IJROMS
Dharmakirti: International Journal of Religion, Mind and Science
IJROMS 4(1): 49–65
ISSN 3030-8518

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Danu Kerthi as a Hindu theo-ecological practice in conservation of water resources

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Received Date: August 7, 2026 Revised Date: October 11, 2026 Accepted Date: October 11, 2026

ABSTRACT

Background: This study examines *Danu Kerthi* as a Hindu theo-ecological practice for water resource protection at Lake Batur, Bali. It employed a qualitative approach using a focused ethnographic design conducted from January to March 2026, covering the periods before, during, and after Tumpek Uye. **Methods**: Data were collected through participant observation, in-depth interviews with 30 informants consisting of customary leaders and community members involved in the tradition, informal conversations, documentation, and a review of scientific publications and policy documents. The data were thematically analyzed across theological, ethical-ecological, and practical dimensions. **Findings:** The findings demonstrate that *Danu Kerthi* has been practiced for generations, long before the enactment of Bali Governor Regulation No. 24 of 2020. The tradition shapes the identity of the Batur community as guardians of the lake and centres on the worship of Dewi Danu, locally experienced as Bhatari Batur. The local cosmology reveals a strong feminine dimension in which water is understood both as the source of life and as a manifestation of divine presence. Nevertheless, the study identifies a theo-ecological paradox between the symbolic sacredness of the lake and its material condition. Floating and submerged waste, declining water clarity, odour, nutrient pollution, pressure from floating net cages, agricultural runoff, domestic wastewater, recurrent fish mortality, and invasive species indicate that Lake Batur remains productive but is ecologically degraded and increasingly vulnerable. **Conclusion**: The study concludes that *Danu Kerthi* can function as a comprehensive theo-ecological practice only when its *niskala* dimension is translated into *sakala* actions, including pollution control, use restrictions based on ecological carrying capacity, stronger customary regulations, regular water-quality monitoring, and ecosystem restoration. **Novelty/Originality of this article:** Thus, the sacredness of water should not only be ritually affirmed but also demonstrated through the ecological integrity and long-term sustainability of Lake Batur.

KEYWORDS: *Danu Kerthi*; focused ethnography; Hindu theo-ecology; Lake Batur; sacred water; water resource protection.

1. Introduction

Water is a fundamental prerequisite for the continuity of life, but its availability is increasingly under pressure due to climate change, population growth, changes in land use, agricultural intensification, pollution, and exploitation that exceeds the ecosystem's capacity to recover. Water issues can therefore no longer be understood merely as technical problems related solely to availability, distribution, and physical-chemical quality. The water crisis is also a matter of values, as it relates to how humans interpret nature, determine the limits of resource use, distribute resources, and take responsibility for the impacts of their actions on other forms of life. Recent studies on the value of water indicate

Cite This Article:
Suparman, I. N., Suparta, I. K., & Rahayu, N. W. S. (2026). Danu Kerthi as a Hindu theo-ecological practice in conservation of water resources. *Dharmakirti: International Journal of Religion, Mind and Science, 4*(1), 49-65. https://doi.org/10.61511/ijroms.v4i1.2026.4038

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that management policies that emphasize only economic value tend to overlook the social, cultural, spiritual, and ecological dimensions that determine the acceptance and sustainability of water resource management within society (Schulz et al., 2024).

The limitations of this technocratic paradigm have spurred the development of a more integrative approach to water management. This approach does not reject hydrology, water treatment technology, or environmental regulations, but rather places them within a broader ethical framework. Religion and spirituality are once again being discussed as sources of values that can shape perceptions, social norms, self-control, and ecological behavior. Systematic studies on the relationship between religion and environmental behavior show that religiosity can influence pro-environmental actions when religious teachings are translated into concrete norms, collective identities, and social practices. However, this influence does not occur automatically. Beliefs regarding the sanctity of nature can lose their ecological power if they remain merely symbolic or are not accompanied by institutional mechanisms and behavioral change (Sabir et al., 2025; Hasanadka et al., 2025).

In this context, theo-ecology offers an analytical framework for examining the relationship between views of divinity and ecological responsibility. Theo-ecology is grounded in the assumption that human understandings of God, nature, and humanity's place in the cosmos have implications for how the environment is treated. Nature is not viewed as a reality entirely separate from spiritual life, but rather as part of a sacred order that possesses intrinsic value. Thus, ecological degradation is not merely a failure of resource management but also indicates a rupture in the moral and spiritual relationship between humans and nature. From this perspective, conservation efforts are an expression of faith because they embody respect for life and cosmic order.

Hindu thought provides a strong foundation for the development of theo-ecology. In various Hindu traditions, nature is not merely positioned as a resource available to serve human interests. The elements of nature are understood as manifestations of divine power, the constituents of life, and part of an interdependent network of relationships. Water holds a significant position because it functions materially as a source of life and spiritually as a medium of purification, restoration, and a link between humans and transcendent reality. Studies on Hindu environmental consciousness indicate that reverence for the earth, water, plants, animals, mountains, and rivers forms an ethical orientation that rejects an absolute separation between the sacred and the ecological spheres (Sharma, 2024; Surpi, 2026).

