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Customary-Based Spatial Control of River Cliff Tourism Landscapes in Bali

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Abstract

Rapid tourism development in Bali has triggered extensive land conversion, particularly along river cliff landscapes that possess ecological, cultural, and spiritual significance. The Tukad Ayung river cliffs in Ubud represent one of the most critical areas where tourism-driven development has transformed protected landscapes into commercial accommodation zones. This conversion has led to environmental degradation, increased landslide risk, and conflicts between formal spatial planning regulations and traditional community governance systems. This study aims to develop a customary-based spatial control model that integrates indigenous governance with formal spatial planning frameworks to regulate land use along river cliffs in tourism areas. A mixed-methods approach was applied, combining qualitative institutional analysis and quantitative spatial analysis using Geographic Information Systems (GIS). Data were collected through field observations, interviews with traditional village leaders and government officials, and spatial analysis of land use change. The results indicate that more than 60% of the Tukad Ayung river cliffs have been converted for tourism development, increasing erosion and landslide vulnerability. Existing regulatory mechanisms remain ineffective due to weak integration between formal regulations and customary governance systems. This study proposes a customary-based spatial governance model integrating environmental protection zoning, indigenous institutional authority, and participatory monitoring mechanisms. The findings demonstrate that integrating customary institutions into spatial planning can enhance environmental protection while supporting sustainable tourism development.

Keywords: Customary Governance, Spatial Planning, Sustainable Tourism, Indigenous Institutions, River Cliff Landscape

1. Introduction

1.1 Background

Tourism development has become one of the most significant drivers of land use transformation in Bali. While tourism contributes substantially to regional economic growth, it also generates considerable pressure on environmental resources and spatial planning systems (Aryanta, 2024). In recent decades, the expansion of tourism infrastructure has intensified land conversion in environmentally sensitive areas such as coastal zones, forests, and river cliffs.

One of the most critical examples of this phenomenon occurs along the Tukad Ayung river cliffs in Ubud, where scenic landscapes have attracted intensive tourism development, including villas, hotels, restaurants, and recreational facilities (Yasa & Sunarta, 2019). River cliffs historically function as ecological buffers that stabilize slopes, maintain vegetation cover, and protect river ecosystems. In Balinese cultural perspectives, these landscapes also possess spiritual value and are traditionally treated as sacred spaces associated with water temples and ritual activities (Dwijendra et al., 2025).

However, increasing demand for panoramic tourism accommodation has gradually transformed these areas into commercial tourism zones. Previous studies have identified that tourism-driven development in cliff landscapes often leads to environmental degradation, slope instability, and increased landslide risks. In Bali, several incidents of landslides have occurred in cliff areas that were converted for tourism development, demonstrating the vulnerability of these landscapes.

Another important dimension of this issue involves the institutional conflict between formal spatial planning regulations and indigenous governance systems (Suryana et al., 2022). Bali has a unique socio-cultural governance structure where traditional villages (*desa adat*) possess customary laws known as *awig-awig* and *pararem* that regulate community life and land management (Wijaya et al., 2020). Despite their strong social legitimacy, these customary regulations are often not fully integrated into formal spatial planning frameworks.

Recent regulatory changes, including the implementation of the Online Single Submission (OSS) system, have centralized many licensing processes at the national level. This centralization has reduced the role of local institutions, including traditional villages, in spatial decision-making processes. As a result, development permits can sometimes be issued without sufficient consideration of local ecological conditions and customary regulations. These conditions highlight the need for a more integrative spatial governance approach that bridges formal planning systems and indigenous institutional mechanisms.

1.2 Research Gap

While the literature on Bali's watershed development is extensive, a critical gap remains regarding the integration of indigenous governance into modern spatial control, particularly in high-risk river cliff areas. Previous studies have primarily approached the issue from three distinct yet limited perspectives. Bawa (2002) focused extensively on the ecological consequences of tourism, such as erosion and biodiversity loss, but did not address the regulatory frameworks needed to mitigate these impacts. Praganingrum (2013) highlighted the economic pressures and the failure of formal legal enforcement due to policy ambiguities, yet the analysis remained centered on top-down government interventions. Furthermore, Suprpto (2010) underscored the tendency of local authorities to prioritize economic utility over legal certainty in permit issuance, identifying a systemic weakness in the formal statutory system.

