

IMPLEMENTING AN ENVIRONMENTAL GREENING PROGRAMME TO FOSTER SANTRI ENVIRONMENTAL CARE AT PONDOK PESANTREN AL-FATTAH BUNGO

Baili¹, Nopriyanto¹, Angga Kurniawan¹, Moh Rafi Khatami¹, and Ari Afrizal¹

¹Universitas Islam Yasni Bungo, Jambi, Indonesia

Corresponden E-mail: bailiiasni0@gmail.com

Abstrak

Krisis ekologi global menuntut respons nyata dari lembaga pendidikan, termasuk pesantren sebagai pusat pembentukan karakter. Penelitian ini bertujuan menganalisis implementasi program penghijauan lingkungan dan proses penumbuhan kepedulian lingkungan santri di Pondok Pesantren Al-Fattah Bungo, Jambi. Penelitian menggunakan pendekatan kualitatif dengan desain studi kasus. Data dikumpulkan melalui observasi partisipan dan nonpartisipan, wawancara mendalam dengan 13 informan (kyai, koordinator lingkungan hidup, ustadz fikih lingkungan, serta santri senior dan junior), dan dokumentasi, kemudian dianalisis dengan model interaktif Miles, Huberman, dan Saldaña. Hasil penelitian menunjukkan bahwa program penghijauan diimplementasikan melalui tiga dimensi yang saling mengunci, yaitu fisik (ruang terbuka hijau, penanaman pohon, bank sampah, biogas), kurikuler (integrasi fiqh al-bi'ah dalam pembelajaran kitab kuning), dan kultural (gerakan Jumat Bersih dan kampanye zero waste). Kepedulian lingkungan tumbuh melalui internalisasi nilai ekoteologi Islam secara kognitif, afektif, dan psikomotorik yang menggeser cara pandang santri dari antroposentris menuju ekosentris-religius. Adopsi pohon menumbuhkan keterikatan emosional, dan santri senior mulai memilah sampah di rumah. Faktor pendukung utama adalah otoritas dan keteladanan kyai, sistem kelompok sebaya, dan kemitraan eksternal, sedangkan faktor penghambatnya adalah keterbatasan anggaran dan lahan, resistensi santri baru, serta pergantian pengurus. Penelitian ini menyimpulkan bahwa pesantren dapat berperan sebagai agen transformasi ekologis melalui ekopedagogi yang berakar pada ekoteologi Islam.

Kata kunci: Eco-pesantren, kepedulian lingkungan, ekoteologi Islam, ekopedagogi, pendidikan karakter

Abstract

The global ecological crisis demands a concrete response from educational institutions, including Islamic boarding schools (pesantren) as centres of character formation. This study analyses the implementation of an environmental greening programme and how it fosters environmental care among students (santri) at Pondok Pesantren Al-Fattah Bungo, Jambi, Indonesia. A qualitative case study design was employed. Data were collected through participant and non-participant observation, in-depth interviews with 13 informants (the kyai, the environmental coordinator, the teacher of environmental jurisprudence, and senior and junior santri), and documentation, and were analysed using the interactive model of Miles, Huberman, and Saldaña. The programme is implemented through three interlocking dimensions: physical (green open space, tree planting, a waste bank, biogas), curricular (integration of fiqh al-bi'ah into classical-text learning), and cultural (Clean Friday and a zero-waste campaign). Environmental care develops through the cognitive, affective, and psychomotor internalisation of Islamic eco-theological values, shifting santri from an anthropocentric to a religious-ecocentric outlook. Tree adoption built emotional attachment, and senior santri began sorting waste at home. The kyai's authority and role modelling, peer groups, and external partnerships support the programme, whereas limited budget and land, the resistance of new santri, and leadership turnover hinder it. Pesantren can thus act as agents of ecological transformation through an ecopedagogy rooted in Islamic eco-theology.

Keywords: Eco-pesantren, environmental care, Islamic eco-theology, ecopedagogy, character education

Introduction

Climate change and environmental degradation have become some of the most pressing challenges facing humanity in the twenty-first century. The latest synthesis report of the

Intergovernmental Panel on Climate Change warns that delayed mitigation and adaptation will escalate interconnected risks to ecosystems, livelihoods, and human well-being (Intergovernmental Panel on Climate Change [IPCC], 2023). In Indonesia, deforestation, river pollution, and the accumulation of plastic waste are compounded by limited ecological literacy in society. Education is therefore expected to play a transformative role, as reflected in the global agenda of Education for Sustainable Development (UNESCO, 2020). However, the evidence on how education changes behaviour is mixed: a meta-analysis of 169 studies found that environmental education improves knowledge substantially but has smaller effects on attitudes, intentions, and mostly self-reported behaviour (van de Wetering et al., 2022), while interventions targeting children yield medium-sized effects on pro-environmental behaviour and rarely measure actual conduct (Świątkowski et al., 2024). Within this landscape, Islamic boarding schools (*pondok pesantren*) hold a strategic position and moral authority, because they are not only institutions for transmitting religious knowledge (*tafaqquh fī al-dīn*) but also incubators of the values that shape the character of the Muslim community.

Islam offers rich theological resources for environmental responsibility. The concept of *khalīfah fī al-arḍ* (vicegerent on earth) gives humans an explicit mandate to cultivate and preserve the balance of nature rather than exploit it, and scholarship on Muslim environmentalisms shows how such concepts are mobilised in diverse religious and social settings (Gade, 2019; Hancock, 2018), within the wider field of religion and ecology (Jenkins et al., 2017). Nevertheless, a gap persists between Islamic teachings on the environment and the everyday practices of Muslims. In a review of research on Muslims and climate change, Koehrsen (2021) observed that Muslim environmentalists promote pro-environmental interpretations of Islam, yet it remains unclear whether these efforts change everyday practices. At the level of religious authority, the Indonesian Ulama Council (MUI) has responded to climate-related issues progressively through several fatwas, although none has yet made climate change itself its central subject (Harnowo & Habib, 2024). Many *pesantren*, moreover, have long been portrayed as text-centred institutions that are less responsive to contemporary socio-ecological issues around them.

To bridge this gap, the paradigm of the eco-*pesantren*, or environmentally oriented *pesantren*, has emerged. A bibliometric study of green *pesantren* research from 2000 to 2025 recorded a sharp rise in publications between 2020 and 2025 and a shift of focus from ecological awareness towards programme implementation and institutional evaluation (Bashori & Prasetyo, 2025). Empirical studies have documented ecopedagogical practices such as planting productive trees and raising livestock in *pesantren* (Maslani et al., 2023), the *kyai*'s role in developing ecological piety through living environmental jurisprudence (*fiqh al-bī'ah*) (Putri et al., 2023), alumni environmental leadership grounded in eco-theological education (Adawiah et al., 2022), and community empowerment through waste banks and composting (Khoirurrijal et al., 2023). At the policy level, the Ministry of Religious Affairs has placed eco-theology among its programme priorities, prompting proposals for eco-theology-based character education in Islamic educational institutions (Firnanda & Yusuf, 2026).

Despite this growth, important questions remain. Much of the literature describes programmes, physical facilities, or management strategies; for example, eco-*pesantren* assessments have focused on renewable resources, green space, and waste management (Bakri, 2021), while conceptual work has proposed models linking ecoliteracy and environmental jurisprudence that still require field validation (Helmi et al., 2025). Fewer studies have

examined in detail the psychological and pedagogical process through which physical greening activities are transformed into internalised environmental awareness at the level of individual santri. This question matters because a global meta-analysis found that contact with nature increases human–nature connectedness, whereas environmental education alone did not (Barragan-Jason et al., 2022), suggesting that the mechanism of learning, not merely its content, determines whether care becomes durable. In addition, most eco-pesantren studies are located in Java, and evidence from pesantren in Sumatra remains scarce. Research on character formation in pesantren likewise shows that structured programmes and the kyai's example can internalise values such as social care and social morals (Maulana et al., 2021; Ummah et al., 2025), but it has rarely traced how these mechanisms operate for environmental values. Quantitative evidence that religiosity predicts students' ecological awareness (Sudrajat, 2026) indicates that such a link exists, yet it does not explain how awareness is formed and sustained in the daily life of an institution.

