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Dwelling with the Fault: Cultural Landscape and Spatial Formation in Kampung Batu Lonceng, Indonesia

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ABSTRACT

Since UNESCO formalized the concept of cultural landscapes in 1992, heritage discourse has shifted from monument-centric approaches toward values-based perspectives that foreground the dynamic interplay among people, place, and ecology. Within this framework, cultural landscapes offer a critical lens for understanding rural settlements not only as spatial configurations but also as embodiments of intangible knowledge and ecological adaptation.

This study investigates Kampung Batu Lonceng, a vernacular settlement situated along the active Lembang Fault in West Java, Indonesia. With historical traces dating back to the Neolithic period, the kampung exemplifies how spatial formation is shaped simultaneously by geomorphological vulnerabilities and long-standing cultural practices. In the absence of formal planning, the settlement has developed an organic, linear morphology aligned with the fault line.

Drawing on qualitative fieldwork—site mapping, semi-structured interviews, and a literature review—the findings reveal that spatial practices are grounded in local belief systems and environmental knowledge. Geological features—particularly scared stones—are not merely avoided but embraced as symbolic landscape markers guiding everyday activities. The study argues that resilience in disaster-prone areas depends not only on conserving physical structures but also on safeguarding the intangible cultural values and practices that shape spatial logics and adaptive strategies over time.

Keywords: cultural landscape, conservation, settlement formation, Kampung Batu Lonceng, Lembang fault mitigation

INTRODUCTION

Over the last three decades, landscape has become central to planning and heritage conservation (Albert et al., 2013; Smith, 2006). A pivotal change occurred in 1987 with the articulation of sustainable development (Roseland, 1992), while, in parallel, heritage studies reframed landscape as a socio-cultural construct (Martokusumo et al., 2022; Muñoz-Viñaz, 2005; Smith, 2006; Walter, 2020). In contrast with earlier object-focused approaches, practice moved from a predominantly physical-based lens toward values-based perspectives that recognize complex socio-cultural interrelations across larger spatial scales (Fayez, 2024). This turn foregrounds immaterial qualities—values, spirit, religious context and multi-sensory experiences—aligned with people-centered development (Engelhardt & Rogers, 2009).

Conceptually, cultural landscape challenges universalized heritage discourses (Albert et al., 2013; Smith, 2006). Against the Authorized Heritage Discourse (AHD)—which often isolates monuments and privileges natural over cultural values, producing exclusion and dispossession—cultural landscapes emphasize dynamic, lived relations among people, place, and memory (Taylor & Altenburg, 2006; Taylor & Lennon, 2012; Wells, 2010). Furthermore, today's heritage discourse and practice have moved from a narrowly technical focus to a more ethics-based approach (Muñoz-Viñas, 2005; Smith, 2006). Thus, it has moved to a values-based approach in managing heritage sites by emphasizing associative values, including indigenous and local communities and knowledge (Fayez, 2024, Veldpaus et al., 2013; Weiler & Gutschow, 2017).

Since UNESCO's 1992 recognition of cultural landscapes, interests across architecture, planning, and landscape have expanded into rural contexts (Albert et al., 2013). Alongside sustainability concerns, late-1980s cultural-landscape thinking advanced a shift from landscape as cultural product to cultural process—a social construct (Martokusumo et al., 2024; Walter, 2020). Tangible elements—buildings, structures, and landscape patterns—therefore require interpretation through cultural contexts: how they came into being, how specific forms evolved, and who shaped them over time. A holistic, interpretive "way of seeing" is articulated by Wylie (2007) and Oltwig (2007).

Historical studies likewise must account for the mental attitudes and ideologies that shape landscapes as social constructs, not merely their visible expressions (Baker, 1992). This aligns with Barthes (1977), who frames landscape as a system of signs and symbols; read culturally, landscapes reveal human values and plural meanings.

This paper re-examines conventional understandings of heritage through the case of Kampung Batu Lonceng, emphasizing the nexus of people, social systems, and landscape. Deeply rooted in Sundanese culture, the settlement holds significant socio-cultural value in West Java, Indonesia's most populous province. Located near the active Lembang Fault, its spatial formation and morphology have been shaped by environmental (external) and socio-cultural (internal) forces. The article analyzes how local imperatives pattern settlement and development and advocates for a collaborative approach to landscape management—integrating tangible and intangible dimensions—to support sustainable and resilient outcomes.

LITERATURE REVIEW

New Approach in Planning and Design

Today, "cultural landscape" is often labeled a new heritage typology; more usefully, both the concept and the wider heritage approach merit re-evaluation (Muñoz-Viñas, 2005; Smith, 2006; Taylor & Altenburg, 2006). As heritage discourse evolved, particularly under postmodern influence, it shifted toward an ecological view of cultural resources, integrating natural and cultural resource management with contemporary practice (Albert et al., 2013; Fayez, 2024; Roseland, 1992; Smith, 2006). The main components of cultural landscapes can be classified as tangible heritage dimensions (i.e., the physical characteristics) or intangible heritage dimensions (i.e., the meaning of the landscape) (O'Donnell, 2008). Rejecting earlier nature–

culture separations and specialized protections, the new paradigm integrates both (Leitmann, 1999; Taylor & Lennon, 2012), as shown in Table 1.

In Asia, human-made heritage is deeply intertwined with—and shaped by—the natural geography and environmental context of its respective cultures. Fundamentally, these elements serve as a setting for more intangible cultural expressions (Baker, 1992; Engelhardt & Rogers, 2009). Growing recognition of cultural landscape in conservation marks a shift away from viewing buildings in isolation, reinforcing that buildings and landscapes (*topos*) form a continuum (Taylor & Lennon, 2012). Embracing the inseparable nexus of cultural and natural landscapes is therefore essential (Leitmann, 1999; Martokusumo & Wibowo, 2019). Accordingly, landscape as a socio-cultural process is not a mere visual backdrop to built heritage but an integral part of it (Baker, 1992; Taylor & Lennon, 2012).

The cultural landscape framework comprises three interrelated elements: the landscape, the people, and the social system (Martokusumo et al., 2022). Understanding landscape as a built environment goes beyond physical form: It is a socio-cultural product shaped by local traditions, lived practices, and belief systems. The relationship between landscape and people—mediated by culture and social organization—anchors cultural landscapes, with local social structures playing a defining role in physical configuration.

As shown in Figure 1, these elements align with vernacular architecture, which encompasses natural, human, and intellectual resources (Kobayashi, 2023). Recognizing their interconnections is crucial for engaging cultural landscapes. This study thus re-affirms that, beyond its natural dimension, landscape is not merely physical: It embodies people, social dynamics, and continuous cultural negotiation—a social construct.

