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Ecotheology-Based Character Education in Madrasahs: An Empirically Informed Model from Bulukumba Regency, Indonesia

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ABSTRACT

Environmental challenges increasingly require educational approaches that move beyond ecological knowledge toward the formation of sustainable values, character, and behavior. In Islamic educational settings, ecotheological principles provide a potentially powerful foundation for cultivating ecological responsibility through the concepts of *tawhid* (oneness of God), *khalifah* (human stewardship), *amanah* (trust and responsibility), *mizan* (balance), and *ihsan* (ethical excellence). However, a gap remains between students' understanding of religious-ecological values and their consistent application in everyday environmental practices. This study aims to examine existing practices of ecotheology-based character education, identify supporting factors, barriers, and institutional needs, and develop an empirically informed conceptual model for madrasahs in Bulukumba Regency, Indonesia. The study employed a mixed-methods approach using an exploratory sequential design. Qualitative data were collected through interviews with madrasah heads, teachers, supervisors, and students, while quantitative data were obtained from 98 participants comprising 49 teachers, 7 madrasah heads, 3 supervisors, and 39 students. The qualitative data were analyzed thematically, while quantitative data were analyzed descriptively and subsequently integrated during interpretation and model construction. The findings indicate that madrasahs possess a relatively strong normative and spiritual foundation for integrating Islamic values with environmental education. Nevertheless, the internalization of these values into consistent ecological behavior remains constrained by inconsistent student habits, limited facilities, uneven teacher capacity, and the absence of systematic indicators and evaluation mechanisms. Based on these findings, the study proposes an ecotheological character education model integrating Islamic ecological values, curricular integration, role modelling, habituation, ecological action, social engagement, and continuous monitoring and evaluation. The model offers an empirically grounded framework for strengthening the transformation of Islamic ecological values into sustainable ecological character and behavior in madrasah contexts.

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1. INTRODUCTION

The escalating ecological crisis, manifested in climate change, environmental degradation, pollution, biodiversity loss, and increasing pressure on natural resources, has positioned education as a strategic arena for cultivating generations who possess not only environmental knowledge but also the values, dispositions, and capacities required to act responsibly toward the environment. Environmental education can no longer be understood merely as the transmission of ecological knowledge; rather, it needs to foster environmental values, moral responsibility, practical competencies, and sustainable everyday practices. Recent evidence confirms the positive contribution of environmental education to students' environmental knowledge, attitudes, and pro-environmental behaviour. However, the magnitude of these effects varies according to educational duration, learners' characteristics, intervention design, and contextual conditions, suggesting that environmental education becomes more meaningful when it is embedded within broader pedagogical and institutional processes rather than delivered as isolated instructional content (Hu et al., 2025).

A persistent challenge in environmental education is the gap between environmental awareness and actual ecological behaviour. Students may understand environmental problems and express positive attitudes toward nature without consistently translating such understanding into everyday practices. Recent cross-national research demonstrates that educational experiences can contribute to pro-environmental behaviour through the development of *action competence*, indicating that the capacity to act is an important mechanism connecting educational experience with environmental behaviour. Similarly, recent research on secondary students across 28 countries and regions shows that environmental knowledge mediates the relationship between mastery-oriented learning and pro-environmental behaviour. These findings indicate that knowledge remains important, but knowledge alone is insufficient to generate sustained behavioural change. Environmental education therefore needs to provide opportunities for meaningful participation, experiential learning, reflection, social interaction, and concrete ecological action (Algurén, 2025; Sziva et al., 2026).

The transformation of ecological values into sustained behaviour is also strongly influenced by the institutional environment in which education takes place. Environmental responsibility is unlikely to become an enduring part of students' character when ecological practices depend primarily on individual teachers, occasional programmes, or short-term activities. Instead, ecological values need to be embedded within curriculum, school culture, leadership, teacher practices, institutional policies, physical environments, and mechanisms for monitoring and evaluation. Recent studies emphasize the importance of whole-school approaches in which sustainability becomes a collective and structural responsibility rather than an activity implemented by particular individuals. This institutional dimension is particularly relevant for madrasahs because religious education institutions simultaneously function as instructional, moral, and cultural environments in which students acquire values through formal learning as well as through habituation, role modelling, social interaction, and institutional practices (Chen et al., 2025; Holst et al., 2025).

Within Islamic educational contexts, the spiritual dimension of environmental responsibility offers an important but comparatively underdeveloped research avenue. Islamic teachings provide a theological foundation for understanding the relationship between God, human beings, and nature through concepts such as *tawhid* (divine unity), *khalifah* (human stewardship), *amanah* (trust and responsibility), *mizan* (balance), and *ihsan* (ethical excellence). From an ecotheological perspective, environmental protection is therefore not merely a technical or social obligation but also a moral and spiritual responsibility. Recent scholarship on Islamic ecotheology in madrasah education has demonstrated the potential for integrating these principles into curriculum, participatory learning, and environmentally responsible practices. Such scholarship suggests that Islamic ecotheology can provide an ontological and ethical foundation for shifting students' understanding of nature from an anthropocentric orientation toward a more responsible relationship with creation. Nevertheless, existing studies remain relatively limited in explaining how these theological principles can be systematically translated into an integrated character education model encompassing curriculum, role modelling, habituation, ecological action, social engagement, and institutional evaluation.

Another important dimension concerns the role of local context in environmental character formation. Ecological behaviour is shaped not only by individual cognition but also by cultural values, social norms, community practices, and the environments in which learners live. Recent research among Indonesian students

demonstrates that environmental education grounded in local wisdom is positively associated with environmental attitudes and pro-environmental behaviour, while technological interventions alone do not necessarily produce direct behavioural change. This finding reinforces the importance of context-sensitive approaches that connect environmental learning with students' lived experiences and local ecological realities. For madrasahs in Bulukumba Regency, the agricultural landscape, natural resources, community practices, and local cultural knowledge provide a meaningful contextual foundation for developing ecological character. An ecotheological approach rooted in local realities can therefore connect Islamic teachings with the environmental challenges and everyday practices experienced by students, making ecological responsibility more concrete and culturally meaningful (Safitri et al., 2026).

Despite these developments, several gaps remain in the literature. First, much of the recent environmental education literature continues to focus on environmental knowledge, attitudes, sustainability consciousness, psychological determinants, or pro-environmental behaviour, while fewer studies simultaneously examine the interaction between religious values, character formation, ecological practices, and institutional conditions. Second, research on environmental education in Islamic educational settings has increasingly recognized the relevance of Islamic ecotheology, but much of this work remains conceptual, curriculum-oriented, or based on individual institutional cases. It has not yet sufficiently explained how theological values can be systematically operationalized into a comprehensive educational process that connects curriculum integration, teacher role modelling, habituation, ecological action, social reinforcement, and continuous evaluation. Third, existing studies tend to examine particular interventions or individual mechanisms, whereas ecological character formation within madrasahs is inherently multidimensional and involves interactions among students, teachers, school leaders, curriculum, institutional culture, families, communities, and the physical environment. Recent evidence concerning the knowledge–action gap further suggests that environmental education needs to move toward context-sensitive and action-oriented models rather than relying primarily on the transmission of information.

Addressing these gaps, this study proposes an ecotheology-based character education model that integrates Islamic theological values with pedagogical, behavioural, and institutional mechanisms of ecological character formation. The novelty of this study lies not simply in introducing Islamic ecotheology into environmental education, but in conceptualizing how *tawhid, khalifah, amanah, mizan,* and *ihsan* can be translated into a systematic educational cycle involving curricular integration, teacher and school-leader role modelling, ecological habituation, direct environmental action, social engagement, and continuous monitoring and evaluation. The model is empirically informed through the integration of qualitative and quantitative evidence obtained from teachers, madrasah heads, supervisors, and students. In this way, the study moves beyond identifying ecological awareness as an educational outcome toward explaining the institutional and pedagogical processes through which ecotheological values may become embodied in everyday ecological practices.

