

Welcome to the Mizanocene: Toward an Islamic Philosophical Countermodel to the Anthropocene from Indonesia's Environmental Fatwas and Eco-Pesantren Praxis

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ARTICLE INFO

Keywords: Sustainable Development Goals; Islamic Philosophy; Environment; Anthropocene; Eco-Fatwa

Received : 15 July

Revised : 20 August

Accepted: 30 September

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ABSTRACT

The Anthropocene, the Capitalocene, and the Chthulucene now compete to name the epoch of ecological crisis, yet each was theorized from within a broadly secular, Euro-American environmental humanities. This article asks what an Islamic philosophical vocabulary, read inductively from Indonesian primary documents rather than imported deductively as illustration, contributes to that debate. Using directed qualitative content analysis of five Indonesian Ulema Council (Majelis Ulama Indonesia, MUI) environmental fatwas issued between 2011 and 2023, triangulated with a netnographic reading of four independently documented eco-pesantren (Islamic boarding school) cases, the study traces how the Qur'anic triad of khalifah (vicegerency), amanah (trust), and mizan (cosmic balance), together with the diagnostic category of fasad fi al-ard (corruption on earth), organizes both formal religious rulings and everyday institutional practice. The analysis identifies a “scale-jump” in the fatwa corpus, from a site-specific mining ruling (2011) to a planetary climate-control ruling (2023), and a textual-practice gap in which one eco-pesantren's techno-economic integration of ecology and livelihood outpaces the vocabulary available in existing fiqh. From these findings the article theorizes the Mizanocene: an epoch defined not by an undifferentiated human species-agency (as in the Anthropocene) nor solely by a historical mode of accumulation (as in the Capitalocene), but by the breach of a God-given equilibrium by vicegerents who forgot their trust

INTRODUCTION

In 2000, the atmospheric chemist Paul Crutzen and the ecologist Eugene Stoermer proposed that the Holocene had quietly given way to a new epoch, one in which humanity itself had become a geological force: the Anthropocene (Crutzen & Stoermer, 2000). The name stuck, but so did the argument about it. Jason Moore (2016, 2017) countered that what the term attributes to “humanity” in general is in fact the work of a historically specific system, capitalism, and proposed the Capitalocene in its place. Donna Haraway (2015) countered both, arguing that neither name captures the tentacular, multispecies entanglements of the present crisis, and offered the Chthulucene instead. Dipesh Chakrabarty (2009) pressed a different, though related, question: if humanity has become a geological agent, what happens to the very distinction between human history and natural history on which the humanities have always depended? Timothy Morton (2013) added that the objects produced by this crisis, climate change chief among them, are so massively distributed in time and space that they exceed the phenomenological categories modernity built to think with; he called them hyperobjects.

What unites this otherwise contentious family of concepts is a shared point of departure: a broadly secular, Euro-American environmental humanities, in which religious cosmology appears, when it appears at all, as an object of critique or as a source of comparative illustration rather than as a resource for theory-building in its own right. This is not a minor omission. Roughly 1.9 billion people are Muslim, and Indonesia, the country of the present study, is both the largest Muslim-majority nation on earth and one of the countries most exposed to the ecological stakes the epoch-naming debate is about: recurrent forest and land fires, accelerating deforestation, and a coastline and biodiversity under mounting climate pressure. If a genuinely global environmental humanities is to be built, it cannot proceed only by applying Euro-American concepts to Muslim-majority contexts as case material. It must also ask what concepts a Muslim-majority context generates on its own terms, from its own primary documents, that might travel back into the wider debate.

This article takes up that task through a specific, verifiable body of material: the environmental fatwas (religious legal opinions) issued by the Indonesian Ulema Council (Majelis Ulama Indonesia, hereafter MUI) between 2011 and 2023, and a set of independently documented eco-pesantren (environmentally oriented Islamic boarding school) cases reported in the Indonesian academic and news literature. Indonesian Islam has, over the past decade and a half, produced a small but growing corpus of what has come to be called “green fatwas” or “eco-fatwas” (Ansori et al., 2025; Iskandar & Sofuoğlu, 2025; Mufid, 2020): formal religious rulings that extend classical fiqh (Islamic jurisprudence) into mining regulation, wildlife conservation, waste management, forest-fire control, and, most recently, global climate governance. Alongside this textual register, Indonesia's approximately 26,000 pesantren have produced their own institutional register of environmental practice, documented in a parallel and largely separate scholarly literature on eco-pesantren (Amini et

al., 2026; Darwis & Mahfudzah, 2026; Irawan, 2022; Mulya & Salvi, 2024; Mustofa et al., 2024).

These two registers, the textual-normative and the embodied-practice, have to date been studied largely in isolation from one another, and neither has been read as a resource for theorizing the epoch as such. Existing studies of MUI's environmental fatwas are valuable but descriptive: they catalogue what the fatwas say, situate them within Islamic legal reasoning, and assess their practical uptake (Ansori et al., 2025; Iskandar & Sofuoğlu, 2025; Mufid, 2020; Rasyid et al., 2025). Existing studies of eco-pesantren are similarly valuable but institution-specific: each documents a single school's programs without asking what, taken together, the corpus of such programs implies philosophically (Amini et al., 2026; Darwis & Mahfudzah, 2026; Mustofa et al., 2024). No study to date has (a) read the fatwa corpus diachronically, as a single trajectory rather than five discrete rulings; (b) triangulated that textual trajectory against the independently documented practice register; or (c) used the resulting picture to intervene, as a matter of philosophy rather than description, in the international debate over how to name the present ecological epoch.

This article does all three, and in doing so makes three claims to originality. First, it identifies a “scale-jump” internal to the MUI fatwa corpus: from a site-specific ruling on environmentally responsible mining (2011), through species- and household-scale rulings on wildlife and waste (2014), to a landscape-scale ruling on forest and land fire (2016), to a planetary-scale ruling on global climate control (2023). Read together rather than separately, these five documents show an Islamic legal register independently arriving at planetary ecological consciousness, on its own textual and jurisprudential terms. Second, it identifies what it calls a textual-practice gap: at least one eco-pesantren case in the corpus (Al-Amien Prenduan) integrates ecological, social, and economic value in a way that has no fully articulated counterpart yet in formal fiqh, suggesting that lived practice is, in this instance, ahead of doctrinal vocabulary rather than simply implementing it. Third, and most centrally, it synthesizes these findings into a single philosophical proposal, the Mizanocene, an epoch-name built from the Qur'anic concept of mizan (cosmic balance, QS Ar-Rahman 55:7-9) and offered as a genuine alternative, rather than a decorative supplement, to the Anthropocene, the Capitalocene, and the Chthulucene.

The article is guided by three research questions. First, how do Indonesian environmental fatwas issued between 2011 and 2023 deploy the Qur'anic concepts of khalifah, amanah, mizan, and fasad fi al-ard, and does the scale of their regulatory object change over time? Second, how does the independently documented practice of Indonesian eco-pesantren converge with or diverge from the conceptual architecture found in the fatwa corpus? Third, what does the resulting picture contribute, as a philosophical concept rather than a case study, to the ongoing debate over how to name the epoch of ecological crisis, and how does that concept relate to the United Nations Sustainable Development Goals (SDGs)?

