



Ecological crisis as a crisis of spirituality: A philosophical study of Seyyed Hossein Nasr's thoughts on the challenges of peat ecosystem management

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ABSTRACT

Background: The ongoing ecological crisis in Indonesia, especially the widespread degradation of peatland ecosystems in Riau, South Sumatra, Kalimantan, and Papua, reveals not only environmental and socio-economic problems but also a profound spiritual and philosophical crisis rooted in the desacralization of nature. This study reinterprets Seyyed Hossein Nasr's concept of desacralization as a framework for understanding ecological degradation and developing sacred ethical principles for peatland restoration. **Methods:** Employing a qualitative philosophical approach, this study integrates textual analysis of Nasr's works (Man and Nature; Religion and the Order of Nature) with empirical data from Center for International Forestry Research (CIFOR), Peatland and Mangrove Restoration Agency/*Badan Restorasi Gambut dan Mangrove* (BRGM), National Aeronautics and Space Administration (NASA), and related agencies (2015–2024) on peatland fires, subsidence, and carbon emissions. Ecological findings are synthesized with Islamic ethical concepts to generate practical restoration principles. **Findings:** The results reveal that peatland degradation stems from the loss of metaphysical awareness of the sacred order of creation. Six sacred ethical principles: intrinsic value, participatory stewardship, hydrological harmony, distributive justice and transformative economy, epistemic integration, and transparent accountability form a holistic framework integrating technical, social, economic, and spiritual dimensions. **Conclusion:** The resacralization of nature, grounded in *tawhīd*, *amānah*, and *mīzān*, offers a transformative paradigm for sustainable peatland governance and ecological ethics. **Novelty/Originality of this article:** This study uniquely integrates Islamic metaphysical ethics into the discourse on ecological restoration, offering an innovative eco-philosophical foundation and an actionable model for sustainable environmental governance in Indonesia.

KEYWORDS: desacralization of nature; eco-theological governance; Indonesia; islamic environmental ethics; peatland restoration; Seyyed Hossein Nasr.

1. Introduction

The modern ecological crisis can no longer be understood merely as a technical or environmental problem; rather, it must be viewed as a manifestation of a deeper spiritual and philosophical rupture in humanity's relationship with nature. The Intergovernmental Panel on Climate Change (IPCC, 2023) highlights that global climate change exerts multisectoral impacts, exacerbating the vulnerability of critical ecosystems. Among these, tropical peatlands play a pivotal role as the world's largest natural carbon sinks and

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regulators of hydrological balance. However, their degradation in Indonesia has contributed significantly to global carbon emissions, ecosystem service loss, and public health crises resulting from long-term exposure to fine particulate matter (PM_{2.5}) generated by peat fires (Hein et al., 2022; Grosvenor, et al., 2024). As Page et al. (2011) note, tropical peatlands store immense carbon reserves, making their destruction a direct threat to the success of global climate mitigation efforts.

Indonesia stands at the epicenter of this environmental paradox. The country hosts one of the world's largest areas of tropical peatland, yet simultaneously records one of the highest rates of degradation. Consequently, Indonesia occupies a paradoxical position bearing substantial responsibility for global climate mitigation while confronting complex socio-ecological conflicts that hinder sustainable management (Global Peatlands Initiative (GPI), 2023; Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF), 2024). Empirical studies demonstrate that peatland fires not only inflict ecological losses but also impose severe socio-economic burdens through increased morbidity, mortality, and public health costs (Hein et al., 2022). Furthermore, extensive drainage and canalization for agriculture and plantation industries have altered hydrological structures, heightened fire susceptibility, and accelerated land subsidence (Choy & Onuma, 2025).

Previous scientific investigations have predominantly concentrated on the technical dimensions of peatland ecosystems hydrology, carbon cycles, and economics while the underlying moral, symbolic, and spiritual dimensions remain underexplored. In the context of contemporary sustainability science, this lopsided focus creates a critical research gap. While conventional sustainability frameworks excel at identifying biophysical thresholds and economic trade-offs, they frequently overlook the underlying worldview specifically the paradigm of techno-rationalism that drives ecological exploitation. By treating nature merely as a resource to be managed rather than a living system with intrinsic value, current sustainability policies address the symptoms of degradation rather than its root causes. To resolve this, modern discourse must look beyond standard resource governance and actively engage with the principles of sustainability transitions, which advocate for a profound, structural reconfiguration of societal values, institutions, and practices. Furthermore, building genuine socio-ecological resilience requires more than just engineering interventions; it demands adaptive governance models that are deeply anchored in community ethics and local cosmological values.

Within the broader discourse of environmental philosophy and religion-ecology studies, ecological degradation is increasingly interpreted as a reflection of humanity's moral and spiritual crisis. Naess (2008), through his deep ecology framework, urged the need for an ecological consciousness that transcends anthropocentrism. In parallel, Nasr (1968; 1996) offered a profound critique of modernity, asserting that the desacralization of nature represents a fundamental metaphysical rupture in human civilization. According to Nasr (1996), the ecological crisis emerges when humanity severs its ontological bond with the Divine order inherent in nature, thereby reducing the cosmos to a mere object of material exploitation.

Nasr's metaphysical critique forms the cornerstone of the ecospiritual approach, which posits that the restoration of the sacred relationship between God, humanity, and nature is essential for ecological sustainability. Sadjali (2024), through his notion of eco-sufism, recontextualizes Sufi spirituality within modern ecological discourse, emphasizing that spiritual awareness may serve as the foundation for a renewed environmental ethic. Hence, the ecospiritual framework does not remain purely theoretical; it offers an ethical paradigm capable of reshaping human-environment relations toward a more holistic and sacred orientation.

Recent theoretical and empirical studies reinforce the urgency of this philosophical turn. Kiely et al. (2021) demonstrate that the socio-economic costs of peatland fires in Indonesia far exceed the short-term economic benefits of land conversion. Yuwati et al. (2021) highlight the ecological importance of peatland restoration for biodiversity and carbon sequestration. Puspitaloka et al. (2021) identify weak institutional coordination as a major obstacle to effective restoration in Central Kalimantan, while Budiningsih et al.