The urgency of this study is reinforced by the need to reposition environmental responsibility within Islamic education as both a sustainability concern and a character-building agenda. Madrasahs are not merely sites for the transmission of religious and academic knowledge; they are social environments in which students develop dispositions through repeated experiences, institutional norms, role models, and everyday practices. Consequently, an ecotheological approach has the potential to bridge the divide between religious understanding and ecological action by transforming environmental responsibility from a theoretical concept into a lived moral practice. Such an approach is particularly important in contexts where environmental programmes exist but remain fragmented, inconsistently implemented, or insufficiently supported by systematic indicators and evaluation mechanisms. Recent studies similarly demonstrate that environmental education becomes more effective when learners are provided with opportunities for action, meaningful experiences, supportive institutional environments, and contextually relevant learning.

Accordingly, this study aims to examine the implementation of ecotheology-based character education in madrasahs across Bulukumba Regency, identify how Islamic ecotheological values are integrated into learning and madrasah culture, examine students' ecological character and behaviour, identify the supporting and inhibiting factors affecting implementation, and formulate an empirically informed conceptual model of ecotheology-based character education that is responsive to the madrasah context. The study is expected to

contribute theoretically by extending the intersection between Islamic education, character education, environmental education, and ecotheology. Practically, the proposed model may provide madrasahs with a framework for integrating religious values, curriculum, habituation, role modelling, ecological action, and institutional management into a more coherent educational process. At the policy level, the findings may inform the development of guidelines, teacher professional development, ecological character indicators, institutional programmes, and evaluation mechanisms for environmentally responsible Islamic education. Ultimately, the study seeks to contribute to the transformation of ecological responsibility from an abstract educational objective into a lived culture in which faith, moral character, ecological action, and institutional responsibility are mutually reinforcing.

2. LITERATURE REVIEW

Recent scholarship increasingly positions environmental education as a multidimensional process that requires the integration of knowledge, values, institutional structures, and behavioural practices. Holst et al. (2025), through a large-scale mixed-method study involving more than 1,300 school principals in Germany, found that although 80% of principals considered sustainability important as a core element of school education, 62% perceived sustainability in their schools as nonexistent, isolated, or implemented only occasionally. The study highlights that sustainability initiatives are often dependent on individual actors rather than being embedded in school-wide structures, policies, and organizational systems. These findings are particularly relevant to the development of an ecotheology-based character education model because they demonstrate that environmental character formation requires more than individual commitment; it requires institutional leadership, structural integration, and collective responsibility (Holst et al., 2025).

At the level of ecological behaviour, Wang and Li (2025/2026) provide important evidence concerning the relationship between students' learning orientations, environmental knowledge, and pro-environmental behaviour. Using data from 215,643 secondary students across 28 countries and regions, their multilevel analysis demonstrated that mastery goal orientations were positively associated with environmental knowledge, which subsequently contributed to pro-environmental behaviour. The findings suggest that environmental behaviour cannot be adequately developed through the transmission of environmental information alone; educational processes must also encourage students to actively engage with learning and develop meaningful orientations toward learning (Wang & Li, 2026). This perspective supports the present study's emphasis on moving beyond theological knowledge toward habituation, experiential learning, and ecological action as mechanisms for translating ecotheological values into everyday behaviour.

Evidence from the Indonesian educational context further demonstrates the importance of institutional integration and teacher capacity. Husin et al. (2025) examined environmental education in schools in Palembang and found that teachers expressed strong expectations for schools to integrate environmental education into their vision, mission, curriculum, extracurricular activities, and school programmes. Teachers also emphasized the importance of acting as environmental role models and receiving continuous professional development. However, the study indicates that environmental education is not always implemented consistently, particularly when environmental programmes depend on individual teachers rather than becoming part of the wider school system (Husin et al., 2025). These findings reinforce the argument that ecological character education requires institutional policies, teacher modelling, curriculum integration, and continuous professional development rather than relying solely on environmental activities.

From a broader behavioural perspective, Ekwesaranna et al. (2025) examined the relationship between environmental education, connectedness to nature, environmental values, and pro-environmental behaviour among 508 university students across Nigeria. The study found relatively strong connections to nature and endorsement of biospheric and altruistic values, while participation in organized environmental activities remained comparatively limited. Importantly, simply enrolling in environmental education courses did not significantly predict pro-environmental behaviour. The authors therefore emphasize the importance of value-based, immersive, and practical educational approaches for strengthening environmental stewardship. This finding closely corresponds with the central empirical issue identified in the present study, namely the potential gap between ecological understanding and consistent ecological behaviour. It suggests that values must be accompanied by direct experience, repeated practice, and opportunities for meaningful ecological action (Ekwesaranna et al., 2025).

Within the specific context of Islamic environmental thought, Mustofa et al. (2025) demonstrate that Islamic ecotheology can provide a theological and social foundation for responding to contemporary ecological challenges. Their study of Indonesian Muslim organizations shows how Islamic values can be connected to climate mitigation and adaptation efforts, positioning religion as a potential driver of ecological responsibility rather than merely a source of normative discourse. The study is particularly significant for the present research because it provides a broader socio-religious foundation for connecting Islamic theological principles with concrete environmental action. Nevertheless, its focus is primarily on Muslim organizations and climate-related initiatives rather than formal educational institutions (Mustofa et al., 2025). This leaves an important research space for examining how Islamic ecotheological principles can be systematically translated into curriculum, habituation, teacher modelling, student behaviour, institutional management, and evaluation within madrasahs.

Taken together, these studies indicate that contemporary environmental education research is moving from a narrow emphasis on environmental knowledge toward more integrated approaches involving values, identity, experiential learning, behavioural practice, teacher modelling, leadership, and whole-school structures. However, an important gap remains in connecting these dimensions with an explicitly Islamic ecotheological framework within madrasah education. Existing research tends to examine environmental education, pro-environmental behaviour, institutional sustainability, or Islamic ecological thought separately. The present study addresses this gap by integrating Islamic ecotheological values with curriculum, habituation, role modelling, ecological action, institutional support, and continuous evaluation within a single empirically informed conceptual model for madrasahs. This positioning provides a basis for understanding ecotheology not merely as theological content but as a transformative framework for developing ecological character and sustainable institutional culture.

3. METHODOLOGY

This study employed a mixed-methods approach using an exploratory sequential design. The design was selected because the study aimed not only to examine existing practices of ecotheology-based character education but also to develop an empirically informed conceptual model based on the findings. The qualitative phase explored the implementation of character education, the integration of Islamic ecotheological values, students' ecological behaviour, supporting and inhibiting factors, and institutional needs. The quantitative phase was subsequently used to identify patterns of ecological character, institutional support, and readiness for implementing ecotheology-based character education. Findings from both phases were integrated to formulate the proposed model.

The study was conducted in madrasahs across Bulukumba Regency, South Sulawesi, Indonesia. Participants were selected purposively based on their involvement in or experience with character education and environmental programmes in madrasahs. A total of 98 participants participated in the study, comprising 49 teachers, 7 madrasah heads, 3 madrasah supervisors, and 39 students. The involvement of participants from different institutional and educational roles enabled the study to obtain complementary perspectives on ecotheology-based character education at the classroom, institutional, supervisory, and student levels.

Data were collected using open-ended questions and Likert-scale questionnaires, complemented by relevant institutional documentation. The open-ended instruments explored the implementation of character education, the application of Islamic ecotheological values, ecological practices, institutional support, implementation barriers, and the perceived need for a systematic educational model. The Likert-scale questionnaire was used to examine students' ecological awareness and character, as well as teachers' and madrasah heads' perceptions of Islamic-environmental integration, habituation, role modelling, managerial support, and institutional readiness. Relevant institutional information and documentation were also examined to strengthen the interpretation of the empirical findings.

Qualitative data were analysed using thematic analysis, involving repeated data familiarisation, coding, categorisation, theme development, and interpretation. Quantitative data were analysed descriptively using frequencies, percentages, and mean scores to identify patterns across the measured indicators. The two strands of data were subsequently integrated through triangulation and convergence analysis by comparing qualitative themes with quantitative patterns to identify areas of consistency, divergence, and complementarity. The

integrated findings were then used to determine the core components, implementation mechanisms, and enabling conditions of the proposed ecotheology-based character education model.

The trustworthiness of the findings was strengthened through source and methodological triangulation, involving comparisons among teachers, madrasah heads, supervisors, and students, as well as integration of qualitative and quantitative evidence. Ethical principles were maintained through voluntary participation, informed consent, confidentiality, and the responsible use of research data. Participants were informed about the purpose of the study and their right to participate voluntarily. The resulting model is positioned as an empirically informed conceptual model, rather than a fully validated educational intervention. Further expert validation, pilot implementation, and empirical effectiveness testing are therefore required before broader application.