However, the sacralization of nature is not always synonymous with ecological protection. Ritual reverence for rivers or lakes can coexist with pollution and exploitation. A number of studies on sacred rivers in India reveal a paradox between the symbolic sanctity of water and the ecological degradation caused by waste, dam construction, urbanization, and economic pressures. Religion can drive resistance and conservation, but it can also lose its transformative power when rituals are not linked to governance and restrictions on exploitation (Blair, 2023). Therefore, theo-ecology must go beyond merely cataloging teachings on the sanctity of nature. Analysis must focus on the capacity of teachings and rituals to shape ecological actions, institutional frameworks, and public responsibility.

In the Balinese Hindu tradition, this theological and ecological relationship is embodied, among other ways, through the concept of *Sad Kerthi*, the six forms of veneration and purification encompassing the soul, the ocean, forests or plants, lakes or freshwater sources, social life, and the universe. One of these forms is *Danu Kerthi*, which substantively involves the reverence, purification, and preservation of lakes and freshwater sources. The word *danu* refers not only to lakes as physical landscapes but also represents the source, reservoir, and conduit of life. Meanwhile, "*kerthi*" conveys an orientation toward glory, well-being, purity, and sustainability. *Danu Kerthi* can thus be understood as a system of values and actions aimed at honoring water by safeguarding the sustainability of its spiritual, social, and ecological functions.

This interpretation is closely linked to the Balinese Hindu cosmological view, which places water within the framework of *parahyangan, pawongan*, and *palemahan*. These three

are recognized as the core pillars of *Tri Hita Karana*: the harmony of the relationship between humans and God, relationships among humans, and the relationship between humans and nature. In water management, these three dimensions are inseparable. Water is viewed as a sacred gift, managed through institutions and social agreements, and preserved as part of the ecosystem. Research on water management based on local wisdom in Bali indicates that integrating the values of *Tri Hita Karana* and *Sad Kerthi* can broaden the policy orientation from merely meeting economic needs toward a balance between the conservation of water sources, social justice, and spiritual responsibility (Pradipta et al., 2024).

Danu Kerthi is relevant for study not only as a ritual but as a practice of theo-ecology. As a ritual, *Danu Kerthi* involves offerings, prayers, purification, and the veneration of divine powers associated with water. As a theo-ecological practice, its meaning must encompass concrete actions such as protecting watersheds, controlling pollution, reducing waste, restoring vegetation, limiting exploitation, monitoring water quality, and ensuring equitable water distribution. Rituals within this framework serve as a means for internalizing values and fostering collective commitment. The sanctity of water is not merely expressed through ceremonies but demonstrated through behaviors that prevent water from being treated as an unlimited dumping ground or commodity.

The urgency of this transformation is clearly evident in the condition of several lakes in Bali, particularly Lake Batur. Lake Batur serves strategic functions as a water source, a fish farming area, a support for agriculture, a socio-religious space, and a tourist destination. On the other hand, various studies indicate that this lake faces increasingly complex anthropogenic pressures. Research by Sani et al. (2024) identified declining water quality and nutrient pollution stemming from agricultural activities, floating net cages, settlements, livestock farming, and tourism. Research on the degradation of Lake Batur's waters also indicates that water quality has reached the "moderately polluted" category based on pollution indices, meaning its ecological functions and uses are at risk of decline (Nuringtyas et al., 2023).

Significant pressure stems from nutrient and organic matter loads. Garno et al. (2024) demonstrated that the number of floating net cages in Lake Batur has exceeded the lake's carrying capacity and contributes to reduced water transparency, increased organic matter, decreased dissolved oxygen, chlorophyll-a growth, and eutrophication processes. Further studies found that Lake Batur receives large annual anthropogenic loads, including organic matter, total nitrogen, and total phosphorus. These conditions indicate that pollution is no longer localized but has diffused throughout the water body and is affecting the lake's trophic status (Garno et al., 2025).

This reality reveals a theological-ecological paradox. On the one hand, the lake is designated as a sacred site and serves as the center for the *Danu Kerthi* ritual. On the other hand, the lake suffers from pollution resulting from cumulative human activities. This paradox raises a critical question: to what extent has the sacredness of the ritual been translated into ecological ethics? Does *Danu Kerthi* function as an instrument for behavioral and governance change, or is it limited to a periodic ritual that does not sufficiently influence the sources of pollution? This question is important because the success of an ecological ritual cannot be measured solely by the completeness of the ceremony, the number of participants, or the intensity of religious symbols, but also by changes in the relationship between humans and water sources after the ceremony concludes.

A number of studies have addressed *Tri Hita Karana*, *Sad Kerthi*, local wisdom, and environmental conservation. Other research has examined water quality, eutrophication, floating net cage aquaculture, and pollution loads in Lake Batur. Nevertheless, there remains a disconnect between religious studies and environmental studies. Theological studies tend to emphasize the symbolic and normative meanings of rituals, while environmental studies focus more on pollution parameters and technical strategies. Few studies have positioned *Danu Kerthi* as a point of convergence between theology, ritual, environmental ethics, community behavior, and water resource management. Yet such

integration is necessary to assess whether religious practices are truly capable of fostering measurable ecological protection.

This article aims to analyze *Danu Kerthi* as a Hindu theo-ecological practice in the protection of water resources. The analysis focuses on three issues. First, the theological and cosmological foundations that position water as a sacred reality and source of life. Second, the function of *Danu Kerthi* in shaping the community's ecological ethics, awareness, and actions. Third, the relevance and limitations of the *Danu Kerthi* practice in addressing concrete water management issues, particularly lake pollution and degradation. This article argues that *Danu Kerthi* has the potential to become a paradigm for water resource protection if interpreted as a unity between the non-physical (*niskala*) rituals and the physical (*sakala*) actions.