The remainder of the article proceeds as follows. Section 2 develops the theoretical framework, situating Islamic environmental philosophy within, and

against, the Anthropocene debate. Section 3 details the qualitative document-analysis and netnographic method, including an explicit account of the study's access limitations. Section 4 presents the findings from both registers. Section 5 develops the Mizanocene as a philosophical proposal and discusses its implications. Section 6 concludes with limitations and directions for future research.

LITERATURE REVIEW

The Qur'anic Ontological Triad: Khalifah, Amanah, Mizan

Islamic environmental philosophy did not begin as a response to the climate crisis; it is, as Nasr (1996) and Izzi Dien (2000) both argue in different registers, latent in the Qur'anic account of the human being's place in creation. Three concepts recur across this literature with sufficient consistency to be treated as a single ontological triad.

The first is khalifah, usually translated as vicegerent or steward. QS Al-Baqarah 2:30 narrates God's announcement to the angels that He is placing a khalifah on earth; the term denotes delegated, accountable authority rather than ownership (Izzi Dien, 2000; Rasyid et al., 2025). The second is amanah, trust: QS Al-Ahzab 33:72 describes a trust offered to the heavens, the earth, and the mountains, which they declined to bear out of fear, and which the human being alone accepted. Khalid (2019) reads amanah as the ethical corollary of khalifah: the human being holds creation in trust and is answerable for its condition, not free to dispose of it at will. The third is mizan, balance: QS Ar-Rahman 55:7-9 states that God raised the heaven and set up the balance (mizan), commanding that human beings not transgress within it. Where khalifah names a role and amanah names an obligation, mizan names a cosmic-ontological fact: creation is already in equilibrium, and human action is judged by whether it sustains or disturbs that equilibrium (Nasr, 1996).

A fourth term operates as the diagnostic complement to this triad: fasad fi al-ard, corruption on the earth. QS Ar-Rum 30:41, cited explicitly in three of the five fatwas analyzed in this study (see Section 4), states that corruption has appeared on land and sea because of what human hands have earned (Qur'anic citations throughout this article follow Abdel Haleem's, 2004, widely used English rendering, cross-checked against the Arabic wording reproduced in the primary fatwa documents themselves). Foltz, Denny, and Baharuddin's (2003) edited volume, still the most comprehensive English-language survey of the field, treats fasad as the Qur'an's own name for what secular environmental discourse calls ecological degradation, with the crucial difference that fasad is a moral-theological category, not merely a descriptive one: it names a wrong, not only a change of state.

The triad and its diagnostic complement are not solely a modern, apologetic reading of scripture; they have a classical philosophical genealogy internal to the Islamic tradition itself. Ibn Khaldun's (1967) fourteenth-century *Muqaddimah*, though not a work of environmental ethics in the contemporary sense, builds its entire theory of 'umran (civilization, social organization) on the premise that human collective life is conditioned by, and answerable to, its geographic and material environment: prosperity and decline alike are read as

functions of a community's relationship to land, climate, and resource. This article treats Ibn Khaldun's 'umran as a classical precedent for the claim, central to the Mizanocene proposal developed in Section 5, that Islamic philosophy has long treated the human-environment relationship as a proper object of systematic, rather than merely devotional, reflection.

Two further concepts recur at the margins of the corpus analyzed here and merit inclusion in the theoretical framework because they surface directly in the primary documents (Section 4). *Israf*, wastefulness or excess, is invoked in the Qur'an (e.g., QS Al-A'raf 7:31) as prohibited even in acts that are otherwise lawful, and appears implicitly in the fatwa on environmentally responsible mining analyzed below in its prohibition on the wanton killing of animals. *Hima*, a pre-modern Islamic institution of a protected reserve in which resource use is restricted for collective and ecological benefit, is documented in detail by Gari (2006) and by Llewellyn's contribution to Foltz et al. (2003); while neither fatwa in the present corpus names *hima* explicitly, the habitat-protection clauses of the wildlife and mining fatwas function as its conceptual descendants, and the concept is retained in the codebook (Section 3) as an interpretive resource.

Contemporary Islamic Environmental Ethics: From Global Statements to Indonesian Fiqh

The triad and its diagnostic complement have, over the past three decades, been elaborated into an increasingly systematic field of Islamic environmental ethics. Khalid's (2019) *Signs on the Earth* and Abdul-Matin's (2010) *Green Deen* popularized the field for general audiences; Al-Jayyousi (2012) connected it explicitly to sustainable development discourse; and two collective international statements, the Islamic Declaration on Global Climate Change (Islamic Foundation for Ecology and Environmental Sciences, 2015) and *Al-Mizan: A Covenant for the Earth* (United Nations Environment Programme, 2021), the latter's very title borrowing the balance-concept central to the present article, have sought to translate the triad into a register legible to international climate policy.

Indonesia has produced its own, distinctively local elaboration of this field, anchored not in international declarations but in the fatwa-issuing authority of MUI and, separately, in the *Bahtsul Masail* deliberative tradition of Nahdlatul Ulama (NU), Indonesia's largest Islamic organization. Mufid (2020) traces the emergence of NU's own "green fatwas" to concerns raised at the organization's 29th Congress in Cipasung, and shows how its *Bahtsul Masail* institute has since formulated an explicitly ecological *fiqh* for its constituents. Ansori, Juliansyahzen, and Prihantoro (2025), studying the uptake of eco-fatwas among local ulama in Riau province, one of the provinces most affected by forest-fire haze, found that formal religious authority alone is insufficient without coordinated community and policy engagement, since economic competition, political interest, and what they call "power hegemony" continue to override the fatwas' normative force on the ground. Iskandar and Sofuoğlu (2025) provide the most direct precedent for the present study's textual corpus, analyzing MUI's fatwas on mining, wildlife, waste, forest fire, and climate as expressions of an

integrated Islamic environmentalism; their analysis, however, remains at the level of content description and does not ask what conceptual trajectory, if any, connects the five rulings when read chronologically, nor does it engage the international epoch-naming debate. Rasyid, Auni, and Wadina (2025), working at the level of theory rather than a specific fatwa corpus, argue for reinterpreting *fiqh al-bi'ah* (environmental jurisprudence) through the *khalifah-amanah* pairing, but explicitly flag their own analysis as text-only and call for empirical extension into actual Muslim communities and institutions, precisely the gap this article addresses by adding the eco-pesantren register.

