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SACRED LANDSCAPES AND URBAN EXPANSION: THE ROLE OF PAPUAN COSMOLOGY IN CITY PLANNING AND SPATIAL DEVELOPMENT

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Abstract :

This article examines the intersection of Papuan cosmological belief systems and contemporary urban planning practices in the provinces of Papua and West Papua, Indonesia. Indigenous Papuan communities maintain deep ontological relationships between sacred landscapes including mountains, rivers, forests, and ancestral sites and their social and spiritual ordering of space. As rapid urbanisation accelerates across the Bird's Head Peninsula, the Mamberamo Basin, and the Jayapura metropolitan corridor, development frameworks frequently disregard these cosmological mappings, generating socio-cultural displacement and environmental degradation. Drawing on ethnogeographic fieldwork, spatial analysis, and a review of regional planning documents (RTRW), this study argues that integrating Papuan cosmological knowledge into city planning and spatial development policies can enhance cultural sustainability, reduce land conflict, and foster more equitable urban futures. The article advances a framework for cosmologically informed planning, proposing policy mechanisms, community consultation protocols, and spatial mapping methodologies adapted to diverse Papuan ethno-cultural contexts.

Keywords : *Papuan cosmology, Sacred landscapes, Urban planning, Spatial development, Indigenous knowledge*

INTRODUCTION

The transformation of Papua's natural and cultural landscape under accelerating urbanisation represents one of Indonesia's most complex planning challenges. Papua spanning the provinces of Papua, Papua Tengah, Papua Pegunungan, Papua Selatan, and Papua Barat Daya is home to more than 300 distinct ethnic groups (Mansoben, 1995), each maintaining intricate cosmological frameworks that encode sacred meaning onto the physical landscape. Mountains, rivers, old-growth forests, ancestral burial sites, and ritual clearings are not merely ecological features but constitutive elements of social identity, governance, and spiritual life (Timmer, 2000). Yet contemporary urban expansion, driven by national transmigration policy legacies, special autonomy investment flows, and extractive industry corridors, proceeds largely without reference to these ontological geographies (Braithwaite et al., 2010).

The consequences are far-reaching. Land disputes between adat (customary) communities and state or private developers have intensified since

the enactment of Papua Special Autonomy Law No. 21 of 2001 and its 2021 amendment, with sacred sites increasingly mapped as developable land in Regional Spatial Plans (RTRW) at the provincial and district levels (Sumule, 2020). The intersection of cosmology and spatial planning has been explored in comparative contexts from Andean sumak kawsay frameworks (Gudynas, 2011) to Maori tikanga in New Zealand's Resource Management Act (Tipa & Tierney, 2006) but remains theoretically underdeveloped in the Melanesian Pacific and Indonesian Papua specifically.

This article contributes to this gap by investigating how Papuan cosmological belief systems structure the perception and use of sacred landscapes and how such structures can inform and be formally incorporated into urban and spatial planning practice. We argue that cosmologically informed planning is not an obstacle to development but a mechanism for securing more durable, equitable, and culturally resonant spatial outcomes. The central research questions are: (1) How do Papuan cosmological frameworks organise sacred space in relation to settlement and land use? (2) What are the current disjunctures between cosmological spatial logic and formal planning instruments in Papua? (3) What institutional and methodological pathways exist for integrating indigenous cosmological knowledge into urban planning frameworks?

Literature Review

Cosmology, Landscape, And Indigenous Spatial Ordering

Cosmology, understood as a society's fundamental account of the structure and meaning of the universe, is deeply geographic (Descola, 2013). For many Melanesian and Papuan societies, the cosmos is not an abstract schema but a materially grounded map in which specific peaks, waterways, and forest tracts are simultaneously topographic realities and sacred nodes in a relational ontology connecting the living, the dead, and non-human persons (Robbins & Wardlow, 2005). Rumansara (2019) documents how among the Biak-Numfor of Cenderawasih Bay, cosmological narratives encoded in koreri millenarian traditions assign specific islands and coastal formations to ancestral spirit pathways, which regulate fishing rights, marriage exchange, and ritual movement. Any disruption to these formations through reclamation, industrial dredging, or port construction is experienced not merely as ecological damage but as ontological rupture.

Across the highlands, the Dani and Lani peoples of the Baliem Valley organise settlements (honai clusters) according to cosmological principles linking cardinal directions with gendered ancestral energies and agricultural fertility cycles (Giay & Ballard, 2003). Sacred garden spaces (pilamo) and men's houses are positioned in deliberate spatial relation to mountain features believed to harbour ancestral spirits. Such arrangements regulate water management, soil rotation, and inter-clan territorial boundaries in ways that have sustained agricultural productivity for centuries (Kirsch, 2006).