Without such a transformation, *Danu Kerthi* risks being reduced to a mere ritual, water is symbolically revered, yet at the same time continues to be burdened by behaviors and policies that undermine its carrying capacity. Through a theo-ecological approach, *Danu Kerthi* is not positioned as a traditional relic in opposition to modern environmental science. Rather, this practice can serve as an ethical and cultural foundation for the integration of scientific knowledge, public policy, and community participation. Water quality data provide an empirical basis for identifying damage, while theo-ecological values provide the moral motivation to change behavior and limit exploitation. The convergence of these two elements has the potential to yield a water conservation model that is not only technically effective but also rooted in the community's worldview. Thus, the discussion of *Danu Kerthi* is relevant to the development of studies in Hinduism, eco-theology, environmental ethics, and sustainable water resource management.

2. Methods

This study employs a qualitative approach using a focused ethnography design. This design was chosen because the research aims to gain an in-depth understanding of *Danu Kerthi* practices within the social, religious, and ecological contexts of the communities in the Lake Batur region. The study does not aim to describe the entire culture of the Batur community, but specifically examines the system of meanings, ritual practices, social relations, and actions to protect water resources related to *Danu Kerthi*.

The ethnographic approach allows the study to observe *Danu Kerthi* as a living cultural practice. Rituals are not merely analyzed based on texts, symbols, or normative explanations, but are examined through actions, interactions, the division of roles, the use of space, and the relationships between the community, traditional institutions, the government, and the lake environment. Through this approach, the study can identify the connections between theological beliefs regarding the sanctity of water and the ecological practices that take place in daily life.

The research was conducted over three months, from January to March 2026, in the Lake Batur area, Kintamani Subdistrict, Bangli Regency, Bali. This timeframe was chosen because it encompasses the periods before, during, and after the observance of Rahina Tumpek Uye. In 2026, Tumpek Uye falls on Saturday, February 7, 2026, coinciding with Saniscara Kliwon Wuku Uye. This event serves as the primary focus of observation as it relates to the *Danu Kerthi* ceremony, which is part of the actualization of the *Sad Kerthi* values.

Data collection is divided into three phases. The first phase takes place from January through early February 2026 and focuses on observing ritual preparations, community meetings, the arrangement of ceremonial items, the assignment of roles, and social and environmental activities leading up to Tumpek Uye. The second phase centered on the Tumpek Uye ceremony itself, particularly the *Danu Kerthi* procession, community participation, ritual symbols, religious messages, and ecological activities accompanying the ceremony. The third phase took place after Tumpek Uye through the end of March 2026 to assess the sustainability of ecological values and practices following the conclusion of the ceremony. The primary research site is the Lake Batur area. Observation sites were selected

through purposive sampling, including the venue for the *Danu Kerthi* ceremony, temples and sacred spaces associated with water worship, communities living around the lake, agricultural areas, floating net cage locations, the lake's shoreline, and key tourism activity sites.

These locations were selected to integrate data on the ritual with ecological conditions and patterns of Lake Batur's utilization. Data were collected through participatory observation, in-depth interviews, informal conversations, documentation, and document analysis. Participatory observation involved limited participation in community activities, from preparation and execution through to post-ritual activities. The researcher observed forms of social interaction, division of labor, use of symbols, transmission of teachings, attitudes toward water, and ecological activities associated with *Danu Kerthi*.

Observations were directed not only at the ritual space but also at the physical conditions of Lake Batur. The aspects observed included shoreline cleanliness, the presence of trash, sewage channels, agricultural activities, the use of fertilizers and pesticides, floating net pens, tourism activities, and the use of riparian zones. These observations were used to compare the sacred interpretations of the lake with the ecological realities found in the field.

The study involved 30 informants initially selected through purposive sampling, with additional participants recruited through snowball sampling. They included customary leaders, local spiritual leaders, women community leaders, and community members involved in *Danu Kerthi*. Selection was based on their participation in the ritual or in the management of Lake Batur. Recruitment ceased when additional interviews yielded no new themes relevant to the research focus.

In-depth interviews were conducted using a semi-structured approach. The interviews were designed to explore the informants' understanding of *Danu Kerthi*, the sacredness of water, Dewi Danu, *Sad Kerthi*, *Tri Hita Karana*, the purposes of ritual practices, and the relationship between the ceremonies and the protection of Lake Batur. The interviews also addressed changes in the lake's condition, sources of pollution, conflicts over land use, the role of customary institutions, the effectiveness of government policies, and changes in community behavior following the ceremonies.

Informal conversations were used to capture the community's spontaneous views that might not emerge in formal interviews. These conversations took place during daily activities, such as ceremony preparations, community work, activities along the lakeshore, farming, or in fish cage areas. The results of these conversations were recorded in field notes while respecting the informants' consent and confidentiality.

Documentation includes photographs, audio recordings, field notes, activity schedules, outreach materials, traditional village documents, *awig-awig, pararem*, government regulations, and environmental activity reports. Ritual documentation was conducted with due regard for religious etiquette and with permission from the relevant authorities. Parts of the ceremony considered confidential or not permitted for publication were not recorded. Data were analyzed thematically and interpretively through a process of coding, categorization, mapping of inter-thematic relationships, and ethnographic interpretation. Analysis began at the start of the research, concurrently with data collection. Field notes, interview transcripts, documentation, and policy documents were read repeatedly to identify patterns of meaning, actions, and social relationships.