Pondok Pesantren Al-Fattah, located in Bungo Regency, Jambi Province, is one of the pesantren that has proactively adopted the eco-pesantren paradigm. Situated in an area with fairly complex environmental dynamics, including proximity to plantation areas and river flows, the pesantren has launched various greening and integrated environmental management programmes. It integrates environmental care into its curriculum, its institutional culture, and the spatial layout of its campus, and it has received appreciation from the local government as a pesantren with an environmental culture. Al-Fattah was therefore chosen as the case for three reasons. First, its programme combines facilities, curriculum, and institutional culture rather than relying on a single project, which makes it possible to examine how these elements interact. Second, its location in Jambi adds evidence from Sumatra, where eco-pesantren research remains scarce. Third, its recognition by the local government indicates that the programme is sufficiently established for its effects on santri to be observed.

Accordingly, this study addresses the following questions: how is the environmental greening programme implemented at Pondok Pesantren Al-Fattah Bungo, how does the programme foster environmental care among santri, and which factors support or inhibit it? The unit of analysis is the greening programme as enacted within the pesantren, with the internalisation process among santri as an embedded unit. The analysis draws on Islamic eco-theology, the notion of ecopedagogy as critical environmental teaching (Misiaszek, 2020), the tripartite model of character comprising moral knowing, moral feeling, and moral action (Lickona, as cited in Aprillia et al., 2023), Bourdieu's (2020) concept of habitus, and Goffman's (1961/2017) notion of the total institution. In this study, environmental care (*kepedulian lingkungan*) refers to santri's disposition to protect and maintain their surroundings, which comprises an understanding of why the environment should be preserved, emotional attachment to and concern for the natural environment, and everyday actions such as sorting waste, tending plants, and avoiding single-use plastics. Following Lickona's model, the three components are treated as the cognitive, affective, and psychomotor sides of one disposition, and the term is used in this sense throughout the article. Environmental care is thus distinguished from mere compliance with pesantren rules: an action counts as care when santri understand and endorse it, not only when they perform it under supervision.

The study has theoretical significance in enriching the literature on ecopedagogy within Islamic education, and practical significance in offering a reference model for pesantren seeking to design environmental programmes that are transformative rather than merely ceremonial.

The remainder of the article describes the research method, presents and discusses the findings on implementation, internalisation, and supporting and inhibiting factors, and closes with conclusions and prospects for further research.

Research Method

This study employed a qualitative approach with a case study design in order to explore the implementation of the greening programme in depth and in its natural context (Creswell & Poth, 2018). A case study is appropriate when the research questions ask "how" and "why" about a contemporary phenomenon that cannot be separated from its real-life setting (Yin, 2018). Here, the phenomenon, namely the transformation of a greening programme into environmental care, is inseparable from the daily life, authority structure, and spatial organisation of the pesantren. The design also allowed the researchers to draw on multiple sources of evidence and to compare them systematically, which strengthens the credibility of the interpretations.

The research was conducted at Pondok Pesantren Al-Fattah in Bungo Regency, Jambi Province, Indonesia. The site was selected purposively because the pesantren has a track record of systematic environmental programmes and has received appreciation from the local government as a pesantren with an environmental culture, making it an information-rich case for the research questions. Observation was carried out over four weeks between August and September 2025, and the interviews cited in this article were conducted in August 2025. The researchers were present at the site as the key research instrument, observing activities both as participants and as non-participant observers, in line with the qualitative tradition in which the researcher's presence and reflexivity are part of the inquiry (Merriam & Tisdell, 2016).

Informants were selected using purposive sampling to obtain comprehensive perspectives from different positions within the programme. Key informants comprised the pesantren leader (kyai), who holds authority over the institutional vision; the Head of Environment and Security Affairs, who acts as technical coordinator; the teacher (*ustadz*) of *fiqh al-bī'ah*; five senior santri who serve on the daily student board; and five junior santri. In total, 13 informants were involved, as summarised in Table 1. The criteria for selection were direct involvement in leading, coordinating, teaching, or carrying out the greening programme. Santri were drawn from two groups, senior santri serving on the daily student board and junior santri who were newer to the programme, so that the accounts of experienced participants could be compared with those of santri who were still adapting to its rules.

Table 1. Profile Of Research Informants

Informant category	Number	Role in the study
Leader of the pesantren (kyai)	1	Holder of the institutional vision and religious authority
Head of Environment and Security Affairs	1	Technical coordinator of the greening programme
Teacher (<i>ustadz</i>) of <i>fiqh al-bī'ah</i>	1	Integration of environmental jurisprudence into the curriculum
Senior santri (daily student board)	5	Student implementers and peer supervisors of daily activities
Junior santri	5	Programme participants; perspective of newer learners
Total	13	

Source: Field data (2025).

Table 1 shows that the informants represent three levels of the programme: institutional authority (the kyai), programme management and instruction (the coordinator and the teacher), and the learners who experience the programme (senior and junior santri). This composition enabled source triangulation, because statements about the programme's intentions could be compared with the experiences of those who implement and receive it. Including both senior and junior santri was particularly important for capturing the process of adaptation and internalisation over time, which is the central concern of the second research question.

Data were collected through three techniques. First, participant and non-participant observation was used to examine the implementation of greening activities, the physical condition of the pesantren environment, the activities of the waste bank, and the santri's interaction with their environment. Second, in-depth interviews were conducted in a semi-structured format with a flexible interview guide; the interviews were recorded and transcribed verbatim. Third, documentation was collected in the form of photographs of activities, the structure of the programme's work plan, the syllabus of *fiqh al-bī'ah* learning, and the pesantren's monthly evaluation reports. In participant observation, the researchers took part in routine greening activities together with the santri, whereas in non-participant observation they observed activities without taking part in them. Both forms of observation were conducted during the four-week fieldwork period and were recorded in field notes, supported by photographs that were also included in the documentation.

Data analysis adopted the interactive model of Miles et al. (2020), which consists of three concurrent streams of activity. Data condensation involved selecting, focusing, and simplifying raw data from field notes and interview transcripts, a step analogous to the first-cycle coding described by Saldaña (2021). Data display involved organising the condensed data into textual matrices and flow charts to identify patterns, such as the relationships between programme dimensions and the stages of internalisation. Conclusion drawing and verification involved deriving meaning from the displayed data and checking it repeatedly against field notes to ensure the validity of the findings. These streams were carried out iteratively rather than sequentially, so that emerging interpretations could guide further observation and questioning.

The coding proceeded in two cycles. In the first cycle, interview transcripts and field notes were coded descriptively for programme activities, the religious meanings attached to them,

and the changes that informants reported in santri. In the second cycle, these codes were grouped into categories. Codes referring to facilities and spatial arrangements, such as green space, trees, the waste bank, and biogas, formed the physical dimension; codes referring to teaching content, such as fiqh al-bī'ah, environmental hadiths, and kitab kuning, formed the curricular dimension; and codes referring to routines, rules, and sanctions, such as Clean Friday, the plastic ban, and educative punishments, formed the cultural dimension. Codes describing change in santri were sorted, following Lickona's framework, into changes in understanding (cognitive), in feelings and attachment (affective), and in habitual action (psychomotor), while codes on conditions that enabled or hindered the programme were grouped as supporting and inhibiting factors. The categories were then arranged in matrices that cross-tabulated the programme dimensions with the forms of change, and the recurring links between them were interpreted as the patterns of environmental care reported in the Results.

