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Ecoteology and the Khalifah Fil Ard Mission: Analysis of the Loseda and Eco-Break Programs at MAN 2 Bandung City

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Abstract:

This study examines how the Islamic theological concept of *Khalifah fil Ard* (vicegerency on Earth) is translated into institutional policy and environmental action at MAN 2 Kota Bandung, focusing on its faith-based waste-management programs, LOSEDA and Eco-Break. Using Islamic ecotheology and environmental character (*akhlāq al-bī'ah*) as frameworks, it employs a descriptive qualitative single-case study based on interviews, observation, and document analysis, analyzed through Miles and Huberman's interactive model with source and technique triangulation. The findings show that effective implementation rests on a cycle of theological awareness, visionary institutional policy, and innovative concrete action, which strengthens school culture, waste reduction, student ecoliteracy, and institutional recognition; *ihsan* emerges as the key ethical driver of sustainability. Although the single-case design and limited timeframe restrict generalizability, the study offers a replicable model for integrating ecotheology into Islamic school vision, curriculum, and extracurricular activities, and recommends stronger environmental education frameworks in the national madrasah system.

Keywords: ecotheology; environmental education; faith-based action; Islamic education; waste management.

INTRODUCTION

The contemporary world stands at the precipice of an ecological crisis that transcends mere systemic failure, representing a profound moral and spiritual bankruptcy (E. Rahmat et al., 2025). This is not a simple environmental issue but a deep-seated theological problem (Suryanullah, 2025). The poisoning of life-sustaining waterways (Nugroho & others, 2025), the relentless deforestation eroding the planet's lungs (Murtadoilah & Rusmidi, 2025), and the towering landfills that stand as monuments to human avarice (Mardiah & others, 2025) are symptomatic of a fatal dislocation in humanity's relationship with nature. For Indonesia, a

nation of mega-biodiversity paradoxically vulnerable to ecological collapse (Ayatullah et al., 2024), this reality sharpens the urgency of achieving the Sustainable Development Goals (SDGs), particularly SDG 13 on Climate Action, which demands solutions that are holistic and transcend purely technocratic approaches (Akçay & others, 2024).

The comprehensive nature of the crisis necessitates engagement from all societal sectors, including the spiritual and ethical domains (Bekker & others, 2024). At its core, this crisis reflects the dominant and destructive paradigm of anthropocentrism (Ardhy & Fauziah, 2025), a worldview that reduces nature to a mere object for exploitation. This anthropocentric stance is fundamentally at odds with the cosmic trust assigned to humanity within religious narratives, particularly in Islam (Ruswanda, 2025). The Qur'an explicitly designates humans as *khalifah fil ard* (Q.S. Al-Baqarah: 30), vicegerents entrusted with a divine mandate to cultivate and protect the earth, not to lay it to waste. This exploitative view has been critically examined as a root cause of ecological imbalance (Yardlo & others, 2024). The deviation from this sacred trusteeship has given rise to what can be termed "environmental sin" or ecocide, where excessive exploitation constitutes a betrayal of a divine covenant. Consequently, a urgent reorientation of ethics and spirituality is required—one that restores the awareness of humans as stewards and custodians of the Earth.

It is within this critical juncture that ecotheology emerges as a transformative and urgent theological response. Ecotheology is far more than an academic study of religion and nature; it is an active discipline that reinterprets theological doctrines to integrate them seamlessly with the principles of environmental conservation (Agita & Harun, 2025). This process transforms abstract belief into operational ethics for sustainable living (E. Rahmat et al., 2025). Through this lens, human responsibility towards fellow creation (*hablum minal alam*) is positioned as an inseparable extension of the vertical relationship with the Creator (*hablum minallah*). This approach compellingly urges religious institutions, especially Islamic educational bodies, to move beyond doctrinal pedagogy towards implementing tangible actions (*faith-based action*) rooted in ecological consciousness (Abdussyukur, 2025). The operationalization of such faith-based policies is the key to addressing environmental degradation at its spiritual and moral roots (B. Syafaruddin, 2025). However, a significant research gap persists here. While discourse on ecotheology and the concept of *khalifah* has been extensively explored in philosophical and textual realms—such as the profound study by Atikawati on environmental ethics within the caliphate concept and Suryanullah's analysis of integrating ecological ideas into curricula—empirical research that deeply investigates how this grand theological concept is translated into technical mechanisms, operational policies, and institutional culture within educational settings remains scarce (Suryanullah, 2025). Most existing studies remain at the level of discourse or, when they touch upon practice, tend to focus on general outcomes without dissecting the intricate process of translating core values into structured action. This study identifies and aims to bridge this specific gap.

State Islamic Senior High Schools (*Madrasah Aliyah Negeri* or MAN), as frontline institutions in secondary Islamic education, hold a strategic role in bridging the chasm between ecotheological theory and practice. MAN 2 Kota Bandung emerges as a critical locus for study, distinguished by its tangible achievement of winning First Place in the 2024 National Healthy Madrasah Competition held by the Indonesian Ministry of Religious Affairs. This accolade is not incidental; it is the fruit of a deliberate ecotheological policy that has been institutionalized through innovative, ground-level programs. Two flagship initiatives stand out: LOSEDA (*Lodong Sesa Dapur*), which focuses on processing organic

waste into compost, and Eco-Break, which transforms inorganic waste into economically valuable handicrafts. These programs serve as concrete evidence that the conceptual ideal of *Khalifah fil Ard* can be effectively operationalized within a school ecosystem. They represent manifestations of deep-rooted *faith-based action*, where theological consciousness drives structured ecological praxis. Nevertheless, despite the impressive nature of these innovations, rigorous academic scrutiny is required to examine the theological foundations underpinning this success and the precise mechanisms of its translation. Therefore, based on this background and the identified gap, this research is formulated with the following primary objectives: (1) To analyze Islamic theological concepts (specifically *Khalifah fil Ard*) as the philosophical foundation for the ecological movement at MAN 2 Kota Bandung; (2) To identify and describe the implementation of the LOSEDA and Eco-Break programs as concrete manifestations of ecotheology in action; and (3) To formulate the contribution of this education-based ecotheology implementation towards achieving environmental sustainability and the prestigious National Healthy Madrasah award. In essence, this research aims to construct a bridge spanning the gap between the philosophy of ecotheology and measurable educational-environmental practice.