Themes of analysis included the sacredness of water, the conception of Dewi Danu, the *Danu Kerthi* ritual practice, the relationship between the *niskala* and *sakala* realms, community participation, local ecological knowledge, behavior toward the lake, sources of environmental pressure, the role of customary institutions, government policies, and the gap between ritual and conservation practices. These themes were developed based on field data and were not rigidly defined from the outset. The analysis was conducted at three levels. First, the theological level to understand how water and Lake Batur are interpreted as part of the divine order. Second, the ethical-ecological level to identify the values of responsibility, self-restraint, harmony, and the obligation to protect water sources. Third, the practical level to assess the translation of these values into behavior, rules, programs, and actions to protect Lake Batur.

Danu Kerthi is considered to have a theo-ecological function when the theological meanings expressed in rituals shape ecological norms and result in concrete actions to protect water resources. Conversely, if the sacralization of water is not followed by behavioral changes, pollution control, or strengthened lake management, this situation is analyzed as a gap between ritual symbolism and ecological practice. Data validity was ensured through source triangulation, methodological triangulation, repeated observations, and informant confirmation. Source triangulation was conducted by comparing the perspectives of religious leaders, customary institutions, the community, the government, farmers, fish farmers, and tourism operators. Methodological triangulation was conducted by comparing the results of observations, interviews, informal conversations, documentation, and secondary data. Informant confirmation was conducted for interpretations that were significant or sensitive to ensure that the research results remained consistent with the context and intent of the informants.

3. Results and Discussion

3.1 Danu Kerthi as a living tradition and ecological identity of the Batur community

Observations conducted from January to March 2026 indicate that *Danu Kerthi* is not a religious practice that emerged only after the enactment of the Bali Provincial Government's policy. The Batur community has been worshiping the lake and water sources for generations, long before the issuance of Bali Governor Regulation No. 24 of 2020. This regulation is more accurately understood as a formal recognition and reinforcement of the ecological-religious tradition that has long existed within the community, rather than as the starting point for the emergence of *Danu Kerthi*.

On Rahina Tumpek Uye, February 7, 2026, starting early in the morning, the community offered ritual offerings and performed prayers at several temples that have ritual connections to Lake Batur. The ritual spaces were not concentrated in a single location but formed a network of sacred landscapes encompassing Pura Segara Ulun Danu Batur, Pura Jati, and Pura Ulun Danu Batur. This network demonstrates that the sanctity of the water is produced and maintained through the relationship between the temples, the lake, the community, and the agricultural areas that benefit from the water. For the most part, it is women who bring offerings and perform prayers, as shown in Figure 1 below.



Fig. 1. The Batur community offering sacrifices
(Authors's Documentation, 2026)

Pura Segara Ulun Danu Batur, located in the Pura Jati area on the shores of Lake Batur, serves as one of the centers for the *Danu Kerthi* ceremonies. This temple is directly associated with the worship of Ida Bhatari Dewi Danu and various rituals that incorporate the lake as an integral part of the ceremonies. In large-scale ceremonies, this area also serves as the site for the *Tawur Agung Labuh Gentuh* and the *pakelem* procession. In this context, the lake is not merely a passive backdrop for the ceremonies but a sacred entity to which reverence, offerings, and prayers for well-being are directed.

Pura Jati has a direct ritual connection to Pura Segara Ulun Danu Batur, while Pura Ulun Danu Batur serves as the center of worship for Dewi Danu and is known as Pura Panguluning Subak. This position demonstrates that the worship of water at Batur extends

beyond the communities living on the lake's shores. The water of Lake Batur is connected to the agricultural system, the *subak*, soil fertility, and the sustainability of community life across a broader region. Thus, the ritual structure of Batur is, in essence, also a structure of ecological relationships.

This finding aligns with the argument that traditional ecological knowledge is not merely a set of techniques for utilizing nature but encompasses the values, institutions, rituals, and identities that shape a community's relationship with its environment (Brondízio et al., 2021). In the Balinese context, *Danu Kerthi* functions as an ethical-spiritual system that fosters collective awareness of the sanctity of *tirta* and responsibility toward the lake (Surpi et al., 2025). This study expands upon these findings by demonstrating that in Batur, *Danu Kerthi* serves not only as a system of knowledge but also as a community identity centered on the worship of Dewi Danu.

A traditional leader from Batur stated that *Danu Kerthi* has become the "identity of lake worship" and affirmed the community's role as guardians of the lake who honor Dewi Danu (interview, February 6, 2026). The statement by traditional leaders that the people of Batur identify as "guardians of the lake" indicates that their relationship with Lake Batur is understood as a religious responsibility, not merely a relationship based on resource utilization. The series of prayer ceremonies at Pura Segara Ulun Danu Batur, Pura Jati, and Pura Ulun Danu Batur demonstrate how this relationship is maintained through ritual practices. Through these sacred spaces, reverence for Dewi Danu connects the lives of the communities around the lake with an agricultural system that depends on its water.

However, religious identity, stated obligations, and ecological protection measures must be distinguished. Quotes from traditional leaders provide evidence of how the community interprets its role, while observations of the prayer rituals demonstrate the fulfillment of these responsibilities within the ritual sphere. Neither of these, on their own, proves that the community consistently manages trash, waste, or the pressures of lake use. Moreover, field observations still reveal trash in some parts of the lake. This finding indicates that reverence for the lake coexists with unresolved ecological issues.