The trustworthiness of the data was established through source triangulation, technique triangulation, and member checking. Source triangulation compared the kyai's statements with the actual practices of the santri, while technique triangulation compared observation results with interview data. Member checking was conducted by confirming preliminary findings with key informants. These strategies correspond to established procedures for enhancing the credibility of qualitative case studies (Creswell & Poth, 2018; Merriam & Tisdell, 2016). The overall research procedure is shown in Figure 1.

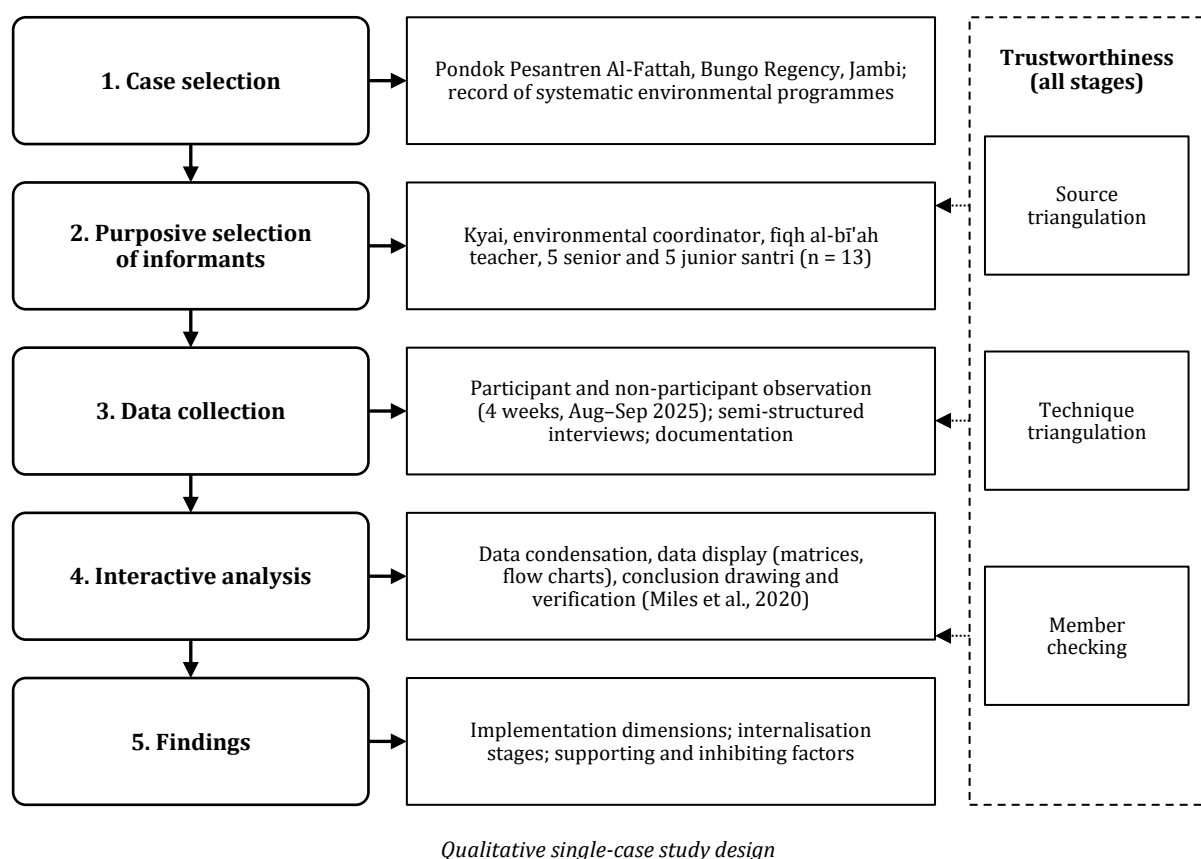


Figure 1. Research procedure of the case study
Source: Authors' elaboration (2026).

Figure 1 summarises the logic of the research procedure. The process moved from the selection of the case and informants, through three complementary data collection techniques, to the interactive analysis of the data, while the trustworthiness strategies operated across all

stages rather than as a final step. This arrangement reflects the iterative character of qualitative case study research, in which data collection and analysis inform each other until the patterns are sufficiently stable to answer the research questions (Miles et al., 2020; Yin, 2018).

Results and Discussion

Based on observation and interview data, the greening programme at Pondok Pesantren Al-Fattah Bungo does not stand alone as an incidental activity; it is systematically integrated into the life of the pesantren. The findings are presented in four parts: the forms of programme implementation, the process of fostering environmental care among santri, the supporting and inhibiting factors, and a discussion of the eco-pesantren as an agent of ecological transformation.

Three-Dimensional Implementation of the Greening Programme

The first dimension is physical and spatial, which can be described as ecological landscaping. The pesantren has allocated 40% of its total land as green open space. Each dormitory is required to maintain at least three fruit trees and one bed of family medicinal plants (*tanaman obat keluarga*, TOGA). According to the informants, this arrangement not only makes the campus greener but also provides economic value and botanical education for the santri. The physical dimension also includes ecologically based energy and sanitation. Manure from the pesantren's goat pen is processed into biogas, which is used as fuel for the communal kitchen, while liquid waste from the kitchen and bathrooms is channelled into a simple wastewater treatment installation before being discharged into the river. In addition, the pesantren operates a waste bank: santri sort organic and inorganic waste from their dormitories; inorganic waste is deposited in the waste bank managed by the pesantren cooperative, while organic waste is processed into compost to fertilise the gardens.

These physical arrangements address the very criteria on which earlier eco-pesantren assessments have focused, namely the use of renewable resources, green space, and waste management (Bakri, 2021). They also resemble the waste bank and composting initiatives documented in other pesantren (Khoirurrijal et al., 2023). What distinguishes Al-Fattah is that facilities such as the waste bank function simultaneously as infrastructure and as learning spaces. This resonates with the finding that a school-based waste bank can become an inclusive learning space in which ecological awareness grows from students' everyday experiences and social interactions (Kim et al., 2026), and with evidence from another eco-pesantren where waste sorting and resource conservation produced measurable changes in practice (Muin et al., 2025).

The second dimension is curricular, reflecting the integration of knowledge. Greening at Al-Fattah is not detached from the curriculum. The teacher of *fiqh al-bī'ah* explained:

"We do not merely tell the santri to plant trees. We teach them that planting a useful tree is an act of continuous charity (*ṣadaqah jāriyah*). We integrate the hadiths on the prohibition of cutting down trees in war, the prohibition of polluting water, and the obligation to revive dead land (*iḥyā' al-mawāt*) into everyday fiqh lessons." (Interview, Ustadz Z, 15 August 2025)

This statement shows that the curricular dimension gives religious meaning to physical activities. Environmental jurisprudence is not taught as a separate abstract subject but is embedded in the reading of classical texts (*kitab kuning*) and connected directly to what santri

do in the gardens. This pattern is consistent with studies showing that kyai cultivate ecological piety by translating teachings on stewardship and cleanliness into institutional rules and a hidden curriculum (Putri et al., 2023), and with proposals for hadith-based ecological education that embeds values such as stewardship, balance, and the avoidance of excess into curriculum, teaching, and school culture (Arifuddin et al., 2026). It also supports the argument that environmental jurisprudence provides the normative grounding and theological motivation that ecoliteracy alone cannot supply (Helmi et al., 2025).