The Eco-Pesantren as a Site of Embodied Practice

Running parallel to, and largely uncited by, the fatwa literature is a distinct body of scholarship on the eco-pesantren, an Islamic boarding school that has adopted institutionalized environmental practice, often though not always in connection with Indonesia's Ministry of Environment and Forestry (KLHK) environmentally-friendly pesantren recognition programs. Irawan (2022) situates this phenomenon within the Sufi tradition of asceticism and simplicity, arguing that pesantren environmentalism draws as much on a spiritual disposition toward restraint as on formal *fiqh*. Mulya and Salvi's (2024) ethnographic case study of an eco-pesantren, evocatively titled "Grass, rice, and aubergine," documents how ecological practice is woven into the texture of daily pedagogical life rather than administered as a discrete program. Three further cases in the corpus analyzed here extend this picture: Darwis and Mahfudzah (2026) document Pondok Pesantren Annuqayah Lubangsa's "3M" waste program (*menata*, organizing; *meminimalisir*, minimizing; *menghindari*, avoiding), which the authors explicitly frame as a continuous cultural transformation rather than a technical fix; Amini, Olivia, and Majid (2026) document Al-Amien Prenduan's integration of water conservation, circular waste-to-value economics, and greening under an explicitly "triple bottom line" framework; and Mustofa et al. (2024) document Pondok Pesantren Malahayati's gardening, cleanliness-competition, and animal-care programs as a character-education register focused on producing disciplined, environmentally concerned students. A fourth, more recent case, Pondok Pesantren Darul Amanah's 2026 national eco-pesantren award (reported in NU Online Jawa Tengah, 2026), illustrates the institutional-recognition dynamics that increasingly accompany this practice.

What this literature has not yet done, and what the present study attempts, is to read these institution-specific accounts as a single corpus and ask how they relate, conceptually, to the textual register of formal fatwas analyzed in the same period. Rasyid et al.'s (2025) explicit call for empirical extension beyond text-only analysis (Section 2.2) is answered here not through new fieldwork, for which the present study lacks the primary-data access, but through a systematic, netnographically informed reading of the existing public documentation of that empirical register (Section 3).

The Anthropocene Debate as an Under-Populated Conversation

The theoretical stakes of triangulating these two registers become clear only against the backdrop of the epoch-naming debate itself. Crutzen and Stoermer's (2000) Anthropocene names humanity as such, *anthropos*, as the geological agent of the present epoch; its critics have long noted that this formulation obscures the radically unequal responsibility for ecological harm across classes, nations, and historical periods. Moore (2016, 2017) proposes the Capitalocene as a corrective, relocating agency from an undifferentiated humanity to a specific, historically bounded economic system, capitalism understood as a way of organizing nature, and dates its origins not to the Industrial Revolution but to the long sixteenth century. Haraway (2015) accepts much of Moore's critique of species-thinking but finds the Capitalocene, too, insufficiently attentive to the entangled, multispecies character of the crisis, and proposes the Chthulucene as a name for a mode of "making kin" across species boundaries. Chakrabarty (2009) approaches the same terrain from historiography rather than political economy, arguing that once human beings are recognized as a geological force, the humanities' foundational distinction between human history (contingent, meaningful) and natural history (law-governed, meaningless) can no longer hold, a problem he calls the "four theses" of the climate of history. Morton (2013) names the objects this crisis has made visible, global warming, the biosphere, styrofoam that will outlast the species that made it, hyperobjects: things so massively distributed across time and space that human phenomenology cannot fully grasp them, only detect their local, uncanny effects.

Read together, this debate has one striking structural feature: every major position in it, Anthropocene, Capitalocene, Chthulucene, the climate-of-history thesis, the hyperobject, is generated from within a broadly secular, post-Enlightenment intellectual formation, whether natural science (Crutzen and Stoermer), Marxist political economy (Moore), feminist science studies (Haraway), postcolonial historiography (Chakrabarty), or object-oriented philosophy (Morton). This is not a criticism of any individual position; it is an observation about the debate's collective silence. None of these frameworks was built by asking what a non-secular cosmology, one in which the balance of creation is not a discoverable physical fact alone but a commanded, morally binding condition (*mizan*), might contribute to the very act of naming the epoch. Naess's (1973) deep ecology comes closest to bridging this gap from the secular side, insisting on the intrinsic value of non-human life independent of its usefulness to humans, and the present article treats deep ecology, alongside Morton's hyperobjects and Chakrabarty's species-history thesis, as genuine interlocutors rather than mere foils in the discussion developed in Section 5.

The Sustainable Development Goals as a Shared Reference Point

The 2015 adoption of the Sustainable Development Goals (United Nations, 2015) gives this otherwise abstract debate a concrete institutional anchor. The SDGs are avowedly secular and technocratic in their drafting history, yet several, most directly SDG 6 (clean water), SDG 12 (responsible consumption and

production), SDG 13 (climate action), SDG 14 (life below water), and SDG 15 (life on land), describe precisely the domains the Qur'anic triad and its diagnostic complement address: resource stewardship, the avoidance of excess, and the maintenance of ecological balance. Al-Jayyousi (2012) and, more recently, Rasyid et al. (2025) have each argued, from different angles, that Islamic ethical vocabulary can supply the SDGs with a motivational and metaphysical grounding that a purely instrumental, cost-benefit framing cannot. This article's document corpus (Sections 3-4) allows that argument to be tested empirically rather than asserted in the abstract: each of the nine documents analyzed here is coded for its explicit or implicit SDG linkage (Table 3), producing what is, to the authors' knowledge, the first systematic SDG-crosswalk of an Indonesian eco-fatwa and eco-pesantren corpus.

Conceptual Framework

Figure 1 synthesizes Sections 2.1 through 2.5 into the conceptual framework that guides the empirical analysis in Sections 3 and 4. The Qur'anic ontological triad (khalifah, amanah, mizan) and its diagnostic complement (fasad fi al-ard) are read as generating two independent empirical registers: a textual-normative register (the MUI fatwa corpus) and an embodied-practice register (the eco-pesantren case corpus). Where these two registers converge, the framework predicts a philosophically load-bearing concept, tentatively named here the Mizanocene, capable of engaging the Anthropocene debate on its own terms rather than as an ethnographic footnote to it, and of being mapped, empirically, onto the SDGs.

