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Tri Hita Karana as an indigenous ecological ethic when and how customary values translate into environmental compliance

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ABSTRACT

Background: *Tri Hita Karana* (THK) is widely presented as the ecological ethic of Bali, yet land conversion, inequitable water use, and the loss of green space continue. Existing studies have largely treated THK as a cultural and philosophical framework, with less attention to the institutional and political-economic conditions that determine whether its values shape compliance. This study asks under what conditions THK values are translated into compliance with environmental rules, and when this translation fails. **Methods:** A critical hermeneutic documentary analysis was conducted across three cases differing in resource tenure and tourism pressure: the subak of Jatiluwih, the customary village of Tenganan Pegringsingan, and Canggu. Sources comprised UNESCO World Heritage records, provincial regulations, analyses of customary regulations, and peer-reviewed studies. Data condensation, data display, and cross-case comparison were used to interpret how institutional and political-economic contexts shape the translation of THK values into rules, with common-pool resource design principles as the analytical framework. **Findings:** In Tenganan, THK gains legitimacy through specific forest rules monitored by the village assembly, supported by graduated sanctions, and recognized by the state. These arrangements provide an institutional basis for regulating forest use, although sharecroppers have less say. In Jatiluwih, ritual authority coordinates water, but customary institutions have little control over land conversion and tourism. In Canggu, THK persists mainly as discourse while individually titled land is converted and customary authority marginalized. **Conclusion:** Across the three cases, THK appears to support stewardship when sacred legitimacy is embedded in specific, monitored rules governing collectively managed resources, particularly with state recognition. Its influence appears weaker where land is individually alienable and tourism-related incentives constrain customary authority. **Novelty/Originality of this article:** The study reframes THK from a general ethic of harmony to an institutionally embedded relational ethic and specifies when it supports compliance.

KEYWORDS: commons governance; customary law; environmental ethics; *subak*; *Tri Hita Karana.*

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1. Introduction

Tourism growth in Bali since the 1980s has intensified competition for land and water, challenging the capacity of customary institutions to regulate resource use amid expanding tourism activities. Studies document unequal access to water between tourism and farming (Cole, 2012; Cole & Browne, 2015), weak environmental impact assessment amid overdevelopment (Warren & Wardana, 2018), and the loss of green open space in tourism areas (Warastuthi et al., 2024). The conversion of *subak* rice fields is especially visible because these fields carry both agricultural and cultural value (Lanya et al., 2017; Ambarini et al., 2026; Miyazawa, 2026). Water scarcity and the conversion of sacred river buffers show that these pressures also affect resources with religious significance (Adhariani & Sulaiman, 2026; Praganingrum et al., 2026).

At the same time, *Tri Hita Karana* (THK), the idea that well-being arises from harmonious relations with the divine (*parahyangan*), among humans (*pawongan*), and with the environment (*palemahan*), has become the most frequently cited framework for sustainability in Bali, as reflected in its use, from the inscription of the *subak* cultural landscape as a World Heritage Site (UNESCO, 2012) to provincial spatial planning (Wiryawan & Ernawati, 2024) and tourism (Mulyana & Busro, 2025). Although THK is widely promoted as a framework for sustainability in Bali, its prominence does not necessarily demonstrate that its values are translated into effective environmental practices. This raises a further question: how, and under what institutional conditions, do THK-based values shape compliance with environmental rules? Indigenous and local knowledge can complement state and market instruments (Brondízio et al., 2021), and THK has recently been described as a lived ecotheology that guides environmental governance mainly through social obligation (Muchtar et al., 2026). The question is therefore not whether customary values matter, but under what conditions they shape environmental conduct.

Two clarifications frame the analysis. First, although THK draws on older Balinese Hindu cosmology and customary practice, it was articulated as an explicit formula only in the second half of the twentieth century and has since been mobilized as an ideology, scientific concept, and policy instrument (Roth & Sedana, 2015). Accordingly, this study treats THK not as a timeless doctrine, but as a framework whose meaning and political implications are shaped by its use in contemporary governance, including its invocation on both sides of contested tourism megaprojects (Adityanandana & Gerber, 2019). Second, the term indigenous refers here to locally originating knowledge, values, and institutions governed by local communities, rather than to a legal claim about the status of Balinese communities under international law (Brondízio et al., 2021). The institutions examined in this article, namely the customary village (*desa adat*), the irrigation association (*subak*), and customary regulations (*awig-awig* and *perarem*), are recognized under Balinese provincial regulation.

THK also belongs to a wider class of religious and customary institutions that govern natural resources through sacred authority. Sacred groves, sacred waters, and church forests have been shown to protect trees, fish, and water through prohibitions backed by the fear of supernatural sanction (Setia Budi et al., 2025; Stara et al., 2025; Undaharta et al., 2025), and studies of sacred natural sites suggest that such institutions can display the design principles of durable commons while reproducing exclusion (Mokashi & Mudaliar, 2026). Research on Indonesian customary regimes shows, however, that their authority depends on how the state recognizes them and on how they regulate access to land under market pressure (Dewi et al., 2026; Martin, 2025). Existing research on THK and the environment can be grouped into four strands, summarized in Table 1.

Table 1 shows that THK values have been traced in texts, customary law, irrigation institutions, and policy, and that their use is often contested. What remains insufficiently understood is how institutional arrangements and economic pressures shape the extent to which THK values influence environmental compliance across different settings. Most studies examine one village or one sector, and few examine noncompliance, although

research elsewhere in Indonesia shows that customary regimes range from effective strongholds to marketized forms and institutional vacuums (Dewi et al., 2026). Recent studies have begun to move in a more critical and comparative direction. They examine how heritage designation romanticizes the *subak* (Wardana & Haryanto, 2026), how market values displace local values in the governance of water (Adhariani & Sulaiman, 2026), and how tourism turns customary signs into commodities (Prasada et al., 2026). Building on these critical perspectives, this study compares three settings to examine why customary institutions retain regulatory influence in some contexts but become constrained under different resource-tenure arrangements and tourism pressures.