(2024) note the absence of ethical and spiritual integration in global restoration frameworks. Similarly, Sakuntaladewi et al. (2024) reveal the vulnerability of local communities to climate variability, and Albintani et al. (2025) link peatland degradation to threats to coastal food security. Jalilov et al. (2025) emphasize the lack of valuation for non-market ecological services in restoration policies, while Surati et al. (2025) and Musyid et al. (2025) call for multi-crisis approaches that integrate social, cultural, and ethical dimensions of sustainability.

Nevertheless, most of these studies remain confined to biophysical and technical analyses, leaving a conceptual gap between moral-spiritual consciousness and ecological sustainability. By failing to connect spiritual values with tangible ecological metrics, current paradigms struggle to foster the deep behavioral shifts necessary for sustainable peatland governance. To bridge this divide, this study positions ecospirituality not as an alternative to empirical science, but as a normative driver for structural sustainability transitions. We argue that a comprehensive framework for socio-ecological resilience must merge the metaphysical defense of nature with practical environmental metrics. Therefore, this study assumes that Indonesia's ecological crisis arises not solely from economic and political dynamics but from a profound spiritual rupture rooted in the desacralization of nature. This temporary hypothesis guides the qualitative philosophical exploration of the present research, which seeks to reinterpret Seyyed Hossein Nasr's ecospiritual philosophy as a conceptual framework for understanding the metaphysical roots of environmental degradation and for formulating sacred ethical principles applicable to peatland restoration.

Theoretically, this study contributes to the advancement of environmental philosophy by operationalizing Nasr's metaphysical insights into a normative framework for sustainable environmental policy. Empirically, it contextualizes ecospiritual principles within Indonesia's peatland governance practices, emphasizing the integration of sacred ecological consciousness into climate adaptation and ecosystem restoration strategies. The novelty of this research lies in its synthesis of philosophical reflection and empirical environmental management, offering a holistic framework for reimagining sustainability through the lens of sacred ecology.

Building upon the above discussion, the urgency of this research stems from Indonesia's ongoing multidimensional crisis encompassing ecological degradation, social vulnerability, and moral alienation from nature. Addressing these challenges requires a paradigmatic transformation from exploitation to stewardship, and from domination to reverence for creation. Accordingly, this study aims to reinterpret Seyyed Hossein Nasr's ecospiritual philosophy within the context of Indonesia's peatland crisis through three primary objectives: (1) to describe the forms and contexts of peatland degradation in Indonesia; (2) to interpret Nasr's concept of the desacralization of nature as a key to understanding the roots of the ecological crisis; and (3) to formulate sacred ethical principles as normative foundations for sustainable peatland management and restoration.

2. Methods

This study adopts a qualitative interpretive approach based on the view that ecological reality and human spirituality are inseparable dimensions of a unified cosmic order. Using a philosophical-hermeneutical paradigm, it interprets texts and meanings to understand the ecological crisis not only as a physical issue but also as a spiritual and moral one. The analysis focuses on Seyyed Hossein Nasr's concepts of the desacralization of nature and sacred cosmology to interpret Indonesia's peatland crisis within the context of modern spirituality. This approach is suited to the study's aim of uncovering philosophical and ethical meanings beyond the scope of positivistic or quantitative methods (Creswell & Poth, 2018; Flick, 2022).

This research focuses on Indonesia's peatland ecosystems, particularly in three main regions: Sumatra, Kalimantan, and Papua, which are methodologically selected as they represent three typologies of Indonesia's tropical peatlands coastal, inland, and transitional.

The distribution and geographical boundaries of these three regional typologies are illustrated in detail within Figure 1.

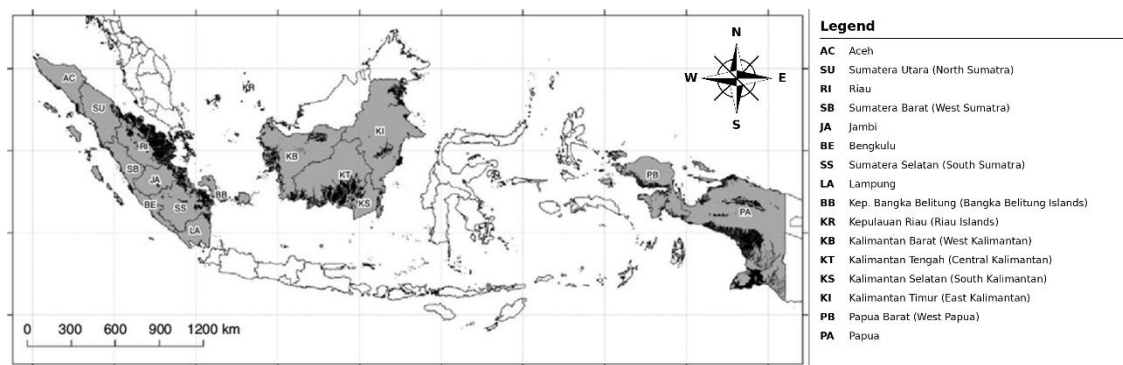


Fig. 1. Research location

According to CIFOR-ICRAF (2024) and Peatland and Mangrove Restoration Agency/*Badan Restorasi Gambut dan Mangrove* (BRGM) (2023), Indonesia hosts about 13.9 million hectares of tropical peatlands among the largest globally vital for carbon storage and hydrological balance. Yet, plantation expansion, canal construction, and recurring fires have led to severe ecological degradation (Page et al., 2011; GPI, 2023). Given their ecological and social complexity, peatlands offer a critical context for exploring the link between environmental degradation and the human spiritual crisis toward nature. This study, conducted in October–November 2025, employs a qualitative, literature-based approach using secondary data from scientific publications, institutional reports, and official documents on peatland management and restoration in Indonesia.

This study relies entirely on secondary data obtained from books, official institutional reports, and relevant scientific articles. The data are grouped into three main categories: (1) Islamic philosophical texts, including Seyyed Hossein Nasr's *Man and Nature* (1968) and *Religion and the Order of Nature* (1996), which provide the theoretical foundation for understanding the desacralization of nature and sacred ethics; (2) ecological and policy reports from official sources such as the Intergovernmental Panel on Climate Change (IPCC, 2023), United Nations Environment Programme (UNEP, 2023), Peatland and Mangrove Restoration Agency (BRGM, 2023), National Aeronautics and Space Administration (NASA, 2023), Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF, 2024), and United Nations Office for Disaster Risk Reduction (UNDRR, 2024), offering the most recent information on peatland conditions and management frameworks; and (3) relevant scientific articles that present empirical findings on ecological degradation, restoration initiatives, and peatland governance in Indonesia.

