutions, and environmental interests. Effective management requires coordination between spatial planning, environmental protection, water resources management, housing, infrastructure, disaster risk reduction, and urban development policies.

In Indonesia, river buffer zones are legally recognized as areas that require protection. Government Regulation No. 38 of 2011 concerning Rivers provides the national legal framework for river management, while Minister of Public Works and Housing Regulation No. 28/PRT/M/2015 regulates the determination of river and lake buffer lines. The regulation remains an important legal reference for protecting river corridors from activities that may interfere with river functions. The challenge, however, is not simply the availability of regulations. The major challenge is how regulations are implemented in rapidly changing urban environments. Spatial planning policies may designate river buffer zones as protected areas, while development pressures encourage their utilization for economic and settlement purposes. This situation creates a regulatory–implementation gap in which

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formal spatial plans do not always correspond to actual land use. Bali provides an important context for examining this issue. The island has experienced substantial urban and tourism development, particularly in the southern urban areas. Increasing development intensity has generated pressure on land resources, water systems, river corridors, and ecological areas. The Provincial Spatial Plan of Bali for 2023–2043 establishes a framework for sustainable spatial development and explicitly incorporates environmental protection and Balinese local wisdom. The policy framework promotes the development of a quality, safe, comfortable, productive, competitive, and sustainable spatial environment while emphasizing the harmony between nature, humans, and Balinese culture.

The concept of green governance provides a useful analytical framework for understanding these challenges. Green governance extends conventional environmental management by emphasizing not only environmental protection but also participation, transparency, accountability, institutional coordination, equity, and the integration of environmental considerations into public decision-making. Environmental governance becomes particularly important when multiple institutions possess overlapping responsibilities and when environmental resources are subject to competing interests. River buffer zones represent a particularly relevant arena for green governance because their management involves multiple actors and levels of government. Local governments are responsible for spatial planning and urban management, while water resource authorities possess responsibilities related to river systems. Communities interact directly with river environments, while private actors may have significant interests in land development. Without effective coordination, policies may become fragmented and implementation may be inconsistent. The Bali context adds another important dimension: Tri Hita Karana, a Balinese philosophical framework emphasizing harmony between humans and God (*parahyangan*), humans and other humans (*pawongan*), and humans and nature (*palemahan*). In spatial planning, Tri Hita Karana can provide a normative foundation for balancing economic development, social interests, cultural identity, and environmental sustainability. Previous studies have demonstrated that Tri Hita Karana has been incorporated into Bali's spatial planning framework and can support environmentally oriented spatial governance.

The regulation of river buffer zones in Bali has also evolved. The current Provincial Spatial Plan is Regional Regulation of Bali Province No. 2 of 2023 concerning the Provincial Spatial Plan for 2023–2043. This regulation replaced earlier spatial planning regulations, including Regional Regulation No. 16 of 2009 and Regional Regulation No. 8 of 2015 concerning provincial zoning directions. Nevertheless, empirical evidence indicates that regulatory protection does not automatically guarantee effective protection of river buffer zones. Recent research concerning the Tukad Badung River in Denpasar, for example, indicates substantial land-use conversion within the river corridor and the presence of buildings that do not comply with river buffer regulations. These conditions demonstrate the continuing tension between spatial planning regulations and actual urban development. This article aims to analyze the governance dimensions of urban river buffer management in Bali and formulate an integrated green governance framework that connects spatial planning, environmental protection, institutional collaboration, public participation, digital information, and Balinese local wisdom.

RESULTS AND DISCUSSION

Rule of Law: Strong Regulations, Uneven Implementation

The first dimension of green governance is the rule of law. Effective river buffer management requires clear legal provisions concerning the designation, utilization, protection, monitoring, and enforcement of buffer zones. Indonesia has established a national legal framework through Government Regulation No. 38 of 2011 concerning Rivers and Minister of Public Works and Housing Regulation No. 28/PRT/M/2015 concerning the determination of river and lake buffer lines. At the provincial level, Bali has incorporated river buffer protection into its spatial planning framework. The provincial spatial planning system recognizes river buffer zones as areas requiring specific spatial management. The Bali spatial information system also provides spatial planning information and identifies buffer zones as part of the regional spatial planning framework. However, the existence of regulations does not automatically ensure compliance. Urban development pressures, land-value increases, weak monitoring, and overlapping institutional interests can encourage violations. The Tukad Badung case illustrates this challenge. Research published in 2026 identified extensive land-use conversion within the river corridor and numerous buildings that were not compliant with the applicable river buffer regulations. This indicates that the central challenge is a regulatory–implementation gap. Green governance therefore requires not only regulatory clarity but also consistent enforcement, updated spatial information, institutional coordination, and community involvement.