Table 1. Strands of previous research on *Tri Hita Karana* and the environment

Strand	Representative studies	Typical question and method	Limitation for this study
THK as philosophy or ecosophy	Astawa et al. (2019)	How THK values are represented in texts, through textual or critical discourse analysis	Little attention to how values shape conduct or institutions
Customary law and forests	Sumarmi et al. (2020); Umiyati (2020); Suyadnya (2021); Aldyan et al. (2025); Saefudin et al. (2025)	What *awig-awig* prescribes for the environment, mostly through legal or linguistic analysis of a single village	Rules are described rather than examined against compliance
Subak and irrigation	Lansing (2006); Roth (2014); Yekti et al. (2017); Zen et al. (2024); Miyazawa (2026)	How *subak* coordinates water and respond to policy, through ethnography and systems analysis	Strong on mechanisms but rarely connected to environmental ethics
Tourism, policy, and critique	Cole (2012); Roth & Sedana (2015); Adityanandana & Gerber (2019); Wiryawan (2024); Mulyana & Busro (2025)	Whether THK guides tourism and policy, through policy analysis and political ecology	Shows tokenism but not why customary mechanisms hold in some places and fail in others

This article uses a two-level framework. The primary analytical framework is the institutional analysis of common-pool resources. Ostrom (1990) showed that communities can sustain shared resources when their institutions display certain design principles, later refined by Cox et al. (2010): clearly defined boundaries, rules that fit local conditions, collective-choice arrangements, monitoring, graduated sanctions, accessible conflict resolution, recognition of the right to organize, and nested levels of governance. Lansing (2006) showed that *subak* water temples perform some of these functions by coordinating irrigation schedules, while research in West Sumatra shows that conflicts between formal and customary institutions can prevent strong rules-in-use from emerging (Yuniarti et al., 2021). The design principles have also been identified in institutions grounded in sacred or supernatural authority, both in Indonesia and in sacred natural sites in India (McIntyre-Mills et al., 2023; Mokashi & Mudaliar, 2026). The design principles allow this study to examine the presence, absence, and limitations of institutional functions across different governance settings, including contexts where collective control over natural resources is weakened by individual land ownership and tourism development.

The secondary framework is interpretive and draws on environmental ethics to clarify what kind of ethic THK expresses. Three perspectives are used separately. The land ethic (Leopold, 1949; Piccolo, 2020) concerns the scope of the moral community and helps articulate how *palemahan* extends obligation to land, water, and vegetation. Virtue ethics (Sandler, 2007; Jordan & Kristjánsson, 2017) concerns the dispositions cultivated through repeated practice, such as the restraint and humility that communal service (*ngayah*) may foster. Care ethics (Gilligan, 1982) concerns attentiveness and responsibility within

particular relationships, which can be observed in the ways farmers negotiate water shares. These three perspectives are used to interpret different aspects of the same practices. The working hypothesis is that THK values are translated into environmental compliance when sacred legitimacy is embedded in specific and monitored rules over resources that the community governs collectively, and when customary authority is recognized by the state. Translation is expected to weaken where individual land ownership and tourism-related economic incentives constrain the capacity of customary institutions to regulate resource use and enforce collective norms. Sacred legitimacy is considered a source of normative authority that may strengthen the acceptance of locally appropriate rules, while monitoring, graduated sanctions, collective governance, and state recognition are examined in relation to their corresponding institutional design principles (Cox et al., 2010; Ostrom, 1990).

Previous research has explained how THK is represented in texts and customary law, how *subak* coordinates water, and how THK is used in tourism and policy. This study focuses on three documented settings: the *subak* landscape of Jatiluwih, the customary village of Tenganan Pegringsingan, and the tourism landscape of Canggu in South Bali, with attention to the rules and practices that govern water, forest, and land. These cases were selected to represent contrasting conditions of resource tenure, customary institutional authority, and tourism pressure, thereby enabling a comparison of how these factors shape the capacity of customary institutions to regulate resource use. Specifically, the study aims to identify the institutional mechanisms through which THK values are translated into compliance with customary and formal environmental rules, the conditions under which this translation is constrained or fails, and the implications of these findings for understanding THK as an environmental ethic.

2. Methods

This study uses a qualitative and interpretive design that combines critical hermeneutics, qualitative document analysis, and a multiple-case structure. Critical hermeneutics guides the reading of THK in two directions: as a body of meanings that make claims about the proper relationships among humans, the divine, and the environment, and as an idiom that actors invoke to legitimize particular interests (Roth & Sedana, 2015). Qualitative document analysis (Bowen, 2009) provides the evidence base, namely official reports, regulations, published analyses of customary regulations, and peer-reviewed empirical studies. The multiple-case structure (Yin, 2018) provides a basis for comparing how institutional mechanisms, including rule-making, monitoring, sanctions, and recognition of customary authority, operate across settings that differ in resource tenure and tourism pressure.

The unit of analysis is a customary institution governing a specific resource within a defined territory. Villages and subak are not treated as equivalent units; each case is bounded by the institution and the resource it governs. The first case is the *subak* institutions of Jatiluwih in Tabanan Regency, which govern irrigation water and rice terraces within a component of the World Heritage property Cultural Landscape of Bali Province. The second case is the customary village (*desa adat*) of Tenganan Pegringsingan in Karangasem Regency, which governs a customary forest under its *awig-awig* and received state recognition as a customary forest through Minister of Environment and Forestry Decree No. 1546/MENLHK-PSKL/PKTHA/KUM.1/2/2019 of 28 February 2019 (Suwitra, 2025; Raharja et al., 2026). The third case is Canggu in Badung Regency, where the customary village and subak lands face rapid tourism-driven conversion of agricultural land (Suhirman et al., 2026).

The cases were selected for maximum variation in two conditions that the working hypothesis identifies as decisive: the tenure of the resource, which ranges from collectively governed water to communally held forest to individually titled land, and the intensity of tourism pressure, which ranges from heritage tourism to cultural village tourism to intensive resort and villa development. Resource tenure was differentiated according to the extent of collective institutional authority over resource access and use, while tourism

pressure was assessed through the documented scale and intensity of tourism-related development and land-use change in each case. A further criterion was the availability of documentation from multiple source types. Jatiluwih offers a longitudinal official record through the World Heritage state of conservation reviews of 2015, 2017, and 2023. Tenganan Pegringsingan offers several independent analyses of its awig-awig together with a documented act of state recognition. Canggu was selected because its individually titled land and intensive tourism development provide a contrasting setting for examining the limits of customary resource governance; the availability of a recent mixed-methods study combining interviews, surveys, land-use maps, and satellite imagery further supports its suitability for documentary analysis (Suhirman et al., 2026).