Table 1

Conventional Versus Ecological Design

Issue	Conventional Design	Ecological Design
Key criteria	Economic return	Human and ecological health
Form	Standard approaches are copied around the globe	Design respond to the bioregion and local culture, needs and conditions
Energy	Bias toward nonrenewable fossil fuels and nuclear energy	Bias toward renewable energy and reduction of greenhouse gases
Materials use	High degree of waste, with air, water and land degradation	Emphasis of reuse, recycling, ease of repair, flexibility, and durability.
Time horizon	Short term	Long run
Spatial scale	Focus on one scale	Consider interrelationships and integrate across is visible
Relationship with environment	Design in imposed on nature for better control, nature is hidden	Design works with nature as a partner, nature is visible
Knowledge base	Narrow disciplinary focus	Integrate across disciplines
Decision-making	Top-down and expert-driven	Participatory

Note. This table demonstrates aspects and characteristics of conventional and ecological design approach. Adapted from *Sustaining cities* (p. 360), by J. Leitmann, 1999, Mc-Graw Hill. Copyright 1999 by Mc-Graw Hill.

Given this context, culture-nature relations and traditional ways of seeing cultural landscapes are attracting renewed critical attention. Within this paradigm shift, the nexus of people, social systems, and (urban) landscape must guide historic landscape engagement. Consequently, built environments and man-made heritage, including settlements of specific historical, social, and cultural significance, should be conceived as a continuum constituted through intertwined tangible and intangible dimensions.

METHODOLOGY

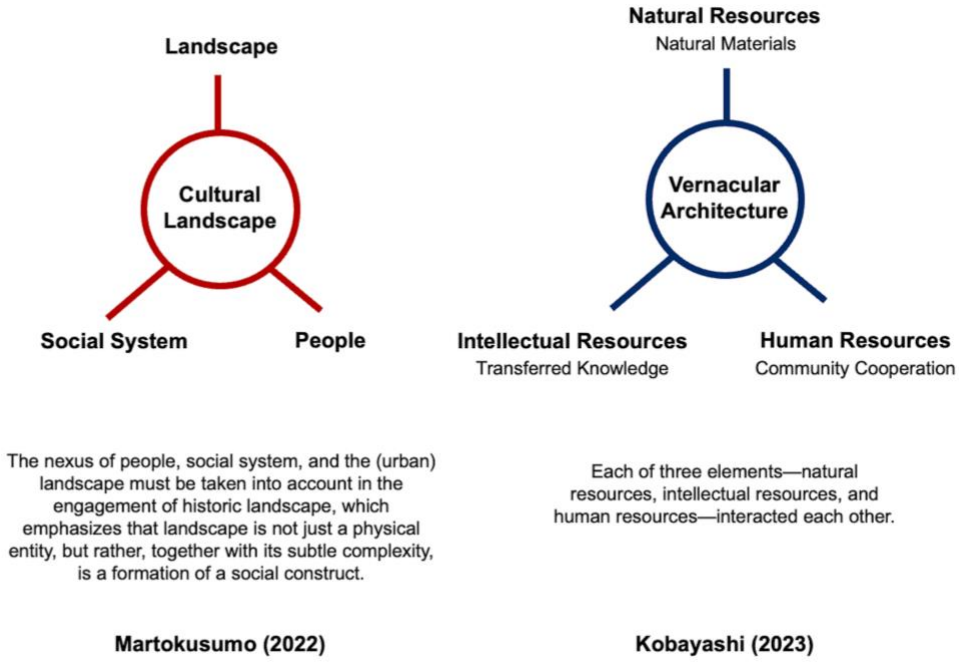
Kampung Batu Lonceng was selected on two grounds. First, it is a cultural palimpsest, with spatial traces reaching back to the Neolithic period. Second, its proximity to the highly active Lembang Fault places it in a high-risk seismic zone, enabling analysis at the intersection of cultural heritage and environmental vulnerability.

Given the lack of design and planning frameworks that address such risk, the study employs a cultural landscape lens to ask how environmental and socio-cultural factors shape spatial organization. Specifically, it aims to: (1) document site context via mapping and drone surveys; (2) identify spatial and cultural patterns driving settlement morphology, especially in relation to landslides, rockfalls, and earthquakes; and (3) propose design and planning recommendations for resilience and sustainability.

The research adopts a qualitative methodology, combining field surveys, semi-structured interviews (primary data), and a literature review (secondary data), as shown in Figure 2. On-site observations, including drone-assisted documentation, identified socio-spatial and environmental elements: sacred sites, fault lines, and settlement patterns. Geospatial mapping with ArcGIS delineated geological features, such as rockfalls and boulders, that function as cultural markers.

Figure 1

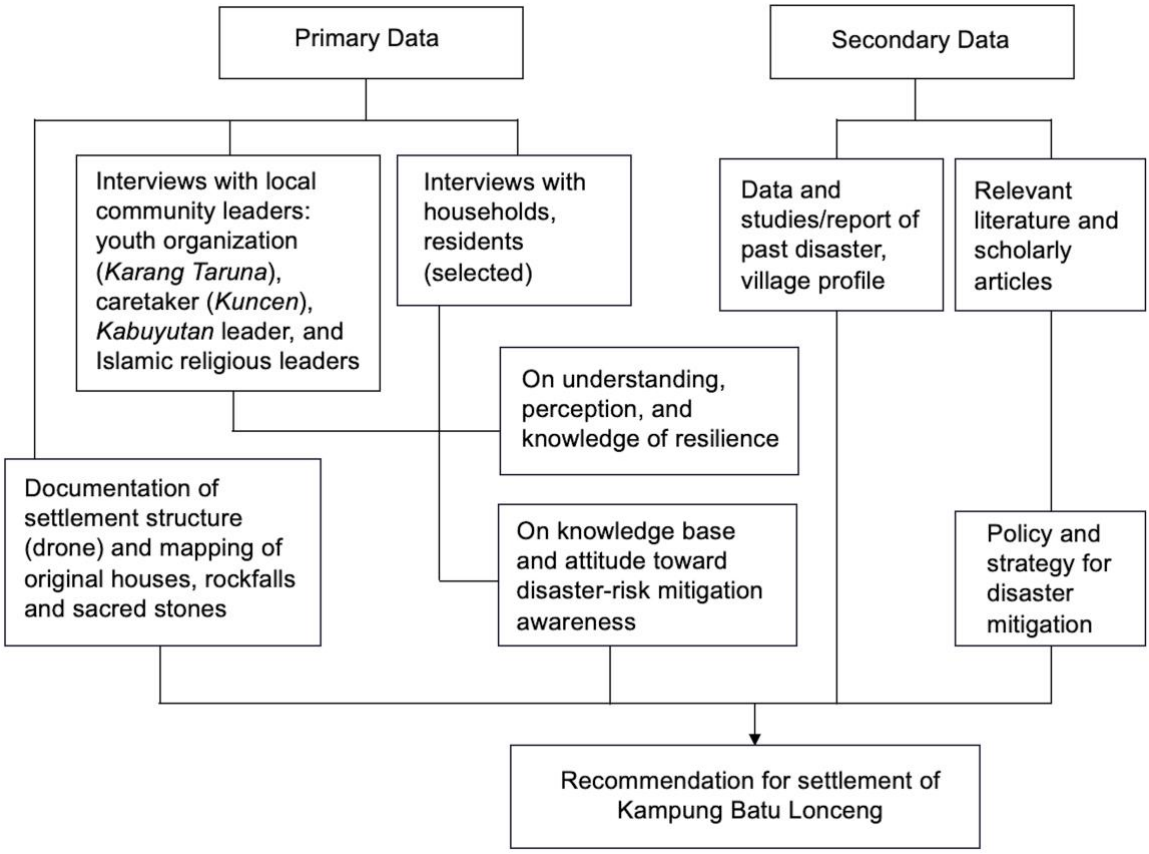
Dimensions of Cultural Landscape and Vernacular Architecture