Urban Expansion and the Erasure of Sacred Geographies

Indonesia's post-1998 Reformasi period and Papua's Special Autonomy regime accelerated infrastructure spending and urban growth across the region,

intensifying pressure on indigenous land. Jayapura's urban footprint has expanded nearly threefold since 2000 (BPS Papua, 2022), while Manokwari, Sorong, Merauke, and Timika have each experienced significant demographic growth driven by transmigration, resource extraction, and state administrative relocation (Wainggai, 2021). Hidayati (2020) demonstrates that district-level RTRW documents in Papua provinces routinely fail to map adat territorial boundaries or sacred site locations, relying instead on cadastral data that reflects colonial-era land classification. Franky and Sari (2018) document dozens of cases in which churches, government buildings, roads, and commercial facilities have been constructed on sites identified by local communities as sacred, generating prolonged conflict.

Comparative Frameworks: Indigenous Cosmology in Planning

International comparative scholarship offers relevant frameworks. Howitt and Suchet-Pearson (2006) articulate a 'postcolonial geographies' approach in which indigenous spatial knowledge is treated not as supplementary local data but as a foundational ontological frame requiring epistemic equality with technical planning knowledge. In New Zealand, the incorporation of Maori landscape concepts (wahi tapu, mauri, kaitiakitanga) into the Resource Management Act (1991) has enabled community-led cultural landscape mapping as a statutory planning tool (Tipa & Tierney, 2006). Closer to Papua, the Philippines' Indigenous Peoples' Rights Act (IPRA, 1997) mandates Free, Prior and Informed Consent (FPIC) for development on ancestral domains. While FPIC mechanisms exist formally in Indonesian law (Minister of Environment and Forestry Regulation P.32/2015), their application in Papua has been inconsistent, with consultation processes frequently truncated or bypassed entirely (Colchester & Chao, 2013).

RESEARCH METHOD

This study employs a qualitative multi-method design combining ethnogeographic fieldwork, document analysis, and participatory mapping. Fieldwork was conducted across four purposively selected sites representing different ecological zones and ethnic groups, as shown in Table 1 below.

Table 1. Research Sites: Ecological Zones, Communities, and Urban Pressure Types

Site / Location	Community	Urban Pressure Type	Primary Sacred Elements
1. Jayapura Corridor (Sentani, Abepura, Waena)	Sentani; Tobati-Enggros	Metropolitan sprawl; road infrastructure	Lake Sentani sacred sites; lakeside ritual nodes
2. Manokwari Hinterland (Arfak highlands)	Arfak highland communities	Residential zoning; road penetration	Suangi spirit pathways; mountain nodes

3. Merauke Lowland (Maro River floodplain)	Marind-anim	MIFEE agricultural estate; transmigration	Ancestral spirit corridors; wetland ceremonial sites
4. Sorong Coastal (coastal and near-shore)	Moi communities	Port expansion; industrial zones	Coastal sacred groves; inter-clan boundary markers

Primary data collection included semi-structured interviews (n = 64) with adat leaders (ondoafi, kepala suku), spatial planning officials (Bappeda provincial and district levels), NGO practitioners, and community elders. Interviews were conducted in Indonesian and local languages with interpreter assistance, recorded with informed consent, and transcribed using verbatim protocols. Focus group discussions (n = 8) were conducted with women's groups, youth organisations, and joint adat councils. Participatory mapping workshops (n = 6) used printed topographic base maps and satellite imagery. Maps were digitised using QGIS 3.28 and cross-referenced against existing RTRW spatial layers obtained from provincial Bappeda offices. Data were analysed using constructivist grounded theory (Charmaz, 2014). Ethical approval was obtained from the Universitas Cenderawasih Research Ethics Committee (No. 024/UNCEN-LPPM/2024).

FINDINGS AND DISCUSSION

Cosmological Spatial Logic: Key Principles

Analysis of participatory mapping and interview data revealed three structuring principles common across the four field sites: (1) vertical cosmological axis the alignment of settlement, sacred grove, and mountain summit as a vertical spine connecting terrestrial and spiritual realms; (2) water-as-mediator rivers, lakes, and coastal formations as thresholds between living and ancestral space; (3) relational zoning the spatial organisation of land into nested zones of decreasing ritual intensity. Table 2 summarises these principles and their planning implications.

Table 2. Cosmological Spatial Principles and Planning Implications

Cosmological Principle	Description	Community / Site	Planning Implication
Vertical Cosmological Axis	Alignment of settlement, sacred grove, and mountain summit	All four sites	Regulates expansion direction; determines ritual site buffer zones
Water-as-Mediator	Rivers, lakes, coastal	Jayapura; Merauke; Sorong	Governs seasonal land-use access;

	formations as thresholds between living and ancestral space		delineates inter-clan boundaries
Relational Zoning	Nested zones from sacred core outward to agricultural and marginal areas	Arfak; Marind-anim	Structures land-use intensity gradients; determines setbacks from sacred nodes
Spirit Pathway (Suangi)	Corridors connecting highland nodes to coastal estuaries	Arfak (Manokwari)	Defines no-build corridors; links ecological function with spiritual governance

Among the Arfak communities of Manokwari, the concept of suangi pathways (spirit corridors running between highland nodes and coastal estuaries) structures where new settlement expansion is and is not permissible. Community mapping identified eleven distinct suangi pathways, none of which appear in the Manokwari district RTRW spatial layer. Five of these pathways intersect with areas currently zoned for residential or commercial expansion in the 2032 planning horizon, representing direct spatial conflict between cosmological and formal planning logics.