The documents analyzed are listed in Table 2. Documents included in the empirical corpus were official records, legal texts, or peer-reviewed studies published between 2006 and 2026 that addressed one of the three cases or their governing regulatory framework and contained relevant empirical evidence. Theoretical and conceptual publications were consulted separately to inform the analytical framework. Promotional materials and studies without an identifiable method were excluded. The provincial regulations examined are Bali Provincial Regulation No. 2 of 2012 on Balinese Cultural Tourism and Bali Provincial Regulation No. 4 of 2019 on Customary Villages in Bali.

Peer-reviewed studies were identified in two steps. First, studies cited in the original version of the manuscript were retained only if their bibliographic details could be verified against Crossref and their identifiers corresponded to the cited works. Second, six searches of the Scopus database were conducted in October 2026, covering *Tri Hita Karana* and customary law, *subak* and the World Heritage landscape, customary forests in Indonesia, tourism and land conversion in Bali, commons design principles in customary institutions, and sacred natural sites. The searches were limited to English-language articles published between 2021 and 2026 and returned 1,037 unique records. The Scopus searches were restricted to English-language articles published between 2021 and 2026 to identify recent studies, while relevant earlier publications were retained through the initial reference-based identification process. Records were screened by title and abstract and were excluded if they did not address one of the three cases or the conditions in the working hypothesis; the remaining records were retained only if their bibliographic details could be verified against Crossref. Twenty-seven articles met both criteria.

Analysis followed the three stages of data condensation, data display, and conclusion drawing (Miles et al., 2014). In the condensation stage, relevant passages were coded with two sets of codes. The first set was deductive and derived from the design principles of Cox et al. (2010), such as monitoring, graduated sanctions, collective choice, and recognition of rights. The second set was inductive and captured the ethical meanings attached to THK in each source, following the coding and theme development procedure of Braun & Clarke (2006). Initial codes such as sacred prohibition, communal approval, and loss of farmland were grouped into themes describing how a value is linked, or fails to be linked, to an enforceable rule. The two coding sets were subsequently examined together to identify how ethical meanings associated with THK were translated into institutional rules and practices, or remained disconnected from mechanisms of monitoring, enforcement, and collective decision-making.

In the display stage, coded evidence was arranged in a case-by-mechanism matrix, which is summarized in Table 3. In the conclusion-drawing stage, the three cases were compared against the working hypothesis through pattern matching (Yin, 2018). Evidence that contradicted the hypothesis, including reports of noncompliance, unequal participation, and contested uses of THK, was sought deliberately and is reported alongside supporting evidence.

Every empirical claim in the results is attributed to its source, and the evidential status of each claim is distinguished: official documents, published empirical studies, and the authors' interpretation. A claim was labelled O when it was stated in an official document, E when it was reported as a finding of a peer-reviewed study, and I when it was an inference drawn by the authors from one or more sources; where a cell in Table 3 combines labels,

both kinds of evidence were used. Where an interpretation was derived from multiple sources, the underlying source types were identified separately from the authors' analytical inference to distinguish documentary evidence from interpretive conclusions. Because every claim is attributed, readers can identify claims that are based on a single study, such as the description of forest rules in Tenganan, which draws mainly on Sumarmi et al. (2020). Coding was carried out by K.H. and checked by M.; differences in interpretation were resolved through discussion.

Table 2. Documentary sources for each case

Case	Official documents	Analyses of customary regulations	Empirical studies
Jatiluwih (*subak*, water and terraces)	UNESCO World Heritage Committee decisions and State of Conservation reports, 2015, 2017, and 2023	Not applicable; *subak* rules were examined in empirical studies	Lansing (2006); Sutomo et al. (2021); Roth (2014); Yekti et al. (2017); Zen et al. (2024); Miyazawa (2026); Prasada et al. (2026); Wardana & Haryanto (2026)
Tenganan Pegringsingan (*desa adat*, forest)	Minister of Environment and Forestry Decree No. 1546/MENLHK-PSKL/PKTHA/KUM.1/2/2019 recognizing the customary forest (28 February 2019)	Astawa et al. (2019); Umiyati (2020); Sumarmi et al. (2020); Suwitra (2025)	Wijana & Mulyadiharja (2022); Rahmi (2025); Raharja et al. (2026); Prasada et al. (2026)
Canggu (*desa adat* and *subak*, land)	Provincial Regulations No. 2/2012 and No. 4/2019	Aldyan et al. (2025)	Cole (2012); Cole & Browne (2015); Warastuthi et al. (2024); Suhirman et al. (2026); Hamid et al. (2026)

Four of the authors are scholars at Hindu higher education institutions in Bali and Central Java, and one is an information technology researcher. This collective background supports the interpretation of ritual and customary terms but carries the risk of idealizing THK. To reduce this risk, the analysis includes critical scholarship on THK and searches explicitly for evidence of failure. Reflexivity was maintained by distinguishing documented institutional practices from normative interpretations of THK and by critically examining evidence of exclusion, institutional limitations, and noncompliance across all three cases. The study relies only on published and publicly available documents and involves no human participants; therefore, ethical review was not required.

3. Results and Discussion

The cases are presented according to the extent to which THK values are institutionally embedded in enforceable rules, as examined through the documentary evidence and subsequent cross-case comparison. Each case presents the documentary evidence before the authors' interpretation, followed by a cross-case comparison and an ethical reading.

3.1 Jatiluwih: sacred coordination of water, weak control over land

The *subak* of Jatiluwih are part of a landscape whose inscription as a World Heritage property rests on the claim that *subak* institutions embody THK (UNESCO, 2012). Ethnographic research has shown that the network of water temples to which *subak* belong coordinates irrigation and planting schedules across many associations, so that ritual authority serves an institutional coordinating function (Lansing, 2006). The landscape combines forest, terraced rice fields, dry fields, villages, and temples, and its dry fields support the highest plant diversity (Sutomo et al., 2021). The UNESCO record acknowledges

the continued presence and institutional recognition of these customary management practices. The state of conservation report examined in 2015 noted that traditional systems led by the head of the *subak* (*pekaseh*) retain considerable autonomy over land decisions, and the 2023 review stated that "the strength of traditional management practices such as the *awig-awig* is acknowledged" (World Heritage Committee, 2015, 2023).