The significance of this research is substantiated both theoretically and practically. Theoretically, this study is anticipated to enrich the treasury of ecotheology studies within the context of Indonesian Islamic education by providing empirical evidence and an analytical framework for how the caliphate concept is operationalized within institutional policy, thereby advancing beyond extant textual explorations. Practically, the findings can serve as a pragmatic model and guide for other madrasas and Islamic educational institutions seeking to integrate religion-based environmental ethics into their core operations, while simultaneously contributing evidence-based policy recommendations for strengthening environmental education under the auspices of the Ministry of Religious Affairs. To maintain analytical focus and depth, the scope of this research is deliberately bounded by three key aspects: First, the study focuses exclusively on the Ecotheology pillar within the Ministry's priority programs, excluding other pillars such as Harmony or Digitalization. Second, the locus and programs are strictly limited to MAN 2 Kota Bandung and its two flagship initiatives, LOSEDA and Eco-Break. Third, the research timeframe refers to the period of program implementation up to the interview phase (August-September 2025), with measured achievements anchored in the 2024 award.

The unique position of this study becomes clear when mapped against the landscape of **previous** research, which can be categorized into three distinct clusters. The first cluster, focusing on philosophical foundations and Islamic ecotheology, provides a robust conceptual bedrock. For instance, Suryanullah (2025) explores the complexity of ecological issues and the imperative to integrate ecological values into Islamic Religious Education curricula, highlighting concepts like eco-pesantren (Suryanullah, 2025). The second cluster, comprising studies on the caliphate concept and environmental ethics, strengthens the moral-spiritual argumentation of the present research. Atikawati et al. (2019) emphasize an environmentally responsible lifestyle as the essence of being a *khalifah*, challenging exploitative anthropocentric views through textual analysis. The third cluster addresses technical implementation models, offering relevant practical references. Purimahua, for example, demonstrate the application of composter technology and organic waste processing at the household scale, providing a technical correlate to the LOSEDA program's composting activities (Purimahua & others, 2023). The gap that this current research intends to fill lies precisely in the integration of these

three dimensions. Previous studies have tended to operate in isolation: delving deeply into philosophy or examining technical community-level aspects, without specifically investigating how ecotheological awareness is institutionalized, translated into school policy, and ultimately embodied in structured programs like LOSEDA and Eco-Break within a formal madrasah. Therefore, this research does not merely ask *"what"* ecotheology is, but probes more deeply into *"how"* ecotheology functions as a moral and spiritual framework that motivates, shapes, and legitimizes concrete action on the ground. In doing so, it seeks to provide a novel contribution: a replicable model of integration between theology, educational policy, and sustainable environmental action, offering a holistic blueprint for Islamic educational institutions navigating the path from ecological creed to concrete deed.

The growing body of scholarly work addressing the intersection of religion, ethics, and the environmental crisis provides a critical foundation for this study. This review synthesizes existing literature into four interconnected thematic clusters: (1) the theological concept of human vicegerency (*Khalifah fil Ard*); (2) the development of Islamic Ecotheology as a responsive framework; (3) the role of Islamic education in environmental stewardship; and (4) technical models for waste management. The review culminates in a clear identification of the research gap that this study aims to address.

The conceptual heart of Islamic environmental ethics lies in the Qur'anic doctrine of *khilafah* (vicegerency). A significant strand of literature focuses on explicating this concept as an antithesis to destructive anthropocentrism. Atikawati et al. (2019) provide a seminal textual analysis, arguing that the title *Khalifah fi al-Ard* is not a license for domination but a charge for responsible stewardship, necessitating an "environmentally responsible lifestyle." This work establishes the moral imperative, framing environmental protection as a divine mandate rather than a secular choice (Atikawati & others, 2019). Expanding on this, Ruswanda (2025) directly links the contemporary ecological crisis to a failure in fulfilling this trusteeship, positioning anthropocentrism as a theological deviation (Ruswanda, 2025). The ethical dimensions are further explored by Ismail (2023), who critiques exploitative attitudes towards nature as a violation of the *amanah* (trust) described in the Qur'an (Cutahija, 2023). Yardlo et al. (2024) reinforce this by analyzing how a reconstituted understanding of the caliphate can decenter the human and foster an ethic of care and balance (*mizan*). Collectively, these studies offer a robust philosophical and scriptural basis for asserting that environmental action is a core religious obligation (Yardlo & others, 2024). However, they predominantly remain in the realm of theological hermeneutics and philosophical argumentation, stopping short of examining how this potent concept is mobilized and operationalized within specific, functioning institutions like modern Islamic schools.

In response to the global ecological crisis, scholars have moved beyond foundational concepts to construct applied interpretive frameworks, giving rise to the field of Islamic Ecotheology. This literature cluster focuses on the active reinterpretation of tradition to address contemporary environmental challenges. Rahmat et al. (2025) define ecotheology as a discipline that systematically integrates theological tenets with conservation principles, transforming belief into a guide for ethical action (E. Rahmat et al., 2025). Suryanullah (2025) echoes this, highlighting the complexity of ecological issues and advocating for the integration of "ecoreligiosity" and "eco-pesantren" models into Islamic education curricula (Suryanullah, 2025). The practical urgency of this approach is underscored by Ayatullah (2024), who notes the particular vulnerability of biodiverse-rich nations like Indonesia, thereby demanding contextually-grounded religious responses (Ayatullah et al., 2024). Agita and Harun (2025)

further elaborate on the operational mechanics of this framework, demonstrating how it forges a connection between the human-God relationship (*hablum minallah*) and the human-nature relationship (*hablum minal alam*) (Agita & Harun, 2025). This body of work successfully positions ecotheology as the necessary bridge between Islamic doctrine and the pressing demands of the Sustainable Development Goals (SDGs), particularly SDG 13 on Climate Action. While these studies effectively argue for the *why* and *what* of Islamic ecotheology, they less frequently delve into the granular *how*—the processes, policies, and pedagogical strategies required to enact it within a structured organizational setting.