Note. Redrawn by Author in 2023

Figure 2

Flow Chart of Primary and Secondary Data-Gathering Processes



Note. Adopted from *"Climate-resilient traditional architecture: A case of Dharamshala, India",* by G. Kaundal, P. Sharma and I. Singh, 2025, *Journal of Architectural/Planning Research and Studies (JARS), 22*(2), p. 272106-4 (https://doi.org/10.56261/jars.v22.272106). Copyright 2025 by Kaundal, G., Sharma, P., and Singh, I.

Fieldwork ran from November 2022 to August 2024, with intensive surveys on December 11, 2022, and February 5, 2023 (each ca. 6 hours). In-depth interviews (ca. 1-2 hours) involved the *Kabuyutan* leader (R1/R2), residents (R3–R5), religious leaders (R6–R7), a youth organization leader (R8), the caretaker (*Kuncen*) of sacred sites, an archaeologist, and geoscience experts. Interviews in Indonesian and Sundanese yielded insights on socio-cultural values, spatial memory, and environmental strategies. Ethical clearance and oral informed consent were secured before interviews commenced.

Data were analyzed through thematic analysis supported by an abductive approach (Braun & Clarke, 2020; Numsuk, 2025; Thompson, 2022). Iterative coding bridged findings and theory across themes: spatial logic; local cosmologies (traditions, beliefs, practices, religious-based determinants); environmental constraints; and socio-ritual practices. Snowball sampling identified informants versed in local histories and environmental issues (Knott et al., 2022; Noy, 2008).

Participant observation complemented interview data, notably during the village-scale cultural event *Hajat Lembur* (July 20, 2023). Documentary analysis of archival materials, historical maps, and oral histories further enriched the findings. Content analysis systematically interpreted textual, visual, and spatial data, ensuring triangulation and validation through key informants and theoretical cross-referencing.

Key discussions show how indigenous knowledge systems, vernacular building practices, and the spatial perception of geological

features (e.g., sacred stones) underpin resilience. The study also underscores community-based disaster communication strategies. Framed by cultural landscape, the research concludes that integrating tangible and intangible dimensions—beliefs, values, and rituals—sustains a culturally resilient, environmentally responsive settlement, reflecting community aspirations and adaptive strategies to persistent geophysical risk.

RESULTS AND DISCUSSION

Kampung Batu Lonceng: A Semi-Urban Settlement in Jeopardy

Kampung Batu Lonceng (ca. 47 ha) is a small semi-urban settlement of fewer than 986 people (326 households, 2022) confronting accelerating urban dynamics. The kampung comprises ca. 13 ha of residential land and 34 ha of agricultural land. Administratively, it falls within Suntenjaya Village (ca. 1,456 ha; 8,264 people; 2,780 households) in West Bandung Regency. Most residents engage in traditional agriculture and animal husbandry: 36% are farmers and 6% farm laborers (Wibowo, 2022).

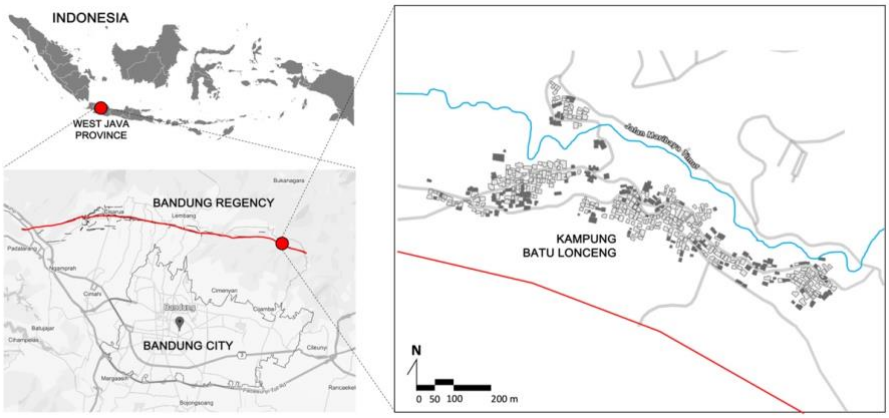
The kampung takes its name from an archaeological stone located upslope at a sacred site. Socio-culturally, it is part of the *Kabuyutan* tradition in West Java (Tatar Sunda). *Kabuyutan* denotes sacred locales—settlements, forests, or specific natural sites—of cultural, religious, archaeological, or traditional significance (Perdana & Wahyudi, 2020). Boundaries are symbolic rather than fixed: Those who perform rituals or feel socio-culturally bound are considered part of the *Kabuyutan.*

Located approximately 10 km north of Bandung at approximately 1,290 m.a.s.l. in Lembang District, West Java Province, the kampung occupies a critical earthquake-prone zone along the Lembang Fault (Daryono et al., 2019; Musson, 2012; Perdana, 2019), as shown in Figure 3. Despite seismic risk, urbanization drives morphological change, and the settlement has evolved organically into a linear pattern parallel to the fault. von Koenigswald (1951) reports that North Bandung, including Batu Lonceng, has Neolithic roots (Rothpletz, 1951). The kampung is a palimpsest of early valley-and-water–oriented settlements; obsidian shards in the northern Bandung–Lembang hills indicate prehistoric habitation and cultivation (Chia et al., 2010; Rothpletz,1951).