The same record documents the limits of this authority. In 2015, the World Heritage Committee found that the pressure for land conversion remained significant and that existing national, provincial, and regency laws were not sufficient to control it; it also identified a particular need for community-centred tourism planning in Jatiluwih (World Heritage Committee, 2015). In 2017, the Committee noted that unsuitable developments had occurred at Jatiluwih and requested environmental or heritage impact assessments for new developments there (World Heritage Committee, 2017). Across the three reviews, the lack of support that would allow farmers to stay on the land recurs as a concern, and the 2023 review observed that it was not clear how traditional and institutional decision-making structures interact (World Heritage Committee, 2023). A critical analysis of the site argues that heritagization has drawn on colonial imaginaries and that the landscape has been governed and marketed through a romanticized image of the *subak*, with consequences for how tourism benefits are distributed (Wardana & Haryanto, 2026). At the regency level, research identifies the enforcement of *subak* penalties as one of several factors associated with rice field conversion, alongside land prices, housing needs, and tourism growth (Djelantik et al., 2023). This provides a broader context for understanding the pressures affecting agricultural land in Jatiluwih. Research on irrigation in Bali also shows that *subak* operate within overlapping customary and state legal orders whose relations are not settled (Roth, 2014; Miyazawa, 2026).

The authors' interpretation is that, in Jatiluwih, THK-related institutional authority appears stronger in irrigation management, where *subak* collectively coordinate water distribution and planting schedules, than in land-use decisions, which remain substantially influenced by individual landowners and external economic pressures. Heritage status adds an international monitoring layer, but the documented concerns about continued land conversion suggest that this recognition alone is insufficient to secure the long-term protection of rice terraces. Moreover, *subak* penalties, where they exist, compete with land prices and tourism growth. Read through the design principles, Jatiluwih shows a problem of nesting. The *subak* are nested within water-temple networks that coordinate irrigation across associations (Lansing, 2006), but the heritage regime adds national and international layers whose relation to customary decisions the World Heritage Committee itself described as unclear (World Heritage Committee, 2023). Nested governance supports compliance when each level knows which decisions belong to it; in Jatiluwih, decisions about land fall between levels.

3.2 Tenganan Pegringsingan: Dense rules, sanctions, and recognition

Tenganan Pegringsingan provides the most detailed documentary evidence among the three cases of how customary values are translated into specific rules and enforcement mechanisms. Analyses of the village *awig-awig* show that its text encodes the relation between people, the divine, and nature in specific provisions and an extensive natural lexicon (Astawa et al., 2019; Umiyati, 2020). Sumarmi et al. (2020) describe how these provisions govern the village forest. Trees may not be cut without the permission of the village assembly (*krama desa*); use is limited to specified rights, including the cutting of dead trees, the thinning of closely spaced trees, timber for a new household, and the collection of fruit only after it has fallen; certain species are protected; and violators must return the timber and pay twice its value, with heavier social sanctions, including loss of office, for members who hold customary positions. The same study reports that the rules are transmitted through a year of customary education for young people before marriage and through rituals such as *tumpek wariga* performed in the forest. Ceremonial use also sustains the forest: a survey of the Bukit Kangin forest recorded 46 useful plant species, of

which 29 were used for religious ceremonies (Wijana & Mulyadiharja, 2022). Evidence from elsewhere in Bali shows that sacred groves managed by local communities can match formally protected forests in tree diversity (Undaharta et al., 2025). In Petulu, a village *awig-awig* protects a nesting colony of cattle egrets (Sudaryanto et al., 2022), and studies of sacred waters in Indonesia and sacred forests in Greece report similar forms of protection based on prohibitions reinforced by sacred authority (Setia Budi et al., 2025; Stara et al., 2025). Although these cases differ in their institutional arrangements, they illustrate how sacred authority can provide a normative basis for restricting resource use and supporting customary conservation practices.

State recognition reinforces this arrangement. In 2019, the Ministry of Environment and Forestry recognized the Tenganan Pegringsingan forest as a customary forest, the first such recognition for a customary village in Bali (Raharja et al., 2026). Such recognition became possible after the Constitutional Court ruled in 2013 that customary forests are not part of the state forest estate (Harada et al., 2022), and in Jambi the recognition of a customary forest has been associated with stronger conservation behavior (Ridwan et al., 2025). The same study, however, shows that forest governance involves three parties with unequal positions: the village assembly, the holders of inherited rights, and the *penyakap*, sharecroppers and settlers who live and work in the forest without those rights (Raharja et al., 2026). Unlike holders of inherited rights, the *penyakap* have a more limited role in customary decision-making, raising questions about the inclusiveness of forest governance despite its strong institutional enforcement. Tourism has also changed the village, as many residents have opened art shops in their houses and altered the use of open spaces (Rahmi, 2025). A comparative socio-legal study of Jatiluwih, Kerobokan, and Tenganan Pegringsingan shows that the authorized use of Gringsing textiles links ritual status, membership, and attachment to ancestral territory, while tourism turns these signs into commodities and creates conflicts between market visibility and customary authority (Prasada et al., 2026). The same study describes customary communities as interpretive communities that validate legal signs through repeated ceremonies, collective deliberation, and social recognition. In the terms of the design principles, ceremony here is part of collective choice: it is one of the occasions on which members confirm who belongs, which rules apply, and who may use the forest.

The authors' interpretation is that the available evidence indicates that Tenganan exhibits several of the design principles identified by Cox et al. (2010), particularly clearly defined boundaries, locally adapted rules, collective-choice arrangements, monitoring, graduated sanctions, and recognition of customary rights. Evidence concerning accessible conflict-resolution mechanisms and nested governance arrangements, however, remains limited. A study of another Bali Aga village similarly shows that deadlines, escalating material sanctions, and mutual visibility among members sustain compliance, while full membership is withheld until ritual obligations are met (Sukabawa et al., 2026). This comparison suggests that similar mechanisms of social monitoring and graduated sanctions may also operate in other Bali Aga communities, although their specific institutional arrangements should not be assumed to be identical to those of Tenganan. THK values do not act here as a general ideal but as the legitimating source of specific prohibitions. The case also shows that effective customary governance is not necessarily equitable, since compliance rests on a bounded membership that gives the *penyakap* a more limited role in decision-making, a pattern also found in sacred natural sites in India, where institutions that match the design principles exclude women from decision-making (Mokashi & Mudaliar, 2026).