The research followed three interconnected stages forming an interpretive framework between philosophy and ecology. To ensure a transparent integration of empirical findings and philosophical principles, a systematic three-stage analytical procedure was established. The first stage was a philosophical literature review that interpreted Seyyed Hossein Nasr's major works through textual hermeneutics to extract key ideas such as the desacralization of nature, the hierarchy of being, and sacred environmental ethics. The second stage analyzed ecological and policy documents from BRGM, IPCC, and CIFOR-ICRAF to identify Indonesia's peatland conditions including fire dynamics, hydrological systems, and restoration efforts integrating Nasr's philosophical insights with empirical realities. The third stage employed a dialectical synthesis and thematic comparative analysis linking Nasr's metaphysical theory to Indonesia's ecological context. In this synthesis phase, empirical symptoms of peatland degradation (such as rapid land subsidence, extensive canalization, and high carbon emissions) were explicitly mapped as physical manifestations of the metaphysical rupture and 'desacralization' described in Nasr's framework, highlighting recurring themes like the modern spiritual crisis and the loss of cosmic sacredness.

Data were analyzed using the interactive model of Miles, Huberman, & Saldaña (2018), involving data condensation, display, and conclusion drawing. During the data condensation phase, the integration mechanism was operationalized through a dual-stream open coding system: philosophical texts were coded for metaphysical concepts (e.g., *Tawhid*, *Amanah*, *Mizan*), while environmental reports were coded for empirical ecological variables (e.g., water table depletion, biodiversity loss, community vulnerability). To cross-examine these distinct data streams, specialized thematic matrices and conceptual maps were then developed to visualize connections between Nasr's thought and peatland management practices, thereby allowing the abstract eco-philosophy to serve as an evaluative lens for empirical governance failures. Conclusions were verified through reflection and triangulation across philosophical, scientific, and policy sources (Flick, 2022). This interpretive qualitative approach frames the ecological crisis not merely as material damage but as a spiritual and ethical disorder, proposing an ecosystem management paradigm rooted in sacred awareness and spiritual ethics toward nature (Nasr, 1996; Sayem, 2019; Sadjali, 2024; Grosvenor, 2024). As the study used only secondary data, formal ethical clearance was unnecessary, though all sources were cited according to academic integrity standards.

3. Results and Discussion

3.1 Results

3.1.1 General forms and conditions of peat ecosystem degradation in Indonesia

Based on Figure 2, the spatial distribution map illustrates that Indonesia's peatland areas are predominantly concentrated in three main regions Sumatra, Kalimantan, and Papua with a total national coverage of approximately 13.4 million hectares (Wooster et al., 2018). As presented in Figure 2, this distribution underscores specific regional environmental vulnerabilities. The most recent data from CIFOR-ICRAF estimates the total extent of Indonesia's peatlands at around 13.43 million hectares (GPI, 2023; CIFOR-ICRAF, 2024). Within this distribution, Kalimantan accounts for approximately 4.5 million hectares, Sumatra covers between 4.3 and 4.5 million hectares, while the remaining areas are located in Papua and other regions (Ramadhan et al., 2025). The extensive coverage of peatland ecosystems positions Indonesia as a key global actor in climate change mitigation, given the exceptionally high carbon storage capacity of tropical peatlands.

Nevertheless, the ecological condition of Indonesia's peatlands indicates significant signs of degradation. According to BRGM (2023), between 40% and 60% of the total peatland area has experienced varying degrees of ecological decline, depending on factors such as drainage intensity, land-cover conversion, and historical fire occurrences. For instance, Kiely et al. (2021) estimate that large-scale peatland degradation and recurring fires have collectively resulted in substantial environmental losses, particularly in terms of carbon emissions and air quality deterioration.

Spatial analysis indicates that the epicenters of peatland fires and degradation are concentrated in provinces such as Riau, Jambi, and Central Kalimantan, which consistently appear as critical zones on damage maps (Wooster et al., 2018). Data from Sentinel-2 and Moderate Resolution Imaging Spectroradiometer (MODIS) reveal that the total burned area reached 3.11 million hectares in 2019, while CIFOR-ICRAF (2024) reports an average annual burned area of approximately 2.04 million hectares. This degradation has caused substantial alterations in peatland ecosystem structures, primarily due to drainage and land conversion.