The Lembang Fault is active due to ongoing regional tectonics. It extends along Bandung's northern edge, just south of the active Tangkuban Perahu volcano, and exhibits primarily sinistral (left-lateral) motion with an estimated slip rate of 1.95–3.45 mm/yr (Daryono et al., 2019). At approximately 29 km length, it is capable of Mw 6.5–7.0 earthquakes, with a recurrence interval of approximately 170–670 years. Although no major historical earthquakes are recorded, geomorphic evidence indicates recent activity, reinforcing its active classification.

Figure 3

Location of Kampung Batu Lonceng within the Village Suntenjaya in Indonesia



Daryono et al. (2019) underscore the seismic threat posed by the Lembang Fault and other Javan faults to Bandung and its environs (Irsyam et al., 2010; Newcomb & McCann, 1987). Field observations show Batu Lonceng's houses lie approximately 100–200 m from the active fault. For mitigation, Hart and Bryant (1997) recommend a 30 m exclusion zone in the U.S., while McClymont (2001) cites a 40 m buffer in New Zealand. Although the kampung's distances meet these benchmarks, vulnerabilities and preparedness remain concerns, requiring heightened awareness and effective local strategies to reduce seismic risk and enhance resilience (Fig. 4). Over the past decade, residents' awareness has grown, and more socio-ecologically conscious solutions have emerged, signaling commitment to sustainable, resilient settlement planning.

> *"In 2015, this area (of Kampung Batu Lonceng) was proposed as a protected forest."*

(R1, personal communication, December 11, 2022).

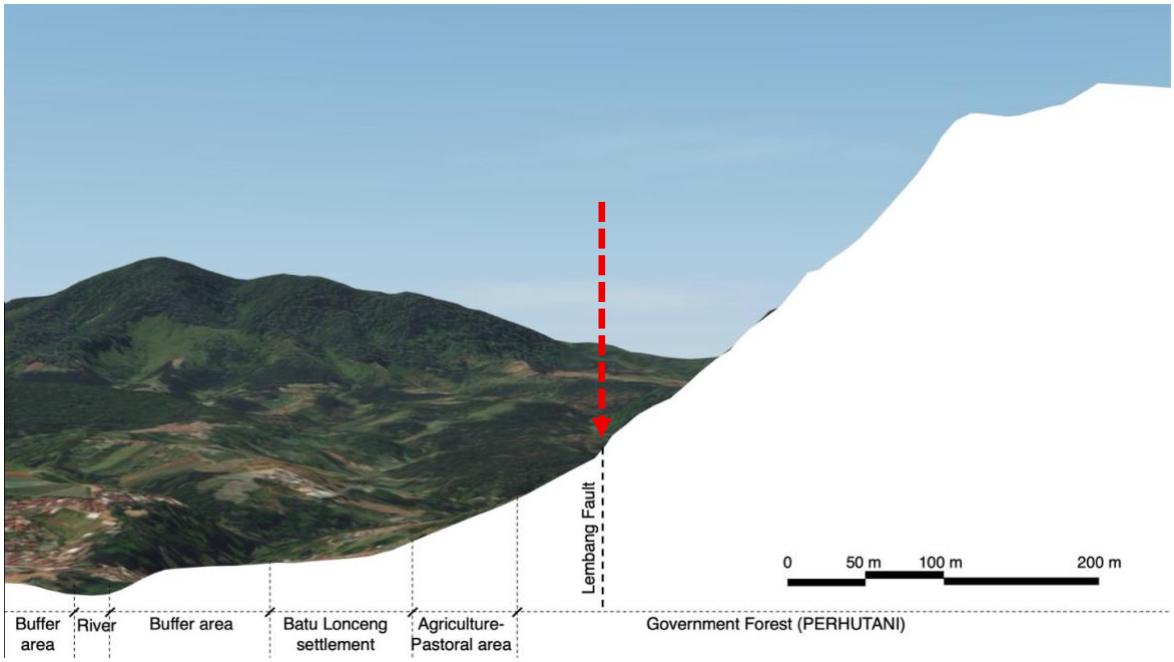
Spatial Formation and Building Tradition/Practices

Kampung Batu Lonceng lies on the north hillside of the Lembang Fault on moderately sloped terrain. Responding to steep, fault-adjacent topography, the settlement developed organically in a band parallel to the fault. North of the west–east linear settlement, the Cikapundung River forms a boundary. From the observation, a 100–200 m swath between settlement and active trace is used for plantations, agriculture, and forestry, functioning as a buffer between residential and forest areas. Thus, the zone of agriculture and animal farming is designated as a buffer zone between residential and forest areas. Boundary regulations limit encroachment into PERHUTANI zones, supporting risk mitigation.

The observation also reveals that five original houses from the earlier period are still intact and have been built using simple timber construction, as shown in Figure 5. Local knowledge holds that original stilt houses better resist lateral forces. Mostly one story, they feature double-ventilated clay-tile roofs; wooden and/or woven-bamboo (*gedeg*) walls that promote airflow; glass-and-wood windows; wooden floors; bamboo columns;

Figure 4

North-South Cross Section of Kampung Batu Lonceng



Note. Section of Kampung Batu Lonceng from the river to the top of the hill, showing different zonings.

and andesite-stone pile foundations. Plans are geometrically simple—typically rectangular or L-shaped (with additional modifications)—with a living room, bedrooms, service area, kitchen, bathroom/toilet, and a small terrace, as shown in Figure 6.