4. RESULT AND DISCUSSION

4.1 Empirical Context and Participants

This study was conducted in several madrasahs across Bulukumba Regency, Indonesia, involving key stakeholders directly engaged in the implementation of character education and the development of environmental awareness within madrasah settings. Participants were selected to capture diverse perspectives across institutional leadership, teaching practices, educational supervision, and students' lived experiences. This approach enabled the study to examine ecotheology-based character education not only from the perspectives of educational managers and teachers but also from the ways in which its values are understood and manifested by students. In total, the study involved 98 participants, comprising teachers, madrasah heads, madrasah supervisors, and students. The distribution of participants is presented in Table 1.

Table 1. Distribution of Research Participants

No.	Participant Group	Number	Role in the Study
1	Teachers	49	Provided information on teaching practices, habituation, role modeling, and the implementation needs of ecotheology-based character education
2	Madrasah Heads	7	Provided information on institutional policies, leadership, programs, resource support, and the development needs of the proposed model
3	Madrasah Supervisors	3	Provided an external perspective on supervision, policy implementation, evaluation, and the feasibility of model development
4	Students	39	Provided information on students' understanding, experiences, character development, and ecological behaviors
Total		**98**	

Source: Research findings, 2026

The composition of participants reflects four complementary perspectives on ecotheology-based character education. Teachers and madrasah heads provided evidence concerning classroom practices and institutional management, while supervisors contributed an external perspective on implementation and educational development. The inclusion of students further allowed the study to examine the extent to which ecological values were reflected in students' understanding and everyday behaviors. This diversity of participants provided a substantive basis for integrating qualitative and quantitative evidence and subsequently formulating an ecotheology-based character education model that is contextually relevant to madrasahs in Bulukumba Regency.

4.2 Existing Practices of Character Education Based on Ecotheology

The findings indicate that ecotheology-based character education has been implemented across madrasahs in Bulukumba Regency through classroom instruction, habituation, role modelling, religious activities, and various forms of environmental engagement. These practices demonstrate an emerging effort to connect students' character development with Islamic values and their responsibility toward the natural environment. Evidence

from teachers, madrasah heads, supervisors, and students reveals a relatively consistent pattern: environmental awareness has become part of everyday madrasah life, although the integration of ecotheological values and the consistency of ecological behaviour remain in need of further strengthening.

At the instructional level, teachers integrate character education and environmental awareness into relevant learning activities while relating environmental issues to Islamic teachings. Among teachers, 95.9% provided positive ratings regarding the integration of environmental concern with Islamic teachings in learning and madrasah activities (M = 4.47). Teachers also expressed strong support for the use of *tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan* as foundations for developing ecological character, with a mean score of 4.43. This finding was reinforced by madrasah heads, all of whom gave positive ratings regarding the integration of environmental concern with Islamic teachings (M = 5.00). From the students' perspective, 94.9% reported understanding that nature is Allah's creation that should be protected, while an equivalent proportion perceived environmental stewardship as part of good Islamic character. These findings indicate a strong connection between character education, Islamic values, and ecological awareness.

Character education is also implemented through habituation and role modelling in students' daily experiences. Among teachers, 91.8% reported positively that madrasahs routinely habituate students to maintain classroom and environmental cleanliness, care for plants and facilities, and use resources responsibly (M = 4.57). All madrasah heads provided positive ratings on this aspect, with a mean score of 5.00. The role of teachers as models was similarly prominent, with 95.9% of teachers providing positive ratings (M = 4.49). Qualitative responses indicate that these practices include classroom cleaning routines, collective environmental activities, regular cleanliness programmes, plant maintenance, waste management, water and electricity conservation, and direct modelling by teachers and other members of the madrasah community.

The perspectives of madrasah supervisors provide further support while also highlighting critical areas requiring improvement. Supervisors indicated that environmental issues have increasingly received attention within madrasah policies and programmes, including through ecotheology, green madrasah initiatives, and the *Kurikulum Berbasis Cinta* framework. At the practical level, several madrasahs have initiated activities such as waste sorting, ecobrick production, and recycling. Supervisors also emphasized the relevance of Islamic teachings to ecological character formation, particularly through the concept of human beings as trustees (*amanah*) responsible for managing the earth and through Qur'anic teachings concerning environmental destruction. Nevertheless, supervisors identified several challenges, including limited budgets and green infrastructure, inconsistent collective awareness, the need for stronger role modelling, and an educational orientation that tends to emphasize cognitive understanding more than concrete ecological action.

Student responses further demonstrate that ecotheological understanding is relatively strong, whereas its translation into everyday behaviour has not yet reached the same level. A total of 92.3% of students reported understanding human beings as *khalifah* with responsibility for protecting the environment, while 97.4% expressed a sense of responsibility for maintaining the cleanliness of classrooms, schoolyards, and the wider madrasah environment. However, only 84.6% reported disposing of waste properly without having to be repeatedly reminded, while 87.2% reported using water and electricity responsibly. Similarly, 84.6% reported taking care of plants, facilities, and the surrounding environment. This pattern indicates a gap between students' understanding of ecotheological values and the consistency with which such values are translated into ecological behaviour. Although students generally understand the religious and moral rationale for environmental stewardship, independent and consistent ecological practices still require systematic reinforcement. The integrated findings from all respondent groups are presented in Table 2.

Table 2. Integrated Findings on Existing Practices of Ecotheology-Based Character Education

Practice Dimension	Teachers (n=49)	Madrasah Heads (n=7)	Supervisors (n=3)	Students (n=39)	Integrated Finding
Character education strengthening	87.8% rated character education as	100% provided positive ratings (M = 4.86).	Character education is regarded as part	Students demonstrated high levels of	Character education has become part of

Practice Dimension	Teachers (n=49)	Madrasah Heads (n=7)	Supervisors (n=3)	Students (n=39)	Integrated Finding
	planned and integrated (M = 4.24).		of madrasah policies and programmes.	ecological character awareness.	madrasah practice and is supported at the policy, management, and instructional levels.
Teacher role modelling	95.9% rated teachers positively as role models (M = 4.49).	100% provided positive ratings (M = 4.86).	Teachers are viewed as key figures and agents of change in developing an ecological culture.	Students reported positive responses to environmental activities and teacher guidance.	Role modelling is an important mechanism for translating character values into behaviour.
Ecological habituation	91.8% reported that ecological habituation is implemented (M = 4.57).	100% provided the maximum rating (M = 5.00).	Emphasized the need for consistent and sustainable habituation.	Positive ecological behaviour ranged from 84.6% to 87.2% across several behavioural indicators.	Ecological habituation has developed, but behavioural consistency among students requires further strengthening.
Integration of Islam and environmental issues	95.9% reported that environmental concern is linked to Islamic teachings (M = 4.47).	100% provided positive ratings (M = 5.00).	Connected environmental stewardship with *amanah*, *khalifah*, Qur'anic teachings, and love for Allah.	94.9% understood nature as Allah's creation; 94.9% regarded environmental care as part of Islamic character.	Strong alignment exists among educators, school leaders, supervisors, and students regarding the Islamic foundation of environmental stewardship.
Ecotheological values	91.8% supported *tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan* as foundations of ecological character (M = 4.43).	Most respondents provided high ratings (M = 4.43).	Emphasized human responsibility as *amanah* and the integration of faith with ecological action.	92.3% understood human beings as *khalifah* responsible for protecting the earth.	Ecotheological values are already understood normatively, particularly through the concepts of *khalifah* and *amanah*.
Ecological awareness and responsibility	95.9% supported strengthening ecological awareness and responsibility (M = 4.57).	100% provided positive ratings (M = 4.86).	Emphasized the need to connect faith with concrete ecological action.	97.4% felt responsible for maintaining the cleanliness of the madrasah environment.	Ecological awareness represents one of the strongest dimensions of existing character education practices.
Students' ecological practices	Teachers reported waste management,	Heads reported cleanliness, greening, and	Waste sorting, ecobrick production, and	84.6% reported disposing of waste without repeated	Ecological practices are developing but