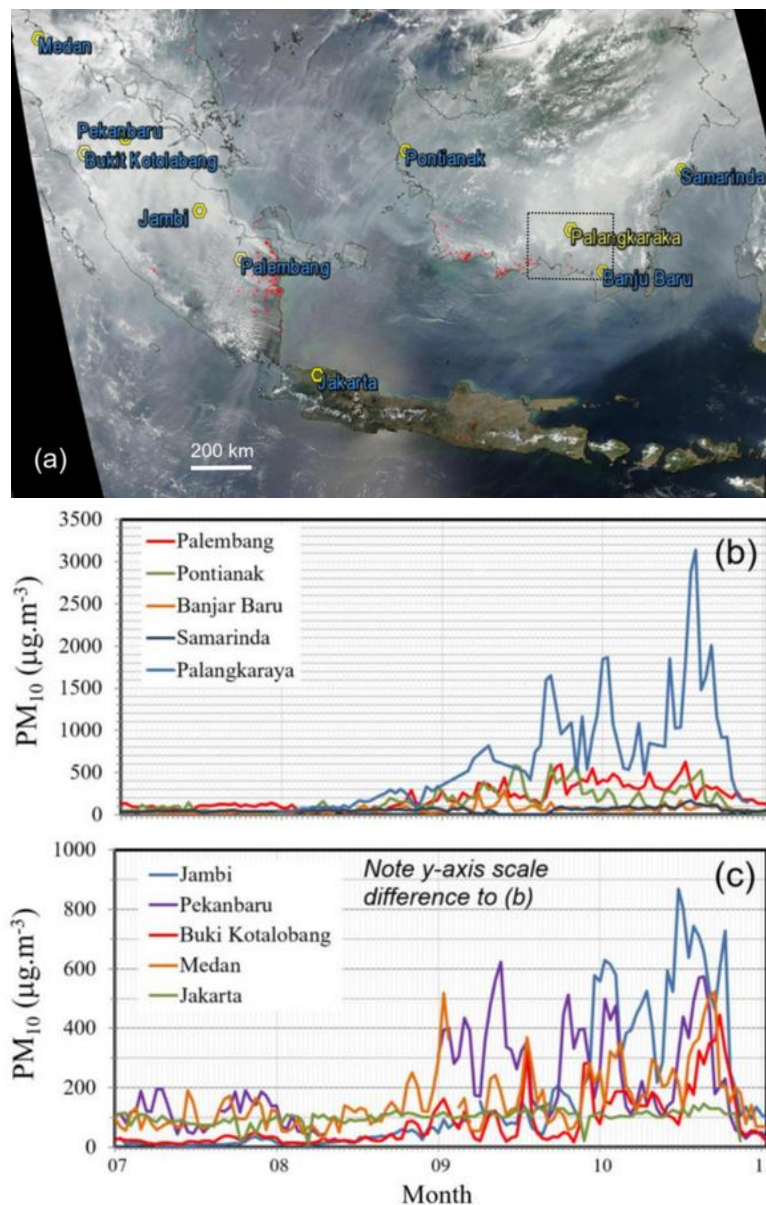


Fig. 2. Spatial distribution of peatlands in Indonesia (Wooster et al., 2018; NASA Earth Observatory, 2023)

Ecologically, drainage canal construction remains the primary driver of peatland structural damage in Indonesia. These canals accelerate the oxidation of organic materials and trigger soil subsidence, drastically reducing the peat's carbon storage capacity. Astiani et al. (2022) found that in Riau, drained peatlands converted into oil palm plantations experience significant declines in water tables and carbon stocks. When the groundwater level drops below approximately 40 cm, peat layers begin to undergo aerobic oxidation, accelerating organic decomposition and increasing fire risk. Yuwati et al. (2021) further confirmed that rewetting and revegetation strategies can effectively reduce fire hazards when properly implemented.

Recurrent fires have become a defining feature of the peat degradation cycle. Zahro et al. (2025) reported that in 2015, peatland fires affected 2.61 million hectares, producing exceptionally high levels of carbon emissions. Purnomo et al. (2024) estimated that up to 33% of burned areas during a single fire event involved previously drained and converted peatlands. The consequences extend beyond local boundaries transboundary haze and global carbon emissions have been among the most severe impacts. The socio-economic losses are also substantial: in several peatland regions, economic damages from fires and hydrological degradation reached billions of dollars (Astianti et al., 2022).

From a hydrological perspective, the natural water retention function of peatlands has been severely disrupted. The Pantau Gambut Report (2025) indicates that about 25% of peatlands are currently classified as highly flood-prone, while another 18% are moderately vulnerable (Jong, 2025). Lowering of the water table triggers a negative feedback loop of drought, oxidation, combustion, subsidence, and flooding. This dynamic interplay demonstrates that peatland degradation is a self-reinforcing ecological crisis. Spatially, Riau, Jambi, South Sumatra, and Central Kalimantan are identified as the most severely affected provinces. Although restoration programs have shown localized success, their overall effectiveness remains limited due to institutional and social constraints (Mendham et al., 2024).

Table 1. Peat subsidence and carbon emissions by province in Indonesia (2015–2024)

Province	Peatland area (million ha)	Average subsidence (cm/year)	Carbon emissions (ton CO ₂ /ha/year)	Key causes
Riau	4,0	3.5 – 4.2	50 – 55	Significant land subsidence due to intensive drainage in oil palm plantations (NASA, 2023).
Jambi	1,2	3.0 – 3.8	40 – 48	Forest-to-agriculture conversion accelerates degradation (CIFOR-ICRAF, 2022).
South Sumatra	1,4	4.0 – 5.0	55 – 60	BRGM priority restoration zone; high post-2019 fire emissions (Skalský et al. (2022).
Central Kalimantan	2,5	3.2 – 4.0	45 – 52	Controlled subsidence in canal-blocked areas; increased community-based management (UNDRR, 2024).
West Kalimantan	1,7	2.8 – 3.5	35 – 42	Stable emission reduction after 2020–2023 restoration (CIFOR, 2023).
Papua	1,3	1.2 – 2.0	20 – 30	Relatively pristine ecosystems; lowest national emission rates (NASA, 2023; Skalský et al., 2022).

Note: Data compiled from field observations and satellite imagery reported by CIFOR-ICRAF (2022), Skalský et al. (2022), NASA (2023), and UNDRR (2024) through comparative mapping and spatial harmonization of land-cover maps for the 2015–2024 period. Subsidence and emission values represent annual averages reconciled across research institutions to ensure spatial and temporal consistency.

Figure 2 and Table 1 together reveal significant spatial variation among Indonesia's peatland provinces. South Sumatra and Riau exhibit the highest rates of land subsidence up to 5 cm per year and carbon emissions exceeding 55 tons CO₂ per hectare annually, primarily due to extensive drainage and oil palm expansion. In contrast, Papua and West Kalimantan demonstrate greater ecological stability, with lower subsidence rates and controlled emissions, suggesting the effectiveness of protection and restoration measures. At the national scale, Western Indonesia remains the dominant source of land-based carbon emissions, whereas Eastern Indonesia serves as an ecological buffer that must be safeguarded for long-term sustainability.

The empirical findings above highlight that Indonesia's peatland ecosystems are experiencing a multidimensional ecological crisis encompassing interrelated biophysical, social, and policy factors. Such degradation is not merely the result of technical interventions like canalization or land conversion but stems from a deeper anthropocentric worldview that reduces nature to a mere instrument of economic gain. Addressing this issue

thus requires moving beyond empirical analysis toward a philosophical and ethical reflection on humanity's relationship with nature.

Beyond these biophysical indicators, the pattern of drained and degraded peatlands also conveys symbolic and spiritual meanings. The intricate canal networks, barren vegetation patches, and persistently low water tables may be interpreted not only as ecological failures but as landscapes of spiritual aridity material manifestations of a ruptured relationship between humans and the more-than-human world (Nasr, 1968; Foltz, 2003). Viewed through this lens, ecological collapse signifies not only the loss of biodiversity but also the erosion of place, ritual, and moral orientation. This symbolic dimension lays the groundwork for employing Seyyed Hossein Nasr's critique of the desacralization of nature as an interpretive framework in the following discussion (Nasr, 1996; Sayem, 2019).