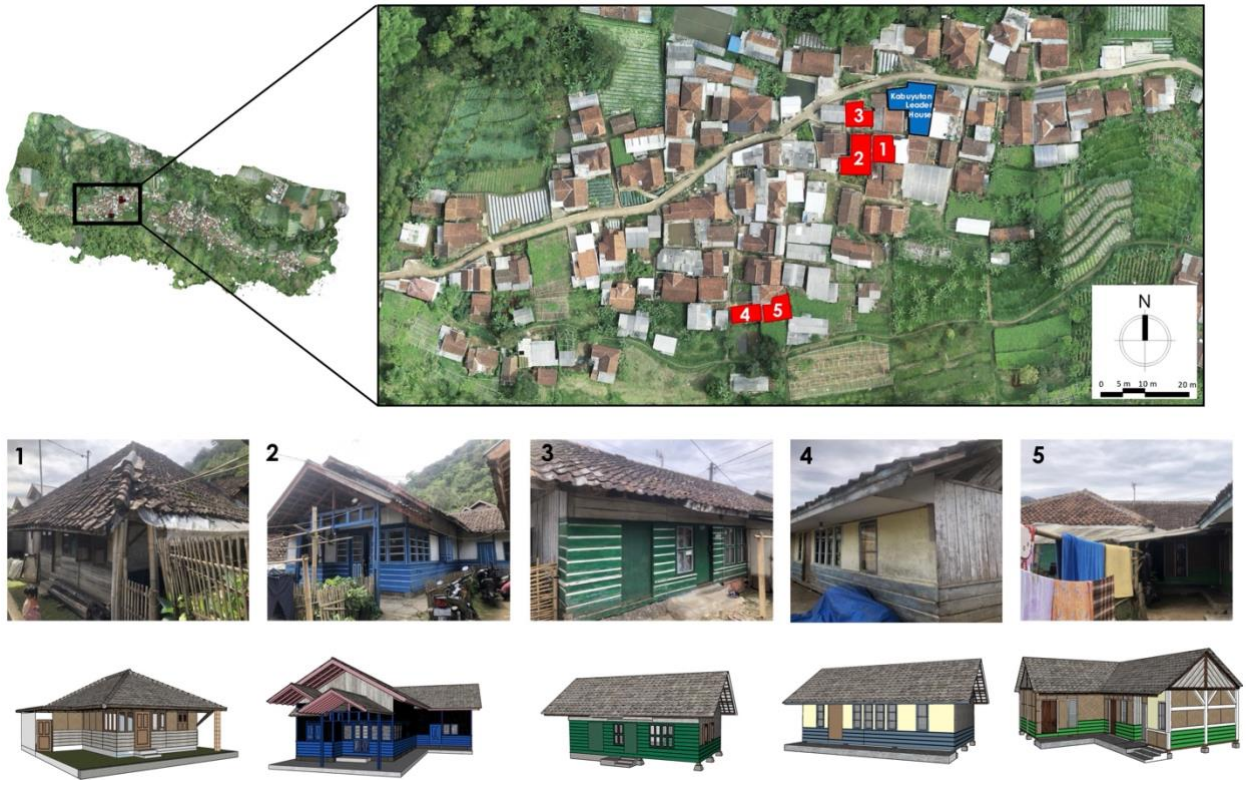
Generally, the original stilt houses constructed in the earlier periods developed organically and were gradually expanded to accommodate emerging needs. Over time, scarcity and rising costs reduced access to quality timber, shifting preferences toward brick and modern materials (e.g., prefabricated brick, clay tiles, and metal roofing). Field observations and interviews with local residents consistently affirm this transition in construction practices, including both material preference and building techniques. Additionally, due to the latest development, residential areas have become relatively more dense, resulting in a lack of open space.

> *"The transformation of houses from stilt structures to masonry walls reflects new developments influenced by changing environmental conditions."*

(R1, personal communication, December 11, 2023).

Figure 5

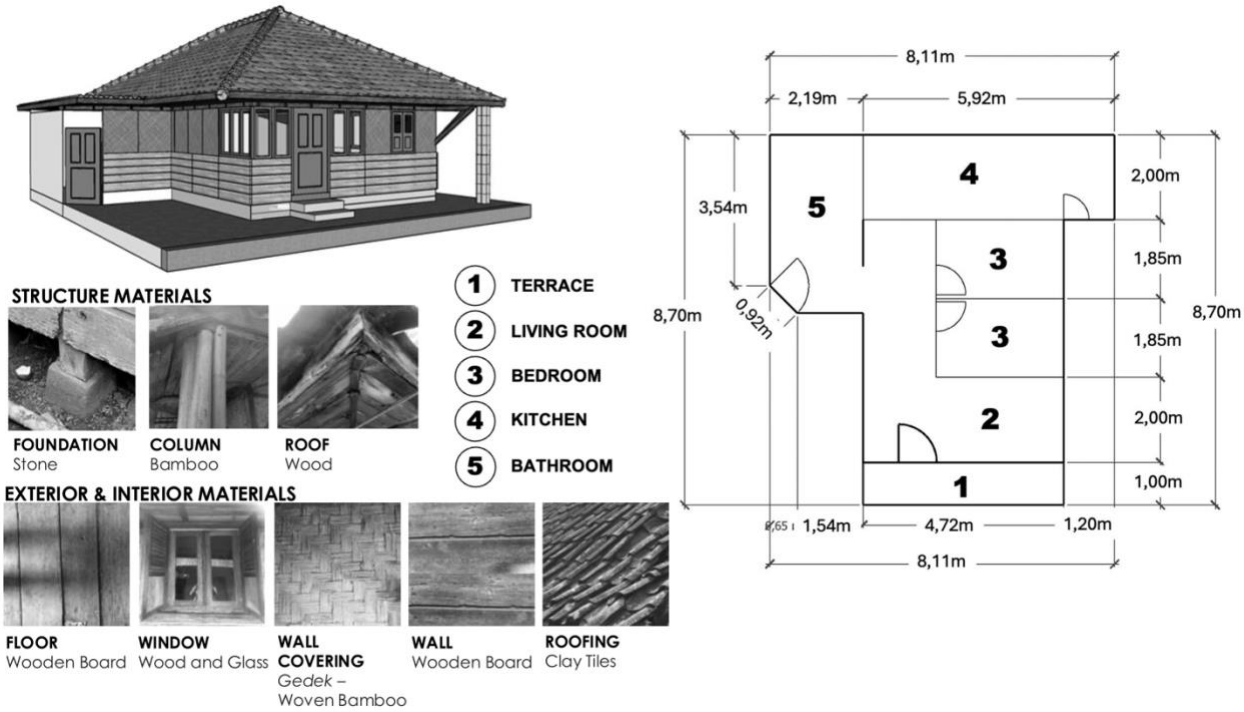
Original Stilt-Timber Houses in Kampung Batu Lonceng



Note. Authors' Documentation in 2023

Figure 6

Example of Original Stilt-Timber House in Batu Lonceng



Note. Documented and redrawn after field observation in 2023

Residential dwellings reflect community-specific construction traditions shaped by local materials, practicality, and cost (Melnick, 1983).

> *(The use of wooden materials) "….the wood came from Subang. If we used the local wood from around here, it would have all been gone by now. In the past, yes, the wood was taken from here."*

(R1, personal communication, December 11, 2022).

In contrast to earlier construction practices, where stilted timber houses evolved organically in response to cultural traditions and practical needs, recent development in Kampung Batu Lonceng shows only a limited adoption of earthquake-resistant principles. Despite growing awareness of seismic risks, many newer houses are still constructed without adequate structural considerations or adherence to seismic building standards.