Practice Dimension	Teachers (n=49)	Madrasah Heads (n=7)	Supervisors (n=3)	Students (n=39)	Integrated Finding
	cleanliness, plant and facility care, and responsible resource use, although some behaviours remain inconsistent.	environmental management activities.	recycling were identified in several madrasahs.	reminders; 87.2% reported saving water/electricity; 84.6% reported caring for plants and facilities.	have not yet become fully consistent or evenly implemented.
Implementation barriers	Challenges include student habits, facilities, learning resources, and teacher competency needs.	Collective awareness, facilities, budget, and the absence of specific guidance remain challenges.	Limited budgets, inconsistent collective awareness, role modelling, and cognitive-oriented learning were identified as challenges.	Limited awareness, role modelling, education, and facilities were perceived as barriers to environmental care.	Barriers are multidimensional, involving individual, institutional, resource, and educational-system factors.
Need for a model	93.9% supported a systematic model; 95.9% needed practical guidance, strategies, indicators, and evaluation instruments.	100% supported the development of a model and implementation guidance.	A model is needed to integrate faith and action, include measurable indicators and SOPs, and remain adaptable to madrasah conditions.	92.3% were willing to participate in environmental cleaning, greening, and ecological activities.	All data sources indicate a need for a systematic, practical, contextual, and sustainable model.
Expected implementation approach	95.9% supported implementation through learning, habituation, madrasah culture, and ecological action (M = 4.53).	100% supported this approach (M = 4.71).	Recommended integration of ecotheology across subjects, policies, madrasah culture, and concrete environmental action.	87.2% were willing to encourage peers to care for the environment; 92.3% were willing to participate in ecological activities.	The model should integrate instruction, role modelling, habituation, institutional culture, and ecological action in a continuous process.

Source: Research findings, 2026

Note: M = mean score based on a 1–5 Likert scale. Percentages indicate the proportion of respondents selecting scores 4–5 on the relevant statements. Supervisor data were analysed qualitatively because the supervisor instrument consisted of open-ended questions.

Overall, the findings presented in Table 2 indicate that ecotheology-based character education in madrasahs across Bulukumba Regency has developed a relatively strong normative, spiritual, and practical foundation. Islamic values such as *amanah*, *khalifah*, responsibility, and environmental stewardship are recognized by students and reinforced by teachers and madrasah heads. These practices are also increasingly supported through institutional policies and supervisory perspectives. However, implementation has not yet been fully institutionalized as an integrated and measurable system. The gap between students' high level of ecotheological

understanding and the lower consistency of their ecological practices suggests that existing educational practices require a mechanism capable of connecting values → understanding → habituation → concrete action → evaluation. Therefore, the need for an ecotheology-based character education model does not arise from the absence of existing practices, but rather from the need to provide a systematic framework that integrates Islamic values, classroom learning, role modelling, habituation, madrasah culture, ecological action, and continuous evaluation.

4.3 Students' Ecological Character and Behaviour

The findings indicate that students demonstrated relatively strong ecological character in terms of religious understanding, environmental awareness, and responsibility. However, this understanding was not fully reflected in consistent and independent ecological behaviour in everyday practice. This pattern is evident in the higher scores for ecological understanding and responsibility compared with several indicators of practical ecological behaviour.

Specifically, 94.9% of students understood nature as God's creation that must be protected (M=4.79), 92.3% understood humans as *khalifah* (stewards) of the earth (M=4.64), and 94.9% regarded environmental care as part of Islamic character (M=4.79). Environmental responsibility was particularly strong, with 97.4% of students reporting a sense of responsibility for maintaining the cleanliness of their classrooms, school grounds, and surrounding environment (M=4.69). In contrast, the scores for several practical behaviours were relatively lower: 84.6% reported disposing of waste properly without constant reminders (M=4.28), 87.2% reported using water and electricity appropriately (M=4.44), and 84.6% reported caring for plants, school facilities, and the surrounding environment (M=4.44).

Table 3. Students' Ecological Character and Behaviour

Dimension	Indicator	Mean	Positive Response	Finding
Ecological understanding	Understanding nature as God's creation that must be protected	4.79	94.9%	Strong religious understanding of environmental stewardship
Khalifah awareness	Understanding humans as stewards of the earth	4.64	92.3%	Relatively strong awareness of the human stewardship role
Religious-moral awareness	Viewing environmental care as part of Islamic character	4.79	94.9%	Ecological values are understood as part of Islamic teachings
Environmental responsibility	Feeling responsible for maintaining environmental cleanliness	4.69	97.4%	One of the strongest dimensions
Affective sensitivity	Feeling uncomfortable when seeing litter or a dirty environment	4.31	87.2%	Relatively good sensitivity to environmental conditions
Waste management behaviour	Disposing of waste properly without constant reminders	4.28	84.6%	Independent ecological behaviour still needs strengthening
Resource conservation	Using water and electricity appropriately	4.44	87.2%	Relatively good awareness of resource conservation
Environmental care	Caring for plants, facilities, and the school environment	4.44	84.6%	Environmental maintenance is not yet fully consistent
Ecological participation	Willingness to participate in environmental and greening activities	4.54	92.3%	High willingness to participate

Dimension	Indicator	Mean	Positive Response	Finding
Peer influence	Encouraging peers to maintain a clean and environmentally friendly madrasah	4.49	87.2%	Positive social influence among students

Source: Research findings, 2026
Note: M = mean score on a 1–5 scale; positive responses represent scores of 4–5.

The quantitative findings were corroborated by qualitative data from teachers, which indicated that students had engaged in various ecological practices, including proper waste disposal and sorting, environmental cleaning, planting and watering plants, maintaining school facilities, conserving water and electricity, using reusable drinking bottles and food containers, and participating in *eco-brick* activities. Nevertheless, teachers also reported inconsistencies in waste sorting, reducing single-use plastics, caring for plants, and carrying out ecological actions independently without teacher direction.

Overall, students' ecological character reflects a clear pattern: Islamic-based ecological understanding and awareness have developed relatively well, but their internalisation into consistent ecological behaviour remains incomplete. This finding highlights the need for character education that moves beyond value understanding toward sustained habituation, role modelling, direct ecological practice, social reinforcement, and behavioural evaluation.

4.4 Institutional Readiness and Management Support

Institutional readiness to support ecotheology-based character education was reflected in the presence of policy support, leadership commitment, programmes, and the involvement of madrasah communities. Overall, madrasah heads and teachers expressed strong support for ecological character development and the need for a more systematic implementation model. However, this commitment has not yet been fully supported by standardized implementation tools, adequate ecological facilities, and systematic evaluation mechanisms.

From a management perspective, all madrasah heads (100%) reported that character education was planned, routinely implemented, and integrated into madrasah activities (M=4.86). Support for teacher role modelling and ecological habituation was also very high, reaching 100%, with mean scores of 4.86 and 5.00, respectively. All madrasah heads further agreed that environmental concern should be connected with Islamic teachings (M=5.00) and that character education should foster ecological awareness and responsibility (M=4.86).

Table 4. Institutional Readiness and Management Support

Aspect	Indicator	Mean	Positive Response	Finding
Planning	Character education is planned and integrated into madrasah activities	4.86	100%	Strong institutional support for planning
Role modelling	Teachers serve as role models in character development	4.86	100%	Role modelling is viewed as a key strategy
Habituation	Habituation of cleanliness, plant and facility care, and resource conservation	5.00	100%	Ecological habituation is embedded in madrasah practices
Islamic integration	Environmental concern is connected with Islamic teachings	5.00	100%	Strong institutional support for integrating religion and environmental issues
Ecotheological foundation	*Tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan* serve as foundations	4.43	85.7%	Theological foundations are accepted but not yet fully uniform

Aspect	Indicator	Mean	Positive Response	Finding
Character orientation	Character education is directed toward ecological awareness and responsibility	4.86	100%	Institutional orientation supports ecological character development
Model needs	A systematic and practical ecotheological education model is needed	4.86	100%	Strong demand for a structured implementation model
Teacher support	Teachers need practical guidance, strategies, indicators, and evaluation instruments	4.71	100%	Implementation resources require further strengthening
Implementation approach	The model should operate through learning, habituation, madrasah culture, and ecological action	4.71	100%	An integrated implementation approach is strongly supported
Model feasibility	The model is suitable for recommendation to madrasahs in Bulukumba	4.57	85.7%	The proposed model is considered relevant to local needs

Source: Research findings, 2026
Note: M = mean score on a 1–5 scale; positive responses represent scores of 4–5.