Despite these valuable insights, there is a noticeable lack of research that explores "bottom-up" solutions rooted in cultural heritage. Existing studies predominantly view the degradation of Tukad Ayung's cliffs through a lens of formal regulatory failure, often overlooking the potential of customary institutions as robust spatial governance mechanisms. Specifically, how traditional Balinese spatial concepts and indigenous building codes can be synthesized with modern planning to protect fragile cliff landscapes has not been sufficiently explored.

This study fills this academic void by shifting the focus from a purely legal-formal critique to a cultural-integrative approach. It diverges from previous research by investigating how land-use patterns on the Tukad Ayung cliffs can accommodate and internalize local wisdom (*awig awig* and *pararem*), including specific customary spatial zoning within building structures. By doing so, this research provides a novel framework for sustainable riverside management that harmonizes prestigious tourism development with ancestral ecological and cultural stewardship.

1.3 State Hypotheses and Their Correspondence to Research Design

The hypotheses of this study are systematically aligned with the research design to ensure a rigorous investigation of the identified gaps in spatial governance. The first hypothesis (H1) posits that the current utilization of river cliff lands along Tukad Ayung prioritizes short-term economic utility over ecological sustainability and formal spatial mandates. This hypothesis corresponds to an evaluative spatial research design. To test this, the study employs Geographic Information System (GIS) mapping and field-based observations to quantify the discrepancies between actual land-use patterns and the designated conservation zones stipulated in formal spatial planning regulations.

The second hypothesis (H2) asserts that customary law, manifested through *awig-awig* and *pararem*, possesses greater social legitimacy and practical efficacy in controlling land use than existing top-down regulatory frameworks. This hypothesis informs a qualitative-descriptive research design. Correspondence is established through in-depth interviews with Bendesa Adat (traditional leaders) and stakeholders, coupled with a rigorous content analysis of customary documents. This approach allows for an empirical assessment of how indigenous norms influence community compliance and spatial behavior in sensitive cliffside areas.

Finally, the third hypothesis (H3) proposes that an integrative spatial control model—one that synthesizes customary zoning with modern planning systems—will significantly enhance regulatory compliance and long-term environmental resilience. This hypothesis is operationalized through a model-development research design. The correspondence is executed by utilizing Focus Group Discussions (FGD) with multidisciplinary experts. This design facilitates the validation of the proposed integrative framework, ensuring it is both theoretically sound and practically applicable for sustainable riverside management.

2. Literature Review

Research concerning the Tukad Ayung cliffs highlights the utilization of these riverside terrains as a pivotal attraction in the tourism industry (Suryani et al., 2022). This industry relies heavily on natural panoramic beauty for activities such as rafting, trekking, and the construction of accommodations with exclusive views, presenting a crucial dilemma for environmental preservation. The transformation of these fragile cliff ecosystems into commercial tourism zones frequently driven by economic pressure and intense market competition, carries a high risk of significant environmental degradation (Rideng & Widyatara, 2021). This degradation manifests in various forms, including the decline of Tukad Ayung's water quality due to domestic and operational waste discharge, soil erosion and landslides resulting from unchecked construction, and the fragmentation or loss of natural vegetation that serves as an essential erosion barrier and biodiversity habitat (Bawa, 2002). Furthermore, the conversion of cliff lands that possess sacred value or serve as traditional livelihoods for local communities poses a risk of triggering social conflicts regarding access rights, resource ownership, and fundamental changes to the cultural landscape (Pemayun & Suidarma, 2017).