> *"Maybe the main reason is budget-related. If there were sufficient funds, I would actually prefer to extend the building toward the back. This structure has been standing since 1948."*

(R3, personal communication, February 5, 2023).

Field observations indicate that houses are typically clustered based on kinship networks, and are built in close proximity to one another. The size of each dwelling generally corresponds to household composition, while the spatial distribution of units is shaped by both lineage and increasing population density. Renovation and maintenance vary widely with household economic capacity.

> *"Everyone here in this RW (neighborhood unit) belongs to one extended family, all tracing their lineage back to a common ancestor."*

(R1, personal communication, December 11, 2022).

Landscape and Intangible Heritage

Kampung Batu Lonceng contains a well-known *situs keramat*—the Batu Lonceng sacred site—named for an archaeological stone within it. Administratively designated as an archaeological

site of West Java, it also serves as a local pilgrimage destination. Physically, the site is a stepped pyramid (*punden berundak*), a form associated with prehistoric ritual places. The active Lembang Fault passes directly through the site, crossing at its entrance. Two key objects are present: Batu Lonceng, a bell-shaped andesite, and Batu Kujang, an andesite resembling a *kujang* dagger handle. These large stones hold spiritual significance and are believed to confer protection against hazards and misfortune.

> *(The sound of the stone bell as a disaster warning) "Yes, it's just like a bell. It's a belief passed down from our ancestors. But hopefully, we will be spared from disaster."*

(R3 & R4, personal communication, February 5, 2023).

In the Kampung Batu Lonceng, notable rockfalls as geological features of varying sizes can also be found within the village's agricultural area. Among the several significant rock formations are *Batu Wahyu* (revelation stone), *Batu Leuit* (rice storage stone), and *Batu Goong* (gong stone). These and others are shown in Figure 7.

Field observations reveal that those stones are spatially aligned along the active Lembang Fault, positioned roughly 100–200 m from the fault line, in the cultivated area. Together with other smaller rockfalls, the *Batu Leuit*, *Batu Lonceng*, *Batu Goong*, *Batu Kujang*, and *Batu Wahyu* hold deep cultural significance for the local community, functioning as natural markers tied to farming and everyday socio-cultural life. This linear alignment forms an "imaginary boundary" distinguishing the settlement area from the more vulnerable, hazard-prone zone, as illustrated in Figure 8.

In earthquake risk management, practice has shifted beyond purely technological fixes toward traditional knowledge, community-based action, and lessons from prior events (Ayeb-Karlsson et al., 2019; Guy & Farmer, 2001; Kurnio et al., 2021). Kampung Batu Lonceng exemplifies this: Rockfalls operate as cultural markers that actively shape spatial organization. These elements are not merely static: They actively shape the spatial organization of the settlement. As Melnick (1983) argues, such imaginary boundaries are integral to cultural landscapes, serving as informal but influential elements that

Figure 7

The Distribution of Stones/Archaeological Objects Around the Sites

Note. Field survey in 2023

regulate land use, whether through tree plantings or other natural features, intentional or not. In Kampung Batu Lonceng, this imaginary boundary structure divides the buffer zone along the Lembang Fault into three distinct areas: the settlement core, the farming or cultivated agricultural land, and a protected forest area, managed by the state-owned forestry company, PERHUTANI.

> "*Due to a jurisdictional conflict with PERHUTANI, the land cannot be possessed or legally controlled."*

(R1, personal communication, December 11, 2022).

This organization reflects a hierarchy of inhabited, utilized, and conserved areas. Landscape, as a socio-cultural construct, bears layered meanings as well as practical functions. As Taylor et al. (2015) emphasize, landscape formation is deeply informed by the beliefs, values, and worldviews of the communities that inhabit it. Within the framework of cultural landscapes, these spaces reflect layers of meaning—embodying ingenuity and adaptation, spiritual and healing practices, memory and identity, as well as histories of conflict and coexistence. Its complex tangible–intangible values require holistic reading, not only spatially or materially but as shapers of narrative and lived experience (Brown, 2015). Thus, meaning of living in a disaster-prone settlement emerges not as fixed or absolute, but through ongoing interpretation shaped by time, culture, and perspective.

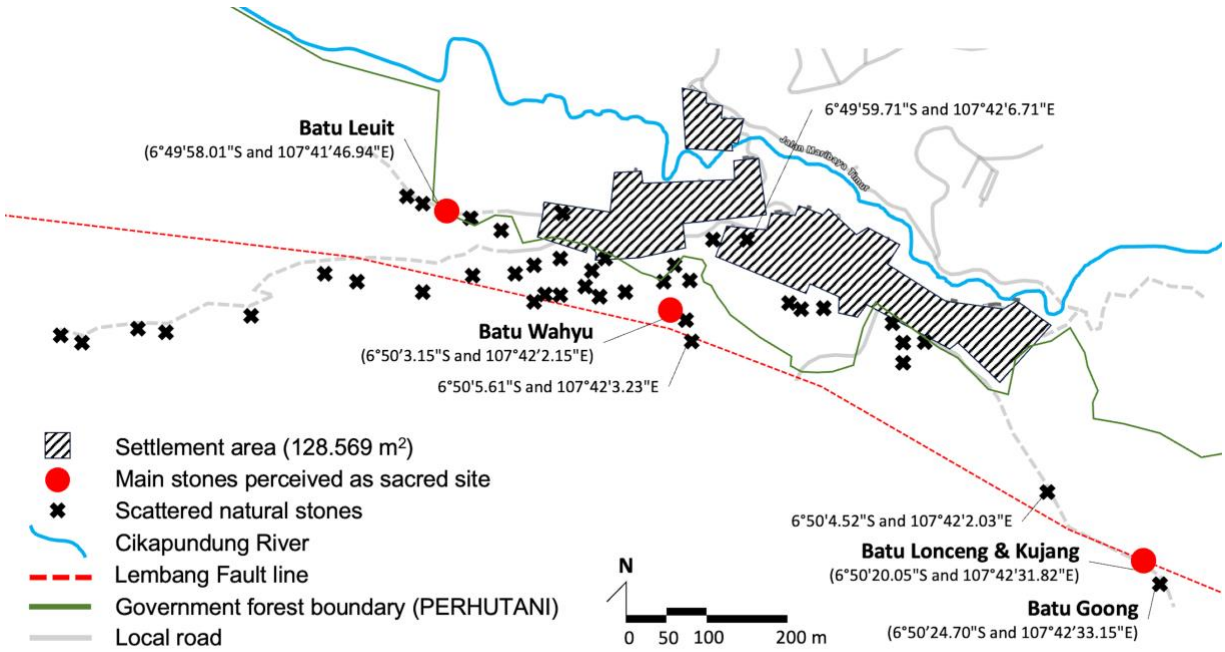
> *"(Aware of living in the Lembang Fault zone?) Yes, we're aware. But where else can we go?"*

(R3 & R4, personal communication with residents, Feb. 5, 2023).