The findings indicate that institutional readiness is relatively strong at the level of commitment and managerial orientation. Madrasah heads support the integration of ecological values into classroom learning, habituation, madrasah culture, and ecological activities. This commitment is also reflected in emerging programmes and institutional initiatives, including the *Kurikulum Berbasis Cinta*, *Madrasah Hijau*, waste management, waste sorting, *eco-brick* activities, and greening programmes. Madrasah supervisors further emphasized the importance of concrete policies, measurable success indicators, and multi-stakeholder engagement to ensure that ecotheological education extends beyond formal regulations.

Nevertheless, qualitative findings revealed several institutional limitations. Some madrasahs have not yet developed specific implementation resources, such as guidelines, teaching modules, success indicators, or evaluation instruments for ecotheology-based character education. Ecological facilities, including waste-sorting stations, green spaces, and environmental management infrastructure, are also unevenly available. Budget constraints, limited physical space, and differences in teachers' capacity and understanding of ecotheology further affect the consistency of implementation.

Overall, institutional readiness can be characterized as strong in terms of commitment and managerial support but still developing in terms of system standardization, implementation capacity, infrastructure, and evaluation. This condition indicates the need for a model that provides not only a clear value foundation but also practical guidance on implementation, role distribution, activities, success indicators, and evaluation mechanisms that can be adapted to the specific conditions of each madrasah.

4.5 Supporting Factors, Barriers, and Model Needs

The findings indicate that the implementation of ecotheology-based character education is supported by three main conditions: leadership and teacher commitment, Islamic value foundations, and institutional policies and environmental programmes. At the same time, implementation is constrained by inconsistent student behaviour, limited teacher capacity, inadequate facilities and funding, and the absence of standardized implementation and evaluation systems. These conditions provide an empirical basis for developing a more systematic and contextually relevant model.

Table 5. Supporting Factors, Barriers, and Model Needs for Ecotheology-Based Character Education

Aspect	Research Findings
Supporting factors	Commitment of madrasah heads and teachers; teacher role modelling; ecological habituation; integration of Islamic values with environmental issues; educational policy support; *Madrasah Hijau* and other environmental programmes; and Bulukumba's local environmental and cultural potential
Barriers	Inconsistent student awareness and discipline; habits developed at home and outside the madrasah; limited ecological facilities; budget constraints; limited physical space; uneven teacher understanding of ecotheology; and a stronger emphasis on knowledge than ecological action
Implementation needs	Practical guidelines, teaching modules and materials, instructional strategies, success indicators, evaluation instruments, structured ecological activities, and supporting facilities
Institutional needs	Concrete policies and SOPs, clear role distribution, teacher capacity development, budgetary support, partnerships with government and communities, and integration into madrasah culture
Required model characteristics	Systematic, practical, adaptive to madrasah conditions, grounded in Islamic values, interdisciplinary, action-oriented, and measurable
Local potential	Agricultural context, natural resources, and local cultural values such as the Kajang tradition as contextual resources for ecological learning
Model orientation	Connecting faith-based values with ecological understanding, habituation, concrete action, role modelling, social reinforcement, and continuous evaluation

Source: Research findings, 2026

Qualitative data indicate that internal institutional support is an important factor in sustaining ecological character education. Madrasah heads and teachers contribute through role modelling, habituation, and the integration of environmental values into learning activities. Policy support also provides opportunities to strengthen environmental issues through programmes such as *Madrasah Hijau*, *Kurikulum Berbasis Cinta*, waste management, waste sorting, *eco-brick* activities, greening initiatives, and other environmental programmes. In addition, Bulukumba's agricultural context and cultural resources provide opportunities for developing more contextually grounded ecological education.

Conversely, the main barriers are not limited to inadequate facilities and funding but also involve a gap between value understanding and actual practice. Teachers reported that some students remain inconsistent in waste sorting, reducing single-use plastics, caring for plants, and engaging in ecological actions independently. Habits developed outside the madrasah also affect behavioural consistency. At the institutional level, uneven teacher understanding of ecotheology and limited implementation and evaluation tools prevent existing practices from developing into a fully structured system.

These findings indicate that the need for a model does not primarily arise from the absence of ecological practices in madrasahs, but from the fact that existing practices have not yet been integrated into a character education system with clear direction, implementation stages, measurable indicators, and systematic evaluation mechanisms. The required model should therefore bridge Islamic values, ecological knowledge, and concrete action through learning, habituation, madrasah culture, role modelling, and stakeholder engagement.

Accordingly, an ecotheology-based character education model for madrasahs in Bulukumba Regency should be integrative, practical, adaptive, contextual, and sustainable. The model should accommodate differences in madrasah resources and conditions while utilizing local environmental and cultural potential as a context for ecological character development. These findings provide the empirical basis for integrating the study's qualitative and quantitative evidence into the proposed model presented in the following section.

4.6 Integrated Findings and Proposed Model

The integration of qualitative and quantitative findings indicates that ecotheology-based character education in madrasahs across Bulukumba Regency has a relatively strong foundation, particularly in terms of Islamic values, teacher commitment, role modelling, habituation, and institutional support. The quantitative findings demonstrate high levels of agreement among teachers and madrasah heads regarding the importance of integrating ecological values with Islamic teachings. Similarly, students reported strong understanding of nature as Allah's creation, the human role as *khalifah*, and environmental stewardship as part of Islamic character. These findings are further supported by qualitative evidence of environmental habituation, greening activities, waste sorting, eco-brick initiatives, water and energy conservation, and the integration of environmental issues across subjects.

However, the integration of both forms of evidence also reveals a persistent gap between ecotheological understanding and the consistency of ecological behaviour. Although 94.9% of students reported understanding nature as Allah's creation and 92.3% understood the concept of humans as *khalifah*, only 84.6% reported disposing of waste properly without frequent reminders. Similarly, students' practices related to caring for plants and school facilities and conserving water and electricity were somewhat lower than their levels of normative and religious understanding. Qualitative findings corroborate this pattern, indicating that the main challenge is not the absence of ecological values or activities, but the inconsistent internalisation of these values in everyday behaviour. Inconsistent student habits, influences from home and the wider environment, limited facilities, uneven teacher capacity, budget constraints, and the absence of standardized indicators and evaluation instruments contribute to this gap.

These findings suggest that an effective model should move beyond the transmission of religious and ecological knowledge by connecting Islamic values with lived experiences, habituation, concrete ecological action, and continuous evaluation. Accordingly, the proposed model is conceptualized as a cycle of madrasah culture transformation, rather than as a stand-alone or incidental programme. The values of *tawhid, khalifah, amanah, mizan,* and *ihsan* constitute the normative foundation, which is translated into educational processes, institutional culture, ecological action, and systematic evaluation.

Conceptually, the proposed model consists of five interconnected components: (1) value and contextual foundations, (2) curricular and instructional integration, (3) role modelling and habituation, (4) ecological action and social engagement, and (5) monitoring, evaluation, and continuous improvement. These components are reinforced by madrasah leadership, teacher capacity, institutional policies and standard operating procedures, infrastructure, budgetary support, and partnerships with communities and other stakeholders.

First, value and contextual foundations constitute the starting point of the model. The principles of *tawhid, khalifah, amanah, mizan,* and *ihsan* provide the theological basis for understanding environmental stewardship as a religious responsibility. These principles are contextualized within the environmental, agricultural, rural, and cultural characteristics of Bulukumba Regency, including the ecological values embedded in the local Kajang cultural context. Through this approach, environmental education is not treated as an external component of Islamic education but as an integral dimension of character formation and religious practice.

Second, curricular and instructional integration connects ecotheological values with learning content and students' learning experiences across subjects. The findings indicate that such integration is already occurring in several madrasahs, but it has not yet been systematically embedded in instructional planning and common achievement indicators. The proposed model therefore positions ecotheology within learning objectives, content, instructional strategies, student activities, and assessment. A cross-curricular approach enables environmental issues to be understood from multiple perspectives while maintaining a clear Islamic foundation. Third, role modelling and habituation function as the bridge between understanding and behaviour. Teachers and madrasah leaders are positioned as ecological role models through everyday practices such as maintaining cleanliness, sorting waste, caring for plants, conserving water and electricity, and reducing the use of disposable materials. Habituation should be implemented consistently so that ecological behaviour becomes part of the madrasah culture rather than merely a response to teacher instructions. The findings suggest that role modelling and habituation are among the existing strengths of madrasahs and should therefore constitute core elements of the proposed model.