Thus, the ecological contribution of *Danu Kerthi* in these findings lies in the moral foundation it provides for the care of the lake. The extent to which this foundation translates into sustainable action must be assessed through daily practices, the customary rules that are enforced, and changes in environmental conditions. The identity as "guardians of the lake" is therefore a starting point for examining the relationship between belief and action, not conclusive evidence that the lake's protection has been effective.

The identity as guardians of the lake holds strong ecological potential because it establishes obligations that originate from within the community itself. Lake conservation is not carried out merely because of government regulations, oversight, or sanctions, but because damaging the lake contradicts the community's own identity. This aligns with the concept of freshwater ethics, which places moral relationships, responsibility, and shared stewardship at the foundation of freshwater ecosystem conservation (Cooke et al., 2021).

Nevertheless, religious identity does not automatically result in effective ecological protection. Surpi et al. (2025) demonstrate that the symbolic power of *Danu Kerthi* at Lakes Beratan, Buyan, and Tamblingan still faces challenges posed by weak enforcement of *awig-awig*, tourism pressures, plastic waste, agricultural runoff, and sedimentation. Findings at Lake Batur reveal comparable and even more complex issues, as awareness of the lake's sanctity coexists with nutrient pollution, high densities of floating net pens, trash, domestic wastewater, and pressures from the watershed.

3.2 Feminine theology: Goddess Danu as a divine presence in the Batur landscape

One of the findings of this study is the interpretation of Dewi Danu or Bhatari Batur as a divine presence closely associated with water and the continuity of life. JA (45), a female spiritual leader, stated that the ritual is performed as follows. This statement links devotion to Bhatari Batur with the benefits of water experienced by the people of Batur and the wider

Bali region. In JA's interpretation, the ritual is an expression of gratitude for the life sustained by the lake.

> "*As an act of devotion to Dewi Danu or Bhatari Batur, who has bestowed life, protection, and sustenance upon the community, and has even become a blessing for Bali in the form of water and fertility*" (interview, February 2026).

This meaning also emerges in the account of GA (38), a fish cage owner. He emphasized on below. For GA, his relationship with Bhatari Batur is directly linked to his family's livelihood from the lake. The accounts of Jero A and GA demonstrate that reverence for Bhatari Batur is expressed not only by spiritual leaders but also by a community member whose economic activities depend on the lake's waters. Both link the divine presence to the life made possible by water, even though they speak from different experiences and roles.

> "*His relationship with Bhatari Batur as a divine entity and a devotee, because she has provided a livelihood and safety for his entire family*" (interview, February 2026).

Observations of the use of temple spaces and the performance of prayers reveal the ritual forms of this reverence. The *Pratima* of Dewi Danu used in the context of worship, as shown in Figure 2, also signifies the presence of a female divine figure in the religious life of the Batur community. This evidence from interviews and observations supports the interpretation that water is not viewed solely as an economic resource. However, the accounts of two informants and ritual observations are not sufficient to conclude that the entire community interprets Dewi Danu uniformly.



Fig. 2. *Pratima* of Dewi Danu worshiped at Lake Batur
(Authors's Documentation, 2026)

In this study, feminine theology refers specifically to the interpretation of Dewi Danu or Bhatari Batur as a divine presence associated with water, fertility, and the life force in Batur. This interpretation can be understood within the framework of Hindu eco-theology, which emphasizes humanity's interconnectedness with nature and responsibility toward life (Sherma, 2021; Sen, 2021). The concept of *Bhumi Devi* provides a conceptual point of comparison, as it situates the earth within the Hindu sacred framework (Surpi, 2026).

However, *Bhumi Devi* and Dewi Danu have different references and contexts of worship. This comparison is used to explore the possible connection between reverence for the source of life and the ethical obligation to care for it, not to equate the two figures.

The statements by Jero A and GA reveal a sense of faith, gratitude, and interdependence with the lake. These statements do not, in and of themselves, prove a change in ecological behavior. Similarly, the presence of the figure of Dewi Danu in rituals highlights the religious significance of water, but does not yet explain how the community makes decisions regarding waste management, the use of lake space, or aquaculture activities. The relationship between belief and ecological protection must therefore be assessed through observable actions and rules enforced outside of ceremonies.

The findings in this subsection indicate that reverence for Dewi Danu provides a religious foundation for understanding the importance of water to the lives of the Batur community. Analytically, this foundation opens up the possibility of formulating a sense of responsibility toward the condition of the lake. However, this study distinguishes these ethical possibilities from conservation practices that have been shown to be in place.

This finding can be interpreted through the lens of Hindu eco-theology, which views nature as part of divine manifestation and interconnectedness. Sherma (2021) explains that the early Hindu ecological vision is built upon the principle of relationality, that is, humans do not stand as isolated, singular subjects separate from nature, but exist within a network of cosmic relationships. Sen (2021) also notes that Hindu ecological ethics demands actions grounded in interconnectedness, self-restraint, and responsibility toward nonhuman life.

Batur's feminine cosmology can also be linked to the concept of Bhumi Devi, which positions the earth as a living and sacred reality, not merely as material available for exploitation. This conception affirms that reverence for the divine feminine entails an ethical obligation to care for the sources of life. Nature as mother is not a justification for unlimited extraction, but a moral foundation for a reciprocal relationship: humans receive life from nature and are therefore obligated to preserve nature's capacity to continue sustaining life.