In relation to meanings and values in building practice and spatial formation, this research identifies several key aspects such as the belief system, landscape-related values embedded in construction traditions, use of local materials and techniques, and role geological features as landscape markers in shaping settlement patterns. Hence, a cultural-landscape lens is thus essential for assessing meanings and values in Batu Lonceng's building practices and spatial planning.

Figure 8

Settlement Area and the Formation of Rockfalls



Note. Redrawn after field survey in 2023

The Communication of Disaster and Social Challenges

Human engagement with natural hazards offers cumulative experience that can foster a sustainable relationship between society and nature. In many cultural communities, adaptation to risk and responses to danger are understood not only as practical matters but also as behavioral and material practices shaped by religious taboos and indigenous warning systems. This is particularly evident in Indonesia, where culture deeply informs disaster response; accordingly, integrating local knowledge and community-led action is essential (Imadudin & Erwantoro, 2021; Thene, 2016). Traditional wisdom operates as a risk-reduction mechanism, rooted in collective memory shaped by recurrent disasters (Donovan, 2010). This memory influences how the community responds, often manifested through religious interpretations and taboos that deter settlement in high-risk zones, embedding these practices within the cultural landscape.

In Kampung Batu Lonceng, potential disaster is primarily understood through culturally embedded stories, particularly those of Batu Lonceng and Batu Kujang. These mythical narratives serve as localized interpretations of potential threats, standing some distance from scientific logic. Disasters are often attributed to God's displeasure and rage for transgressions against nature or customary rules. In response, the community maintains a triangular communication—toward God, nature, and fellow humans (Purwaningrum et al., 2024). These intertwined modes of communication are expressed collectively through rituals, reinforcing community bonds while serving spiritual, social, and ecological functions. This cultural framework supersedes scientific explanations, with cultural leaders like the *Kabuyutan*, local youth organization and religious leaders playing more central roles in raising awareness and preparedness for disaster preparedness than formal authorities.

> *"..yes, we enjoy exploring the cultural potential that exists in our community. When we conduct such rituals, we always make an effort to provide proper understanding so there is no miscommunication—so people don't assume, for example, 'Oh, she's making offerings.' In fact, we're simply asking for help from Allah, only the way we do it may look different."*

(R5, personal communication, December 11, 2022).

> *"Regarding what will be done and is currently being done this year, I've been given a specific mandate to reforest the Lembang Fault. That's probably the main focus. As I mentioned earlier, I don't agree with the notion of being 'disaster-ready'—because I come from a background in disaster mitigation. From the mitigation perspective, we must always remain alert. That's the key: Never feel too safe. Because the moment we feel safe, that's when we become negligent."*

(R8, personal communication, August 24, 2024).

Interviews in this research reveal that disaster narratives in the kampung are contested; sites of negotiation and contestation reflecting community dynamics. Rituals attract not only local participants, but also outsiders with political or economic motives. While some residents refrain from engaging in the rituals due to religious differences or scepticism toward cultural leaders, the shared threat of disaster fosters a pragmatic unity. Even dissenting voices often support collective efforts, acknowledging their role in communal resilience.

> *"In terms of ritual practices, offerings like sesajen still exist, and praying or asking the ancestral spirits* (*karuhun*) *is also still practiced."*

(R6, personal communication, August 24, 2024.

> *"There are still many such matters that need to be addressed. Things like burning incense and others. That, perhaps, is our responsibility as ustadz (religious leaders) to become more attentive and more, how should I put it, more accepting in responding to these practices—with the sincere hope that over time, they can be gradually*

> *realigned towards the true essence of tawhid (monotheism).”*

(R7, personal communication, August 24, 2024).

> *“This place is located on a mountain slope. There was a landslide in the past, but it never reached the houses. We believe this is thanks to the prayers we often recite during Muharram, the month of Mulud, and the Hajj month, when we carry out specific rituals. The main point is that we are praying to Allah—not to spirits—but perhaps the way we do it looks different. On the 1st of Muharram, we often slaughter a goat; we bury the blood in the ground, and distribute the meat to the community. If the slaughter is done in the morning, we hold a communal prayer ritual in the evening at Abah’s house as a form of prayer to ward off misfortune.”*

(R3 & R4, personal communication, February 5, 2023).

> *"That was an effort to bring the community together by integrating culture and religion."*

(R1, personal communication, December 11, 2022).

Thus, disaster narratives serve as a cultural mechanism for reconciling internal differences and fostering solidarity (Purwaningrum & Savirani, 2021).

Given Indonesia's predominantly oral tradition, disaster narratives are typically transmitted through stories and songs in local languages, aiding comprehension and retention. In Kampung Batu Lonceng, narratives contrast with formal disaster training sessions, which often use technical language unfamiliar to residents. Despite these trainings, many locals struggle to recall evacuation procedures or assembly points, revealing gaps between institutional methods and indigenous communication styles. While rooted narratives like those of Batu Lonceng endure, externally introduced logical frameworks often fail to resonate.

Another factor impeding disaster training uptake is the community's belief in divine protection following ritual observance. While psychologically comforting in a disaster-prone area, this confidence can lead to complacency. Despite expressing readiness for disaster (*siap bencana*), they may not perceive imminent risk, especially in the absence of recent traumatic events. This duality—empowerment versus negligence—poses a significant challenge for local stakeholders aiming to embed preparedness through modern strategies. In this context, a nuanced understanding of the kampung’s cultural landscape is critical in ensuring successful disaster mitigation attempts.

The case of Kampung Batu Lonceng highlights the complex interplay between cultural identity and disaster management. Bridging local intangible heritage with contemporary technical approaches is essential. Addressing tensions between scientific and traditional worldviews—tangible and intangible, modern and local, contemporary and traditional—is vital for crafting disaster mitigation strategies that resonate with and effectively serve the community (Purwaningrum, 2021).

Dimensions of Cultural Landscape and New Challenges

Having mapped the overlapping traits in Kampung Batu Lonceng and how they intersect within everyday life, it is essential to identify the pillars that structure the area’s cultural landscape. As part of their collective practice, the people of Kampung Batu Lonceng explicitly conserve three fundamental principles for living within an earthquake-prone landscape, as shown in Table 2.