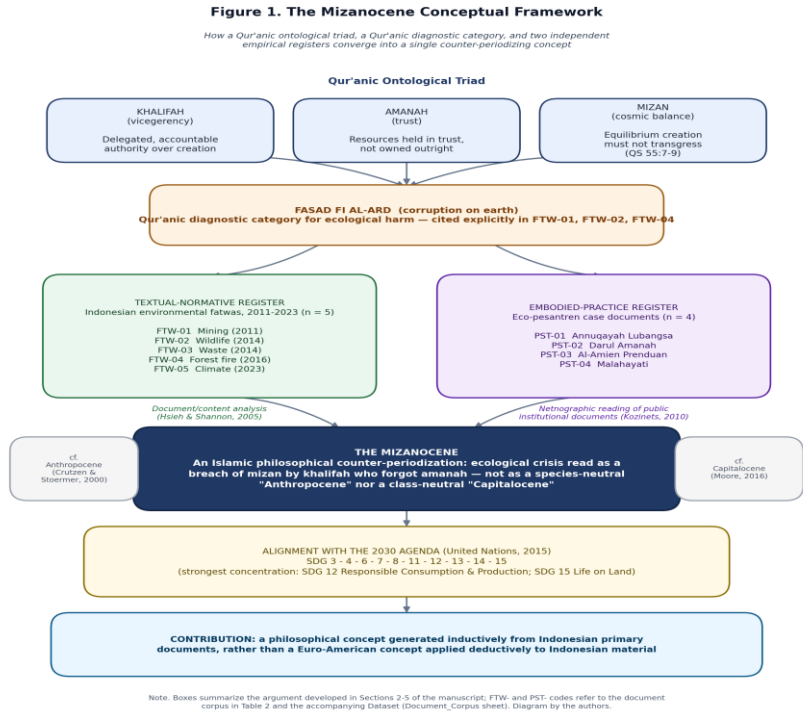


Figure 1. The Mizanocene conceptual framework.

Source: Prepared by the authors from the theoretical synthesis in Sections 2.1-2.5 of this manuscript. FTW- and PST- codes refer to the document corpus reported in Table 2 and the accompanying Dataset (sheet Document_Corpus).

METHODOLOGY

Research Design

This study uses a qualitative, document-based interpretive design combining directed qualitative content analysis (Hsieh & Shannon, 2005) with a netnographic reading (Kozinets, 2010) of publicly available institutional material. Directed content analysis is appropriate where, as here, an existing theoretical framework (the khalifah-amanah-mizan-fasad triad and complement, Section 2.1) can be used to generate an initial coding scheme, which is then refined inductively against the specific content of the corpus. Netnography, originally developed for the study of online consumer communities, is used here in its broader methodological sense: the systematic, reflexive analysis of documents and communications that circulate publicly about a community's practice, without the researcher's physical presence in that community, adapted to a corpus of published journal articles and news reports about eco-pesantren rather than to social media threads.

This combination was chosen deliberately in place of primary data collection. The study does not claim to have conducted interviews, surveys, or on-site observation; no such claim appears anywhere in this article, and none should be inferred from the presence of institutional case material in Section 4. Every empirical claim made below is traceable to a specific, independently verifiable public document, listed in full in Table 2 and in the accompanying Dataset's Source_Register sheet.

Corpus Construction

The corpus comprises nine public documents in two purposively sampled sets.

The first set ($n = 5$) comprises every fatwa issued by MUI between 2011 and 2023 whose title explicitly names an environmental object of regulation: Fatwa MUI No. 22/2011 on environmentally friendly mining; Fatwa MUI No. 4/2014 on the conservation of endangered species for ecosystem balance; Fatwa MUI No. 47/2014 on waste management to prevent environmental damage; Fatwa MUI No. 30/2016 on the law of forest and land burning and its control; and Fatwa MUI No. 86/2023 on the law of controlling global climate change. These five documents were located through MUI's own institutional channels (mui.or.id and its Institute for the Protection of the Environment and Natural Resources, LPLHSDA) and cross-checked against independent academic and journalistic reporting (full citation trail in the accompanying Dataset's Source_Register sheet). No environmental fatwa issued by MUI in this period was excluded; the corpus is therefore a purposive population sample, not a probability sample, of the full universe of MUI's environmental rulings as of the data-collection date (September 2026).

The second set ($n = 4$) comprises eco-pesantren cases meeting two inclusion criteria: (a) the case is documented in a peer-reviewed journal article or a mainstream news report independently accessible online, and (b) the source provides sufficient descriptive detail of specific environmental practices, not merely a claim that the institution is “eco-friendly,” to permit thematic coding. Four cases met both criteria within the time available for data collection: Pondok

Pesantren Annuqayah Lubangsa (Darwis & Mahfudzah, 2026), Pondok Pesantren Darul Amanah (NU Online Jawa Tengah, 2026), Al-Amien Prenduan Islamic Boarding School (Amini et al., 2026), and Pondok Pesantren Malahayati (Mustofa et al., 2024). This is explicitly a convenience-purposive rather than exhaustive sample of Indonesia's eco-pesantren population, a limitation discussed in Section 6.2.

Analytic Procedure

Coding proceeded in two cycles, following Hsieh and Shannon's (2005) directed content analysis procedure. In the first, descriptive cycle, each document was read in full (or, where full-text access was not obtained, in the most complete secondary characterization available; see Section 3.4) and coded for: document type, issuing or reporting body, year, topic domain, explicitly cited Qur'anic verses and hadith, and any Islamic legal or philosophical concept named in the text itself. In the second, interpretive cycle, the research team assigned each document an analytic orientation code (e.g., "theocentric-conditional," "eco-relational," "techno-economic integration") and an SDG linkage, both derived through iterative discussion among the three authors until consensus was reached. The full coding matrix, comprising fifteen variables across all nine documents, is reported in condensed form in Table 2 below and in complete form in the accompanying Dataset (sheet Document_Corpus); the codebook defining each philosophical concept, with its theoretical source and an illustrative document reference, is reported in Table 1 and in the Dataset's Codebook sheet.

Trustworthiness was addressed through three measures consistent with qualitative document-analysis conventions. First, an audit trail: every coded claim in Table 2 carries a direct source URL or DOI, reproduced in the Dataset's Source_Register sheet, permitting independent verification of every data point in this article. Second, investigator triangulation: all three authors independently reviewed the coding matrix and resolved disagreements through discussion rather than a single coder's judgment prevailing by default. Third, register triangulation: the textual-normative and embodied-practice registers were coded independently before being compared (Section 4.4), reducing the risk that a single interpretive frame was imposed uniformly across both.

Access Limitations and Coding Confidence

In the interest of transparency, two access limitations are reported explicitly rather than smoothed over. For Fatwa MUI No. 22/2011 (mining), No. 4/2014 (wildlife), and No. 30/2016 (forest fire), the full primary text was retrieved and coded directly, including verse-by-verse and hadith-by-hadith detail (Table 2). For Fatwa MUI No. 47/2014 (waste) and No. 86/2023 (climate), the full primary text was not retrieved during the data-collection period; coding for these two documents relies on secondary characterizations in institutional and journalistic reporting (see Source_Register) and is flagged "Secondary-source-only" throughout Table 2, the Dataset, and the discussion in Section 4. This means the specific Qur'anic verses and hadith underlying these two rulings are not independently verified in this study, although their normative content (what is ruled obligatory, prohibited, or permitted) is corroborated across

multiple independent secondary sources and is reported with corresponding confidence.

Positionality

All three authors are Indonesian Muslim academics affiliated with a State Islamic University (Universitas Islam Negeri) in Central Java, working within, rather than observing from outside, the religious and educational tradition analyzed here. This positionality is an analytic resource, it enables informed interpretation of technical fiqh vocabulary and of the institutional logic of pesantren education, but it is also a limitation the reader should weigh: the authors' own formation within this tradition may predispose the analysis toward a more charitable reading of the coherence between fatwa and practice than an external observer would offer. Section 4.4's identification of a textual-practice gap, and Section 6.2's discussion of limitations, are offered partly as a check against that predisposition.