3.3 Canggu: THK as discourse without control over land

Canggu represents a contrasting case. A mixed-methods study combining interviews, a survey of 108 respondents, land-use maps, and satellite imagery found a significant decline in agricultural land and green open space driven by tourism development, economic benefits that flowed disproportionately to foreign investors, and a gradual decline in

community participation in traditional and ritual activities (Suhirman et al., 2026). Across Bali, the conversion of customary land into formal individual titles has weakened traditional land stewardship, marginalized customary authorities, and created legal ambiguity, although it is also driven by local aspirations for better livelihoods (Hamid et al., 2026). These studies provide a broader regional context for understanding the pressures on customary land and environmental governance in Bali, rather than direct evidence of land-use changes in Canggu. In neighboring South Denpasar, about 87 hectares of *subak* land were lost within five years, a loss attributed to weak spatial enforcement, pollution, and limited farmer regeneration (Ambarini et al., 2026). Along the Ayung River in Ubud, more than 60% of the river cliff in one study zone, including sacred ecological buffers, had been converted for tourism (Praganingrum et al., 2026).

Field research in Denpasar, Badung, and Gianyar reaches a compatible conclusion from a different angle. It describes THK as a lived ecotheology in which customary villages and *subak* guide environmental conduct mainly through social obligation rather than formal enforcement, and it reports that tourism reshapes ritual timing, communal spaces, and land use, producing performative ceremonies and unequally distributed environmental burdens (Muchtar et al., 2026). Although these findings cover several districts rather than Canggu alone, they provide broader evidence of how tourism-related pressures can reshape the relationship between customary institutions, social obligations, and environmental conduct.

Proposals to restore degraded *subak* land point in the same direction. A study of South Denpasar formulated five priority strategies: enforcement of land-use regulations, economic incentives for conservation farming, integration of THK values, farmer capacity building, and improved irrigation maintenance (Ambarini et al., 2026). The inclusion of THK values alongside regulatory enforcement and economic incentives suggests that the proposed restoration strategy recognizes the need to combine normative commitments with institutional and economic measures. This supports the authors' interpretation that cultural values alone may be insufficient to maintain agricultural land use under strong development pressures.

THK has not disappeared from this landscape; it has changed function. In the conflict over a tourism megaproject in Benoa Bay, proponents and opponents alike invoked THK, but read it in market-oriented, equity-oriented, and radical-integral ways (Adityanandana & Gerber, 2019). In Penglipuran, the hospitality associated with THK has itself become part of the attraction that drives overtourism (Ginanjar et al., 2026). Research on water scarcity similarly finds that market and industrial orders of worth have come to dominate the local values associated with *subak* and THK (Adhariani & Sulaiman, 2026). Roth & Sedana (2015) show more broadly that THK has become a policy and political idiom whose invocation does not guarantee any particular environmental outcome.

The authors' interpretation is that in Canggu the institutional conditions that give THK force in Tenganan are absent. Land is individually alienable, while the customary village's authority to regulate or sanction land sales is limited. The available evidence also suggests that customary institutions have limited influence over land-use decisions, particularly where individual ownership and tourism-related economic incentives shape development choices. THK remains available as a vocabulary, but it is not attached to enforceable rules. The first design principle, clearly defined boundaries, helps explain why. In Tenganan, the boundary of the forest and the boundary of the membership that governs it coincide. In Canggu, land titled to individuals can be sold to buyers who are not members of the customary village and are not bound by its obligations (Hamid et al., 2026), so the community that holds THK as an ethic is no longer the community that decides how the land is used.

3.4 Cross-case comparison

Table 3 compares the three cases across the conditions identified in the working hypothesis. Each entry indicates whether the evidence comes from an official document (O),

a published empirical study (E), or the authors' interpretation (I). The comparison supports the working hypothesis and allows it to be formulated into four conditional propositions. First, THK is more likely to support environmental compliance when its sacred legitimacy is embedded in specific rules, monitoring, and sanctions, as illustrated by Tenganan, rather than being invoked only through the general notion of harmony. Second, customary authority is effective over resources that the community holds or governs collectively, such as water in Jatiluwih and forest in Tenganan, and much weaker over individually alienable land, as in Canggu and in decisions concerning land in Jatiluwih; in a Semende community in Sumatra, by contrast, customary inheritance protects ancestral land from alienation and collective agreements regulate land conversion (Martin, 2025). Third, state recognition matters, but its effects differ across cases: it strengthened customary authority over the Tenganan forest, while in Jatiluwih it added a heritage governance layer whose relation to customary decisions remains unclear. Fourth, effectiveness and justice are distinct, since the most effective case also shows the most clearly bounded and unequal membership.

Table 3. Conditions of THK-based environmental compliance across the three cases

Condition	Jatiluwih	Tenganan Pegringsingan	Canggu
Tenure of the governed resource	Water governed collectively; land held by households (O, E)	Forest held and governed communally (E)	Land individually titled and alienable (E)
Sacred legitimacy attached to specific rules	Yes, for water scheduling through temples (E)	Yes, for felling, use rights, and protected species (E)	Weak; THK used mainly as discourse (E)
Monitoring	Customary for water; international review for landscape (O)	Members and village assembly (E)	No customary monitoring of land use identified (E, I)
Graduated sanctions	Subak penalties for conversion reported in Tabanan, not documented for Jatiluwih (E, I)	Documented, from restitution to loss of office (E)	No customary sanction on land sale identified (E, I)
State recognition of customary authority	Acknowledged, but relation to state decisions unclear (O)	Customary forest recognized in 2019 (O, E)	Customary authority marginalized in land conversion (E)
Tourism pressure	Heritage tourism; unsuitable developments reported (O)	Cultural village tourism (E)	Intensive resort and villa development (E)
Documented environmental outcome	Continued land conversion pressure (O)	High diversity of useful plant species recorded in the forest (E)	Decline of farmland and green space (E)
Documented tension or exclusion	Farmers' incentives to stay insufficient (O)	Unequal rights of penyakap (E)	Benefits captured by investors (E)