Disjunctures Between Cosmological and Formal Planning Instruments

Document analysis confirmed that sacred site mapping is systematically absent from formal spatial plans across all four districts examined. Table 3 presents the RTRW Compliance Matrix, assessing the four studied planning documents against seven indigenous spatial planning indicators.

Table 3. RTRW Compliance Matrix – Sacred and Adat Spatial Indicators

Planning Indicator	Jayapura RTRW	Manokwari RTRW	Merauke RTRW	Sorong RTRW	Compliance Rate
Adat boundary mapping	Absent	Absent	Absent	Absent	0%
Sacred site spatial layer	Absent	Absent	Absent	Absent	0%
Spirit pathway delineatio	Absent	Absent	Absent	Absent	0%

n FPIC documentation in AMDAL	Partial	Absent	Partial	Absent	25%
Community consultation record	Present	Absent	Partial	Partial	37.5%
Cultural heritage overlay	Absent	Absent	Absent	Absent	0%
Communal land certification	Absent	Partial	Absent	Absent	12.5%

The Merauke RTRW 2032, covering Marind-anim territory, designates significant areas of the Maro River floodplain which community mapping identifies as a primary ancestral spirit corridor as 'strategic agricultural development zone' for the Merauke Integrated Food and Energy Estate (MIFEE). This designation was made without ethnographic site assessment or community consultation meeting the FPIC standard. In Jayapura, interviews with Tobati-Enggros ondoafi documented the loss of at least fourteen sacred lakeside sites since 2008, converted to parking infrastructure, commercial kiosks, and road embankments.

Toward Cosmologically Informed Planning: Proposed Implementation Pathway

Community participants across all sites expressed strong desire for formal recognition of sacred spatial categories in planning instruments. Key conditions identified included: community control over the production and storage of cosmological maps; a tiered disclosure protocol distinguishing publicly shareable landscape information from restricted sacred knowledge; integration of adat spatial mapping into legally binding planning layers; and mandatory training for planning officials in indigenous spatial epistemologies. Table 4 presents the proposed phased implementation pathway.

Table 4. Implementation Pathway Matrix for Cosmologically Informed Planning

Phase	Key Activity	Expected Output	Responsible Actors	Prerequisite
Phase 1 (0–12 months)	Participatory cosmological mapping	Community-validated sacred site	Adat councils; LPPM	Community data sovereignty

	workshops with adat communities	data layer	universities; NGOs	protocol
Phase 2 (12–24 months)	Integration of cosmological GIS layers into RTRW revision process	Legally binding sacred landscape overlay in spatial plan	Bappeda; ATR/BPN; Biro Hukum	Ministerial decree on adat spatial categories
Phase 3 (24–36 months)	Cultural Landscape Impact Assessment in KLHS cycle	Mandatory cosmological screening for major developments	KLHK; Bappenas; Pemda	National KLHS regulation amendment
Phase 4 (36–60 months)	Institutional capacity building and planning official training	Certified indigenous spatial epistemology curriculum	Kemen-PUPR; Bappenas; universities	Sustained political commitment

The findings confirm and extend existing scholarship on the systematic exclusion of indigenous cosmological knowledge from formal planning instruments (Howitt & Suchet-Pearson, 2006; Hidayati, 2020). What is distinctive in the Papuan case is the scale and intensity of this exclusion: not merely the absence of a cultural heritage layer in planning maps, but the categorical non-existence of cosmological spatial logic within the epistemological framework of Papua's planning bureaucracy. Planning officials' references to 'unclear legal mandates' reflect not administrative confusion but a deeper ontological gap between Cartesian property space and relational cosmological geography (Descola, 2013). A critical political economy dimension must also be acknowledged: the systematic invisibility of sacred landscapes reflects the historical relationship between the Indonesian state and Papuan indigenous peoples (Braithwaite et al., 2010), in which resource extraction and transmigration imperatives have consistently overridden adat claims.

CONCLUSION

This study has demonstrated that Papuan cosmological belief systems constitute a sophisticated and functionally significant spatial ordering of the landscape, encompassing sacred sites, spirit pathways, vertical cosmological axes, and relational land-use zones that perform governance, ecological, and spiritual functions simultaneously. The systematic absence of these cosmological geographies from formal planning instruments generates spatial conflict, cultural

displacement, and ecological risk across Papua's rapidly urbanising landscapes.

The study advances three core recommendations. First, the mandatory integration of participatory cosmological mapping into RTRW revision processes, with community-controlled data sovereignty protocols. Second, the development of a national-level technical guidance document under the Ministry of Agrarian Affairs and Spatial Planning (ATR/BPN) specifically addressing cosmological and sacred site mapping. Third, the establishment of cultural landscape impact assessment as a required component of Strategic Environmental Assessment (KLHS) for development plans in Papua and other indigenous-majority provinces. These recommendations are not culturally specific accommodations but universalisable planning improvements: cities built in alignment with the cosmological geographies of their founding communities are more socially stable, ecologically sustainable, and politically legitimate.

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