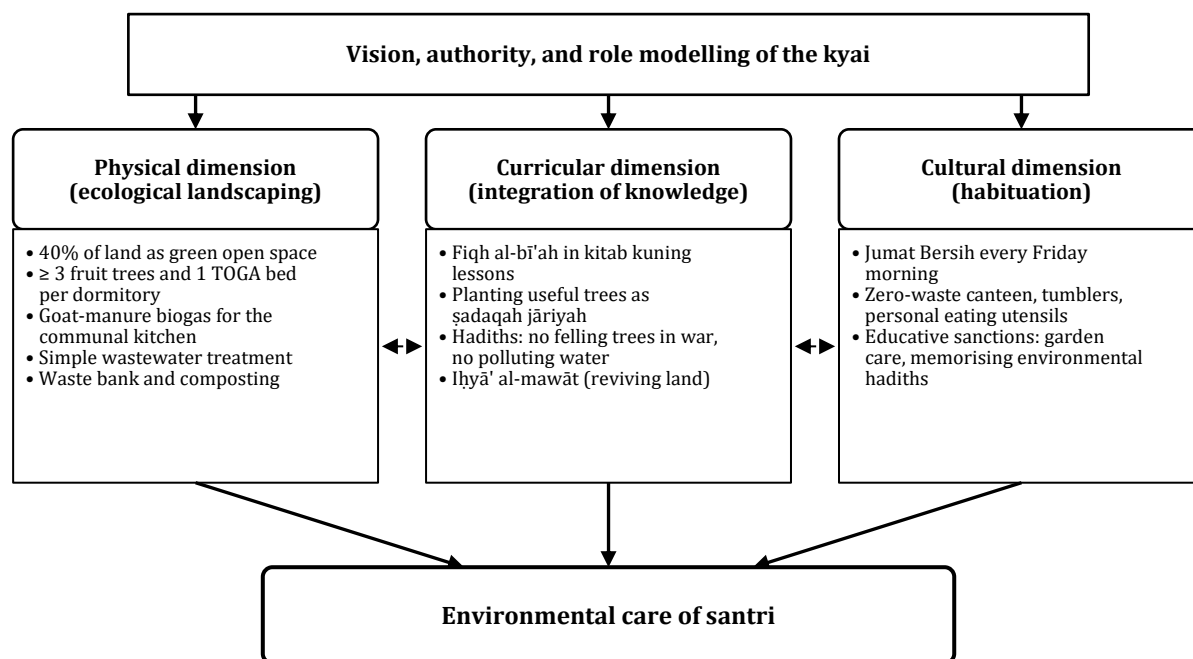
The third dimension is cultural and focuses on habituation. Cultural programmes are designed to build santri's automatic reflexes in caring for the environment. Through the Clean Friday movement (*Jumat Bersih*, abbreviated *Jumsih*), all academic activities are suspended every Friday morning, and santri and teachers clean the environment, pull weeds, and tend the plants. Through a zero-waste and tumbler campaign, the pesantren strictly prohibits single-use plastics in the canteen, and every santri is required to bring a tumbler and personal eating utensils. A system of rewards and educative sanctions complements these programmes: santri caught littering or damaging plants are given educational "punishments", such as caring for the pesantren garden for one week or memorising environmental hadiths. Table 2 summarises the three dimensions.

Table 2. Dimensions of the greening programme at Pondok Pesantren Al-Fattah Bungo

Dimension	Main programme components	Emphasis
Physical and spatial (ecological landscaping)	40% of land allocated as green open space; at least three fruit trees and one TOGA bed per dormitory; goat-manure biogas for the communal kitchen; simple wastewater treatment before discharge to the river; waste bank managed by the cooperative and composting of organic waste	Greening with economic value and botanical education
Curricular (integration of knowledge)	<i>Fiqh al-bī'ah</i> in daily fiqh lessons based on <i>kitab kuning</i> ; planting useful trees as <i>ṣadaqah jāriyah</i> ; hadiths on not felling trees in war and not polluting water; <i>iḥyā' al-mawāt</i>	Religious meaning of conservation
Cultural (habituation)	<i>Jumat Bersih</i> every Friday morning with academic activities suspended; zero-waste canteen with tumblers and personal utensils; educative sanctions (one week of garden care or memorising environmental hadiths)	Automatic reflexes of environmental care

Source: Observation, interviews, and documentation (2025).

Table 2 indicates that each dimension carries a distinct educational function. The physical dimension provides the concrete objects and settings of learning, the curricular dimension supplies religious meaning, and the cultural dimension converts both into routine. This configuration is close to the ecopedagogical practices observed in other pesantren, where environmental awareness is built through hands-on planting cycles reinforced by Qur'anic and hadith teachings, direct instruction, and field guidance (Maslani et al., 2023). It also operationalises the integration strategies proposed for eco-theology-based character education, namely curriculum, role modelling, habituation, institutional culture, and ecological action (Firnanda & Yusuf, 2026). The relationship between the three dimensions is illustrated in Figure 2.



Dashed arrows: the three dimensions interlock and reinforce one another

Figure 2. Three-Dimensional Implementation Model Of The Greening Programme

Source: Authors' analysis of field data (2025).

Figure 2 shows that the three dimensions do not operate in isolation but interlock. The educative sanctions, for instance, link the cultural dimension (discipline) with the physical dimension (garden care) and the curricular dimension (memorising environmental hadiths). Likewise, the waste bank connects a physical facility with the daily cultural practice of sorting waste and with the curricular teaching that polluting the environment is prohibited. This interlocking structure is important because a programme that relies only on physical projects or momentary motivation is likely to lose momentum, whereas a programme anchored in curriculum and culture can reproduce itself through daily routines. The model thus adds a structural explanation to the observation that Indonesian Muslim organisations and pesantren pursue greening, waste management, and education as complementary strategies grounded in Islamic eco-theology (Mustofa et al., 2025).

Do the three dimensions reinforce one another, or could each operate independently? Each dimension on its own corresponds to a type of programme reported in earlier studies: facility-centred eco-pesantren programmes (Bakri, 2021; Khoirurrijal et al., 2023), curriculum-centred ecological education (Arifuddin et al., 2026; Helmi et al., 2025), and habituation-centred programmes (Muin et al., 2025). The Al-Fattah data suggest that the educational effect of each dimension depends on the others. Without the curricular dimension, the waste bank would remain a waste-handling facility; without the physical dimension, fiqh al-bī'ah lessons would have no site for practice; and without the cultural dimension, both would depend on individual motivation. The difficulties reported by informants point in the same direction: when the annual turnover of the student board weakened supervision of the waste bank, the facility continued to exist, but its role in daily practice declined, which indicates that the physical dimension relies on the cultural one. The integration is not, however, uniform. In the data, the biogas installation and the wastewater treatment appear mainly as infrastructure and are less clearly linked to teaching or daily routines. Mutual reinforcement is therefore a tendency of the

programme rather than a property of every component, which is consistent with the view that values, habits, and social norms shape environmental behaviour jointly rather than separately (Steg & de Groot, 2019).

Internalisation of Islamic Eco-Theological Values

The implementation of the programme culminates in a process of value internalisation. The analysis indicates that environmental care among santri at Al-Fattah develops through three psychological-pedagogical stages: cognitive, affective, and psychomotor transformation.