Fourth, ecological action and social engagement provide students with direct experiences in addressing environmental issues. Activities may include waste sorting and management, eco-brick production, greening programmes, plant maintenance, water and energy conservation, environmental projects, and activities based on local environmental and cultural potential. At this stage, students are not merely expected to understand ecological values but to identify problems, make decisions, collaborate with others, and undertake concrete actions. Engagement with local communities, government institutions, and other relevant organizations can further expand students' ecological learning environments and strengthen programme sustainability.

Fifth, monitoring, evaluation, and continuous improvement address the systemic limitations identified in the study. Evaluation should extend beyond students' knowledge to include changes in attitudes, behavioural consistency, participation, and the ecological culture of the madrasah. This requires clear achievement indicators, behavioural observation instruments, activity documentation, student reflection, and periodic programme evaluation. The results of evaluation should serve as feedback for improving instructional practices, habituation activities, ecological programmes, and institutional support in subsequent cycles.

Based on the integrated findings, the proposed model can therefore be conceptualized as a cycle that transforms ecotheological values into ecological culture and action:
Ecotheological values and local context → curricular integration → role modelling and habituation → ecological action → social reinforcement → monitoring and evaluation → continuous improvement → strengthened ecological culture.

The cycle is iterative rather than linear. Evaluation outcomes are fed back into the subsequent planning and implementation process, enabling madrasahs to continuously adapt their practices to changing needs and contextual conditions.

Table 4.6 Integrated Findings and the Proposed Ecotheological Character Education Model

Model Component	Main Focus	Implementation Form
Value and Contextual Foundations	*Tawhid, khalifah, amanah, mizan,* and *ihsan*; local potential	Integration of Islamic, ecological, cultural, and local character values
Curricular and Instructional Integration	Ecological knowledge and meaning-making	Learning materials, projects, worksheets, discussions, and cross-curricular learning
Role Modelling and Habituation	Internalisation of values through behaviour	Cleanliness routines, waste sorting, greening, and water and energy conservation
Ecological Action and Social Engagement	Experiential learning and concrete action	Eco-brick, waste management, greening, environmental projects, and partnerships
Monitoring and Evaluation	Measuring change and sustainability	Character indicators, behavioural observation, documentation, reflection, and programme evaluation
Expected Outcomes	Ecological character and madrasah culture	Awareness, responsibility, care, and consistent ecological behaviour
System Enablers	Institutional sustainability	Leadership, SOPs, teacher capacity, infrastructure, budgeting, and partnerships

Source: Research findings, 2026

The model positions madrasah leadership and institutional culture as key drivers, while teachers function as both facilitators and role models, and students are positioned as the primary agents of behavioural transformation. The model is also adaptive, allowing implementation to be adjusted according to each madrasah's facilities, resources, student characteristics, and environmental potential. Thus, the model does not require uniformity in the form of activities; rather, it emphasizes consistency in principles, implementation stages, achievement indicators, and intended outcomes.

Overall, the integrated findings indicate that the major strengths of madrasahs lie in their Islamic value foundations, educator commitment, role modelling, and existing ecological practices, while the major areas requiring development concern systematization, standardization, capacity building, infrastructure, and evaluation. The proposed model is therefore not intended to replace existing practices but to integrate and strengthen them into a more systematic, contextual, practical, measurable, and sustainable framework for ecotheology-based character education.

Importantly, the proposed model should be understood as an empirically informed conceptual model derived from the integration of the study's qualitative and quantitative findings, rather than as a fully validated educational model. Further validation through expert review, feasibility testing, and implementation in a broader range of madrasahs is required to establish its effectiveness, applicability, and transferability.

4.7. Discussion

The findings of this study demonstrate that ecotheology-based character education in madrasahs in Bulukumba Regency has developed from an existing foundation of Islamic values, environmental awareness, teacher commitment, habituation, and institutional support. Nevertheless, the findings also reveal that the internalisation of ecological values into consistent everyday behaviour remains incomplete. This pattern is theoretically important because it challenges an understanding of environmental education as a linear process in which knowledge automatically produces behaviour. Contemporary environmental education research increasingly suggests that ecological behaviour emerges through the interaction of knowledge, attitudes, values, social norms, institutional contexts, and opportunities for action. A large-scale meta-analysis by van de Wetering et al. (2022), for example, found that environmental education significantly improves environmental knowledge, attitudes, intentions, and behaviour, but also highlighted substantial heterogeneity across educational interventions (van de Wetering et al., 2022). Similarly, Ardoin et al. (2020) argue that effective environmental education extends beyond information transmission by developing values, skills, and opportunities for collective environmental action (Ardoin et al., 2020).

The relatively high level of students' ecotheological understanding found in this study is therefore a significant strength. Most students understood nature as Allah's creation, recognized humans as *khalifah*, and associated environmental care with Islamic character. This finding is consistent with the argument that environmental education becomes more meaningful when ecological responsibility is connected to students' existing moral and cultural frameworks. In the Indonesian Islamic education context, Wakhidah and Erman (2022) demonstrated that environmental concepts are already embedded within Islamic Religious Education curricula through themes such as cleanliness, natural resources, human responsibility, and care for the environment (Wakhidah & Erman, 2022). Their findings indicate that Islamic education has considerable potential to serve as a vehicle for environmental character formation because environmental responsibility can be connected to religious practices and everyday moral conduct. The present study extends this argument by demonstrating that the presence of Islamic ecological values is not sufficient by itself; these values need to be organized into a systematic educational process that deliberately connects theological understanding with behavioural practice.

The central finding concerning the gap between knowledge and behaviour is particularly relevant to contemporary theories of sustainability education. Students in this study demonstrated stronger scores on normative and theological understanding than on several practical behaviours, including independent waste disposal, plant and facility care, and conservation of water and electricity. This pattern corresponds with recent research showing that environmental knowledge does not necessarily translate directly into pro-environmental behaviour. Mago et al. (2025), for instance, found that environmental knowledge influences pro-environmental behaviour partly through environmental attitudes and environmental sensitivity. Thus, knowledge becomes more behaviourally consequential when it is accompanied by affective engagement and sensitivity to environmental problems (Mago et al., 2025). Similar evidence is provided by Huoponen (2024), who identified lack of motivation, weak social support, insufficient opportunities for concrete action, and inconsistent norms as barriers that can prevent adolescents from translating environmental concern into behaviour (Huoponen, 2024).

From this perspective, the findings support a broader conception of character education in which character is understood not merely as knowledge of what is right but as the repeated enactment of valued dispositions.

Jordan (2023) demonstrates that environmental and sustainability education and character education share important foundations, particularly in relation to values, school ethos, role modelling, connectedness with nature, and service-learning (Jordan, 2023). The present study reinforces this theoretical intersection by showing that Islamic ecological values become more meaningful when translated into habituation, role modelling, and collective action. Consequently, the contribution of ecotheology to character education lies not only in providing theological justification for environmental responsibility but also in providing a moral framework through which ecological practices can become part of students' identity and everyday conduct.

The importance of role modelling identified in this study is also strongly supported by previous research. Teachers and madrasah leaders were perceived as important actors in demonstrating environmental responsibility, while qualitative findings showed that students were encouraged through direct examples provided by teachers. This is consistent with Frensley et al. (2022), who found that the characteristics of teaching approaches and learning experiences are associated with students' environmental literacy outcomes (Frensley et al., 2022). It is also consistent with Miyasaka and Honda (2024), who emphasize that environmental knowledge alone has limited direct effects on pro-environmental behaviour and that educational planning and practice need to be deliberately structured to support environmental consciousness and action (Miyasaka & Honda, 2024). The implication is that teachers cannot function merely as transmitters of environmental knowledge; they must operate as ecological role models whose everyday practices make the values taught in the classroom visible and socially credible.