Prior studies indicate that within Bali's dynamic development landscape, watersheds (particularly dramatic cliffside terrains) have emerged as primary targets for capital investors. These areas are increasingly viewed as prime sites for the development of diverse high-end tourism amenities. This phenomenon is clearly evident across the Tukad Ayung Kedewatan Cliff Land in Ubud, where prestigious tourism facilities have proliferated (Hartawan et al., 2024). Lands that were once relatively pristine natural areas have been transformed into high-value economic assets, commanding some of the highest real estate prices in Bali, and arguably, within Indonesia. Ironically, amidst the fervor of cliffside development along Tukad Ayung, significant ambiguities and inconsistencies in government policies regarding spatial planning and land utilization have been identified. Such regulatory obscurity has created loopholes for land use outside designated conservation zones, leading to frequent violations of river

and cliff setbacks. This situation raises fundamental questions regarding the future ecological and social sustainability of the Tukad Ayung cliffs, as well as the efficacy of legal enforcement in curbing over-exploitation (Praganingrum, 2013). While the current study aligns with previous research in terms of geographical focus and the investigation of land-use patterns, it diverges by investigating how land utilization incorporates and accommodates existing cultural norms and local wisdom, including specific spatial zoning regulations within building structures.

Other studies have addressed the legal protection of cliff-edge buffers against hotel development in Gianyar Regency, specifically through the lens of hotel construction permit procedures. The issuance of these permits often prioritizes economic utility over legal certainty, environmental preservation, and alignment with formal spatial planning frameworks. Legal analysis has identified two primary categories of violations: a) the issuance of permits by the Gianyar Regency Government that contravene the cliff-buffer functions mandated by Bali Provincial Regulation No. 16 of 2009 concerning the 2009–2029 Provincial Spatial Plan and b) the unauthorized conversion of cliff-buffer zones into cultivation areas (Suprpto, 2010). This research emphasizes that legal safeguards for cliff-edge areas against hotel expansion in Gianyar require significant strengthening. Rigorous and consistent law enforcement is essential to ensure environmental sustainability and mitigate the risk of natural disasters. However, these customary governance mechanisms are often not formally integrated into modern spatial planning systems. Therefore, developing an integrative spatial governance model that combines formal planning frameworks with indigenous institutional structures remains a critical research gap.

3. Materials and Methods

This study adopts a robust two-phase mixed-methods framework designed to bridge the gap between institutional theory and spatial practice (Sugiyono, 2017). In the initial phase, a qualitative institutional analysis is employed to critically examine the interplay between statutory (formal) and customary (informal) governance frameworks. This stage focuses on identifying the underlying norms, regulations, and power dynamics that dictate land-use behavior. In the subsequent phase, these qualitative insights are operationalized into discrete spatial variables. This transition facilitates a rigorous quantitative analysis utilizing GIS-based modeling to map the distribution, intensity, and geographical footprint of governance efficacy across the landscape. By synthesizing these two phases, the research design provides a comprehensive understanding of how institutional structures physically manifest as tangible spatial outcomes in the fragile river cliff environments.

3.2 Study Area

The study focuses on Tukad Ayung river cliffs in Ubud District, Gianyar Regency, Bali, particularly in the villages of Kedewatan and Sayan, which represent areas with intensive tourism development.