The first stage is a cognitive transformation from an anthropocentric to a theocentric-ecological outlook. According to the informants, many santri entered the pesantren with the view that nature is an object that may be exploited for human interests. Through *fiqh al-bī'ah* lessons and the kyai's sermons, this view is challenged. Santri are taught that nature also glorifies God (Q. 17:44), so that damaging nature means interrupting the glorification (*tasbīh*) of God's creatures. The kyai of Al-Fattah emphasised this point in an interview:

"If a santri damages the environment, he is not only breaking the rules of the pesantren; he is committing a sin because he cuts off the *tasbīh* of nature. This is what makes them think twice before throwing rubbish carelessly." (Interview, Kyai, 12 August 2025)

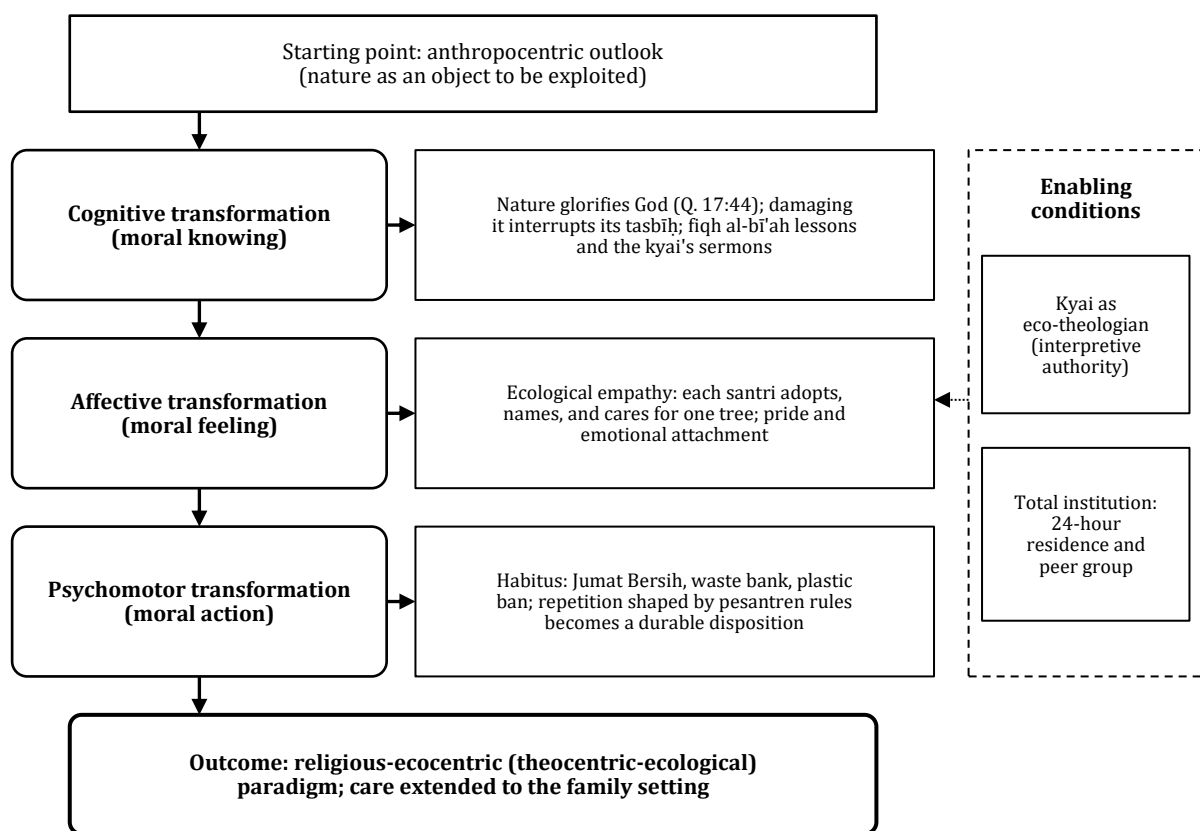
This finding shows that the theological framing of nature serves as the cognitive entry point of environmental care. It is consistent with quantitative evidence that religiosity positively predicts students' ecological awareness (Sudrajat, 2026) and with the description of the kyai's teaching on stewardship as the externalisation phase in the social construction of ecological piety (Putri et al., 2023). In terms of character education, this stage corresponds to moral knowing, which includes awareness of moral values and the ability to reason about their application (Lickona, as cited in Aprillia et al., 2023). Its distinctive feature at Al-Fattah is that environmental knowledge is not presented as a set of scientific facts but as a matter of faith and moral accountability before God.

The second stage is an affective transformation that builds ecological empathy. Care cannot grow without love, and the programme therefore engages santri emotionally. Santri do not merely plant trees; they "adopt" them. Each santri has one tree that he or she must name and care for throughout the period of study at the pesantren. When their trees bear fruit or grow well, the santri feel pride and develop an emotional attachment to them. This finding is in line with the theory of biophilia, which holds that humans have an innate affinity with nature that needs to be activated through direct experience (Kellert, 2018). It is also supported by meta-analytic evidence that contact with nature strengthens human-nature connectedness, which in turn is associated with pro-environmental behaviour (Barragan-Jason et al., 2022). In Lickona's terms, the tree adoption programme cultivates moral feeling, including empathy and love of the good (Aprillia et al., 2023), by giving santri a personal and enduring relationship with a living being.

The third stage is a psychomotor transformation in which a habitus is formed. The culmination of environmental care is concrete action that becomes habitual. Through Clean Friday, waste bank management, and the plastic ban, santri are required to perform environmental actions repeatedly. Bourdieu's (2020) concept of habitus helps to explain this process: repeated practices that are guided by structures, in this case the rules of the pesantren, eventually produce durable dispositions. A senior santri described the change as follows:

"At first it was hard, Sir. I was used to buying food in plastic, and now I have to bring a food container. But gradually it became a habit. When I go home, I actually feel strange if I see my mother throwing plastic waste carelessly. I have started sorting rubbish at home too." (Interview, Senior Santri, 20 August 2025)

This testimony indicates that the habit formed in the pesantren extends beyond its walls into the family setting, which is an important indicator that the disposition has been internalised rather than merely complied with. The weight of habit is also visible in other domains of Muslim religious life: a study that bridged al-Ghazālī's classical pedagogy of disciplined practice (*riyāḍat al-naḥs*) with technology acceptance found habit to be the strongest predictor of Indonesian Muslims' adoption of digital television for da'wah (Fatmawati et al., 2026). At the same time, research on dormitory programmes cautions that the persistence of religious habitus after graduation depends on the capital that students carry and the social settings they later enter (Saputra et al., 2025). The internalisation process is summarised in Figure 3.



Internalisation of Islamic eco-theological values among santri

Figure 3. Internalisation Process Of Islamic Eco-Theological Values Among Santri

Source: Authors' analysis of field data (2025).

Figure 3 depicts internalisation as a movement from an anthropocentric starting point to a religious-ecocentric paradigm through three successive but overlapping transformations. The cognitive stage provides theological meaning, the affective stage creates emotional bonds, and the psychomotor stage stabilises action into habitus. The figure also shows that the process takes place within enabling conditions, namely the kyai's interpretive authority and the residential environment of the pesantren, which are discussed further below. This staged model extends the externalisation–objectification–internalisation sequence described by Putri et al.

(2023) by specifying the psychological domains through which internalisation occurs at the level of individual santri.

Supporting and Inhibiting Factors

The success of the programme is shaped by internal and external dynamics. Three supporting factors were identified. The first is the authority and role modelling (*uswah hasanah*) of the kyai. Within the pesantren, the kyai's religious rulings and directives function as the highest norm. When the kyai personally plants trees and reprimands santri who litter, this produces a strong psychological effect. The second is a strong peer-group system. Dormitory-based mentoring and the system of senior mentors (*kakak asuh*, known locally as *liqo*) make social control among santri effective; junior santri feel ashamed if they appear indifferent to the environment because they are observed by their seniors. The third is partnership with external parties. Al-Fattah cooperates with the Environmental Agency of Bungo Regency and local non-governmental organisations in training on waste management and in the provision of tree seedlings.