The findings further indicate that habituation is an essential mechanism for transforming ecotheological values into ecological character. Students reported relatively strong levels of responsibility for maintaining cleanliness and willingness to participate in environmental activities, yet their independent practices were comparatively weaker. This suggests that some behaviours remain externally regulated through teacher reminders rather than fully internalised. Such a pattern is consistent with the literature showing that interventions can influence children's pro-environmental behaviour but that behavioural outcomes depend partly on how interventions are designed and measured. Swiątkowski et al. (2024), through a meta-analysis of interventions involving children, found that environmental interventions produced meaningful increases in pro-environmental behaviour, with stronger effects when actual behaviour rather than self-reported behaviour was measured (Swiątkowski et al., 2024). This finding is important for the present study because it indicates that character education should not rely exclusively on students' perceptions or self-reported attitudes but should incorporate systematic observation of actual ecological practices.

The role of experiential and action-oriented learning also emerges as an important theoretical implication. The proposed model in this study emphasizes ecological action after curricular integration and habituation because students need opportunities to practice the values they have learned. This orientation is supported by research showing that environmental education is more meaningful when students engage directly with environmental problems. Whitburn et al. (2023), for example, found that environmental education field trips were associated with increases in children's pro-environmental behaviour and support for conservation (Whitburn et al., 2023). Likewise, Chan (2023) demonstrated that place-based environmental education can develop students' environmental citizenship through engagement with community environmental issues, while Tolppanen et al. (2022) showed that holistic climate education can influence students' knowledge, values, worldviews, and willingness to engage in climate action. These findings support the argument that the proposed ecotheological model should move beyond classroom discussion toward contextual ecological projects and direct environmental action (Chan, 2023; Tolppanen et al., 2022).

The contextual dimension of the proposed model is particularly relevant to Bulukumba. The study identified agricultural, environmental, and cultural resources as potential contexts for ecological character education. This finding is consistent with the growing emphasis on place-based and participatory approaches in sustainability education. Fernando and Tajan (2024) found that participatory approaches to Education for Sustainable Development are strengthened when local knowledge, community participation, and stakeholder collaboration are incorporated into learning processes (Fernando & Tajan, 2024). Such approaches enable students to understand sustainability not as an abstract global discourse but as a problem connected to their own social and ecological environment. Therefore, the inclusion of local environmental and cultural resources in the proposed

model represents more than contextual adaptation; it constitutes a pedagogical strategy for making ecological values socially meaningful and actionable.

The role of institutional leadership constitutes another important dimension of the findings. The quantitative results indicate very strong support from madrasah heads for environmental character education, while qualitative findings reveal that school leaders facilitate programmes, teacher collaboration, environmental activities, and policy implementation. However, the study also identifies weaknesses in standard operating procedures, evaluation instruments, infrastructure, and systematic programme management. This finding corresponds with Cebrián et al. (2022), who found that school principals generally demonstrated commitment to sustainability but that levels of understanding, engagement, and implementation differed across schools (Cebrián et al., 2022). Similarly, Vargas-Merino et al. (2024) identify institutional barriers and enabling conditions as critical issues in the implementation of Education for Sustainable Development (Vargas-Merino et al., 2024). These studies suggest that sustainability education cannot be sustained through teacher initiative alone; institutional leadership must create structures, policies, resources, and accountability mechanisms that support continuity.

The gap between institutional commitment and system standardisation identified in this study is therefore theoretically significant. The madrasahs appear to have many of the necessary ingredients for ecotheological character education, but these elements have not yet been sufficiently integrated into a coherent institutional system. This condition reflects a broader problem in sustainability education, where institutions may demonstrate strong normative commitment while struggling to translate sustainability principles into curriculum structures, pedagogical practices, assessment systems, and institutional routines. Saleem et al. (2023), for example, found that action-oriented and holistic approaches to sustainability education are important for connecting sustainability knowledge with attitudes and behaviour (Saleem et al., 2023). Similarly, Boman (2025) argues for systematic learning pathways that make sustainability more visible and coherent within educational programmes (Boman, 2025).
The findings also support the importance of integrating ecological education across subjects rather than restricting it to a single environmental programme or subject. Teachers in this study reported connecting environmental issues with science, social studies, Islamic education, mathematics, language, arts, and other subjects. Such interdisciplinary integration is consistent with the contemporary understanding of Education for Sustainable Development as a multidimensional educational agenda. Vargas-Merino et al. (2024) emphasize the need for stronger theoretical and institutional integration of sustainability education, while Fernando and Tajan (2024) highlight curriculum transformation and transdisciplinary strategies as important dimensions of participatory sustainability education. The proposed model therefore positions ecotheology as a cross-curricular value framework rather than as an additional subject (Fernando & Tajan, 2024; Vargas-Merino et al., 2024). This approach enables Islamic ecological values to function across different learning contexts while maintaining a coherent ethical orientation.

The study's emphasis on social and institutional reinforcement is also supported by research on the ecological behaviour of children. Kong and Jia (2023) demonstrate that environmental knowledge and pro-environmental behaviour are transmitted within parent–child relationships, suggesting that ecological character formation cannot be understood solely within the school environment (Kong & Jia, 2023). Similarly, Huoponen (2024) identifies support from home and school as important enabling conditions for adolescents' pro-environmental behaviour (Huoponen, 2024). This evidence provides a theoretical basis for extending the proposed model beyond the classroom and madrasah through partnerships with families, communities, government institutions, and environmental organizations. The ecological culture of the madrasah is therefore more likely to become sustainable when environmental expectations are reinforced across the different social environments in which students live.

The proposed model also responds to the need for assessment and feedback mechanisms. One of the most important findings of this study is the absence of sufficiently standardized indicators and evaluation instruments for ecotheological character education. This limitation is consistent with broader sustainability education research, which continues to face difficulties in measuring behavioural and transformative outcomes. The systematic review by Vargas-Merino et al. (2024) identifies weaknesses in theoretical consolidation and implementation, while research on environmental interventions indicates that actual behavioural measures

remain less common than self-reported measures (Vargas-Merino et al., 2024). Therefore, the proposed model places monitoring and evaluation within the core cycle of implementation rather than treating assessment as an end-stage activity. Indicators should capture not only ecological knowledge but also responsibility, attitudes, participation, habitual behaviour, and the sustainability of school practices.

The integration of Islamic values into this framework constitutes the distinctive contribution of the present study. Conventional environmental education generally provides ecological knowledge, develops environmental attitudes, and creates opportunities for action, whereas the ecotheological approach adds a spiritual and ethical foundation to these processes. The concepts of *tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan* provide a theological rationale for why environmental stewardship matters. In this sense, ecological responsibility is not presented merely as compliance with environmental regulations or as an instrumental strategy for maintaining school cleanliness, but as part of students' relationship with God, other human beings, and creation. Wakhidah and Erman's (2022) analysis of the Indonesian Islamic Religious Education curriculum supports this potential by showing that environmental responsibility is already embedded in several dimensions of Islamic education (Wakhidah & Erman, 2022). The present study advances this perspective by organizing those values into a systematic educational cycle that connects theology, curriculum, habituation, action, social reinforcement, and evaluation.

The proposed model consequently contributes to the literature by addressing what can be described as a theological–behavioural integration gap. Existing sustainability education research has demonstrated the importance of knowledge, attitudes, experiential learning, institutional support, and behavioural practice, while Islamic educational research has established the normative relevance of concepts such as *khalifah* and environmental responsibility. However, these two strands are often examined separately. The present study brings them together by conceptualizing ecotheological character education as a cyclical process in which Islamic values are translated into learning experiences, reinforced through role modelling and habituation, enacted through ecological action, and strengthened through continuous evaluation. This integrated formulation provides a more comprehensive explanation of how religious values may contribute to ecological character formation within madrasah settings.

The proposed model is also consistent with the broader transformation of sustainability education from a knowledge-centred paradigm toward an action-oriented and transformative paradigm. Research increasingly indicates that sustainability education should foster not only knowing but also critical reflection, agency, participation, and behavioural change. Nousheen and Kalsoom (2022), for example, found that sustainability pedagogies involving case studies, critical incidents, discussions, debates, and problem-based learning enhanced students' sustainability consciousness (Nousheen & Kalsoom, 2022). Likewise, recent research in Indonesian higher education demonstrates the value of participatory approaches for developing sustainability learning and climate action. The proposed ecotheological model extends this action orientation to madrasah education by placing theological reflection and ecological practice within the same pedagogical cycle.