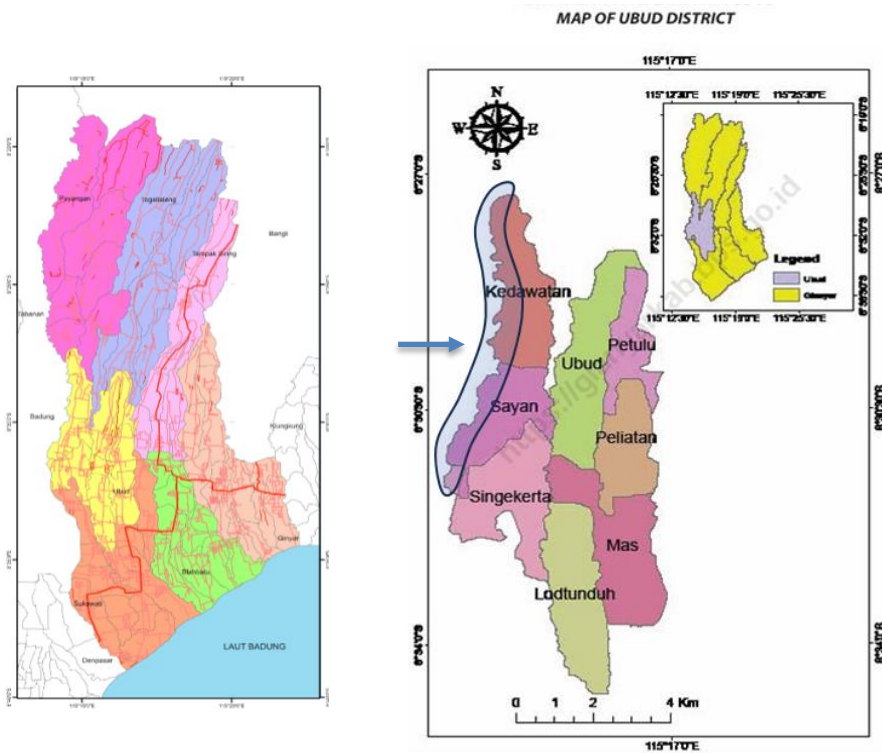


Figure 1: Research Area

3.3 Data Collection

Data collection for this study is conducted through a multi-faceted approach to capture both regulatory dynamics and stakeholder perspectives. The first phase involves an in-depth document analysis of formal legal frameworks, specifically regional spatial planning and river buffer zone regulations. To capture the local context, this is synthesized with an examination of traditional village customary rules, such as *awig-awig* and *pararem*. These documentary insights are further enriched by field observations and semi-structured interviews with key stakeholders including traditional village leaders, local government officials, and tourism entrepreneurs to explore the practical implementation of policies and the diverse interests within the governance structure.

Complementing these institutional insights, the research utilizes spatial data analysis to provide empirical evidence of the study area's physical characteristics. High-resolution satellite imagery is employed to identify land cover patterns, which are then processed through GIS-based land use mapping. This geospatial approach allows for the precise modeling of how governance structures are distributed across the landscape and facilitates a measurable assessment of their impact on the study area. By integrating qualitative narratives with quantitative spatial models, the research ensures a robust triangulation of data, bridging the gap between policy intent and geographical reality.

3.4 Data Analysis

The empirical investigation employed two primary analytical techniques. First, Spatial Analysis was conducted utilizing Geographic Information Systems (GIS) to systematically assess land-use transformation patterns, verify compliance with formal spatial zoning regulations, and identify geomorphological risk areas, specifically those prone to landslides. Second, an Institutional Analysis was performed to examine the cross-scale interactions between formal and customary governance systems. This dimension of the study utilized a comprehensive governance framework, emphasizing the evaluation of stakeholder participation, the distribution of authority, and the efficacy of regulatory enforcement mechanisms within the cliffside landscapes.

4. Results

4.1 Spatial Transformation of River Cliff Areas

Spatial analysis utilizing high-resolution satellite imagery and GIS mapping reveals that land conversion within the Tukad Ayung river cliff zones has reached a critical threshold, with approximately 60% of the designated area now transitioned into tourism-oriented development. This proliferation of infrastructure is characterized by a high density of luxury villas, boutique hotels, and upscale cliffside dining establishments that specifically capitalize on the area's topographical exclusivity. Furthermore, the installation of ancillary recreational facilities (such as concrete stairs leading to riverbeds and rafting platforms) has further fragmented the riparian corridor. Field observations indicate that these developments have led to the extensive replacement of indigenous riparian vegetation with impermeable surfaces and structural foundations. Consequently, this transformation has not only compromised the natural hydrological balance of the watershed but has also adversely impacted the geomorphological stability of the slopes, significantly increasing the region's vulnerability to localized soil erosion and landslide events during periods of high precipitation.