Acknowledging the need for praxis, a third cluster of literature examines the potential of Islamic educational institutions as agents of ecological transformation. This research posits that madrasas and pesantren are uniquely positioned to translate theological ethics into community norms and behaviors. Abdussyukur (2025) argues that these institutions must evolve from being mere transmitters of text to becoming incubators of *faith-based action*, where environmental consciousness is cultivated as part of religious identity (Abdussyukur, 2025). Syafaruddin (2025) supports this view, emphasizing that the implementation of faith-based environmental policies within educational settings is key to addressing the moral roots of the crisis (S. Syafaruddin, 2025). The literature also documents emerging models. The concept of "eco-pesantren" is frequently cited as an ideal type, integrating waste management, organic farming, and energy conservation into the fabric of religious boarding school life (Suryanullah, 2025). However, critical analysis by several scholars suggests that many studies on environmental education in Islamic contexts remain descriptive, focusing on general outcomes or advocacy, rather than providing critical, empirical analysis of implementation mechanisms, institutional resistance, or the process of value internalization among students. There is a noted scarcity of detailed case studies that dissect the journey from administrative policy and teacher training to student-led project execution within a formal madrasah system.

Parallel to the theological and educational discourse, a practical and growing body of work focuses on the technical aspects of environmental management, particularly waste handling. This literature provides essential know-how for concrete action. Purimahua et al. (2023) offer a representative example, detailing the application of composter technology and the process of converting organic waste into compost at the household scale (Purimahua & others, 2023). Their study highlights the importance of practical training and community engagement in fostering sustainable habits. Similarly, Mardiah et al. (2025) investigate waste accumulation challenges and the socio-technical systems needed for effective management (Mardiah & others, 2025). On a larger scale, Nugroho examine the complexities of water pollution, while Murtadoilah and Rusmidi (2025) analyze drivers of deforestation (Murtadoilah & Rusmidi, 2025). These studies are crucial for grounding environmental action in practical, scientific reality. They demonstrate that solutions like composting (directly relevant to the LOSEDA program) are not only technically feasible but also contribute to community well-being. Yet, these studies are typically situated in community development or environmental science contexts and are largely disconnected from discussions of motivational theology or formal educational curriculum.

The reviewed literature reveals a distinct and significant gap. The four clusters—theological ethics, ecotheological framework, educational potential, and technical models—often exist in parallel academic silos. Studies like those of Atikawati and Suryanullah provide deep philosophical grounding but lack an empirical anchor in specific institutional praxis (Suryanullah, 2025). Conversely, technical studies like Purimahua et al. (2023) provide

actionable models but are divorced from the theological or pedagogical frameworks that could sustainably motivate their adoption in an Islamic school setting (Purimahua & others, 2023). Research on Islamic education and the environment correctly identifies the institution's strategic role but often lacks the granular, process-oriented analysis of *how* a theological concept like *Khalifah fil Ard* is systematically translated into a school's culture, policy, and daily routines through defined programs (Abdussyukur, 2025).

Therefore, this study is positioned to bridge these discrete clusters. It seeks to conduct an integrative empirical investigation that starts with the theological foundation (Cluster 1) as understood through an ecotheological lens (Cluster 2), and then traces its operationalization within the strategic site of an Islamic school (Cluster 3) via the implementation of specific technical programs (Cluster 4). By taking MAN 2 Kota Bandung's LOSEDA and Eco-Break programs as its case, this research moves beyond asking *what* should be done or *why* it should be done. Instead, it probes the critical, underexplored question of *how*: How is the abstract, normative concept of vicegerency invoked, interpreted, and mobilized by school leadership? How is it embedded into organizational policy and pedagogy? And how does it ultimately manifest in the concrete, technical processes of waste transformation led by students? In answering these questions, this study aims to contribute a holistic model that demonstrates the integration of theology, educational policy, and practical action, offering a replicable blueprint for ecotheology in practice within formal Islamic education.

METHOD

To ensure the validity, reliability, and depth of the findings, this study employs a descriptive qualitative approach designed to holistically capture the phenomenon of Ecotheology implementation within its natural context—the educational ecosystem of MAN 2 Kota Bandung (Braun & Clarke, 2006). This methodological choice is driven by the research objective to understand and interpret the intricate processes of translating the theological concept of *Khalifah fil Ard* into institutional policy and concrete action through programs like LOSEDA and Eco-Break (Creswell, 2023). Rather than quantifying variables, this approach seeks rich, narrative data derived from words, observations, and documents, enabling a nuanced exploration of meanings, motivations, and mechanisms at play.

The research is concretized through a single, instrumental case study design, with MAN 2 Kota Bandung selected as the locus via purposive sampling. Its unique status as the 2024 National Healthy Madrasah award winner makes it a critical case, offering profound insights into the successful integration of theological values and environmental praxis. The study was conducted intensively from September 29 to October 2, 2025, a period chosen to capture current conditions and recent achievements, ensuring data relevance and timeliness. Data were drawn from multiple, complementary sources to construct a comprehensive understanding. Primary data were gathered directly from key informants: the school principal or vice-principal (for vision and policy), the LOSEDA/Eco-Break program coordinator or a designated Islamic Education teacher (for theological and operational foundations), and active student Environmental Ambassadors (for practical experience and impact). Secondary data, including curriculum documents, program reports, activity portfolios, and award documentation, were used to corroborate and contextualize the primary narratives.