Three inhibiting factors were also identified. The first is limited budget and land. Although the pesantren owns land, it continues to experience growth in the number of santri, which increases pressure on green open space, while the budget for maintaining plants and the wastewater treatment installation is often constrained by limited operational funds. The second is the cultural resistance of new santri. Newly admitted santri (*Mualimin*) often experience culture shock with the strict environmental rules, and they need three to six months to adapt to the pesantren's zero-waste system. The third is inconsistency in student management. The annual turnover of the daily student board sometimes causes inconsistency in supervising the programme, especially in the waste bank sector. Table 3 summarises these factors.

Table 3. Supporting And Inhibiting Factors Of The Greening Programme

Category	Factor	Manifestation in the field
Supporting	Authority and role modelling of the kyai (<i>uswah hasanah</i>)	The kyai's rulings and directives are the highest norm; the kyai personally plants trees and reprimands santri who litter
	Strong peer-group system	Dormitory-based mentoring and senior mentors (<i>kakak asuh</i> , <i>liqo</i>) create social control; juniors feel ashamed to appear indifferent before seniors
	External partnerships	Cooperation with the Environmental Agency of Bungo Regency and local NGOs on waste-management training and tree seedlings
Inhibiting	Limited budget and land	Growing enrolment increases pressure on green open space; maintenance of plants and wastewater treatment constrained by tight operational funds
	Cultural resistance of new santri	New santri (<i>Mualimin</i>) experience culture shock and need three to six months to adapt to the zero-waste system
	Inconsistency of student management	Annual turnover of the daily student board weakens supervision, especially of the waste bank

Source: Interviews and observation (2025).

Table 3 shows that the supporting factors are largely relational and cultural, while the inhibiting factors are largely material and organisational. The centrality of the kyai's example is consistent with research showing that the kyai's exemplary conduct shapes the social morals of santri (Maulana et al., 2021) and with studies of green pesantren leadership in which the founder's approach and consultative management sustain environmental programmes and community participation (Sudarsono et al., 2024). The effectiveness of peer control aligns with experimental evidence that information about peers' behaviour shifts adolescents' normative perceptions and, among younger adolescents, their own climate-friendly behaviour (Koessler et al., 2022), as well as with the finding that structured programmes in pesantren can internalise caring character among santri (Ummah et al., 2025). Conversely, the constraints of time, resources, and organisational continuity resemble those reported in the implementation of a competency-based curriculum at a madrasah, where project-based learning was limited by time and resources (Azizah et al., 2025). The three-to-six-month adaptation period of new santri also confirms that environmental habitus is acquired gradually and requires sustained support rather than a single orientation event.

Eco-Pesantren as an Agent of Ecological Transformation

The findings confirm and extend the literature on eco-pesantren. While earlier studies have emphasised the managerial aspects of waste and facilities (Bakri, 2021; Khoirurrijal et al., 2023), this study shows that greening at Al-Fattah is a manifestation of Islamic ecopedagogy. Ecopedagogy, as Misiasek (2020) argues, is critical environmental teaching that links ecological problems to their social and ethical roots. At Al-Fattah, this link is constructed through religious meaning: the garden, the waste bank, and the canteen become sites where santri learn that their relationship with nature is part of their relationship with God.

The ecopedagogy of this pesantren works through a mechanism that can be called the sacralisation of nature. Unlike approaches that teach the environment mainly from scientific or utilitarian perspectives, for example protecting nature to prevent floods, Al-Fattah teaches the environment from a theological perspective. Nature is regarded as a sign (*āyah*) of God whose sanctity must be preserved. In the researchers' reading of the data, this approach appeared more effective in changing santri behaviour intrinsically than fines or physical rules alone, as illustrated by the kyai's emphasis on sin and by the senior santri's voluntary sorting of waste at home. This interpretation suggests that internalised transcendent values may be key to sustaining environmental commitment, and it offers a partial answer to Koehrsen's (2021) question of whether pro-environmental religious interpretations translate into everyday practice: in a residential religious institution with consistent routines, they appear to do so.

The study also highlights the role of the kyai as an eco-theologian. At Al-Fattah, the kyai does not act merely as an administrator but as an interpreter of classical texts who makes them relevant to the modern crisis. When the kyai links the hadith on removing a thorn from the road with picking up plastic waste in the courtyard, the text is contextualised in a way that makes Islamic teaching feel alive and responsive. This finding challenges the stereotype of pesantren as conservative institutions lagging behind contemporary issues. It is consistent with studies showing that pesantren traditions can generate environmental leadership and ecomodernity (Adawiah et al., 2022) and that pesantren-based ecological movements can draw on faith, local wisdom, and piety to reshape relations between humans and nature (Sulistyati, 2023).

From the perspective of character education, the programme at Al-Fattah integrates moral knowing, moral feeling, and moral action (Lickona, as cited in Aprillia et al., 2023). This integration reflects principles that character education research regards as essential, including modelling by adults, the cultivation of intrinsic motivation, and giving students meaningful responsibility (Berkowitz, 2021), and the idea that character is both taught explicitly and "caught" through the ethos of the institution (Arthur et al., 2017). The success of this integration depends heavily on what Goffman (1961/2017) called the total institution. Because santri live in the pesantren for 24 hours a day, all of their space and time are conditioned to interact with environmental values, leaving little room to evade ecological responsibilities. The condition of the total institution, often criticised in the sociology of education for its controlling character, becomes here a powerful force in forming an ecological habitus that, according to the testimony of senior santri, persists even when they return to their families.

A related question concerns the balance between external regulation and intrinsic motivation. Al-Fattah relies on firm rules, such as the ban on single-use plastics, and on sanctions for littering, yet the sanctions are deliberately educative: caring for the garden or memorising environmental hadiths turns a disciplinary moment into a learning experience that reconnects the offender with the physical and curricular dimensions of the programme. Character education research warns that heavy reliance on extrinsic rewards and punishments can undermine the internalisation of values (Berkowitz, 2021). The Al-Fattah case suggests that rules can support internalisation when they are framed religiously, enforced consistently, and paired with affective experiences such as tree adoption. The testimony of the senior santri, who described the shift from an initially burdensome rule to a habit carried into the family, illustrates this movement from external regulation towards self-endorsed practice, in which the same behaviour comes to be experienced as an expression of faith rather than as compliance.

However, the study also reveals a vulnerability, namely the programme's dependence on the figure of the kyai and on the peer-group system. If the leadership of the pesantren shifts to a figure less concerned with the environment, or if the dormitory system becomes looser, the ecological habitus may erode. This vulnerability is consistent with the observation that the persistence of dormitory-formed habitus depends on later social conditions (Saputra et al., 2025). Institutionalising the programme in official curriculum documents and in the standard operating procedures of the foundation is therefore crucial for sustainability. A systematic review of santri transformation likewise identified system-based governance and the preservation of Islamic values as key pillars and proposed combining Senge's learning organisation with adaptive learning (Manaf et al., 2026), and character education frameworks emphasise that a programme must be made an institutional priority rather than a personal initiative (Berkowitz, 2021).