These propositions also qualify claims made in earlier literature, including the original version of this manuscript, that customary regulation is generally more effective than state regulation. The evidence shows that customary regulation can be effective under specific institutional conditions, while state recognition can strengthen or constrain its authority within the broader legal and governance system (Aldyan et al., 2025; Roth, 2014). Research on sasi in Maluku describes the same dependence, whereby recognition symbolically affirms customary regimes while limiting their substantive authority (Dewi et al., 2026), and research on tourism villages in Bali finds that customary involvement is needed to retain local control over resources (Rosalina et al., 2023). In Denpasar, *Subak* Anggabaya enforces an officially recognized *awig-awig* and is supported by a municipal program to protect agricultural land (Wijayanti et al., 2025). Recognition, however, is not sufficient by itself: studies in Aceh and West Papua show that legal frameworks have not secured effective customary forest governance or the recognition of customary rights (Mansur &

Hann, 2026; Sopaheluwakan et al., 2023), Indonesian conservation law recognizes custom only under state control (Aur et al., 2026), and government intervention can constrain community-led commons (Suyatna et al., 2024).

The authors also considered two alternative explanations. The first is that tourism intensity alone explains the variation. Tourism pressure is indeed highest in Canggu, but the evidence does not support a simple relation: Tenganan and Penglipuran are both exposed to cultural village tourism, and in both cases customary institutions continue to mediate its effects, although with visible social costs (Ginanjar et al., 2026; Rahmi, 2025). What distinguishes Canggu is that tourism interacts with a land tenure system based on individual titles over which customary bodies have no sanctioning authority (Hamid et al., 2026). The second explanation is that THK as a religious ethic is itself decisive. However, comparative evidence from customary regimes outside Bali suggests that resource protection can also be supported by institutional arrangements involving clearly defined rules, membership, and control over land (Dewi et al., 2026; Martin, 2025; Mokashi & Mudaliar, 2026). This indicates that THK provides a culturally specific source of legitimacy, while its environmental effects may depend on institutional conditions that are also relevant in other customary governance systems.

The propositions have a bounded scope. They concern customary institutions that hold or govern a specific resource, and they are derived from three cases selected for variation rather than from a representative sample. Their generality is therefore analytical rather than statistical: they specify conditions that can be examined in other settings, such as other Bali Aga villages, *subak* in peri-urban areas, or customary forests elsewhere in Indonesia (Yin, 2018). Cases in which customary institutions hold land collectively but fail to protect it, or in which individually titled land is nevertheless protected through customary sanctions, would be particularly informative tests.

The findings also extend the strands of previous research summarized in Table 1. Studies of customary law have shown what *awig-awig* prescribe for the environment (Astawa et al., 2019; Sumarmi et al., 2020; Umiyati, 2020); the comparison suggests that such prescriptions are more likely to translate into compliance when supported by monitoring, sanctions, and control over the resource, as illustrated by Tenganan but not Canggu. Studies of *subak* have explained how ritual coordinates water (Lansing, 2006; Yekti et al., 2017); the Jatiluwih case shows that this coordinating capacity does not extend to decisions about land, a gap also identified in analyses of legal plurality in irrigation (Roth, 2014). Critical studies have shown that THK can be invoked to legitimize competing projects (Adityanandana & Gerber, 2019; Roth & Sedana, 2015); the comparison identifies the institutional absence that allows such invocation to have no practical consequences. The comparison also qualifies the view that THK guides environmental governance mainly through social obligation rather than formal enforcement (Muchtar et al., 2026): in these cases, social obligation became effective where it was backed by rules, monitoring, and sanctions. Finally, evidence that sacred groves can match protected forests in tree diversity (Undaharta et al., 2025), alongside research linking diverse values regarding nature to stable forest cover in Indigenous lands in Panama (Alejo et al., 2025), illustrates the potential contribution of customary and Indigenous governance to measurable ecological outcomes, particularly where communities retain authority over the resources they manage.

3.5 Response to the challenges of globalization and ecological crisis

Bali faces serious challenges due to tourism industrialization, climate change, and environmental degradation. The expansion of tourist accommodation has transformed *subak* land into villas and hotels, reducing water catchment areas and increasing pollution (Cole, 2012). THK responds to these challenges with adaptive flexibility, modifying traditional practices to remain relevant without losing their essence.

This conversion not only reduces areas that absorb rainwater but also disrupts the sustainability of traditional irrigation systems and increases environmental pollution (Cole,

2012). Additionally, global climate change has introduced increasingly unpredictable rainfall patterns and the threat of prolonged droughts, which could weaken the foundation of local food security. Limited farmer regeneration has likewise been identified (Ambarini et al., 2026) as a factor in the loss of *subak* land in South Denpasar.

Certain THK-based customary practices have adapted to contemporary environmental pressures by modifying resource-management arrangements while retaining their underlying cultural values. In the *subak* system, for example, irrigation and planting schedules are coordinated collectively across associations through the water-temple network (Lansing, 2006), and in Denpasar, *Subak* Anggabaya enforces an officially recognized *awig-awig* with the support of a municipal program to protect agricultural land (Wijayanti et al., 2025). These adaptations illustrate how customary institutions may respond to changing socio-ecological conditions, although their effectiveness varies across institutional and local contexts.

Another response can be seen in the strengthening of customary regulations prohibiting the sale of productive *subak* land. These provisions function as a local mechanism to prevent further land conversion, while maintaining the ecological function of rice fields as water buffers and green open spaces (Wiryawan & Ernawati, 2024). Customary sanctions of this kind illustrate how customary enforcement mechanisms can complement formal regulations, particularly where customary institutions retain the authority and capacity to monitor and regulate resource use.

In the tourism sector, the use of THK is more ambivalent. THK is widely invoked in tourism (Mulyana & Busro, 2025), yet in the conflict over the Benoa Bay megaproject it was invoked by proponents and opponents alike (Adityanandana & Gerber, 2019), and in Penglipuran the hospitality associated with THK has itself become part of the attraction that drives overtourism (Ginanjar et al., 2026). Research on tourism villages in Bali finds that customary involvement is needed to retain local control over resources (Rosalina et al., 2023). The integration of customary values into tourism therefore risks remaining symbolic unless it is accompanied by customary authority over the resources concerned.