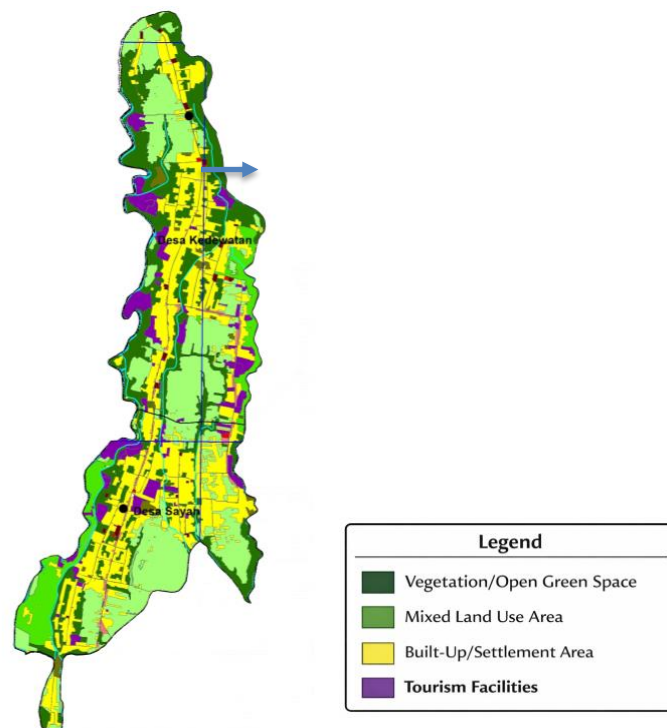


Figure 2: Spatial distribution of land use and tourism facilities in the study area. Purple areas indicate tourism facilities, yellow areas represent built-up zones, and green areas indicate vegetation or open green spaces.

4.2 Environmental Impacts

Field observations documented multifaceted environmental degradation resulting from the ongoing land-use transformation. These impacts are primarily characterized by accelerated soil erosion, extensive loss of indigenous vegetation, and the subsequent geomorphological destabilization of the cliff surfaces. Furthermore, the systematic removal of natural ground cover for construction has significantly heightened the susceptibility of the terrain to landslides. This increased risk is not merely theoretical; several recorded landslide incidents within tourism-developed cliff zones empirically substantiate the ecological vulnerability of these landscapes and underscore the urgent need for more stringent spatial controls.

4.3 Institutional Conflict

The investigation reveals substantial institutional discrepancies between statutory spatial planning frameworks and indigenous village governance structures. A critical finding is that customary regulations often prescribe more stringent environmental safeguards than their formal government counterparts; however, these traditional mandates remain marginalized within the prevailing administrative licensing system. Consequently, despite their ecological rigor, customary institutions lack the requisite legal authority to enforce compliance during the development permit process. This regulatory fragmentation creates a governance void where local ecological

wisdom is frequently bypassed by formal development approvals, leading to the continued degradation of the Tukad Ayung cliff landscapes.

5. Discussion

This study provides important policy implications for spatial planning in tourism destinations. First, integrating customary governance institutions into spatial planning processes can strengthen environmental protection in ecologically sensitive landscapes. Second, formal spatial planning regulations should recognize traditional village authority in monitoring and controlling land development in river cliff areas. Third, participatory governance mechanisms involving local communities, government institutions, and tourism stakeholders are essential to ensure sustainable tourism development.

5.1 Integrating Indigenous Governance in Spatial Planning

The findings demonstrate that traditional governance systems possess significant potential to bolster sustainable spatial management. Unlike formal top-down approaches, customary institutions operate through community consensus and a system of social and spiritual sanctions, which provides them with high socio-cultural legitimacy. This inherent authority makes them exceptionally effective in regulating land-use behavior and ensuring local compliance. Integrating these systems into the formal planning hierarchy allows for a more decentralized and resilient governance framework that respects both ecological limits and cultural values.