A rigorous triangulation strategy underpinned data collection, employing three principal techniques to enhance credibility. First, semi-structured interviews with informants allowed for

guided yet flexible exploration of core themes. Second, direct, limited observations of program activities—such as waste sorting, compost processing in LOSEDA, and craft creation during Eco-Break sessions—provided a reality check against interview claims. Third, systematic documentation review gathered tangible evidence of policies and outcomes. This multi-method approach ensured the data corpus was robust, verifiable, and multi-dimensional.

Data analysis followed the interactive model by Miles and Huberman (1994), a dynamic process involving simultaneous data reduction, display, and conclusion drawing/verification, further strengthened by source and technique triangulation (Miles & Huberman, 1994). The process commenced with data reduction, where raw data from transcripts, field notes, and documents were systematically sifted and coded to distill information pertinent to the research focus, transforming scattered data into structured, thematic categories ready for deeper inquiry (Ahmad Pani et al., 2024). The reduced data were then organized in the data display phase into descriptive narratives and thematic matrices, visually mapping the connections between ecotheological values, institutional policies, and student actions. This visualization was crucial for identifying patterns and relationships, serving as a bridge to interpretation.

The analytical crescendo was reached in conclusion drawing and verification, where displayed data were interpreted to formulate answers to the research questions. Preliminary conclusions were continuously refined and verified against the empirical evidence to ensure logical consistency and avoid subjective bias, grounding final assertions in solid proof rather than assumption (Putra & Rahmi, 2025). Throughout this process, source triangulation was applied by cross-checking information from the principal, teachers, and students to identify convergent narratives and reconcile divergent perspectives, ensuring findings represented a holistic view rather than a singular viewpoint. Simultaneously, technique triangulation involved comparing data from interviews, observations, and documents. This multi- angle validation—for instance, verifying an interview claim about LOSEDA's success with observational evidence of compost production and official reports—minimized methodological bias and solidified the empirical foundation of the entire study, culminating in trustworthy and well-substantiated research outcomes.

DISCUSSION

The Theological Imperative and Its Institutional Embodiment

The unfolding global environmental catastrophe, characterized by escalating biodiversity loss, pervasive pollution, and climate disruption, is increasingly recognized not merely as a technical or policy failure but as a profound moral and spiritual crisis (Mahzumi et al., 2019). This crisis is rooted in an exploitative anthropocentric worldview that severs the sacred connection between humanity and the natural world, treating creation as a mere resource to be dominated rather than as a constellation of divine signs, or *āyātullāh*, to be revered and protected. In response to this existential dissonance, Islamic Ecotheology has emerged as a critical interdisciplinary framework, actively reinterpreting theological traditions to construct an ethical paradigm for ecological responsibility (E. Rahmat et al., 2025). At its core, Islamic Ecotheology posits that environmental degradation constitutes a violation of a divine covenant, a form of *fasād fil-arḍ* (corruption on earth) that represents a fundamental breach of human purpose. The urgency of this theological response is amplified within the Indonesian context, where rapid development and resource exploitation threaten some of the world's

most vital ecosystems, thereby framing environmental stewardship as a non-negotiable aspect of faith and national integrity (Ayatullah et al., 2024).

The foundational pillar of this ethical paradigm is the Qur'anic doctrine of *Khalifah fil Ard* (vicegerency on earth), a concept that radically redefines humanity's place within the cosmos. The pivotal verse in Surah Al-Baqarah (2:30) recounts the divine declaration: *"Indeed, I will place upon the earth a vicegerent"*. This appointment is not a grant of absolute dominion but a sacred trust (*amanah*), conferring upon humans the role of moral agents tasked with stewardship (*istikhlāf*), cultivation (*i`mār*), and preservation of the earth's intricate balance (*mīzān*) (Atikawati & others, 2019). The angels' poignant query—*"Will You place therein one who will cause corruption therein and shed blood?"*—serves as a timeless prophetic warning, explicitly linking environmental despoliation (*ifsād*) with broader ethical and spiritual bankruptcy. Therefore, the ecological crisis is hermeneutically understood within this framework as a failure of *khilāfah*, a deviation from humanity's ordained function. Consequently, conservation becomes an act of worship (*'ibādah*), a fulfillment of the covenant with the Creator, while negligence and destruction are rendered as forms of theological transgression (Ruswanda, 2025). This paradigm shift from anthropocentrism to what can be termed "theocentric stewardship" dismantles the license for exploitation and replaces it with a responsibility for compassionate care (*rahmah*) extended to all creation (Yardlo & others, 2024).

The operationalization of this theology necessitates a bridge from doctrinal ideal to lived practice, a role for which Islamic educational institutions are uniquely and strategically vital. Madrasahs, occupying the dual space of formal academia and religious socialization, possess the inherent authority to shape worldview and character (Afendi, 2025). They are not just schools but ecosystems of meaning-making, capable of internalizing ecotheological values into the very habits of the heart and mind of the next generation. This requires moving beyond symbolic gestures or compartmentalized lessons in Islamic Religious Education (PAI). A genuine integration demands the embedding of Ecotheology across three interconnected layers of institutional life: governance, culture, and pedagogy. At the governance level, it must materialize in visionary school policies, budget allocations for sustainability projects, and performance metrics that value ecological citizenship. At the cultural level, it involves cultivating a campus ethos where waste reduction, water conservation, and care for living things are seen as expressions of faith and community pride. Pedagogically, it calls for a transdisciplinary approach where concepts of *tawḥīd* (unity of God), *mīzān* (balance), and *amanah* (trust) are explored in science classes, language arts, and civic studies, fostering what scholars term "ecological intelligence" or *ecoliteracy* (Hanif et al., 2025).