Participation and Representation

Meaningful participation is a core principle of green governance. Communities living around river corridors are not simply beneficiaries of spatial planning policies; they are also actors who directly influence land-use practices. Participation should occur at three stages: first, spatial planning and decision-making; second, implementation and environmental management; and third, monitoring and evaluation. In practice, participation is often stronger during program implementation than during the planning stage. Communities may participate in river-cleaning activities, infrastructure development, environmental campaigns, and neighborhood programs, while strategic decisions concerning land-use designation and development control remain dominated by

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government institutions. Research on informal settlement upgrading demonstrates that higher levels of community decision-making power are associated with more sustainable and resilient outcomes. Top-down approaches tend to produce weaker community ownership and may be less sustainable over time. Consequently, participation in river buffer governance should shift from consultation toward co-production. Communities should be involved in identifying environmental problems, mapping vulnerable areas, determining restoration priorities, and monitoring compliance

Access to Information and Digital Spatial Governance

Access to information is essential for effective environmental governance. Communities cannot participate meaningfully if they do not have access to accurate information concerning spatial plans, river buffer boundaries, development permits, environmental risks, and government programs. Bali already possesses digital spatial information infrastructure through the provincial spatial planning information system. The system provides access to spatial planning maps and information concerning spatial patterns, infrastructure, protected areas, and buffer zones. However, the existence of digital platforms does not necessarily guarantee effective information access. Three challenges remain.

1. Spatial information may not always be available at a scale that is easily understood by local communities.
2. Different institutions may maintain different datasets, creating problems of interoperability.
3. Digital information must be accompanied by mechanisms that allow communities to provide feedback, report violations, and monitor government responses.

Green governance therefore requires the transformation of spatial information systems from passive information repositories into active governance platforms. A digital river buffer governance system could include:

1. river buffer boundaries;
2. land-use status;
3. building permits;
4. environmental risk indicators;
5. flood-prone areas;
6. pollution points;
7. restoration areas;
8. community reports;
9. enforcement status; and
10. government intervention programs

Transparency and Accountability

Transparency concerns the availability of information about public decisions, while accountability concerns the responsibility of institutions to explain and justify their actions. In river buffer management, transparency should cover:

1. spatial designation;
2. development permissions;
3. environmental assessments;
4. government programs;
5. enforcement actions;
6. restoration activities; and
7. monitoring results.

Without transparency, communities may perceive spatial planning as a closed administrative process. Accountability is also important because river buffer management involves multiple institutions. A violation may involve spatial planning agencies, public works agencies, village governments, developers, and communities. Without clear institutional responsibilities, enforcement can become fragmented. Therefore, a green governance system requires a clearly defined institutional accountability chain from provincial government to district/city government, subdistricts, villages, and communities.

Institutional Coordination and Collaborative Governance

River management is inherently cross-sectoral. Spatial planning, public works, environmental management, disaster management, housing, tourism, and local government institutions may have different responsibilities within the same river corridor. This institutional fragmentation can produce policy inconsistencies. For example, one institution may prioritize river normalization and flood control, another may emphasize environmental restoration, while another prioritizes urban economic development. Without coordination, interventions may solve one problem while creating another. Collaborative governance provides a mechanism for addressing this problem. A River Buffer Governance Forum could be established at the local level involving:

1. provincial government;
2. district/city government;
3. public works agencies;

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4. environmental agencies;
5. spatial planning agencies;
6. village governments;
7. customary villages;
8. community organizations;
9. academics;
10. NGOs; and
11. private-sector actors.

Such a forum should not merely function as a coordination meeting. It should possess clear responsibilities for planning, implementation, monitoring, conflict resolution, and evaluation.

Decentralization and Multilevel Governance

River buffer management illustrates the importance of multilevel governance. Environmental problems occur locally, but their causes and consequences often extend beyond administrative boundaries. A river may pass through several villages and administrative areas, while upstream land-use practices can influence downstream environmental conditions. Therefore, decentralization should not mean that each local government manages its own river corridor independently. Instead, decentralization should be accompanied by vertical and horizontal coordination. This approach is consistent with the concept of integrated spatial governance, which emphasizes coordination across institutional and administrative boundaries. Recent research on spatial governance in Bali identifies fragmented institutional coordination and limited enforcement capacity as important constraints on sustainable spatial development

Environmental Justice

River buffer governance should also be examined through the perspective of environmental justice. Environmental justice requires that environmental benefits, risks, information, participation, and access to decision-making be distributed fairly. Urban river corridors often contain socially vulnerable communities. Strict enforcement without adequate alternatives may disproportionately affect low-income residents. Conversely, weak enforcement may allow economically powerful actors to occupy environmentally sensitive areas. Therefore, green governance must avoid two extremes: environmental protection without social justice, and economic development without ecological responsibility. A just approach requires differentiated strategies, including relocation where necessary, upgrading where feasible, compensation mechanisms, alternative housing, livelihood support, and community participation in decision-making.