The local context of the case also deserves attention. Unlike many eco-pesantren studies conducted in Java, Al-Fattah is situated near plantation areas and river flows in Jambi, so practices such as treating kitchen and bathroom wastewater before it reaches the river carry direct local significance. Its partnership with the regency's Environmental Agency and local non-governmental organisations shows that pesantren can act as nodes linking religious authority with public environmental governance, a role that has been observed in pesantren networks that mobilise resources across sectors (Adawiah et al., 2022). At the national level, the eco-theology agenda of the Ministry of Religious Affairs (Firnanda & Yusuf, 2026) and the MUI's progressive engagement with climate-related issues through fatwas (Harnowo & Habib,

2024) create a supportive policy climate. The experience of Al-Fattah indicates, however, that such policies become effective only when they are translated into the daily routines, curriculum, and authority structures of individual institutions.

Theoretically, the study contributes a model that connects three-dimensional implementation (physical, curricular, and cultural) with three-stage internalisation (cognitive, affective, and psychomotor), conditioned by the kyai's eco-theological authority and the total institutional environment. This model refines the social construction account of ecological piety (Putri et al., 2023) by specifying the psychological domains of internalisation, and it provides empirical grounding for the conceptual integration of ecoliteracy and environmental jurisprudence proposed by Helmi et al. (2025). It also offers an explanation for the inconsistent effects of environmental education reported in meta-analyses (Świątkowski et al., 2024; van de Wetering et al., 2022): knowledge-oriented instruction alone may be insufficient, but when religious meaning, direct contact with nature, and structured repetition are combined in a residential setting, the conditions for durable behaviour appear stronger. Environmental psychology similarly emphasises that values, emotions, habits, and social norms jointly shape environmental behaviour (Steg & de Groot, 2019), and the Al-Fattah case shows how a pesantren can align all four.

Practically, the findings suggest that pesantren and other Islamic schools can design environmental programmes by combining facilities, curriculum, and culture rather than relying on isolated projects. The curricular dimension could be strengthened through project-based learning; evidence from Indonesian vocational education shows that culturally responsive project-based learning substantially improves green energy literacy (Ananta et al., 2026), suggesting that projects around biogas, composting, and waste-bank management could deepen santri's ecological knowledge. Nevertheless, this study has limitations. It examined a single case over a relatively short observation period, relied mainly on qualitative accounts of change, and did not measure behavioural outcomes or environmental impacts directly. Because few studies measure actual behaviour (Świątkowski et al., 2024), future research should combine qualitative insight with behavioural and environmental indicators.

Conclusion

This study concludes that the implementation of the environmental greening programme at Pondok Pesantren Al-Fattah Bungo is not merely a physical activity but a sustained effort at character formation. The programme is implemented through three interlocking dimensions: a physical dimension consisting of green spatial planning, biogas, and a waste bank; a curricular dimension consisting of the integration of *fiqh al-bi'ah* into the learning of classical texts; and a cultural dimension consisting of the habituation of zero-waste practices and the Clean Friday movement. Environmental care among santri grows through a cognitive transformation in which nature is understood theologically as a sign of God, an affective transformation in which empathy and a sense of ownership towards plants are built, and a psychomotor transformation in which a habitus is formed through repeated action, so that the santri's outlook shifts from an anthropocentric to a theocentric-ecological, or religious-ecocentric, paradigm. The main supporting factors are the kyai's authority and example, a peer-group system rooted in dormitory life, and external partnerships, whereas the inhibiting factors include limited budget and land, the initial resistance of new santri, and the annual turnover of the student board. Taken together, these findings show that pesantren can act as agents of ecological

transformation through an ecopedagogy rooted in Islamic eco-theology, and they enrich the ecopedagogy literature by illustrating how transcendent values may support conservation behaviour. These conclusions rest on a single case, a four-week observation period, and qualitative accounts of change, so they describe how environmental care developed at Al-Fattah rather than the measured impact of the programme. For the sake of sustainability, Al-Fattah is advised to formalise its *fiqh al-bī'ah* curriculum in the official documents of the foundation so that the programme does not depend solely on the figure of the kyai, to develop environmental entrepreneurship such as the sale of compost or recycled crafts from the waste bank in order to make the programme financially independent, and to open the pesantren as a centre of environmental education for communities in Bungo Regency. Other pesantren that wish to learn from this experience should adapt it to their own resources, leadership, and institutional culture rather than adopt it as a fixed model. Pesantren with limited land or funds may need to give priority to the curricular and cultural dimensions; those with more collective leadership may depend less on the figure of a single kyai; and non-residential or partly residential institutions cannot assume the same intensity of habituation that a total institution provides. Future research is encouraged to measure quantitatively the carbon footprint reduced by the pesantren through these programmes and to test the proposed implementation–internalisation model across multiple pesantren with different leadership and residential arrangements.

References

- Adawiah, W., Dharmawan, A. H., & Sunito, S. (2022). Ekomodernitas Islam: Kepemimpinan, mobilisasi dan gerakan lingkungan hidup di dua pesantren di Jawa Barat. *Jurnal Sosiologi Agama*, 16(2), 197–218. <https://doi.org/10.14421/jsa.2022.162-04>
- Ananta, M. P., Hadziq, M. F., Aulia, R. N., & Manaf, S. (2026). Project-based learning enhances green energy literacy in Indonesian vocational education: A multisite quasi-experiment. *Educational Technology in Developing Countries*, 1(1), 63–82. <https://doi.org/10.64929/etdc.v1i1.67>
- Aprillia, T. H., Masrof, A. H., Ahid, N., & Huda, S. (2023). Pesantren and tradition (Study of ta'dzim affiliates in character education Al-Ghazali and Thomas Lickona). *Edukasi Islami: Jurnal Pendidikan Islam*, 12(01), 49–70. <https://doi.org/10.30868/ei.v12i01.2738>
- Arifuddin, Yahya, M., & Hafid, E. (2026). Hadith-based ecological education as a recontextualization of environmental values in contemporary Islamic education. *International Journal of Islamic Studies*, 6(1), 12–31. <https://journal.uin-alauddin.ac.id/index.php/ijis/article/view/69785>
- Arthur, J., Kristjánsson, K., Harrison, T., Sanderse, W., & Wright, D. (2017). *Teaching character and virtue in schools*. Routledge.
- Azizah, Z. I., Naustion, M. O. T., Zh, M. H. R., & Daroini, S. (2025). Implementation of the competency-based curriculum development model at MTs Plus Al-Azhar Wlingi Blitar. *al-Afkar, Journal for Islamic Studies*, 8(4), 720–731. <https://doi.org/10.31943/afkarjournal.v8i4.1941>
- Bakri, M. (2021). Eco-pesantren assessment study of Islamic boarding school in Banda Aceh, Indonesia. *Journal of Islamic Architecture*, 6(3), 143–150. <https://doi.org/10.18860/jia.v6i3.7967>