Surpi (2026) demonstrates that the spiritual legacy of Bhumi Devi can shape an environmental management system rooted in reverence for the earth. At Lake Batur, a similar pattern is evident in the veneration of Dewi Danu. Water is not valued solely for its economic benefits, but possesses intrinsic value because it is understood as a manifestation of divine power. Consequently, water pollution is not merely a decline in the quality of a natural resource, but a disruption of the sacred relationship between the community and Bhatari Batur.

This feminine theology provides a unique impetus for the development of Hindu theo-ecology. The protection of Lake Batur can be framed not only in terms of carrying capacity, quality standards, and pollution control, but also in terms of religious obligations toward Dewi Danu. Restrictions on fish cages, reductions in fertilizer use, waste management, and the restoration of riparian vegetation can thus be interpreted as concrete forms of devotion to Bhatari Batur.

However, the use of feminine symbols must be accompanied by tangible ecological consequences. Worship of a divine figure understood as the giver of life will lose its ethical consistency if the body of water representing her presence continues to be burdened by waste. Within the framework of theo-ecology, the ecological validity of a belief is determined not only by the strength of its symbols but by its ability to transform the way humans treat nature.

3.3 The ritual landscape as a cosmological ecology

The network comprising Pura Segara Ulun Danu Batur, Pura Jati, Pura Ulun Danu Batur, Lake Batur, agricultural areas, and the *subak* system demonstrates that the Batur ritual space is both an ecological and a cosmological landscape. Sacred sites do not stand apart from the systems of water, land, and social life. Rather, their sacredness is formed through the relationships between these spaces. This finding can be explained through the concept

of cosmological ecology. Jero (2025) demonstrates that in Balinese tradition, ritual space is a relational landscape connecting humans, ancestors, nature, and the cosmic order. Although his study focuses on the landscape of death rituals, this framework is relevant to Lake Batur. The lake is not merely a geographical feature but a space that binds the human world, divine powers, agriculture, indigenous communities, and ecological life.

These relationships also reflect the actualization of *Tri Hita Karana*. The *parahyangan* dimension is evident in the worship of Dewi Danu, *pawongan* is seen in the collective involvement of the community and traditional institutions, while *palemahan* relates to the lake's ecological existence and function. Sustainable water management requires the integration of these three dimensions, not an emphasis on any single element in isolation (Pradipta & Putri, 2024).

Problems arise when the balance among these three relationships is disrupted. Rituals may continue to sustain *parahyangan*, but economic pressures and pollution indicate a weak realization of *palemahan*. At the same time, conflicts over resource use, inequities in responsibility, and weak compliance can disrupt *pawongan*. Therefore, *Tri Hita Karana* should not be treated merely as a slogan for harmony, but as a tool for critiquing the imbalances occurring in the management of Lake Batur.

Field observations reveal the presence of ecological pressures that are directly observable. Trash was found floating in several parts of the lake and visible on the bottom of shallow waters. The water in some areas appears less clear and emits a slight odor. These findings indicate that degradation is not merely present as invisible chemical parameters but has become a sensory experience for both the community and researchers.

One member of the research team was in the water for approximately one hour and, shortly afterward, experienced itching and a sensation of heat on their body. This experience must be treated with caution. These findings do not constitute medical evidence of water toxicity, as they were not accompanied by clinical examinations, microbiological tests, or analyses of pollutants. However, as ethnographic data, these bodily experiences are significant because they demonstrate how changes in environmental quality are directly felt. These findings serve as preliminary indicators that require verification through laboratory analysis.

This account highlights the strengths of ethnography in environmental research. The condition of the lake is understood not only through numbers but also through smell, clarity, touch, physical discomfort, and the experiences of communities interacting with the water. Although sensory data cannot replace laboratory measurements, it can reveal the socially experienced dimensions of pollution.

In general, Lake Batur continues to fulfill its hydrological, economic, social, and religious functions. The lake still supports fisheries, agriculture, tourism, wildlife habitats, and ritual practices. Therefore, the lake cannot yet be declared completely degraded. However, the sustainability of these functions is under serious pressure. Lake Batur is in a productive yet vulnerable state, the intensity of its use, which generates economic benefits, simultaneously increases the load that reduces the ecosystem's carrying capacity.

These field findings are supported by the research of Sani et al. (2024). Total phosphorus concentrations in Lake Batur were found to range from 0.07 to 0.97 mg/L, while total nitrogen ranged from 0.19 to 2.21 mg/L. All monitoring stations had phosphorus concentrations that did not meet the Class II water quality standard of 0.03 mg/L, while total nitrogen generally still met the standard except at one station. The study identified anthropogenic activities such as agriculture, fish farming, domestic wastewater, tourism, and livestock farming as sources of nutrient pollution. The largest nitrogen load originated from floating net pens, accounting for approximately 45.19%, while the largest phosphorus load came from agriculture, reaching approximately 91.69% (Sani et al., 2024).

These data confirm that visible solid waste on the surface is only one part of the problem. A more fundamental threat stems from dissolved nutrients entering the lake via uneaten fish feed, fish waste, fertilizers, soil erosion, household wastewater, and agricultural runoff. Because Lake Batur is a relatively closed system without adequate natural outflows, contaminants tend to accumulate and take a long time to undergo natural purification (Sani

et al., 2024). Increased nitrogen and phosphorus levels have serious ecological consequences. Nutrients are necessary for aquatic productivity, but excessive concentrations can drive eutrophication, increased algal biomass, reduced water clarity, changes in oxygen levels, and disruptions to the structure of organism communities. These conditions indicate that lake quality cannot be assessed solely based on its ability to produce fish or support economic activities. High productivity can coexist with a decline in ecological stability.