Furthermore, responses to the loss of local wisdom include the transmission of customary knowledge through education and ritual. In Tenganan Pegringsingan, customary rules are transmitted through a year of customary education for young people before marriage and through rituals such as *tumpek wariga* performed in the forest (Sumarmi et al., 2020), while the authorized use of Gringsing textiles links ritual status, membership, and attachment to ancestral territory (Prasada et al., 2026). Both practices tie cultural knowledge to membership in the customary community.

These practices illustrate how cultural knowledge can be transmitted beyond ritual through structured forms of customary education, although their contribution to ecological awareness and environmental behavior requires further empirical assessment. The Canggu case indicates the limits of such transmission: there, community participation in traditional and ritual activities has gradually declined alongside the conversion of agricultural land (Suhirman et al., 2026). Overall, the documented responses suggest that THK-based practices adapt most readily where they remain attached to specific institutions, rules, and resources.This shows that traditional values are not static entities, but living systems that can transform in response to socio-ecological dynamics. Thus, THK can be understood as a model of cultural-ecological resilience, in which spirituality, social solidarity, and ecological ethics work together to respond to contemporary environmental crises.

The responses in Table 4 share a common feature: each attaches THK values to a specific resource, rule, or practice rather than to the general notion of harmony. They range from customary land-use regulations and restoration strategies for *subak* land to the mediation of tourism and the transmission of customary knowledge. However, their implementation and effectiveness depend on the institutional capacity and authority of the communities involved, as the contrast between Tenganan Pegringsingan and Canggu indicates.

Table 4. Adaptive responses of THK to the challenges of globalization and ecological crisis

Challenges	Impacts	THK Response	Examples of Implementation
Degradation of *subak* land	Weak spatial enforcement, pollution, and limited farmer regeneration	Restoration strategies that integrate THK values with regulatory enforcement and economic incentives	Five priority strategies formulated for South Denpasar (Ambarini et al., 2026)
Land use change	Loss of *subak* area	Strengthening of *awig-awig* prohibiting the sale of productive land	Customary regulations on the sale of *subak* land (Wiryawan & Ernawati, 2024); officially recognized *awig-awig* of *Subak* Anggabaya, Denpasar (Wijayanti et al., 2025)
Mass tourism	Overtourism and commodification of customary signs (Ginanjar et al., 2026; Prasada et al., 2026)	Mediation of tourism by customary institutions in cultural villages	Tenganan Pegringsingan and Penglipuran, with visible social costs (Rahmi, 2025; Ginanjar et al., 2026)
Loss of local wisdom	Declining participation in traditional and ritual activities (Suhirman et al., 2026)	Transmission of customary rules through education and ritual	A year of customary education before marriage and forest rituals in Tenganan Pegringsingan (Sumarmi et al., 2020)

The discussion shows that *Tri Hita Karana* (THK) functions not only as part of Bali's cultural heritage but also as an integrated ecological ethical system that regulates the relationship between humans and God (*Parahyangan*), among humans (*Pawongan*), and nature (*Palemahan*). Through sacred rituals, social solidarity, customary law, and traditional spatial planning, these traditional values are transformed into operational ethics that support socio-ecological sustainability while strengthening community cohesion.

Analysis grounded in land ethic theory and virtue/care ethics suggests that THK integrates ecological norms and ethics of care into daily practices. This integration creates a socio-ecological feedback loop, through which religious rituals and collective work become mechanisms of adaptation to environmental change. In a global context, THK contributes to a model of local wisdom-based sustainability that broadens the scope of sustainability, transcending the technocratic paradigm of the Sustainable Development Goals (SDGs). Traditional and spiritual values can provide intrinsic motivation for ecological responsibility, but their translation into environmental compliance depends on institutional arrangements that support collective action, monitoring, and enforcement.

Furthermore, the examples of adaptive practices, including the strengthening of *awig-awig*, the integration of THK values into restoration strategies, and the transmission of customary knowledge, demonstrate that customary institutions can respond to globalization, land-use change, tourism development, and ecological pressures. However, their capacity to remain resilient depends on the authority, resources, and institutional arrangements available to the communities involved.

Thus, it can be concluded that THK is an ecological ethical model that not only maintains ecosystem integrity but also strengthens social cohesion and spirituality among Balinese communities, making it a relevant alternative within global sustainability discourse. THK constitutes an integrated ecological ethic operating through three interconnected dimensions: the religious-spiritual dimension of *Parahyangan*, the social-relational dimension of *Pawongan*, and the ecological-material dimension of *Palemahan*. Bali's traditional values are not merely symbolic but also serve as operational mechanisms of sustainability that contribute to socio-ecological resilience.

THK also expands the global sustainability discourse by offering an alternative epistemology that combines technical indicators with cultural norms and spirituality. This approach can enrich global models such as the SDGs, which have tended to be technocratic.

At the same time, THK's flexibility in responding to globalization demonstrates that indigenous ecological ethics can serve as an adaptive solution to contemporary ecological challenges.

Within Leopold's land ethic framework, the traditional values of Bali articulated in *Parahyangan* show that humans do not stand outside nature but are part of a "biotic community." The mendak toya ritual, for example, is not merely a religious obligation but an ethical statement that water is a living entity whose purity must be preserved. By placing water sources in the sacred realm, the community expands its moral horizon to recognize that land, forests, and water are not merely resources, but are part of a moral community whose integrity deserves protection. Here, *Parahyangan* becomes a concrete form of land ethics: a recognition that sustainability is only guaranteed if humans care for the integrity of ecosystems as part of the broader community of life. Meanwhile, virtue/care ethics as described by Gilligan is evident in the *Pawongan* dimension. Social harmony in the *subak* system is not the result of technical regulations, but arises from mutual concern among community members. The practices of *ngayah* and *menyama braya* show that ecological actions are carried out through social relations full of solidarity: cleaning irrigation channels or sharing water is not just a technical function, but an expression of collective concern to ensure that everyone receives a fair share. Thus, ecological sustainability is supported by an institutionalized ethics of care, with social relationships serving as the moral foundation of environmental management.