INTEGRATING TRI HITA KARANA INTO GREEN GOVERNANCE

The distinctive contribution of Bali to green governance lies in the possibility of integrating modern governance principles with local ecological values. Tri Hita Karana can provide a conceptual bridge between environmental sustainability and local cultural identity.

- a. Parahyangan: Spiritual-Ecological Responsibility. The *parahyangan* dimension encourages respect for sacred landscapes, water resources, and places with spiritual significance. In river buffer management, this principle can strengthen protection of culturally and spiritually important river corridors.
- b. Pawongan: Social Collaboration. The *pawongan* dimension emphasizes harmonious relationships among people. In governance terms, this corresponds to:
 1. participation;
 2. collaboration;
 3. social inclusion;
 4. deliberation;
 5. conflict resolution; and
 6. institutional trust.

Thus, community involvement in river management can be interpreted not only as an administrative requirement but also as an expression of social harmony.

- c. Palemahan: Ecological Sustainability. The *palemahan* dimension is particularly relevant to environmental governance because it emphasizes harmony between humans and nature. River buffer protection can therefore become an institutional expression of *palemahan* through:
 1. ecological restoration;
 2. protection of riverbanks;
 3. reduction of pollution;
 4. conservation of vegetation;

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5. flood-risk reduction; and
6. sustainable land use.

The integration of Tri Hita Karana into spatial planning has already been recognized in Bali's regulatory framework and academic literature.

The analysis demonstrates that sustainable river buffer management requires a transformation from government-centered spatial control to collaborative environmental governance. The first transformation concerns the role of regulation. Regulations remain essential, but regulatory effectiveness depends on institutional capacity, monitoring, information availability, and public legitimacy. The second transformation concerns participation. Community participation should not be limited to implementation. Communities should become active participants in spatial planning, monitoring, and evaluation. The third transformation concerns information. Digital spatial systems should provide not only maps but also opportunities for public monitoring and reporting. The fourth transformation concerns institutional coordination. River corridors require integrated governance because ecological systems do not follow administrative boundaries. The fifth transformation concerns the relationship between economic development and environmental sustainability. Bali's tourism-oriented economy generates strong development pressures, making it necessary to establish ecological limits within spatial planning. The sixth transformation concerns local wisdom. Tri Hita Karana can strengthen green governance by providing a cultural and ethical foundation for environmental responsibility. These transformations suggest that the concept of a sustainable city in Bali should not be limited to infrastructure modernization or green technology. A sustainable city also requires institutional sustainability, social inclusion, environmental justice, cultural legitimacy, and ecological integrity.

CONCLUSION

River buffer zones are strategic components of sustainable urban systems because they provide ecological, hydrological, social, and spatial functions. However, increasing urbanization, tourism development, land-use conversion, and infrastructure expansion have created significant pressures on river corridors in Bali. This study demonstrates that green governance provides a relevant framework for addressing these challenges. The main dimensions of green governance—rule of law, participation, information access, transparency, accountability, institutional coordination, multilevel governance, and environmental justice—are highly relevant to river buffer management. Bali already possesses an important regulatory foundation through national river regulations and the Provincial Spatial Plan for 2023–2043. The provincial planning framework also incorporates Tri Hita Karana and other local wisdom values, creating an opportunity to develop a culturally grounded model of sustainable spatial governance. Nevertheless, significant implementation challenges remain. These include fragmented institutional authority, inconsistent enforcement, limited public participation in strategic planning, insufficient integration of spatial data, and strong economic pressure on environmentally sensitive areas. Therefore, sustainable river buffer management requires an integrated green governance model based on six pillars: regulatory governance, collaborative institutional governance, digital spatial governance, participatory governance, ecological restoration, and Tri Hita Karana-based governance. The central argument of this article is that river buffer protection should no longer be treated solely as a technical or regulatory issue. It should be understood as a governance challenge requiring cooperation among government, communities, customary institutions, private actors, and civil society. For Bali, the integration of green governance with Tri Hita Karana offers an opportunity to develop a distinctive model of sustainable urban spatial planning—one that seeks not merely to control development but to create harmony between economic development, social well-being, cultural identity, and ecological sustainability.

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