- Barragan-Jason, G., de Mazancourt, C., Parmesan, C., Singer, M. C., & Loreau, M. (2022). Human-nature connectedness as a pathway to sustainability: A global meta-analysis. *Conservation Letters*, 15(1), Article e12852. <https://doi.org/10.1111/conl.12852>
- Bashori, B., & Prasetyo, M. A. M. (2025). Lanskap penelitian pesantren hijau: Sebuah studi bibliometrik dari tahun 2000–2025. *POTENSIA: Jurnal Kependidikan Islam*, 11(2), 236–250. <https://doi.org/10.24014/potensia.v11i2.38434>
- Berkowitz, M. W. (2021). *PRIMED for character education: Six design principles for school improvement*. Routledge.
- Bourdieu, P. (2020). *Habitus and field: General sociology, volume 2* (P. Collier, Trans.). Polity Press.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE.
- Fatmawati, Khoiriyah, N., Fauzan, Syam, A. R., Zh, M. H. R., Fauzi, A., & Ghani, M. F. A. (2026). Da'wah in the digital age: Bridging al-Ghazālī's classical da'wah pedagogy and digital television adoption among Indonesian Muslims. *Journal of Islamic Thought and Civilization*, 16(2), 234–260. <https://doi.org/10.32350/jitc.162.13>
- Firnanda, R., & Yusuf, S. (2026). Konseptualisasi pendidikan karakter berbasis ekoteologi untuk mewujudkan Kemenag Berdampak di lembaga pendidikan Islam. *Jurnal Ilmu Pendidikan Dasar Indonesia*, 5(2), 277–295. <https://doi.org/10.51574/judikdas.v5i2.5744>
- Gade, A. M. (2019). *Muslim environmentalisms: Religious and social foundations*. Columbia University Press.
- Goffman, E. (2017). *Asylums: Essays on the social situation of mental patients and other inmates*. Routledge. (Original work published 1961)
- Hancock, R. (2018). *Islamic environmentalism: Activism in the United States and Great Britain*. Routledge.
- Harnowo, T., & Habib, F. H. (2024). Islamic law and environment issues: Indonesian Ulama Council's fatwas on climate change. *AHKAM: Jurnal Ilmu Syariah*, 24(1), 101–118. <https://doi.org/10.15408/ajis.v24i1.34161>
- Helmi, A. M., Suyono, & Sya'diyah, H. (2025). Ecoliteracy and environmental fiqh in pesantren: Transforming awareness for sustainability. *Journal of Islamic Education and Pesantren*, 5(2), 106–116. <https://doi.org/10.33752/jiep.v5i2.11127>
- Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Core Writing Team, H. Lee, & J. Romero, Eds.). IPCC. <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Jenkins, W., Tucker, M. E., & Grim, J. (Eds.). (2017). *Routledge handbook of religion and ecology*. Routledge.
- Kellert, S. R. (2018). *Nature by design: The practice of biophilic design*. Yale University Press.
- Khoirurrijal, M. F., Mahfudloh, R. I., & Rusydiyah, E. F. (2023). Societal development through eco-pesantren programs: Actualizing the functions of pesantren in empowering society. *Cendekia: Jurnal Kependidikan dan Kemasyarakatan*, 21(2), 209–223. <https://doi.org/10.21154/cendekia.v21i2.7008>
- Kim, S. C., Nardion, L., Pamungkas, M. D., & Xavier, C. (2026). Environmental reflexivity, youth participation, and inclusive sustainability education: Learning from school-based waste

- bank initiatives. *Jurnal Penelitian Ilmu-Ilmu Sosial*, 7(1), 115–132. <https://doi.org/10.23917/sosial.v7i1.16323>
- Koehrsen, J. (2021). Muslims and climate change: How Islam, Muslim organizations, and religious leaders influence climate change perceptions and mitigation activities. *WIREs Climate Change*, 12(3), Article e702. <https://doi.org/10.1002/wcc.702>
- Koessler, A.-K., Vorlauffer, T., & Fiebelkorn, F. (2022). Social norms and climate-friendly behavior of adolescents. *PLOS ONE*, 17(4), Article e0266847. <https://doi.org/10.1371/journal.pone.0266847>
- Manaf, S., Novita, M., Zh, M. H. R., At Thaariq, Z. Z., & Kamilah, A. N. (2026). Digital transformation of santri: Integrating learning organisation with adaptive learning in pesantren. *Edukasiana: Journal of Islamic Education*, 5(1), 1–7. <https://doi.org/10.61159/edukasiana.v5i1.803>
- Maslani, Hidayat, W., Qadir, A., & Muhyidin, A. (2023). Ecopedagogy in action: An ethnographic exploration of environmental preservation strategies in pesantren. *Jurnal Pendidikan Islam*, 9(2), 211–222. <https://doi.org/10.15575/jpi.v9i2.29347>
- Maulana, A. H., Suteja, S., Mahfudz, M., & Munjiat, S. M. (2021). Keteladanan kyai dalam pembentukan akhlak sosial santri Pondok Pesantren As-Sanusi Babakan Ciwaringin Kabupaten Cirebon. *Atthulab: Islamic Religion Teaching and Learning Journal*, 6(1), 103–119. <https://doi.org/10.15575/ath.v6i1.9682>
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative data analysis: A methods sourcebook* (4th ed.). SAGE.
- Misiaszek, G. W. (2020). *Ecopedagogy: Critical environmental teaching for planetary justice and global sustainable development*. Bloomsbury Academic.
- Muin, A., Rosyid, M. Z., Rahman, H., & Rofiqi, R. (2025). Ecological tauhid-based green school management: A case study of eco-pesantren implementation at Mambaul Ulum Islamic Junior High School, Pamekasan. *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, 6(1), 551–562. <https://doi.org/10.62775/edukasias.v6i1.1457>
- Mustofa, M. L., Zenrif, M. F., & Barizi, A. (2025). Towards an Islamic ecotheology: Indonesian Muslim organizations in climate mitigation and adaptation efforts. *Problemy Ekorozwoju*, 20(2), 21–31. <https://doi.org/10.35784/preko.7089>
- Putri, L. D., Nugroho, C., Malik, A., & Nastain, M. (2023). Developing ecological piety in pesantren: The kyai's cognition and the practice of living fiqh al-bī'ah in Banten. *Ijtihad: Jurnal Wacana Hukum Islam dan Kemanusiaan*, 23(2), 235–259. <https://doi.org/10.18326/ijtihad.v23i2.235-259>
- Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). SAGE.
- Saputra, R., Qamari, S., Mutmainnah, & Husna, N. A. (2025). The transformation of religious habitus among mahasantri through a dormitory program: A sociological analysis from Pierre Bourdieu's perspective. *Jurnal Sosiologi Agama*, 19(2), 103–114. <https://doi.org/10.14421/jsa.2025.192-02>
- Steg, L., & de Groot, J. I. M. (Eds.). (2019). *Environmental psychology: An introduction* (2nd ed.). Wiley.

- Sudarsono, S., Muadin, A., & Tamam, B. (2024). Green pesantren leadership: Shaping a moderate society for environmental conservation. *Idarah (Jurnal Pendidikan dan Kependidikan)*, 8(1), 1–14. <https://doi.org/10.47766/idadrah.v8i1.1381>
- Sudrajat, A. (2026). Religiosity as a predictor of students' ecological awareness: Study in the school environment. *An-Natiq: Jurnal Kajian Islam Interdisipliner*, 6(1), 74–81. <https://doi.org/10.33474/an-natiq.v6i1.25896>
- Sulistyati, M. (2023). Locality, equality, and piety: Pesantren ecofeminism movement in Indonesia. *Studia Islamika*, 30(2), 319–348. <https://doi.org/10.36712/sdi.v30i2.25175>
- Świątkowski, W., Surret, F. L., Henry, J., Buchs, C., Visintin, E. P., & Butera, F. (2024). Interventions promoting pro-environmental behaviors in children: A meta-analysis and a research agenda. *Journal of Environmental Psychology*, 96, Article 102295. <https://doi.org/10.1016/j.jenvp.2024.102295>
- Ummah, S. C. B. N., Susanto, H., & Zh, M. H. R. (2025). Internalization of social care character among female santri through the Safari Dakwah program. *International Journal of Learning and Education*, 1(1), 47–54. <https://doi.org/10.59683/ijle.v1i1.197>
- UNESCO. (2020). *Education for sustainable development: A roadmap*. UNESCO.
- van de Wetering, J., Leijten, P., Spitzer, J., & Thomaes, S. (2022). Does environmental education benefit environmental outcomes in children and adolescents? A meta-analysis. *Journal of Environmental Psychology*, 81, Article 101782. <https://doi.org/10.1016/j.jenvp.2022.101782>