The *Palemahan* dimension can be read through the same perspectives. The provisions of the Tenganan *awig-awig* that restrict felling, protect certain species, and allow fruit to be collected only after it has fallen (Sumarmi et al., 2020) extend moral consideration to the forest itself, in line with the land ethic, while the repeated communal practices through which these rules are observed cultivate restraint in the use of land, water, and vegetation, as virtue ethics would suggest. Thus, Tri Hita Karana can be understood as an integrated ecological ethics that brings together complementary ethical horizons: land ethics provides the normative foundation for recognizing the intrinsic value of nature, while virtue and care ethics strengthen social relations as the basis for ecological concern. While the Ostrom/Cox framework explains the institutional conditions supporting collective resource governance, these ethical perspectives provide complementary lenses for interpreting the normative and social dimensions underlying these arrangements. This integration makes THK not merely a cultural philosophy but an ecological ethical system that is enacted in everyday life through a morality that is simultaneously spiritual and social. Therefore, this research not only affirms the relevance of THK for Bali but also positions it as a global-local interface, an ethical framework rooted in local contexts yet possessing broader significance in sustainability discourse.

3.6 What kind of ecological ethic is Tri Hita Karana?

The cases also clarify the ethical character of THK. Read through the land ethic, *palemahan* extends moral concern beyond human relations to forests, water, and plants. In Tenganan, plants are addressed in ritual as beings that warrant protection (Sumarmi et al., 2020), which goes beyond treating them as resources. Unlike Leopold's land ethic, which emphasizes the integrity of the biotic community, THK situates ecological obligations within a broader relational framework involving the divine, human communities, and ancestral traditions (Leopold, 1949; Piccolo, 2020).

Read through virtue ethics, customary education in Tenganan and communal service among *subak* members can be understood as institutional practices that reinforce dispositions of restraint and responsibility (Jordan & Kristjánsson, 2017; Sandler, 2007). The Canggu case suggests that the social practices through which such dispositions are maintained may weaken alongside land conversion, as reflected in declining participation in traditional and ritual activities (Suhirman et al., 2026). Field research in Denpasar, Badung, and Gianyar also reports that tourism turns some ceremonies into performances (Muchtar et al., 2026), which suggests that a practice may continue in form while losing the

disciplined repetition through which virtues are formed. Virtues here depend on institutions that sustain their continued practice.

Read through care ethics, the negotiation of water shares among *subak* members expresses attentiveness to the needs of particular others (Gilligan, 1982). The Tenganan case shows that such care is bounded by membership, since those without inherited rights have a more limited role in the relationships through which care is organized (Raharja et al., 2026). This reading connects THK to research that links values regarding nature with land-use outcomes. As a broader comparison, research in Indigenous lands in Panama has associated diverse values regarding nature with stable forest cover (Alejo et al., 2025). The Balinese cases further suggest that ecological values become more consequential for resource management when they are embedded in institutional arrangements governing membership, ritual obligations, and rights over specific resources. However, these arrangements also determine whose interests and participation are included in customary governance. The Gringsing textiles of Tenganan illustrate this embodied dimension, since their authorized use links bodies, ritual status, and collective membership to attachment to ancestral territory (Prasada et al., 2026). This connection illustrates how material cultural practices can reinforce collective identity and attachment to customary territory, although their contribution to environmental protection depends on how these relationships are translated into resource-management practices. The ethic is carried not only in written rules but also in what members wear, perform, and recognize in one another.

Taken together, these readings suggest that THK is best understood as an institutionally embedded relational ethic. Its religious commitments shape ecological responsibility not by asserting harmony in general, but by binding particular rules to sacred authority, ritual calendars, and membership. Where those institutional connections are maintained, THK supports stewardship; where they are absent, THK remains a vocabulary that can be claimed by competing interests. This conclusion is relevant beyond Bali to debates on whether religious and customary ethics can support environmental governance, because it locates their force in specific institutional conditions rather than in cultural values as such.

4. Conclusions

This study asked under what conditions *Tri Hita Karana* values translate into compliance with environmental rules in Bali. The comparison of Jatiluwih, Tenganan Pegringsingan, and Canggu shows that THK is more likely to support environmental stewardship when its sacred legitimacy is embedded in specific and monitored rules and when customary institutions retain authority over the resources they govern, supported where relevant by state recognition. Where land is individually alienable and customary institutions have limited authority over land-use decisions, tourism-related economic pressures can weaken the influence of THK as a basis for environmental regulation.

THK is therefore best understood as an institutionally embedded relational ethic, whose force lies in the institutions that bind values to resources, rituals, and membership arrangements. Its effectiveness is distinct from justice, since the most effective case rests on a bounded membership in which some resource users hold a more limited role in decision-making.

As conditional propositions, the findings suggest that recognizing customary control over specific resources, clarifying how customary and state decisions relate, and addressing the position of excluded resource users are more likely to sustain stewardship than the use of THK as a brand. For Bali, this means that the recognition of customary villages should be matched by clear authority over specific resources and by transparent rules governing the transfer of land within customary territories.

This study is limited by its documentary evidence base, which combines sources of different methods and periods, covers three cases, and does not permit causal inference or direct measurement of environmental outcomes. Accordingly, the findings identify institutional patterns and plausible conditions associated with THK-based environmental

governance rather than establishing causal relationships between customary values, compliance, and ecological outcomes. The database searches also favor studies published in English and indexed internationally, so work published only in Indonesian may be underrepresented. Research that combines interviews, observation, and ecological measurement is needed to test these propositions.

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Author Contribution

Conceptualization, M., S., and P.M.R.A.; Methodology, M., S., and P.M.R.A.; Validation, M.; Formal Analysis, K.H.; Investigation, M., S., P.M.R.A., and K.H.; Resources, M. and S.; Data Curation, K.H. and L.H.A.; Writing – Original Draft Preparation, M.; Writing – Review and Editing, M., S., P.M.R.A., K.H., and L.H.A.; Visualization, M. and L.H.A.; Supervision, M.; Project Administration, M. All authors have read and agreed to the published version of the manuscript.

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Not available. This study analyzed published and publicly available documents and did not involve human participants.

Informed Consent Statement

Not available.

Data Availability Statement

All documents analyzed in this study are publicly available and are listed in Table 2 and the reference list. The coded extracts used in the analysis are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of Generative AI Use

During the preparation of this work, the authors used Claude and Gemini to assist in translating and editing the language, grammar, and academic tone of the manuscript. After using these tools, the authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

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