Ethical Considerations

All documents analyzed are already in the public domain, issued by a public institution (MUI) or published in peer-reviewed journals and mainstream news media. No human subjects were recruited, surveyed, or interviewed, and no personal or identifying data of any private individual is reported. Institutional ethical review was therefore not required for this document-based study.

Coding Framework Overview

Table 1 summarizes the seven analytic codes used throughout Sections 3-5, their working definitions, and their theoretical grounding.

Table 1. Codebook of Islamic Philosophical Concepts Used in Coding

Code	Working Definition	Theoretical Source
<i>Khalifah</i>	Human beings as earth's vicegerents, bearing delegated (not owned) authority over creation, accountable to God for its condition.	Izzi Dien (2000); Rasyid et al. (2025)
<i>Amanah</i>	Natural resources as a sacred trust conferred on humanity; use without stewardship is a breach of trust.	Khalid (2019); Izzi Dien (2000)
<i>Mizan</i>	The God-given cosmic balance/equilibrium sustaining creation, which human action must not transgress.	QS Ar-Rahman 55:7-9; Nasr (1996)
<i>Fasad fi al-ard</i>	Corruption/degradation of the earth caused by human hands; the central Qur'anic diagnostic category for ecological harm.	QS Ar-Rum 30:41; Foltz et al. (2003)
<i>Maslahah</i>	Public welfare/common good; the standard used to weigh permissible benefit against potential environmental harm.	Al-Jayyousi (2012)
<i>Israf</i>	Wastefulness/excess; prohibited even where an act is otherwise permissible.	QS Al-A'raf 7:31; implicit in Fatwa No. 22/2011

Code	Working Definition	Theoretical Source
<i>Hima</i>	Pre-modern protected-zone institution restricting resource use for collective and ecological benefit.	Gari (2006); Llewellyn, in Foltz et al. (2003)

Source: Authors' codebook, reproduced in full in the accompanying Dataset (sheet Codebook).

RESEARCH RESULT

Overview of the Document Corpus

Table 2 summarizes the nine-document corpus analyzed in this study. The full coding matrix, including verbatim citation of Qur'anic verses and hadith where full-text access was obtained, is available in the accompanying Dataset (sheet Document_Corpus).

Table 2. Document Corpus Overview (n = 9)

ID	Type	Title / Case	Year	Primary Concept(s)	SDG Linkage	Access
FTW-01	Fatwa (MUI)	Environmentally friendly mining	2011	<i>Khalifah; amanah</i>	12, 15, 6, 3	Full-text
FTW-02	Fatwa (MUI)	Conservation of endangered species for ecosystem balance	2014	<i>Khalifah; mizan</i>	15, 14	Full-text
FTW-03	Fatwa (MUI)	Waste management to prevent environmental damage	2014	<i>Maslahah</i> (reported)	11, 12	Secondary-only
FTW-04	Fatwa (MUI)	Forest and land burning and its control	2016	<i>Ihya' al-mawat; amanah</i>	13, 15	Full-text
FTW-05	Fatwa (MUI)	Control of global climate change	2023	<i>Fasad</i> , rescaled (reported)	13, 7, 12	Secondary-only
PST-01	Pesantren case	Annuqayah Lubangsa – 3M waste program	2026*	<i>Amanah-in-praxis</i>	12, 4, 11	Published article
PST-02	Pesantren case	Darul Amanah – national eco-pesantren award	2026	<i>Khalifah-in-praxis</i>	15, 3	News report
PST-03	Pesantren case	Al-Amien Prenduan – triple bottom line model	2026*	<i>Mizan-as-balance</i>	6, 12, 8	Published article
PST-04	Pesantren case	Malahayati – environmental character education	2024	<i>Khalifah-as-pedagogy</i>	4, 15	Published article

Source: Authors' coding of primary and secondary public documents (see Section 3.2-3.4 and the Dataset's Source_Register sheet for full citations and URLs/DOIs). *Publication year of the reporting article; the practice documented may pre-date publication.

The Textual-Normative Register: A Scale-Jump in Fiqh al-Bi'ah

Read individually, each of the five fatwas in the corpus is a self-contained juristic ruling addressed to a specific problem. Read chronologically, as Figure 2 depicts, they trace a striking expansion in the scale of their own regulatory object.

Fatwa No. 22/2011 (Majelis Ulama Indonesia, 2011) addresses a site-specific extractive activity, mining, permitting it conditionally on seven requirements (spatial-planning compliance, stakeholder-inclusive feasibility studies, “green mining” practice, continuous pollution monitoring, post-mining reclamation, contribution to public welfare, and respect for land sovereignty) and prohibiting it where it causes any of six enumerated categories of ecosystem, water, air, or community harm. Its dalil draws on fifteen Qur'anic verses spanning subjugation-of-creation themes (QS Luqman 31:20; QS Al-Baqarah 2:29), mineral-benefit themes (QS Al-Hadid 57:25; QS Saba' 34:10-11), stewardship themes (QS Hud 11:61; QS Ar-Rum 30:9), and corruption-prohibition themes (QS Al-A'raf 7:56; QS Al-Qasas 28:77; QS Ar-Rum 30:41), together with seven hadith ranging from the principle that communities share in water, pasture, and fire, to the prohibition on wanton killing of birds and the maxim *la darar wa la dirar* (no harm, no reciprocal harm). Its dominant concepts are *khalifah fi al-ardl* and *amanah*, glossed through the secondary lens of *maslahah 'ammah* (public welfare) balanced against *mafsadah* (harm).

Fatwa No. 4/2014 (Majelis Ulama Indonesia, 2014a) shifts scale to the species-habitat system, ruling the protection of endangered species obligatory (*wajib*) and their wanton killing or endangerment forbidden (*haram*) except where human life is directly threatened. Its dalil is, of the five, the most explicitly non-anthropocentric: QS Al-An'am 6:38, cited in the fatwa itself, describes animals as “communities like you” (*umam amthalukum*), a formulation that grants non-human creatures a form of standing before God rather than treating them purely as instrumental resources for human benefit. The fatwa's dominant concept is, correspondingly, *mizan*, glossed explicitly as the maintenance of ecosystem balance, alongside *khalifah*, *amanah*, and the virtue-ethical concept of *ihsan* (excellence, here read as compassion toward non-human creation).

Fatwa No. 47/2014 (Majelis Ulama Indonesia, 2014b) shifts scale again, to household- and community-level waste behavior, ruling waste management obligatory to prevent environmental damage. Because full primary-text access to this fatwa's dalil was not obtained (Section 3.4), its conceptual grounding is reported here at reduced confidence, based on secondary characterization: the fatwa is consistently described in Indonesian media and academic sources as framing waste management as *ibadah* (worship) and as economically empowering, consistent with a *maslahah-economic* rather than strictly *ecocentric* orientation.