Complementing this interpretive angle, empirical evidence underscores the pivotal role of local and community-based initiatives in shaping peatland outcomes. Community participation in canal blocking, well installation, assisted natural regeneration, and livelihood diversification has proven effective in reducing fire risks and restoring hydrological balance when adequately supported and incentivized. Notable examples from Riau and Central Kalimantan demonstrate the success of community-led rewetting and fire-prevention programs in lowering fire incidence and improving local welfare (Ramadhan et al., 2025; Zahro et al., 2025). Yet these studies also reveal ongoing governance and tenure constraints that hinder wider implementation. Integrating these community-based experiences into a broader eco-spiritual framework provides a crucial pathway for reconciling ecological restoration with moral and cultural renewal.

3.2 Discussion

3.2.1 Interpretation of Nasr's concept of desacralization as a basis for understanding the roots of the ecological crisis

As previously mentioned, this study employs an ecological-hermeneutic approach grounded in Seyyed Hossein Nasr's framework of the desacralization of nature to interpret empirical data on Indonesia's peatland degradation. According to Nasr (1996), the modern environmental crisis stems from a process of desacralization a historical shift in meaning whereby nature ceases to be perceived as a theophany (*āyah kosmiyyah*) or reality of intrinsic value and becomes instead an object of measurement, ownership, and exploitation. This epistemic rupture began with the scientific revolution of modernity, when knowledge lost its transcendent dimension. What was once knowledge as remembrance a means of recalling the Divine through the order of creation degenerated into knowledge as power, oriented toward control and domination over nature. Within this paradigm, humanity assumes the role of ruler (anthropos as sovereign), while nature is reduced to a utilitarian instrument.

For Nasr (1996), desacralization is not simply a rejection of religion but a deeper transformation in the human perception of reality. Nature is no longer apprehended as a manifestation of Divine Being but as a lifeless object stripped of metaphysical meaning. Consequently, the human-nature relationship becomes exploitative and detached from any ethic of reverence. In Islamic terms, this represents a violation of the Qur'anic principle of *khalifah fī al-arḍ* (Q.S. al-Baqarah [2]:30), which designates humans as trustees rather than absolute owners of the Earth. When this trusteeship is neglected, *fasād* (corruption) emerges:

"Corruption has appeared on land and sea because of what the hands of men have earned" (Q.S. al-Rūm [30]:41).

Conceptually, Nasr's (1996) perspective provides a hermeneutic lens to interrogate the rationality underlying modern economic and technological paradigms. Practices such as peatland drainage, canal construction, and large-scale agricultural conversion are not merely technical acts but expressions of a worldview that situates nature in a subordinate hierarchy. Thus, desacralization is not always explicit irreligiosity; rather, it manifests as a collective shift of values that renders destructive actions rational and profitable (Nasr, 1968). Environmental analysis, therefore, must extend beyond technical or ecological indicators to the epistemic level questioning how humanity defines knowledge, progress, and sustainability itself.

This interpretation resonates with contemporary eco-theological scholarship, which frames ecological degradation as a crisis of meaning and spirituality. Ives et al. (2024) argue that environmental damage cannot be healed through technological innovation alone without a parallel renewal of moral and cosmological values. Within the Islamic context, re-sacralizing nature entails reaffirming *tawhīd* as the foundation of ecological cosmology recognizing all beings as interconnected within the unity of existence (*waḥdat al-wujūd*). Genuine ecological restoration must thus begin with the renewal of humanity's spiritual relationship with the natural world, not solely through biophysical mitigation measures.

Empirical data from Indonesia's peatland ecosystems reinforces Nasr's insight regarding the spiritual roots of ecological crisis. Spatial assessments reveal that provinces such as Riau and South Sumatra suffer from severe land subsidence (up to 5 cm per year) and carbon emissions exceeding 55 tons CO₂ per hectare annually, primarily due to intensive drainage and oil palm expansion (NASA, 2023; CIFOR-ICRAF, 2024). Conversely, Papua and West Kalimantan demonstrate greater ecological stability, reflecting the benefits of sustained protection and restoration policies. These disparities indicate that degradation stems not merely from technical mismanagement but from a developmental paradigm privileging economic productivity over ecological balance.

Viewed through Nasr's hermeneutic lens, such practices are concrete expressions of desacralization: nature is no longer respected as sacred but commodified as a financial asset. Drainage and conversion policies appear rational within an extractive economic logic where success is measured by monetary growth rather than ecological integrity (Yuwati et al., 2021). This logic is reinforced by weak institutional coordination, socio-economic pressures, and market incentives that disregard non-market ecosystem services. In this sense, the spiritual disorientation of modernity materializes in both governance structures and global economic systems.

Kiely et al. (2021) emphasize that the linear economic paradigm pursuing perpetual growth while externalizing ecological costs has generated a systemic *ecological debt* that burdens future generations. In Indonesia, drained and burned peatlands release massive carbon emissions that not only disrupt the global climate system but also impair local public health and food security (Murdiyarso et al., 2023). Yet conventional policy frameworks tend to exclude such non-economic losses from their calculus. Here, Nasr's critique becomes particularly relevant: the environmental crisis originates not from a lack of technology, but from a spiritual reductionism that erases the sacred dimension of nature (Sayem, 2019).

From this standpoint, a holistic causal chain may be articulated: A paradigm shift in values, marked by the desacralization of peatlands, has given rise to extractive economic structures that drive technical practices of drainage and land conversion, which in turn cause hydrological degradation and land subsidence, ultimately escalating carbon emissions and socio-economic impacts. Each stage reflects humanity's progressive disconnection from cosmic awareness. While interventions such as rewetting or paludiculture are necessary, they remain remedial rather than curative if not accompanied by a transformation of underlying values (Mangunjaya, 2023). Conversely, ecological re-sacralization viewing nature as a divine trust (*amānah ilāhiyyah*) can serve as a moral and metaphysical foundation for sustainable policy-making.

This vision coheres with the contemporary articulation of *maqāṣid al-sharī'ah*, which increasingly recognizes *ḥifẓ al-bī'ah* (environmental protection) as one of its essential objectives (Pane & Yanis, 2024). When humanity perceives nature as a living component of

the sacred order, conservation, restoration, and ecological rehabilitation transcend technical necessity and become acts of spiritual stewardship. The ecological crisis, therefore, is not merely a failure of governance or science but a profound symptom of the loss of *tawhīdic* consciousness within modernity's epistemic structure.