Fish farming using floating net pens is an important source of livelihood for local communities. However, research findings indicate that the main issue is not the mere presence of the pens, but rather their scale, stocking density, feeding patterns, location, and the mismatch between the intensity of aquaculture and the lake's capacity to break down waste. Garno et al. (2024) determined that Lake Batur's carrying capacity for cage aquaculture is approximately 10,047 units. This limit has been exceeded since 2018, reaching 18,768 units by 2022. During the 2018–2022 period, cage aquaculture activities generated thousands of metric tons of organic waste containing nitrogen and phosphorus. This accumulation is associated with decreased water transparency, increased organic matter, decreased dissolved oxygen, increased chlorophyll-a, and eutrophication (Garno et al., 2024).

Recent research even estimates that Lake Batur receives approximately 14,776 metric tons of organic matter based on chemical oxygen demand (COD) parameters, 1,486 metric tons of total nitrogen, and 461 metric tons of total phosphorus annually. The majority of this load is attributed to floating net cage aquaculture activities. The distribution of pollutants has also expanded, so that concentrations of organic matter and nutrients are no longer high only around the cages but are now spread throughout the lake's water body (Garno et al., 2026).

These findings reveal a productivity paradox. The lake is intensively exploited because it generates economic value, but this intensification is gradually reducing the lake's capacity to maintain its productivity. Uneaten feed and fish waste increase the organic load, while the lake's assimilation capacity is limited. When ecological limits are exceeded, short-term gains have the potential to result in long-term losses in the form of declining water quality, fish mortality, increased production costs, and the loss of livelihood stability.

Within a theoretical-ecological framework, this issue is not an argument for eliminating people's livelihoods. The principle of justice requires that conservation take into account the economic needs of the community. However, economic benefits cannot be used as a justification for disregarding carrying capacity. *Danu Kerthi* should serve as the moral foundation for self-restraint, that is, limiting exploitation so that the source of life remains capable of sustaining future generations.

Recurring fish deaths are a key indicator of declining stability in Lake Batur. The upwelling phenomenon does indeed have a natural component, as Lake Batur is a volcanic lake. Changes in temperature, rainfall, wind, and water circulation can bring masses of water from the oxygen-poor lower layers, which contain sulfur and ammonia, to the surface layer.

However, this phenomenon cannot be entirely separated from human activities. The accumulation of uneaten feed, fish waste, and organic matter at the lake bottom increases oxygen demand during decomposition. When water mass inversion occurs, the oxygen-deprived lower layer can rise into the aquaculture zone, resulting in massive fish kills. Natural factors act as triggers, while anthropogenic organic loads amplify vulnerability and impact.

This vulnerability demonstrates that lake degradation does not always proceed through slow, easily observable changes. Stress can accumulate in sediments and the water column, then manifest as acute events when weather conditions and water circulation change. Therefore, the management of Lake Batur requires a preventive approach. Waiting for fish mortality to occur before taking action will only result in emergency responses that do not address the root cause of the problem.

Research findings also raise concerns about changes in fish communities due to the presence of introduced and invasive species, particularly predatory fish such as the red

devil. These species have the potential to suppress native fish through predation, competition for space, and competition for food sources. If their populations become increasingly dominant, the composition of the fish community may become more homogeneous, and relationships within the natural food web may change.

This issue is important because assessments of lake health often focus too heavily on the volume of fish production. High aquaculture production does not always reflect a healthy ecosystem. A lake may produce large quantities of fish, but at the same time lose biological diversity, undergo changes in trophic structure, and become increasingly dependent on one or a few fish species.

Hindu eco-theology calls for an expansion of responsibility from an anthropocentric orientation toward respect for the broader web of life. Goddess Danu not only provides water for humans but also sustains the habitats of various organisms. Therefore, lake conservation must include the preservation of biodiversity, not merely the sustainability of economic production. The condition of Lake Batur cannot be separated from the changes occurring in its watershed. Intensive agriculture on the caldera slopes carries fertilizers, pesticides, and eroded soil into the lake via surface runoff. Settlements, restaurants, tourism, livestock farming, and suboptimal domestic wastewater management systems further contribute to the pollution load.

The high contribution of agriculture to the phosphorus load indicates that lake restoration cannot be achieved solely within the water body itself (Sani et al., 2024). Pollution reduction must begin with agricultural lands, fertilization practices, erosion control, buffer vegetation, runoff channels, and waste management in residential areas. These findings also correct a narrow understanding of *Danu Kerthi*. If *Danu Kerthi* is directed solely at cleaning the lake's shores during Tumpek Uye, the majority of pollution sources remain untouched. Lake protection must encompass the entire watershed because the lake is the result of all activities taking place across the surrounding landscape.

3.4 Actualizing Danu Kerthi as a theo-ecological praxis

The findings reveal a tension between Lake Batur's sacred status and its material condition. Participants associate the lake with Dewi Danu or Bhatari Batur, sacred water (*tirta*), and community identity. A customary leader's description of the community as "guardians of the lake" expresses a perceived responsibility, while observations of offerings and prayers document its ritual enactment. Visible waste and published evidence of nutrient pollution and aquaculture pressure, however, indicate that sacred reverence coexists with environmental degradation. These findings substantiate religious meaning more directly than sustained conservation effectiveness.