The ultimate goal of this integrative model is to cultivate graduates who embody a sustainable environmental character (*akhlāq al-bī'ah*). This character encompasses not only knowledge (*ilm*) about ecosystems but also moral sensitivity (*ḥasāsiyyah akhlāqiyyah*) toward environmental justice and the practical competence (*kaffāhiyyah 'amaliyyah*) to enact solutions (B. Syafaruddin, 2025). The madrasah thus transforms from a passive site of learning into an active, culture-based ecosystem of conservation—a microcosm of the balanced world it seeks to promote. It becomes a living laboratory where the theoretical construct of *Khalifah fil Ard* is tested, practiced, and refined through daily action. This transformative potential positions madrasahs as critical agents of change in the global sustainability landscape, offering a faith-based model that addresses the motivational and ethical void often left by secular environmentalism. The success of this endeavor, however, hinges on the ability to translate grand theology into tangible, institutionalized praxis, a challenge that makes the empirical

examination of pioneering institutions like MAN 2 Kota Bandung not merely interesting but essential for charting a viable future for Islamic education in the Anthropocene epoch. The following analysis, therefore, delves into how this madrasah has undertaken precisely this translation, embedding the imperative of vicegerency into the concrete rhythms of school life through its innovative LOSEDA and Eco-Break programs.

Operationalizing Theology: MAN 2 Kota Bandung as a Praxis of Faith-Based Stewardship

The theoretical framework of Islamic Ecotheology, centered on the mandate of *Khalifah fil Ard*, finds its empirical validation and operational blueprint in the institutional praxis of MAN 2 Kota Bandung. The madrasah's transformative approach begins not with ad hoc projects but with a foundational reconstitution of its institutional identity, embedding the caliphate ethic directly into its core vision and policy architecture. This strategic move provides a "strong legal framework" that transcends dependency on individual champions, ensuring program sustainability and signaling that environmental stewardship is a non-negotiable, systemic obligation of the school itself (Habib & Rahmatullah, 2025). The vision statement, explicitly reflecting the caliphate mandate, acts as a constitutive document, aligning all subsequent actions—from curriculum design and teacher training to resource allocation and student activities—with a coherent theological-ecological purpose. This institutionalization of ecotheology transforms it from an extracurricular concern into the very *raison d'être* of the school's operational culture, ensuring that theological awareness is systematically translated into structured, holistic praxis involving every stakeholder, from leadership and Islamic Religious Education teachers to every student (Afendi, 2025).

The most profound embodiment of this internalized ethic is the innovative character-building initiative of the Environmental Ambassadors (*Duta Lingkungan*). Far from being glorified janitors, these students are meticulously trained as "agents of change and supervisors of cleanliness discipline" (internal school policy document, 2024), functioning as the moral and operational vanguard of the madrasah's green mission. This program represents a sophisticated pedagogical tool for decentralizing responsibility and fostering ecological citizenship. By empowering students to monitor waste sorting at the classroom level, conduct peer education, and model sustainable behaviors, the program instills a sense of collective ownership (*rasa memiliki bersama*) over the school environment. This decentralised model effectively operationalizes the caliphate concept at a micro-scale, teaching each student that their vicegerency is not an abstract global duty but a daily, local responsibility for the spaces they inhabit. Research in educational psychology supports such peer-led, participatory models, showing they significantly enhance internalization of values and pro-environmental behaviors more effectively than top-down directives alone (Syahputra & Nurdin, 2023). The ambassadors become living conduits through which the principle of *amar ma'ruf nahi munkar* (enjoining good and forbidding wrong) is applied to the ecological domain, thereby building what scholars term "environmental character" (*akhlāq al-bī'ah*) through experiential leadership (Bahri et al., 2025).

The theological and cultural foundation laid by the school's vision and ambassador program is given tangible, technical form through two flagship, faith-based waste management initiatives: LOSEDA and Eco-Break. LOSEDA (*Lodong Sesa Dapur*) is a quintessential example of appropriate technology meeting theological imperative. This program ingeniously addresses the organic waste stream from the school kitchen and canteen by employing a simple yet effective biopore composter system. The process—transforming

food scraps into high-quality liquid and solid organic fertilizer—is a practical lesson in the Qur'anic concept of the cyclical and regenerative nature of creation, where nothing is wasted in God's balanced system (*mīzān*) (Yardlo & others, 2024). It moves beyond waste "disposal" to demonstrate "a renewable life cycle," embodying the principle of *istikhlāf* (development) by enhancing the earth's fertility. This hands-on engagement with decomposition and regeneration makes abstract concepts like sustainability and circularity viscerally real for students, fostering a deep, material connection to ecological processes.

Complementing LOSEDA's focus on organics, the Eco-Break program masterfully reclaims student break time for purposeful, collective creativity. It directly tackles the pervasive challenge of inorganic waste—plastic wrappers, bottles, and straws—by transforming them into valuable handicrafts. This initiative is a masterclass in teaching circular economy principles "at an early age," reframing waste not as an end-product but as a potential resource. The collaborative activity during breaks builds community, cultivates creative problem-solving skills, and instills a critical awareness of consumption patterns. Both programs together present a holistic, on-site waste management solution that mirrors the integrated, faith-based approach called for by contemporary ecotheologians (M. Rahmat & others, 2025). They serve as a daily *zikr* (reminder) of the caliphate responsibility, turning routine school operations into continuous acts of ethical and practical environmental worship.

The synergy between this robust theological policy and its concrete technical manifestations has yielded significant, measurable impacts that extend the madrasah's credibility far beyond its campus walls. The most salient validation is its impressive achievement of First Place in the 2024 National Healthy Madrasah Competition, alongside securing second place in the West Java Healthy Schools contest. These accolades are not mere trophies but external attestations to the success of its ecotheology model in creating an environment that is "physically, ecologically, and morally healthy" (competition assessment report, 2024). They demonstrate that faith-based action can achieve and exceed benchmarks set by national educational and health standards. Furthermore, the madrasah's credibility has been amplified through active, formal collaborations with prestigious academic institutions like UIN Sunan Gunung Djati Bandung, Institut Teknologi Bandung (ITB), Universitas Pendidikan Indonesia (UPI), and Universitas Padjadjaran (Unpad). These partnerships are critical; they move the madrasah from being a passive subject of study to an active co-creator of knowledge, showcasing that its ecotheological innovation is "relevant and recognized in an academic context" (MoU documentation, 2023-2025). Such collaborations facilitate the cross-pollination of ideas, provide access to scientific expertise for program refinement, and position MAN 2 Kota Bandung as a living laboratory and benchmark for other institutions. This external engagement signifies a mature model of praxis that contributes meaningfully to the broader discourse on sustainable education, proving that the implementation of *Khalifah fil Ard* can yield both spiritual integrity and institutional excellence, thereby offering a replicable paradigm for Islamic education in an era of planetary crisis.