3.2.2 Formulation of sacred ethical principles as a normative basis for sustainable peat ecosystem management and restoration

Seyyed Hossein Nasr (1996) conception of the desacralization of nature and the modern spiritual crisis provides a conceptual bridge between metaphysical analysis and ecological praxis. While the preceding section interpreted the ecological crisis as a consequence of the reduction of spiritual value in the modern worldview, the next step is to explore how this sacred dimension can be restored at the practical level. Peatland restoration efforts in Indonesia particularly in South Sumatra, Riau, West Kalimantan, and Papua require an ethical paradigm that is not merely technocratic but rooted in reverence for nature as an entity of intrinsic worth. The following ethical reflection is not a theological exegesis but an ethical interpretation consistent with Nasr's metaphysical vision, aiming to integrate sacred values with empirical restoration strategies.

Based on this synthesis, at least six operational principles of sacred ethics may serve as normative foundations and be translated into practical policy frameworks. To structurally synthesize these principles and their explicit contributions to sustainability governance, Table 2 compiles their theoretical roots alongside operational implications.

Table 2. Summary of the six sacred ethical principles and sustainability governance implications

No	Sacred ethical principle	Philosophical & theological foundation (Nasr)	Practical peatland governance & sustainability implications
1	Recognition of intrinsic value	Re-Valuation of nature beyond resource reductionism; cosmos as a Divine sign (<i>āyah</i>).	Binds policy to multi-sectoral carbon accounting and spatial planning that recognizes non-market ecosystem services (Murdiyarso et al., 2023).
2	Participatory stewardship	Khalīfah-based governance (trusteeship); anthropos as cosmic protector, not absolute master.	Reconfigures local authority by deploying community-led rewetting and inclusive Payment for Ecosystem Services (PES) frameworks (Purnomo et al., 2024).
3	Hydrological harmony	Restoring the cosmic equilibrium (<i>mīzān</i>) broken by human overreach.	Mandates landscape-scale, catchment-level rewetting and paludiculture to actively reverse land subsidence and fire risks (BRGM, 2023).
4	Distributive justice	Universal moral imperative to prevent socio-ecological corruption (<i>fasād</i>).	Inhibits exploitative "green capitalism"; demands equitable distribution of carbon economy revenues to local and native stakeholders.
5	Value education & epistemic integration	Scientia sacra (sacred science); integration of empirical data with traditional cosmological wisdom.	Operationalizes faith-based ecological actions (e.g., eco-pesantrens) to lower consumerist patterns and drive ecological resilience (Sanjotis, 2012).
6	Accountability & transparent monitoring	Divine accounting (<i>ḥisāb</i>); epistemic and moral transparency before the Creator.	Elevates bureaucratic monitoring to a moral duty; integrates near-real-time satellite tracking with open community validation tools.

While Table 2 provides a structured overview of the conceptual framework, translating these ideals into practical policy tools requires a deeper investigation into each principle. By mapping theoretical concepts to empirical restoration data, the following section

elucidates how these six philosophical pillars actively reshape environmental practices on the ground:

3.2.2.1 *Recognition of intrinsic value (re-valuation of nature)*

This principle affirms that nature possesses intrinsic value independent of its economic utility. In the context of peatlands, this means policies must recognize non-market ecosystem services such as carbon storage, hydrological regulation, and spiritual functions for local communities. Ecosystem service valuation and carbon accounting should be integrated into spatial planning, as recommended by Murdiyarso et al. (2023). The Ministry of Environment and Forestry (2022) also emphasizes integrating ecosystem value mapping into regional development plans to mitigate land subsidence and carbon loss. This approach resonates with the Qur'anic verse:

“Corruption has appeared on land and sea because of what the hands of men have earned...” (Q.S. al-Rūm [30]:41).

The verse underscores the moral obligation of humankind to reassess its actions toward nature not in terms of immediate benefit, but through the lens of moral and spiritual consequence.

3.2.2.2 *Participatory stewardship (khalifah-based governance)*

Following from the recognition of nature's intrinsic value, the ethical commitment must also manifest in participatory governance. Islamic ethics situates humans as *khalifah* trustees of the Earth (Q.S. al-Baqarah [2]:30) rather than its absolute masters. Participatory stewardship requires the active involvement of indigenous and local communities in peatland management. Purnomo et al. (2024) found that restoration initiatives in West Kalimantan achieved higher success when communities were engaged in rewetting design and Payment for Ecosystem Services (PES) schemes. The Indonesia Peat Restoration Agency Report (2023) further confirms that local empowerment and community ownership significantly reduce fire recurrence rates. Such participatory models also mitigate benefit inequality, ensuring that restoration outcomes are not captured solely by external actors but distributed justly across local stakeholders.

3.2.2.3 *Hydrological harmony (rewetting and landscape-based restoration)*

Building on participatory stewardship, the restoration process must embody harmony both technically and spiritually. Nasr (1996) emphasizes that spiritual harmony must manifest through ecological balance. Technical restoration measures such as rewetting, canal blocking, and paludiculture revegetation represent attempts to restore the cosmic order disrupted by human overreach. Empirical data from BRGM (2023) show that raising the water table by 40–60 cm can reduce fire risk by up to 70%. Landscape-based and catchment-level interventions facilitate holistic ecological reconnection. Spiritually, this corresponds to the Qur'anic principle of *mīzān* (balance):

“And the heaven He has raised, and He has set up the balance. So transgress not in the balance.” (Q.S. Al-Raḥmān [55]:7–8).

Thus, restoring hydrological balance becomes an act of maintaining divine equilibrium, not merely technical mitigation.

3.2.2.4 Distributive justice and transformative economy

Beyond ecological balance, sacred ethics also demand distributive justice in ecological restoration. This principle highlights the need for equitable distribution of ecological and economic benefits. Restoration should not become an instrument of “green capitalism” that reinforces social inequality. Sustainable paludiculture models in integrated wetscapes (Temmink et al., 2023) demonstrate that community welfare and conservation can advance together. From an Islamic perspective, distributive justice is a central moral imperative:

“And do not deprive people of their rights, nor cause corruption upon the earth.” (Q.S. Asy-Syu’ara [26]: 183).