> *“The stone bell is not about disaster alert — it's about being ready for disaster. Like it or not, we have to be prepared. Never mind the fault line — just look up above.”*

(R1, personal communication, December 11, 2022).

The first is *jaga leuweung*, literally translated as “protecting the forest.” Narratives emphasizing the sanctity and ecological function of the protected forest are prominent in community discourse. This principle is evident in the clear definitive zoning of the kampung, with clear buffer zones to separate and keep a fixed

distance between the protected forest, sacred stones, and the residential area. Moreover, the kampung's quasi-linear form is also a manifestation of this principle, with the development of the kampung running parallel to the border of the protected forest and the active fault line. The main road runs parallel to the forest boundary, while only a few secondary roads extend perpendicularly, keeping growth contained within a safer residential band (Purwaningrum et al., 2024).

> *(There is a restriction on building houses)—it should not be there. Yes, that's the location of the Batu Wahyu (Revelation Stone). So residents are advised not to build houses in that area. First, it is classified as PERHUTANI (state forest) land. Second, in 1957, that area served as a catchment for mud during a landslide."*

(R1, personal communication, December 11, 2022).

The second principle is *jaga tradisi budaya*, translated as "preserving local culture and tradition." The stories of the Batu Lonceng and Batu Kujang are—folklore that is part of enduring disaster narratives—are part of this tradition. Not only well known for their mythical abilities to predict disasters, the two stones indirectly serve as a reminder for the locals that the land remains hazardous. In relation to this, cultural rituals are held periodically to prevent disasters and as a form of gratitude for the protection given to the kampung hitherto.

> *"We must remember ngaruwat (ritually preserving or purifying) is part of ngarawat (caring for). So it's still a form of preservation or care. According to my limited understanding, if we want nature to take care of us, then we must take care of nature. If we care for nature, nature will care for us."*

(R5, personal communication, February 5, 2022).

The third principle is *jaga doa jeung usaha*, translated as "keep praying and striving." This principle balances entrusting safety to God with the obligation to pursue concrete protective measures. It aligns with Muslim beliefs—the dominant religion in the area—that despite their fate being in God's hands, it is also God's order for people to always give their best effort *(ikhtiar)* in changing their unfavorable fate.

> *"There are rituals practiced here—traditions passed down from our elders that we still continue today. They are carried out through generations, but not as acts of worship or to make requests to spirits, just to be clear."*

(R1, personal communication, December 11, 2022).

> *"Safeguard Prayer (Jaga Doa), Safeguard the Forest (Jaga Leuweung), and Safeguard Tradition (Jaga Tradisi). Safeguarding prayer means seeking safety and divine protection for Batu Lonceng from potential harm; this is something that, God willing, everyone can agree upon. Second, Jaga Leuweung involves reforesting the area—planting trees, bamboo, and various types of vegetation. So, the most important is Jaga Doa: a shared commitment to pray to God (Gusti Allah); second is Jaga Leuweung. And third, Jaga Tradisi: preserving our traditions."*

(R1, personal communication, December 11, 2022).

Despite differing perspectives on local beliefs and traditions, residents of Kampung Batu Lonceng demonstrate a shared awareness of their settlement's vulnerability. In recent years, the area has even been proposed as a designated *hutan larangan* (forbidden forest). Some residents have expressed willingness to relinquish the current site for conversion into a cultivated production zone, should a more viable relocation option emerge. Discussions regarding potential relocation have occurred among community members, but until a more socio-ecologically sound alternative is realized, daily life continues amid known environmental risks.

In response, disaster mitigation, particularly risk communication for younger generations, has become a community priority. These efforts aim to foster awareness and preparedness against potential geohazards. The residents' ongoing engagement with their socio-cultural and ecological landscape is summarized in Table 2, which outlines the core dimensions of their cultural landscape: physical settings (e.g.,

landscape and buildings), people, and social systems (Martokusumo et al., 2022). These dimensions resonate with the vernacular architectural framework encompassing natural, human, and intellectual resources (Kobayashi, 2023).

CONCLUSION

This study investigates local spatial practices and their relationships to socio-cultural and geological conditions, and it offers recommendations for future settlement and landscape engagement. This study also confirms that intangible aspects play a significant role in spatial planning for this highly disaster-prone Kampung Batu Lonceng. With its long historical traces dating back to the Neolithic period, this earthquake-prone area holds social, cultural and historical significance. Its zoning system, influenced by archeological, geological, and architectural features, reflects specific activities and purposes within the semi-urban settlement.

Guided by local leaders, the community has developed social and cultural strategies for earthquake mitigation while simultaneously pursuing more socio-ecologically grounded (people-centered) options for relocation or resettlement. Nevertheless, further research is needed to examine the formal roles and institutional legitimacy involved in governance policy frameworks, especially in regard to land tenure and risk-based spatial planning.

The cultural landscape of Kampung Batu Lonceng is defined by three principal dimensions: (1) preserving traditions (*jaga tradisi/budaya*), (2) maintaining a unique social system (*jaga doa jeung usaha*), and (3) protecting the forest/landscape (*jaga leuweng*). This dynamic engagement shapes the settlement's response to changing circumstances, with the cultural-landscape lens serving as a framework for analyzing spatial patterns and disaster mitigation approaches.

A key finding is the integration of local values with pragmatic building traditions—including the use of native materials—and the mobilization of geological features (notably "sacred stones") as landscape markers. These practices are evident in community deliberations on disaster mitigation. In line with this, continuous efforts are needed to map vulnerable areas and enhance early warning systems, as well as organize community outreach and disaster simulation activities. The case of Kampung Batu Lonceng highlights the complex interplay between cultural identity and

Table 2

Dimension of Cultural Landscape in Local Engagements

Dimension	Cultural Landscape	Activities
Physical Setting (Landscape, Building/Structure)	*jaga leuweung* (to protect the forest)	• Protection of the forest • Position of the settlement • Linear development along the imaginary line
Social System	*jaga doa* (to pray)	• Practice of prayer/*jaga doa* • Social network/organization • Involvement of traditional leader and caretaker
People	*jaga tradisi* (to preserve traditions)	• Preservation of local traditions • Culture-based activities/events • Spiritual beliefs practiced by the locals

Note. The cultural landscape consists of three dimensions that can also be observed in Kampung Batu Lonceng in the form of local engagements originally derived from the landscape (physical setting), social system, and people.

disaster management. Despite persisting challenges, with respect to recommendations for future planning, the Lembang Fault area offers a different perspective on sustainable landscapes and resilient communities, with a strong potential for positive transformation.

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