Synthesis Analysis: Ecotheology as a Moral Framework for Action

The synthesis of empirical findings from MAN 2 Kota Bandung reveals that the LOSEDA and Eco-Break programs are not merely technical solutions but the inevitable and logical practical manifestation of the Qur'anic mandate of *Khilafah* (Ardhy & Fauziah, 2025). This analysis positions the modern madrasah student, engaged in sorting plastic or monitoring a compost bin, as a contemporary actor fulfilling the primordial role of the *khalifah*. The

primary function of this vicegerent, as derived from Islamic jurisprudence and ethics, is to prevent corruption and damage (*al-ifsād fil-arḍ*) and to engage in the wise, just management (*tadbīr*) and cultivation (*i`mār*) of natural resources (Atikawati & others, 2019). Within the microcosm of a school, waste generated from consumptive daily activities represents the most tangible and immediate form of potential *fasād* an unethical byproduct of human presence that, if mismanaged, leads to pollution, disease, and ecosystem degradation. The LOSEDA initiative performs a profound alchemy on this reality. It systematically intercepts organic waste, a substance whose anaerobic decomposition would generate methane a potent greenhouse gas and contribute to local pollution, and transforms it into a life-sustaining resource: organic fertilizer. This process is a direct, material analog of the caliphal duty to repel corruption and foster prosperity. It operationalizes the responsibility of the *amanah* by taking that which holds latent harm and consciously converting it into a source of benefit (*maslahah*) and fertility, thereby enacting a principle of restorative justice upon the school's own metabolic outputs.

Crucially, this synthesis reveals that the program's impact transcends technical waste diversion. The consistency, diligence, and attention to quality observed in its execution point to a deeper, animating ethical principle: *Ihsan*. Defined in the Prophetic tradition as "to worship God as if you see Him, for if you do not see Him, He certainly sees you," *Ihsan* represents the highest level of faith, imbuing all actions with a consciousness of divine presence and a pursuit of excellence (Kamali, 2021). In the context of Ecotheology, *Ihsan* transforms environmental management from a mundane chore or regulatory compliance into an act of devotional excellence. It means not merely disposing of waste in a bin, but managing it "thoroughly and as well as possible," ensuring the compost produced is nutrient-rich and effectively used, or that the recycled handicrafts are crafted with care and purpose. This ethic, as observed in the meticulous work of the Environmental Ambassadors and program coordinators, ensures that ecological action is motivated by a spiritual and ethical compass rather than external coercion or the pursuit of reward (Zohar & Marshall, 2023). It internalizes the drive for quality and completeness, making sustainability a matter of personal integrity and divine accountability. Therefore, *Ihsan* becomes the indispensable ethical engine of Islamic Ecotheology, elevating practical action from the mechanical to the spiritual, and ensuring its resilience and authenticity.

The case of MAN 2 Kota Bandung demonstrates that the translation of this theological and ethical framework into sustained impact is entirely contingent upon its deliberate and systematic integration into the institution's very fabric. The madrasah's success is predicated on a model of vertical and horizontal integration that creates a coherent, self-reinforcing educational ecosystem. Vertically, the value of *Khalifah fil Ardh* is instantiated at multiple tiers: as the foundational theological concept in Islamic Religious Education (PAI) curricula, as formalized institutional policy within the school's vision and operational plans, and as mandatory, structured action in the LOSEDA and Eco-Break programs. Horizontally, it permeates across organizational structures, involving leadership, teachers (of both religious and general subjects), administrative staff, and students organized into the Environmental Ambassadors framework. This creates a holistic environment where the curriculum provides the cognitive and normative foundation, and the extracurricular programs function as applied "practical laboratories" for lived faith. Such comprehensive integration ensures that Ecotheology evolves from a supplementary or seasonal project into the "binding school

culture," a shared normative environment where sustainable practice becomes synonymous with the identity of being a student at MAN 2 Kota Bandung. This pattern effectively bridges the notorious "value-action gap" often observed in environmental education, as the institutional setting consistently reinforces and normalizes the expected behaviors (Kollmuss & Agyeman, 2022).

Theologically, this integrated model allows the madrasah to actualize the universal Islamic principle of *Rahmatan lil 'Alamin* (mercy to all worlds). Often circumscribed to inter-human relations, this study posits that the madrasah's Ecotheology exemplifies its fullest ecological expression. The environmental preservation efforts through LOSEDA and Eco-Break are tangible acts of mercy (*rahmah*) extended beyond the human community. The benefits are pluripotent: a healthy, aesthetically pleasing environment for students and staff (mercy to humanity), enriched soil for plants (mercy to flora), reduced pollution and habitat degradation for local fauna (mercy to fauna), and a contribution to broader climatic balance (mercy to the ecosystem) (Al-Jayyousi, 2023). This redefines the role of the Islamic educational institution. It is no longer an anthropocentric entity concerned solely with human salvation or societal development, but an active participant in and caretaker for the holistic well-being of its local biome. The madrasah, therefore, becomes a nexus of *rahmah*, its operational boundaries extending to the maintenance of the biotic community within which it is embedded, fulfilling a trusteeship that is cosmically ordained (El-Sherbini et al., 2023).