In Indonesia, this requires mainstreaming carbon economy mechanisms and environmental compensation that prioritize community welfare alongside national emission targets, as highlighted by the Ministry of Environment and Forestry (2023) in its Low-Carbon Development Report.

3.2.2.5 Value education and epistemic integration

Continuing from distributive ethics, the transformation of ecological values must also occur through knowledge. One of Nasr’s most crucial concepts is *scientia sacra* knowledge sanctified by spiritual awareness. Environmental education in Indonesia must therefore integrate local wisdom, empirical science, and religious–ethical dimensions. Innovations such as eco-pesantren programs, “Religion and Ecology” curricula, and faith-based environmental movements can cultivate ecological consciousness rooted in faith. Studies by Setianingrum et al. (2024) and Saniotis (2012) indicate that Islamic ecological ethics effectively reduce consumerist behavior and foster sustainable living among Muslim youth communities in Southeast Asia. Integrating this epistemic dimension transforms environmental awareness from mere information to illumination a means of spiritual remembrance (*dhikr*) through knowledge.

3.2.2.6 Accountability and transparent monitoring

Finally, sacred ethics demand accountability both spiritual and institutional. Peatland restoration must be supervised through independent environmental audits, public reporting, and spatial–temporal monitoring based on satellite data. The Indonesia Peat Restoration Agency (2023) emphasizes the use of near-real-time peat moisture monitoring to improve adaptive management. From an Islamic perspective, such accountability stems from awareness of divine reckoning (*ḥisāb*):

“And do not pursue that of which you have no knowledge. Indeed, the hearing, the sight, and the heart about all those [one] will be questioned.” (Q.S. Al-Isra [17]: 36).

This verse links epistemic responsibility with moral consciousness: monitoring becomes not only a bureaucratic mechanism but a spiritual duty of transparency before God and society.

These six sacred ethical principles provide both normative and operational guidance for peatland ecosystem restoration in Indonesia. They speak not only to the technical domain but also to the deeper moral and spiritual dimensions of humanity’s relationship with the Earth. Applying these principles across key provinces such as Riau, South Sumatra, West Kalimantan, and Papua can establish adaptive, equitable, and sustainable models of ecological governance while contributing to global climate mitigation.

Ultimately, Nasr’s vision of *re-sacralization* of nature is not merely a metaphysical idea but a practical paradigm one that reawakens human consciousness to the Earth as a divine

trust (*amānah ilāhiyyah*). This synthesis shows that effective peatland restoration cannot be achieved through technical interventions alone; it requires a renewed value framework that restores reverence for ecological integrity. The resacralization framework proposed by Nasr thus offers a normative map that unites epistemic (what we know), ethical (what we value), and practical (what we do) dimensions forming the basis for a transformative ecological ethics grounded in both scientific evidence and spiritual consciousness.

To visualize how these sacred ethical principles translate into an integrative policy framework, Figure 3 illustrates the Conceptual Model of Sacred Ethics for Peatland Ecosystem Restoration. This model bridges the metaphysical foundations of Nasr's thought with empirically grounded ecological governance, showing how spiritual awareness can guide practical restoration strategies.