5.2 Customary-Based Spatial Control Model

To address the existing regulatory gaps, this study proposes an integrative spatial control model. Figure 2 presents the conceptual framework, illustrating the sequential relationship between state regulation, customary institutions, environmental protection zoning, participatory monitoring, and the achievement of a sustainable tourism landscape. The framework is built upon three fundamental pillars designed to harmonize modern development with ancestral stewardship:

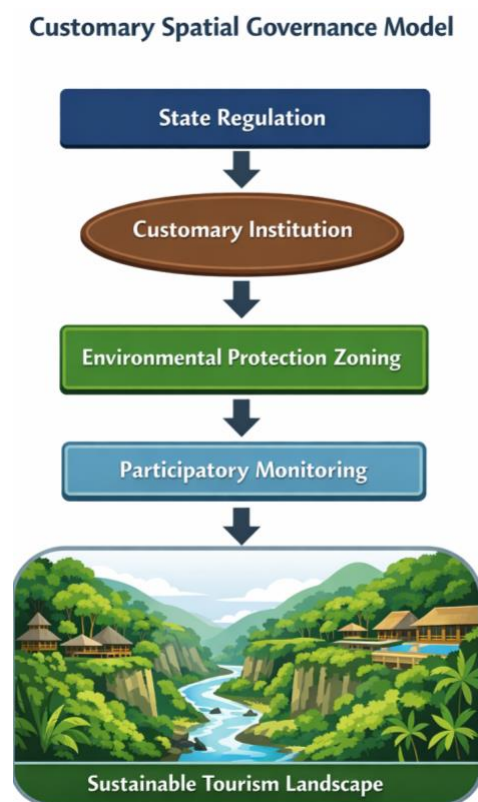


Figure 3: Conceptual framework of the Customary Spatial Governance Model for river cliff tourism development.

1. **Environmental Protection Zoning:** This component focuses on the precise delineation of cliff buffer zones. It identifies sensitive geomorphological areas where commercial development must be strictly restricted or prohibited to maintain slope stability and hydrological functions.
2. **Indigenous Institutional Governance:** This pillar emphasizes the institutional empowerment of traditional villages (*Desa Adat*). By formally integrating these entities into the spatial decision-making process, the model ensures that local wisdom is not merely consultative but is an influential factor in granting development permits.
3. **Participatory Monitoring:** This element establishes a community-based surveillance system for tourism development. By leveraging local vigilance, the model ensures real-time monitoring of setback compliance and environmental impacts, bridging the enforcement gap left by state authorities.

Ultimately, this model facilitates a hybrid governance structure that synergizes state-level regulations with indigenous authority, fostering a more sustainable and culturally grounded approach to riverside management.

6. Conclusion

6.1 Synthesis of Findings

Tourism development along the Tukad Ayung river cliffs has precipitated a profound anthropogenic transformation of environmentally sensitive landscapes. While these developments have generated substantial economic value, they have simultaneously compromised the region's ecological integrity. This study underscores that the inefficacy of existing spatial control mechanisms stems from a fragmented integration between formal statutory planning systems and indigenous governance institutions. The current top-down regulatory approach often marginalizes local ecological wisdom, creating a governance void that capital investors frequently exploit.

6.2 The Proposed Governance Paradigm

To bridge this critical gap, this research proposes a Customary-Based Spatial Governance Model. This framework synergizes three core pillars: environmental protection zoning, indigenous institutional authority, and community-led participatory monitoring systems. By institutionalizing the role of traditional villages (*Desa Adat*) within the formal spatial governance hierarchy, the model ensures that development permits are no longer granted in isolation from cultural and ecological values. This hybrid structure does not replace state authority but rather strengthens it through the localized legitimacy and spiritual-social sanctions inherent in Balinese tradition.

6.3. Contributions and Future Directions

The findings contribute significantly to the discourse on sustainable tourism planning by demonstrating that indigenous governance is not a relic of the past, but a robust instrument for enhancing environmental resilience in modern tourism landscapes. This study offers a replicable framework for regions where formal legal systems struggle to manage rapid commercial expansion in ecologically fragile zones.

Future research should expand upon these findings by exploring the cross-cultural application of indigenous governance models in diverse global tourism destinations facing similar spatial planning challenges. Specifically, longitudinal studies are recommended to assess the long-term efficacy of this hybrid model in mitigating environmental degradation while sustaining local livelihoods.

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