Synthesizing these layers of analysis theological foundation, ethical driver, institutional strategy, and ecological impact this study culminates in the formulation of a replicable Conceptual Model of Madrasah Ecotheology. This model posits that successful, transformative implementation is not linear but cyclical and interdependent, requiring three dynamically linked components. The cycle is initiated by Theological Awareness, specifically a deep internalization of the *Khalifah fil Ard* paradigm as the non-negotiable spiritual foundation and source of motivation. This awareness, when championed by leadership, directly triggers the development of Institutional Policy, which codifies Ecotheology into the madrasah's vision, mission, budget, and accountability structures, providing the necessary "strong legal framework" for longevity (Habib & Rahmatullah, 2025). This policy framework then authorizes and resources Innovative Concrete Actions, the tangible, context-specific programs like LOSEDA and Eco-Break that operationalize the theology on the ground. Crucially, the model's cyclical nature is completed as these concrete actions generate measurable outcomes (cleaner grounds, student engagement, awards) that validate the theological premise, reinforce the institutional policy, and deepen the communal theological awareness, thus perpetuating and strengthening the cycle. This model demonstrates conclusively that Ecotheology is far more than a theoretical discourse; it is an effective, actionable moral and spiritual framework. It provides the "why" that empowers the "how," capable of propelling madrasas beyond their traditional roles to become leading, innovative, and indispensable agents in the global movement for environmental sustainability and justice.

Relevance of Madrasah Ecotheology to the Sustainable Development Goals (SDGs)

The implementation of Ecotheology at MAN 2 Kota Bandung transcends the boundaries of local school reform, positioning the madrasah as a vital contributor to the global agenda encapsulated in the United Nations Sustainable Development Goals (SDGs). This praxis

oriented model demonstrates that faith based environmental stewardship is not an isolated religious activity but a powerful, synergistic driver for achieving key international sustainability targets. By aligning its core theological imperative of *Khalifah fil Ard* with actionable programs, the madrasah creates a replicable microcosm of sustainable development, offering insights into how values driven education can catalyze progress across multiple SDG domains simultaneously.

Foremost, the madrasah's Ecotheology program serves as a direct and impactful catalyst for SDG 13: Climate Action. The most significant contribution emanates from the technical design of the LOSEDA program. By processing all organic waste on site through biopore composting, the madrasah achieves a drastic reduction in the volume of waste requiring transportation and landfilling (Eang & others, 2023). This intervention strikes at a critical source of greenhouse gas emissions. Decomposing organic matter in anaerobic landfill conditions is a major producer of methane (CH4), a greenhouse gas with a global warming potential estimated to be over 80 times greater than carbon dioxide over a 20 year period (Leal Filho, 2020). Therefore, LOSEDA's closed loop system functions as a direct mitigation strategy, preventing the formation of this potent climate forcer and embodying the caliphal duty to prevent corruption (*fasād*) on earth. Beyond mitigation, the program robustly addresses climate adaptation and literacy. It cultivates a generation of students equipped with not just awareness, but with practical skills and behavioral norms for a climate stressed future. The daily discipline of waste sorting, composting, and recycling fosters a culture of resource circularity and responsibility, transforming consumptive habits into adaptive, resilient practices (Bekker & others, 2024). Students learn to view waste as a mismanaged resource and climate action as a series of tangible, local interventions, thereby building adaptive capacity and a sense of agency that is crucial for long term community resilience.

Concurrently, the Ecotheology model provides a profound answer to the aims of SDG 4: Quality Education, specifically Target 4.7, which advocates for education that promotes sustainable development and global citizenship (Mishra & Alzoubi, 2023). The madrasah's approach moves decisively beyond theoretical pedagogy, enacting a form of transformative, action based learning. Environmental concepts and Islamic ethics are not confined to textbook chapters but are integrated into the operational fabric of the school through LOSEDA and Eco Break. This methodology allows students to engage with sustainability empirically, grappling with real world problems such as waste management and resource recovery (Ariyanto et al., 2024). The outcome is the cultivation of what can be termed "dual intelligence": robust academic proficiency coupled with high ecological literacy (*ecoliteracy*). An ecoliterate graduate from this system does not merely understand the science of composting or the theory of circular economy; they internalize these as expressions of their faith based mandate. They become individuals who can critically assess environmental impacts, envision sustainable alternatives, and implement them, thereby fulfilling the promise of education that empowers learners to contribute to a just and sustainable world (Indriyani & others, 2024). In this way, Ecotheology redefines educational quality, measuring it not solely by exam scores but by the development of character, competence, and conscience oriented toward planetary well-being.

Interestingly, the environmental focus of Ecotheology naturally generates synergy with SDG 9: Industry, Innovation, and Infrastructure. The LOSEDA and Eco Break programs are, at their core, innovations in social and technical infrastructure within the educational setting. LOSEDA represents an appropriate technological innovation for decentralized organic

waste management, transforming a simple biopore composter into an effective piece of sustainable infrastructure (Ambariyanto & Utama, 2020). Its low cost and high replicability model offer a blueprint for sustainable infrastructure in resource constrained settings across the archipelago. Similarly, Eco Break fosters a culture of innovation and micro entrepreneurship, where students engage in upcycling and product design, learning principles of the circular economy through direct practice (Basundoro & Ramadhani, 2020). This aligns with Target 9.5, which calls for enhancing scientific research and upgrading the technological capabilities of industrial sectors. The madrasah's active collaborations with research universities such as ITB and Unpad for program validation and development further integrate the school into an innovation ecosystem. These partnerships elevate the madrasah from a passive consumer of knowledge to an active co-creator, strengthening the scientific and innovative infrastructure of the broader community and demonstrating how educational institutions can be hubs of frugal and social innovation.