This tension can be interpreted through the distinction between ritual awareness and operational ecological awareness. Ritual awareness concerns the recognition and expression of water's sacredness through worship and participation in ceremonies such as Tumpek Uye. Operational ecological awareness concerns the translation of responsibility into recurring decisions and practices affecting waste, resource use, and environmental care. These categories are analytical distinctions rather than measured attributes of the entire community. The available evidence demonstrates ritual participation but does not establish whether it consistently influences everyday ecological behaviour.

The *niskala–sakala* relationship gives this distinction a locally grounded conceptual basis. Water is revered in the *niskala* dimension, while its material condition in the *sakala* dimension remains subject to pressures from human activities. This coexistence does not establish that *Danu Kerthi* lacks ecological value. Rather, it shows why symbolic commitment and protective action require separate examination. The findings extend the implementation gap identified by Surpi et al. (2025) by distinguishing sacred identity, expressed obligation, observed practice, and environmental outcomes.

Within this analysis, theo-ecology denotes the framework connecting understandings of divine presence with ecological responsibility. Theo-ecological practice refers to activities through which this relationship is expressed, without assuming their conservation

effectiveness. Theo-ecological praxis denotes the reflective integration of religious meaning, ethical obligation, sustained action, and evaluation of ecological consequences. Accordingly, the theological, ethical, and practical dimensions are treated as analytical levels rather than equally established characteristics of *Danu Kerthi*. Interview accounts support sacred meaning and perceived obligation, while observations substantiate ceremonial activity; evidence of sustained conservation implementation remains more limited.

Three implications follow from these findings. The expressed guardian identity could support documented stewardship activities beyond ceremonies. Published evidence of nutrient and aquaculture pressures suggests that customary deliberation through *awig-awig* or *pararem* should engage scientific knowledge while considering local livelihoods. Community observations could also be connected with regular water-quality assessment to examine whether protective practices produce environmental improvement. These are proposed pathways derived from the analysis, not interventions whose effectiveness has been demonstrated by this study.

The contribution of *Danu Kerthi* therefore lies in its potential to make lake stewardship meaningful within the community's religious worldview. Realising this potential requires evidence that devotion informs recurring practices and institutional decisions. Caring for Lake Batur can thus be interpreted as a religious, ethical, and ecological responsibility, while the effectiveness of this responsibility must be assessed through documented action and sustained ecosystem protection.

4. Conclusions

Danu Kerthi is an inherited religious tradition among the Batur community that predates its reinforcement through Bali Provincial Government policies. Beyond water purification, it shapes the community's identity as guardians of Lake Batur. Worship of Dewi Danu or Bhatari Batur expresses a feminine theo-ecological worldview in which water is understood as both a source of life and a manifestation of divine presence. Analytically, the tradition connects theological beliefs in water's sacredness, ethical obligations to protect it, and their practical translation into conservation.

However, ritual reverence coexists with ecological degradation. Field observations and published environmental evidence indicate pressures from waste, nutrient pollution, intensive aquaculture, agricultural runoff, and domestic wastewater. This tension reveals a theo-ecological paradox: water is sanctified in the *niskala* dimension while remaining burdened by pollution in the *sakala* dimension. Ritual participation therefore cannot, by itself, establish conservation effectiveness; its ecological significance depends on how sacred meaning informs behaviour, institutions, resource use, and measurable environmental outcomes.

The study advances Hindu theo-ecology by demonstrating the need to connect ritual meaning with concrete ecological praxis. Strengthening this connection requires collaboration among religious and customary institutions, environmental science, government, and local communities. Operational customary regulations, pollution control, water-quality monitoring, ecosystem restoration, and resource use within carrying capacity offer pathways for translating sacred responsibility into stewardship. As guardians of the lake, community members have a central role in this process. Ultimately, devotion to Bhatari Batur acquires ecological expression through the sustained capacity of Lake Batur to support life.

Acknowledgement

The authors thank all informants who shared their knowledge, experiences, and perspectives on *Danu Kerthi* and Lake Batur. The authors also thank the customary and local authorities in the Batur area for facilitating the research and granting access to relevant activities and sites.

Author Contribution

Conceptualization, I.N.S. and I.K.S.; Methodology, I.N.S. and N.W.S.R.; Investigation, I.N.S. and N.W.S.R.; Data Curation, N.W.S.R.; Formal Analysis, I.N.S. and I.K.S.; Validation, I.K.S. and N.W.S.R.; Writing – Original Draft Preparation, I.N.S.; Writing – Review & Editing, I.N.S., I.K.S., and N.W.S.R.; Supervision, I.K.S.; Project Administration, I.N.S. All authors reviewed and approved the submitted version of the manuscript.

Funding

This research received no external funding.

Ethical Review Board Statement

Ethical review and approval were not required for this study, which involved non-invasive interviews and observations concerning cultural practices. Participation was voluntary, and informed consent was obtained from all informants before data collection.

Informed Consent Statement

Written informed consent was obtained from identifiable participants for the publication of their images or statements in this article.

Data Availability Statement

The interview transcripts and field notes supporting the findings of this study are not publicly available because they contain information that could identify participants and disclose culturally sensitive practices. De-identified excerpts may be made available by the corresponding author upon reasonable request, subject to participant consent and applicable ethical restrictions.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of Generative AI Use

Declaration of Generative AI and AI-Assisted Technologies: During the preparation of this work, the authors used DeepL Translator to assist in translating the manuscript into English. The authors reviewed and edited the translated text, verified its accuracy against the original, and take full responsibility for the content of the publication.

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