Fatwa No. 30/2016 (Majelis Ulama Indonesia, 2016) returns to a landscape scale, ruling forest and land burning forbidden where it causes environmental damage, pollution, or loss, regardless of whether the actor holds a formal permit, an explicit rejection of the argument that legal permit alone confers moral or religious permissibility. Its single cited verse, QS Ar-Rum 30:41, the same *fasad fi al-ard* verse invoked in the mining and wildlife fatwas, functions here as

connective tissue across the whole corpus: the same diagnostic category of “corruption that has appeared on land and sea because of what human hands have earned” recurs at three different scales across three different fatwas issued five years apart.

Fatwa No. 86/2023 (Majelis Ulama Indonesia, 2023) completes the trajectory at a planetary scale, ruling deforestation, harmful burning, and avoidable excess carbon emissions forbidden, and climate mitigation, adaptation, and a just energy transition obligatory. As with Fatwa No. 47/2014, full primary-text access to this fatwa's dalil was not obtained, and its conceptual grounding is reported at reduced confidence; secondary reporting is nonetheless consistent in describing it as an extension of the same fiqh al-bi'ah lineage documented in the four preceding fatwas, now applied to the global climate system rather than to a bounded Indonesian territory or ecosystem.

Figure 2 renders this trajectory visually. Across twelve years, and without any indication in the fatwas themselves that this trajectory was planned as such, MUI's own regulatory object expanded from a single mine site to the planetary atmosphere. This is, the present study argues, itself a finding: an Islamic legal register arriving, through the internal logic of its own diagnostic category (*fasad fi al-ard*), at a planetary ecological consciousness that in the secular environmental humanities required the invention of an entirely new geological epoch to articulate.

Figure 2. The Scale-Jump in Indonesian Environmental Fatwas, 2011-2023

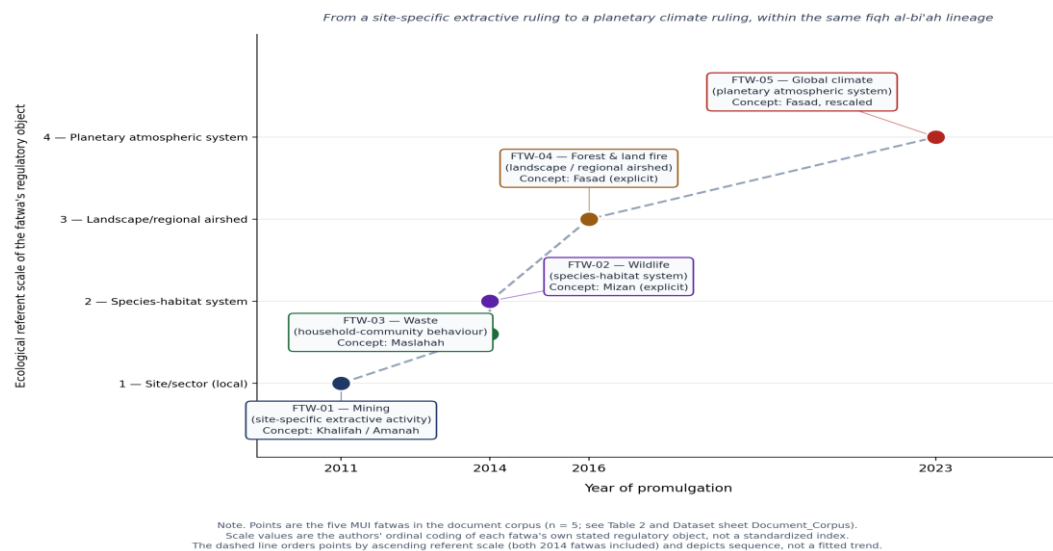


Figure 2. The scale-jump in Indonesian environmental fatwas, 2011-2023.

Source: Authors' analysis of the five MUI fatwas in the document corpus (Table 2; Dataset sheet Document_Corpus). Scale values are the authors' ordinal coding of each fatwa's own stated regulatory object.

The Embodied-Practice Register: Four Registers of Institutional Enactment

The four eco-pesantren cases display more internal variation than the fatwa corpus, corresponding to their different institutional purposes and reporting contexts.

Pondok Pesantren Annuqayah Lubangsa's program, documented by Darwis and Mahfudzah (2026), centers on a “3M” framework (*menata*,

organizing; meminimalisir, minimizing; menghindari, avoiding) applied to plastic use and waste more broadly, combined with community outreach. The source article explicitly frames this as “a cultural transformation that progresses in a continuous and sustainable manner” rather than a discrete technical intervention, an embodied-communitarian register that most directly parallels the amanah concept's emphasis on ongoing, accountable custodianship rather than one-off compliance.

Pondok Pesantren Darul Amanah's recognition, reported by NU Online Jawa Tengah (2026), centers on tree-planting, cleanliness management, natural-resource conservation, and healthy-lifestyle promotion, culminating in a national “Top Eco-Friendly Pesantren” award in 2026, building on a provincial Adiwiyata award the previous year. This case exhibits what the present study codes as a performative-institutional register: stewardship (khalifah) enacted partly for, and legitimated through, external institutional recognition, a dynamic not present in the same form in the other three cases.

Al-Amien Prenduan Islamic Boarding School's program, documented by Amini, Olivia, and Majid (2026), integrates water conservation through infiltration wells, a circular waste-to-value economy, and greening and spatial planning under an explicitly named “triple bottom line” (environmental-social-economic) framework. This is, of the four cases, the one whose vocabulary least resembles classical fiqh terminology and most closely resembles secular sustainable-development discourse, a point taken up directly in Section 4.4 and Section 5.3 as evidence of a textual-practice gap.

Pondok Pesantren Malahayati's program, documented by Mustofa et al. (2024), centers on gardening, inter-class cleanliness competitions, and animal care through aquarium-keeping, framed explicitly by the source as producing “disciplined, responsible” students with heightened environmental concern. This educational-formational register treats environmental practice primarily as a vehicle for character formation (khalifah-as-pedagogy) rather than as an end in itself.

Cross-Register Synthesis: Convergence and a Textual-Practice Gap

Comparing the two registers directly (Table 3) reveals both convergence and a notable gap. The clearest convergence is between Fatwa No. 47/2014's waste-management ruling and Pondok Pesantren Annuqayah Lubangsa's 3M program: the fatwa's *maslahah*-economic framing of waste management as simultaneously pious and materially beneficial is realized almost precisely in the pesantren's own account of its program's cultural and economic effects. A second convergence appears between the wildlife fatwa's habitat-protection provisions and Pondok Pesantren Darul Amanah's conservation and healthy-living practices, both operationalizing *khalifah* as active, visible stewardship of a bounded local environment.