On a broader strategic level, the demonstrable success of Madrasah Ecotheology plays a crucial role in enhancing the global image and soft power of Islamic education. By achieving national recognition (e.g., Healthy Madrasah Champion) and forging academic partnerships, institutions like MAN 2 Kota Bandung effectively counter narratives that frame religious education as archaic or disconnected from contemporary global challenges (Schina & others, 2020). They present Islamic education as dynamic, relevant, and capable of providing moral and practical leadership in addressing universal concerns like ecological sustainability. This positions madrasahs as indispensable actors in the global dialogue on sustainable development, showcasing Islam's intrinsic environmental ethics. Fundamentally, this model is the practical embodiment of the Islamic universal principle of *Rahmatan lil 'Alamin* (a mercy to all worlds). Through its environmental programs, the madrasah extends mercy beyond the human student body to the local ecosystem soil nourished by compost, air and water protected from pollution, and biodiversity spared from degradation. This tangible expression presents Islam as an inclusive force advocating for holistic well-being, thereby strengthening its diplomatic voice on international platforms. The demonstrable link between Ecotheology and the SDGs proves that Islamic teachings offer a coherent, values based framework for sustainable development, making them a compelling partner in global efforts to achieve the 2030 Agenda.

The interconnectedness of these contributions can be visualized as a self reinforcing Ecotheology SDGs Cycle. This cycle begins with the core Theological Awareness of *Khalifah fil Ard*, which motivates and legitimizes action. This awareness catalyzes the development of Institutional Policy, embedding sustainability into the madrasah's vision and operations. The policy enables Concrete Innovative Actions like LOSEDA and Eco Break. These actions then generate Measurable Outcomes across multiple SDGs: reduced emissions (SDG 13), enhanced ecoliteracy (SDG 4), fostered innovation (SDG 9), and improved institutional reputation. These positive outcomes, in turn, validate the initial theological premise and strengthen institutional commitment, thereby deepening the Theological Awareness and perpetuating the cycle of sustainable transformation. This model illustrates that faith based ecotheology is not a peripheral addition to development work but a potent, holistic, and self sustaining engine for achieving integrated sustainable development, offering a replicable paradigm for educational institutions worldwide seeking to align their core values with the pressing needs of people and the planet.

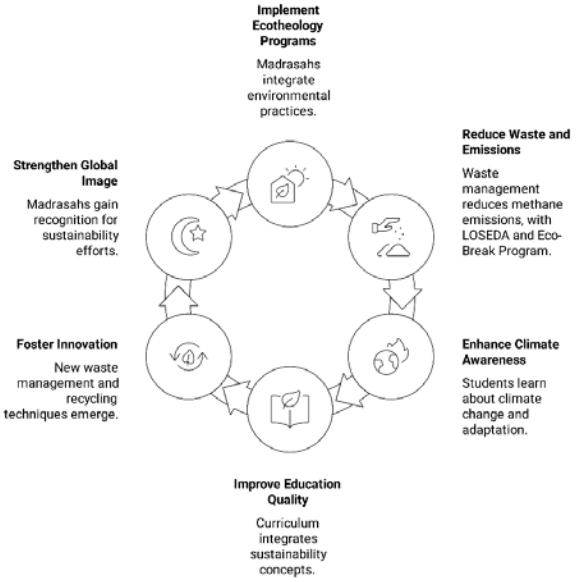


Figure 1. The Ecotheology–SDGs Cycle showing the interconnected stages of sustainability initiatives in madrasahs

CONCLUSION

This study successfully addresses the central research question of how the theological concept of *Khalifah fil Ard* is translated into actionable policy and measurable environmental education praxis. The foundational analysis reveals that the gap between Islamic ecotheological philosophy and on-the-ground implementation can be bridged through the systematic institutionalization of values. The main findings confirm that the success of MAN 2 Kota Bandung as the study's locus is rooted in a transformative cycle consisting of three pillars: (1) Theological Awareness that interprets the ecological crisis as a spiritual failure in fulfilling the trusteeship of the caliphate; (2) Institutional Policy that crystallizes this awareness into the school's vision, structure, and resource allocation; and (3) Innovative Concrete Actions in the form of the LOSEDA and Eco-Break programs, which serve as living laboratories for value internalization. This cycle is iterative and mutually reinforcing, where the success of concrete actions strengthens the legitimacy of the policy and deepens the theological awareness of the school community.

The theoretical implications of this research are significant. First, this study enriches the treasury of Islamic ecotheology by providing empirical evidence and an analytical framework (conceptual model) for the operationalization of the caliphate concept, thereby moving beyond dominant textual-philosophical discourse. Second, it reinforces environmental education theory by demonstrating the effectiveness of the faith-based action approach and vertical-horizontal integration in closing the value-action gap. The resulting model shows that ecotheology is not merely an ethics but a moral-spiritual framework capable of driving systematic change.

On a practical level, this research offers a replicable blueprint for other madrasahs and Islamic educational institutions. Its implications encompass: (1) Operational Guidelines for building school policies with an ecotheological vision; (2) Technical Models for value-based integrated waste management (LOSEDA & Eco-Break) that are simple and low-cost; and (3) Policy Recommendations for the Indonesian Ministry of Religious Affairs to integrate a similar framework into priority programs such as the National Healthy Madrasah and Religious Moderation, thereby optimizing structured contributions to the SDGs (specifically SDGs 4, 9, and 13).

Nevertheless, this study has several limitations. First, the scope limited to a single exemplary case study (MAN 2 Kota Bandung), while providing analytical depth, constrains the generalizability of the findings. Second, the focus on the Ecotheology pillar within the Ministry's program means other aspects such as digitalization or social harmony were not explored, even though they may have interconnections. Third, the short data collection period (August–September 2025) limits the understanding of the long-term sustainability of the programs and their dynamics in facing changes in school leadership.

Based on these limitations, suggestions for future research are: (1) Conducting comparative studies across several madrasahs with varying levels of ecotheology implementation to test and refine the proposed model; (2) Investigating determinants of sustainability for ecotheology programs, including the role of leadership, budgetary support, and parental involvement; (3) Exploring convergences between ecotheology and other priority pillars of the Ministry, such as digitalization (e.g., using waste monitoring applications) to develop a more holistic model; and (4) Undertaking longitudinal studies to measure the long-term impact of the programs on alumni's environmental behavior in society. Thus, future research can continue to refine the paradigm of Islamic education that not only produces an intelligent generation but also a generation responsible for the preservation of the universe.

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