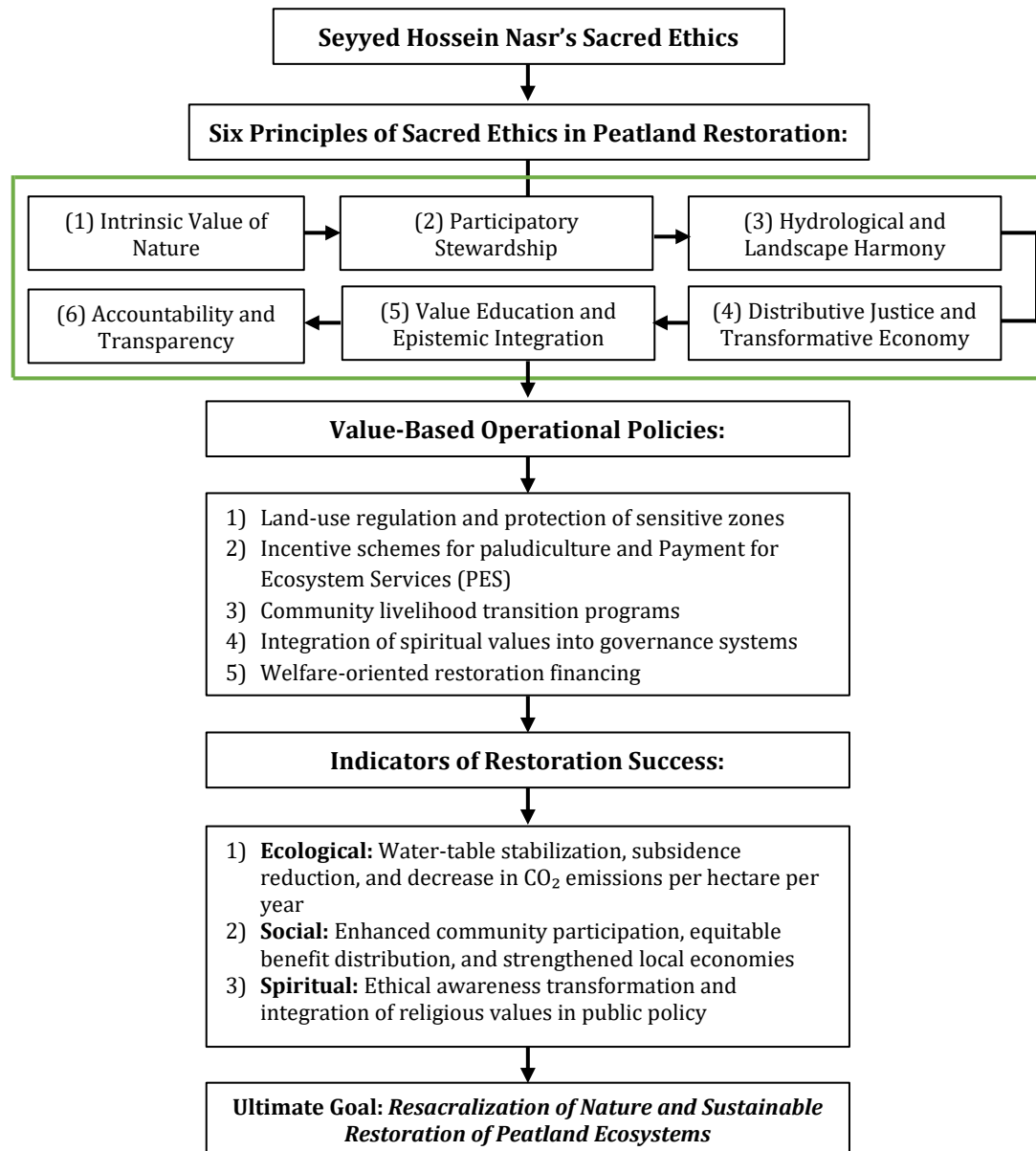


Fig. 3. The conceptual model of sacred ethics for peatland ecosystem restoration

Figure 3 illustrates an integrative-practical framework linking six sacred ethical principles Intrinsic Value of Nature, Participatory Stewardship, Hydrological and Landscape Harmony, Distributive Justice and Transformative Economy, Value Education and Epistemic Integration, and Accountability and Transparency with policy instruments and measurable restoration outcomes. The model highlights that value-based policies such as land-use

regulation, livelihood transition, and welfare-oriented financing operationalize these principles. In Indonesia, this framework is reflected in peatland restoration efforts across Sumatra (especially South Sumatra and Riau), Kalimantan (notably Central and West Kalimantan), and Papua, ensuring that restoration extends beyond biophysical recovery to include social justice, cultural continuity, and spiritual awareness.

However, operationalizing this conceptual model in real-world policy environments presents structural barriers and deep-seated implementation constraints that conventional frameworks fail to address. A primary potential limitation of this ecospiritual framework is the institutional entrenchment of techno-rationalism within modern bureaucratic apparatuses. State regulatory agencies and multinational plantation networks operate strictly on short-term market indicators, posing a severe real-world implementation barrier to the implementation of non-market intrinsic valuation models. Furthermore, transitioning from centralized legal structures to participatory stewardship (Khalifah-based governance) faces political-economic pushback from extractive concessions that dominate overlapping land tenures in Sumatra and Kalimantan.

To overcome these systemic implementation barriers, the framework must be operationalized through an adaptive governance model. Adaptive governance provides a dynamic feedback loop where sacred ethical benchmarks such as maintaining cosmic balance (*mīzān*) through strict water table retention are continuously adjusted in response to empirical real-time data inputs from field sensors and remote sensing platforms. By embedding spiritual accountability (*ḥisāb*) within adaptive institutions, local restoration practices avoid bureaucratic rigidity. Over time, this synthesis of metaphysical principles and institutional elasticity underpins long-term socio-ecological resilience. Long-term socio-ecological resilience ensures that rural communities are not merely passive recipients of top-down conservation funding, but active ethical agents whose traditional knowledge patterns and ecological sovereignty are protected against external landscape disruptions.

At the national and global levels, this model aligns with Indonesia's Forestry and Other Land Use (FOLU) Net Sink 2030 and the National Peatland Restoration Strategy while contributing to broader environmental ethics and climate resilience agendas. By integrating spirituality into sustainability, it supports global initiatives such as the United Nations Decade on Ecosystem Restoration (2021–2030) and the Paris Agreement, positioning the re-sacralization of nature as a moral foundation for ecological governance and climate action.

Collectively, these dimensions converge toward the ultimate goal of Resacralization of Nature and Sustainable Restoration of Peatland Ecosystems, where ecological recovery becomes both an environmental and spiritual renewal process beginning in Indonesia's peatlands yet speaking universally to humanity's moral relationship with the Earth.

4. Conclusions

This study concludes that the systemic degradation of Indonesia's peatland ecosystems marked by severe land subsidence and escalating carbon emissions across Riau, South Sumatra, and Central Kalimantan is not merely a technical management failure. Instead, it is the material manifestation of a profound crisis of meaning: the desacralization of nature. Driven by an extractive developmental paradigm, modern techno-rationalism reduces fragile wetlands into mere financial instruments, severing the spiritual and ontological connections between humanity and the cosmos. By decoding these biophysical crises through Seyyed Hossein Nasr's metaphysical framework, this research establishes that environmental collapse is fundamentally a spiritual and moral anomaly where knowledge is weaponized as power over nature rather than stewardship.

To bridge this metaphysical critique with empirical governance, this study translates Nasr's thought into six operational principles of sacred ethics: recognition of intrinsic value, participatory stewardship, hydrological harmony, distributive justice, epistemic integration, and moral accountability. Operationally, this framework demands concrete policy interventions, including the institutionalization of multi-sectoral carbon accounting

that recognizes non-market ecosystem values, the mandate of landscape-scale water table retention (40–60 cm) via community-led canal blocking, and the deployment of inclusive Payment for Ecosystem Services (PES) models. Furthermore, environmental bureaucracies must integrate near-real-time satellite tracking with open community-based verification platforms to transform institutional monitoring from a rigid technocratic routine into a transparent moral obligation (*ḥisāb*).

Ultimately, the resacralization of nature offers a transformative paradigm shift that transcends Indonesia's geographical boundaries. While this study focuses on tropical peatlands, the conceptual synthesis of spiritual stewardship (*amānah*) and empirical science provides a universal normative framework applicable to other degraded global ecosystems, such as the Congo Basin, Amazonian wetlands, and desertified arid zones facing speculative climate capitalism. Future transdisciplinary research must integrate Islamic philosophy with political ecology and ecological economics to operationalize these values globally. By anchoring environmental policies in a sacred ethic, global sustainability governance can move beyond superficial technical mitigation toward an inclusive, just, and participatory ecological civilization that honors the cosmic equilibrium.

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Author Contribution

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Not available. This study did not involve human or animal subjects and therefore did not require ethical approval.

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Data Availability Statement

The data used in this study were obtained from publicly available reports by CIFOR-ICRAF (2024), IIASA (2022), and UNDRR (2024). No new data were collected by the author.

Conflicts of Interest

The author declares no conflict of interest.

Declaration of Generative AI Use

During the preparation of this manuscript, the author used ChatGPT (GPT-5, OpenAI) to assist in improving structure, grammar, and academic consistency, within ethical limits. The author ensured that the AI was not used to generate the full content of the paper, reviewed and edited all materials comprehensively, and takes full responsibility for the final content.

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