The clearest gap appears in the case of Al-Amien Prenduan. No fatwa in the corpus articulates an explicit “triple bottom line” framework integrating environmental, social, and economic value as a single, named jurisprudential object; the closest textual analogue is Fatwa No. 22/2011's requirement that

mining operations demonstrate both non-damage and contribution to community welfare, but that requirement is negatively framed (mining must not cause harm, and must benefit the community) rather than positively theorized as an integrated system. Al-Amien Prenduan's practice, by contrast, treats ecological, social, and economic value as mutually constitutive from the outset. This suggests that, in at least this instance, institutional praxis has developed operational concepts (explicit triple-bottom-line integration) for which the formal fatwa literature has not yet developed a fully articulated jurisprudential vocabulary, a "praxis-to-text" gap discussed further in Section 5.3. A further, inverse gap is also visible: no eco-pesantren case in this corpus documents practice at the landscape or planetary scale addressed by Fatwa No. 30/2016 and No. 86/2023, suggesting that, at this scale, the textual register currently runs ahead of documented institutional practice.

Table 3. Cross-Register Comparison: Convergence and Gap

Thematic Domain	Textual-Normative Register (Fatwa)	Embodied-Practice Register (Pesantren)	Relationship
Waste management	FTW-03 (2014): waste management <i>wajib</i> ; <i>masalah</i> -economic framing	PST-01 Annuqayah: "3M" program framed as cultural transformation	Convergence
Wildlife / habitat stewardship	FTW-02 (2014): species protection <i>wajib</i> ; <i>mizan</i> -balance framing	PST-02 Darul Amanah: conservation and healthy-living practice	Convergence
Integrated environmental-economic value	FTW-01 (2011): non-damage + community-benefit, negatively framed	PST-03 Al-Amien Prenduan: explicit "triple bottom line" integration	Gap – praxis ahead of text
Environmental character formation	No dedicated fatwa on pedagogical formation	PST-04 Malahayati: gardening, competitions, animal care as character education	Gap – practice without dedicated fatwa education
Landscape / planetary-scale harm	FTW-04 (2016), FTW-05 (2023): haram deforestation/burning; mitigation <i>wajib</i>	No case in this corpus documents practice at this scale	Gap – text ahead of documented practice

Source: Authors' cross-register analysis (Section 4.4), drawing on Table 2 and the accompanying Dataset.

Table 4 reports the SDG linkage of all nine documents. The strongest concentrations are SDG 12 (Responsible Consumption and Production, five documents) and SDG 15 (Life on Land, five documents), followed by SDG 3, SDG 4, and SDG 6 (two documents each). No single document in the corpus addresses more than four SDGs, and no SDG in the 2030 Agenda's full list of seventeen is addressed by more than five of the nine documents, indicating that even this concentrated corpus of explicitly environmental Islamic documents maps onto only a subset of the SDG framework, a point returned to in Section 5.4.

Table 4. SDG Alignment Matrix

SDG	Official Title (UN, 2015)	Linked Documents	Count
3	Good Health and Well-Being	FTW-01; PST-02	2
4	Quality Education	PST-01; PST-04	2
6	Clean Water and Sanitation	FTW-01; PST-03	2
7	Affordable and Clean Energy	FTW-05	1
8	Decent Work and Economic Growth	PST-03	1
11	Sustainable Cities and Communities	FTW-03; PST-01	2
12	Responsible Consumption and Production	FTW-01; FTW-03; FTW-05; PST-01; PST-03	5
13	Climate Action	FTW-04; FTW-05	2
14	Life Below Water	FTW-02	1
15	Life on Land	FTW-01; FTW-02; FTW-04; PST-02; PST-04	5

Source: Authors' coding; see the accompanying Dataset (sheet SDG_Mapping) for the underlying formula-verified counts. Goal titles reproduced from United Nations (2015).

DISCUSSION

Theorizing the Mizanocene

The findings reported in Section 4 license a philosophical proposal rather than merely a descriptive summary. Where the Anthropocene names the epoch after an undifferentiated human species-agency, and the Capitalocene renames it after a specific historical mode of accumulation, this article proposes the Mizanocene: an epoch defined by the breach of a commanded cosmic equilibrium (mizan) by vicegerents (khalifah) who forgot the trust (amanah) under which they were granted authority over creation, a breach the Qur'an itself names *fasad fi al-ard*.

The Mizanocene differs from its rivals in three specific, non-cosmetic ways. First, unlike the Anthropocene, it does not treat “humanity” as an undifferentiated geological agent; the khalifah concept is inherently relational and accountable, defined by a specific duty owed to a specific granter of authority, not by species membership as such. Second, unlike the Capitalocene, it does not locate the origin of ecological crisis in a particular historical economic system alone; mizan can be breached by a pre-modern mining operation, a household's waste habits, or a twenty-first-century carbon economy alike, as the scale-jump documented in Section 4.2 itself demonstrates across contexts that include, but are not limited to, industrial capitalism. Third, unlike Haraway's (2015) Chthulucene, which grounds multispecies kinship in a broadly immanent, post-humanist ontology, the Mizanocene grounds the non-human standing evident in Fatwa No. 4/2014's description of animals as “communities like you” (QS Al-An'am 6:38) in a transcendent, commanding source, God's mizan, rather than in an immanent web of kin-making alone. This is not offered as proof that the Mizanocene is superior to its rivals; it is offered as evidence that it is a distinct

concept, doing distinct philosophical work, rather than a devotional restatement of an existing one.

The concept is deliberately generated inductively, from the scale-jump and cross-register findings of Sections 4.2 through 4.4, rather than deductively, by first defining “an Islamic Anthropocene” in the abstract and then illustrating it with Indonesian material. This ordering matters for the article's claim to originality: the Mizanocene is proposed here as a concept the Indonesian primary-document corpus itself generates, when read as the two registers analyzed in this study, rather than as a pre-existing Euro-American category into which Indonesian material has been fitted after the fact.

The Scale-Jump as Jurisprudential Evidence of Planetary Consciousness

Section 4.2's finding that MUI's own fatwa corpus expanded, unprompted by any explicit programmatic decision visible in the documents themselves, from a single mine site (2011) to the planetary atmosphere (2023), deserves to be read as evidence in the epoch-naming debate, not merely as an interesting fact about Indonesian religious administration. Chakrabarty (2009) argues that recognizing humanity as a geological agent requires a fundamental revision of historical method, because it collapses the distinction between human-scale, meaningful history and planet-scale, law-governed natural history. The MUI fatwa corpus suggests that at least one non-Western, non-secular jurisprudential tradition made a structurally similar move, extending a category (*fasad fi al-ard*) originally applied to bounded, human-scale wrongs (a poorly managed mine, an unregulated fire) to a planetary, law-governed system (the global climate), without requiring the prior dissolution of the human-history and natural-history distinction that Chakrabarty identifies as the price of this move in the Euro-American tradition. *Fiqh*, in other words, may have a resource, the flexibility of *maslahah*-based reasoning to extend an existing category to a new scale of harm, that allows it to arrive at planetary consciousness by a different, less metaphysically costly route than the one Chakrabarty describes for secular historiography.

The Textual-Practice Gap and the Direction of Islamic Legal Innovation

Section 4.4's identification of a gap between Al-Amien Prenduan's explicit “triple bottom line” integration and the absence of an equivalently integrated concept in the formal fatwa corpus bears on a live question in Islamic legal theory: does *fiqh* precede practice, or does practice, under sufficiently novel material conditions, sometimes precede and outpace *fiqh*'s available vocabulary? The classical mechanisms of *'urf* (custom) and *istihsan* (juristic preference) exist precisely to allow accumulated social practice to inform, and eventually to be codified within, formal legal reasoning. The present finding suggests a concrete candidate for such codification: a future fatwa on integrated environmental-social-economic *pesantren* management, explicitly naming and theorizing what Al-Amien Prenduan and similar institutions already practice, would not be inventing a new practice but recognizing, in the classical sense of *istihsan*, a practice that has already demonstrated its own *maslahah*. This is offered here as a concrete, actionable implication (Section 6.3) rather than only an abstract

observation, precisely the kind of textually-grounded but practically consequential claim the discussion section of an Islamic philosophy article can responsibly make.

Implications for the SDG Framework

Section 4.4's finding that the nine-document corpus concentrates on SDG 12 and SDG 15, while leaving most of the seventeen goals unaddressed even within this explicitly environmental sample, complicates any simple claim that Islamic environmental ethics "supports" the SDGs wholesale. What the corpus shows more precisely is that Islamic jurisprudential and institutional practice, at least as documented here, invests its normative energy disproportionately in consumption-and-production ethics (israf, maslahah-based limits on extraction and waste) and terrestrial-ecosystem stewardship (khalifah- and mizan-based habitat and species protection), and comparatively less in, for instance, SDG 8 (decent work) or SDG 11 (sustainable cities), which appear in only one and two documents respectively. This is a more useful and more falsifiable finding than a general claim of compatibility: it identifies specific SDGs where Islamic ethical vocabulary, as currently articulated in Indonesian fiqh and pesantren practice, is comparatively underdeveloped, and where future fatwa-drafting or pesantren-program design (Section 6.3) might productively be directed.

Dialogue with Secular Environmental Philosophy

The Mizanocene is proposed as a genuine interlocutor for, not a replacement of, the secular environmental philosophy surveyed in Section 2.4. Naess's (1973) deep ecology insists on the intrinsic value of non-human life independent of human interest; the present study's finding that Fatwa No. 4/2014 grounds animal protection in animals' standing as "communities like you" before God (QS Al-An'am 6:38) arrives at a structurally similar normative conclusion, intrinsic non-human worth, by a theistic rather than a biocentric route, suggesting the two traditions may be complementary resources for a pluralistic environmental ethics rather than competitors for the same philosophical territory. Morton's (2013) hyperobjects, massively distributed phenomena that exceed ordinary perception, describe the planetary climate system that Fatwa No. 86/2023 attempts to regulate; the fatwa's own scale-jump (Sections 4.2 and 5.2) can be read as a jurisprudential attempt to render a hyperobject governable within a moral vocabulary, khalifah, amanah, fasad, built originally at human scale, an attempt whose success or failure is itself a question the present study's findings raise but cannot settle, and which future research (Section 6.4) should pursue.

CONCLUSIONS AND RECOMMENDATIONS

Summary of Contribution

This article has argued, on the basis of a directed qualitative content analysis of five Indonesian environmental fatwas (2011-2023) and a netnographic reading of four independently documented eco-pesantren cases, that Indonesian Islamic jurisprudence and institutional practice together constitute an under-

recognized resource for the international debate over how to name the present ecological epoch. It has identified a scale-jump internal to the fatwa corpus, from a single mine site to the planetary atmosphere, and a textual-practice gap in which at least one eco-pesantren's integrated environmental-economic practice outpaces the vocabulary currently available in formal fiqh. From these findings it has proposed the Mizanocene, an epoch-name grounded in the Qur'anic concept of mizan, as a genuine, inductively generated alternative to the Anthropocene, the Capitalocene, and the Chthulucene, with direct and specific, rather than merely rhetorical, implications for the SDG framework (Section 5.4).

Limitations

Four limitations should be weighed alongside these contributions. First, coding confidence for two of the five fatwas (No. 47/2014 and No. 86/2023) is reduced because full primary-text access was not obtained during data collection (Section 3.4); the study's central scale-jump finding (Section 4.2) rests most securely on the three fully accessed fatwas and should be treated as provisional, pending full-text verification of the remaining two, with respect to its most granular textual claims. Second, the eco-pesantren sample ($n = 4$) is a convenience-purposive rather than exhaustive or randomly sampled selection from a population of thousands of Indonesian pesantren engaged in some form of environmental practice; the cross-register findings of Section 4.4 should be read as illustrative of possible convergences and gaps, not as a representative estimate of their prevalence. Third, this is a document-analysis study; it reports what fatwas and published accounts of pesantren practice say, not what is independently observed to occur on the ground, a distinction discussed methodologically in Section 3.1 but worth restating here as an interpretive caution. Fourth, the study is confined to a single country; whether the scale-jump pattern identified here recurs in the environmental fatwa corpora of other Muslim-majority jurisdictions (Malaysia, Saudi Arabia, Egypt, or transnational bodies) is an open empirical question this study cannot answer.

Practical and Policy Implications

Three concrete implications follow. For MUI and similarly constituted fatwa-issuing bodies, Section 5.3's finding suggests value in a future fatwa explicitly theorizing integrated environmental-social-economic pesantren management, formalizing through istihsan a practice (exemplified by Al-Amien Prenduan) that has already demonstrated its own *maslahah*. For Indonesia's Ministry of Environment and Forestry and its eco-pesantren recognition programs, Section 4.3's finding that the four cases in this corpus embody at least four distinct institutional registers (embodied-communitarian, performative-institutional, techno-economic, and educational-formatational) suggests that program evaluation criteria should be differentiated by register rather than applying a single uniform standard, since a program's success looks different depending on which register it is operating in. For international environmental humanities and SDG-implementation scholarship, this article's central proposal, the Mizanocene, is offered as a concrete concept, not a general call for "including

religion,” that other Global South, non-Western case corpora might test, extend, or contest.

Directions for Future Research

Three lines of inquiry follow directly from this study's limitations. First, ethnographic fieldwork at the four eco-pesantren sites analyzed here at the document level, and at a larger, randomly or theoretically sampled set of additional sites, would allow the practice register to be verified against direct observation rather than published accounts alone. Second, full-text retrieval and verse-level coding of Fatwa No. 47/2014 and No. 86/2023 would resolve this study's most significant access limitation and permit a fully confident, rather than partially provisional, statement of the scale-jump finding. Third, comparative analysis of environmental fatwa corpora from other Muslim-majority jurisdictions would test whether the Mizanocene, as theorized here from Indonesian material alone, is a nationally specific pattern or a more general feature of contemporary Islamic jurisprudential engagement with ecological crisis.

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