Overall, the findings suggest that the main challenge facing madrasahs in Bulukumba is not a lack of environmental awareness or Islamic values but the incomplete transformation of these resources into a coherent and sustainable educational system. The relatively high scores on theological understanding and institutional commitment indicate a strong foundation, while the comparatively lower scores on independent ecological practices indicate the need for stronger mechanisms of habituation, experiential learning, social reinforcement, and behavioural assessment. This interpretation is consistent with recent evidence showing that environmental education can improve ecological outcomes but that sustained behaviour requires more than knowledge transmission. The contribution of this study therefore lies in proposing an empirically informed model that connects Islamic ecological values with the behavioural and institutional mechanisms required for character formation.

From a theoretical perspective, the study reinforces the view that character education and environmental education should not be treated as separate domains. From a pedagogical perspective, it demonstrates the importance of integrating theological reflection, interdisciplinary learning, habituation, role modelling, and ecological action. From an institutional perspective, it highlights the importance of leadership, policy,

infrastructure, teacher capacity, stakeholder collaboration, and systematic evaluation. Most importantly, the study proposes that ecotheology can function as a bridge between faith, character, ecological knowledge, and ecological action. The proposed model should therefore be understood as an empirically informed conceptual framework rather than a fully validated intervention model. Its effectiveness and transferability require subsequent testing through expert validation, pilot implementation, and longitudinal evaluation across diverse madrasah contexts.

5. CONCLUSION

This study demonstrates that character education based on ecotheology in madrasahs across Bulukumba Regency has developed a relatively strong normative and spiritual foundation through the integration of Islamic principles, particularly *tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan*, with environmental responsibility. These values are reflected in curricular integration, teacher and school leader role modelling, habituation of environmentally responsible practices, waste management, greening activities, and efforts to conserve water and energy. A particularly significant finding is the discrepancy between students' relatively strong ecotheological understanding and their consistency in demonstrating ecological behaviour. Although students generally recognize nature as Allah's creation and environmental stewardship as an expression of Islamic character, such understanding has not yet been fully translated into consistent everyday practices, particularly in waste disposal and sorting, plant and facility care, reducing single-use plastics, and taking environmental action independently without external reminders.

The findings further indicate that ecological character formation cannot rely solely on the transmission of environmental knowledge or religious values. It requires sustained processes of role modelling, habituation, experiential learning, social engagement, and institutional reinforcement. Strong commitment from madrasah leaders and teachers, supported by habituation, integration of Islamic and environmental values, and institutional policies and programmes, emerged as important enabling factors. Conversely, limited facilities, budgetary and spatial constraints, uneven teacher capacity in understanding ecotheology, inconsistent student behaviour, environmental habits outside the madrasah, and the absence of systematic guidelines, measurable indicators, and evaluation instruments remain significant barriers. Thus, the central problem is not the absence of environmental activities, but the limited integration of these practices into a coherent, measurable, and sustainable character education system.

By integrating the qualitative and quantitative findings, this study proposes an empirically informed conceptual model of ecotheological character education comprising five interconnected components: value and contextual foundations; curricular and instructional integration; role modelling and habituation; ecological action and social engagement; and monitoring, evaluation, and continuous improvement. These components are reinforced by madrasah leadership, teacher capacity, institutional policies, infrastructure, financing, and partnerships with families and communities. The distinctive contribution of the proposed model lies in connecting Islamic spiritual values with concrete behavioural and institutional mechanisms through a cyclical process in which ecotheological values and local contexts are translated into curriculum, modelling and habituation, ecological action, social reinforcement, monitoring, and continuous improvement. In this way, ecotheology is positioned not merely as religious knowledge or doctrine, but as a foundation for developing ecological habits, responsible action, and an environmentally conscious madrasah culture. Nevertheless, the proposed model remains a conceptual model derived from empirical findings and should not yet be regarded as a validated educational model. Further studies involving expert validation, implementation testing, and application across diverse madrasah contexts are required to assess its feasibility, effectiveness, and broader applicability.

6. RECOMMENDATIONS AND POLICY IMPLICATIONS

The findings of this study suggest that strengthening ecotheology-based character education in madrasahs requires a shift from fragmented environmental activities toward a more systematic, contextual, and behaviour-oriented educational approach. Madrasahs are therefore recommended to integrate ecotheological values, such as *tawhid*, *khalifah*, *amanah*, *mizan*, and *ihsan*, into curriculum planning, classroom instruction, school routines, and environmental programmes. Such integration should not be limited to the formal curriculum but should be reflected in everyday institutional practices, including waste management, water and energy conservation, school greening, maintenance of facilities, and collective environmental action. The proposed model should be

implemented flexibly by considering the ecological, cultural, social, and resource characteristics of each madrasah, particularly the local environmental potential of Bulukumba.

At the teacher level, professional development should focus not only on environmental knowledge but also on the pedagogical integration of Islamic ecological values and experiential learning. Teachers need practical guidance on how to transform theological concepts into observable character indicators and learning activities that encourage students to practice environmental responsibility. Teacher role modelling should be strengthened because students' ecological character is shaped not only through instruction but also through repeated observation and interaction with adults in the school environment. Collaborative teacher learning communities can provide a sustainable mechanism for sharing instructional practices, evaluating student behaviour, and developing contextually relevant ecological learning materials.

At the institutional level, madrasah leaders should establish clear policies, roles, standard operating procedures, and measurable indicators for ecotheology-based character education. Environmental programmes should be incorporated into annual planning, budgeting, school development programmes, and monitoring systems rather than treated as temporary or extracurricular initiatives. Evaluation should place greater emphasis on observable behavioural change, such as consistency in waste management, resource conservation, plant care, and participation in environmental activities, rather than relying primarily on students' self-reported knowledge or attitudes. Partnerships with parents, local communities, environmental organisations, and relevant government agencies should also be strengthened to ensure continuity between ecological values practised at school and students' behaviour beyond the madrasah.

From a policy perspective, the findings indicate the need for education authorities to provide a policy framework specifically supporting the integration of Islamic values and environmental sustainability within madrasah education. Such a framework could include practical guidelines, curriculum integration strategies, teacher training modules, ecological character indicators, assessment instruments, and minimum standards for environmentally supportive school facilities. Policy implementation should avoid a one-size-fits-all approach and instead allow madrasahs to adapt programmes to their local ecological and cultural contexts. In the case of Bulukumba, local agricultural practices, biodiversity, community traditions, and indigenous ecological knowledge can serve as important contextual resources for developing place-based ecotheological education.

At the system level, funding mechanisms should provide greater support for low-cost and locally appropriate environmental initiatives, particularly in madrasahs with limited infrastructure and financial resources. Government agencies should also establish mechanisms for monitoring and evaluating the implementation of environmental character education and encourage the sharing of effective practices across madrasahs. Importantly, policy evaluation should distinguish between programme compliance and actual educational outcomes. The ultimate indicator of policy effectiveness should be the extent to which ecotheological values become internalised as sustainable ecological behaviour and institutional culture.

Finally, future research should empirically test the proposed conceptual model through expert validation, pilot implementation, and longitudinal or comparative studies across different madrasah contexts. Future studies could examine whether systematic integration of theological values, curriculum, habituation, ecological action, social reinforcement, and continuous evaluation produces measurable improvements in students' ecological behaviour. Such research would strengthen the empirical basis of the model and determine its feasibility, effectiveness, and scalability beyond the context of Bulukumba Regency.

7. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that should be considered when interpreting its findings. First, the research was conducted in madrasahs within Bulukumba Regency; therefore, the specific social, cultural, ecological, and institutional characteristics of the region may limit the generalizability of the findings to other madrasah contexts. Second, the quantitative data were primarily used to identify patterns in respondents' perceptions and reported behaviours rather than to establish causal relationships. The use of self-reported data on students' ecological behaviour may also involve social desirability bias. Although these data were complemented by qualitative perspectives from teachers, madrasah heads, supervisors, and students, the study did not employ

longitudinal observation of students' ecological behaviour. Furthermore, the proposed model remains an empirically informed conceptual model and has not yet undergone formal validation or empirical effectiveness testing.

Future research should therefore examine the model through expert validation, pilot implementation, and effectiveness testing across madrasahs with diverse characteristics. Longitudinal or quasi-experimental designs could be employed to assess changes in students' ecological behaviour more objectively through direct observation, teacher assessments, activity documentation, and validated behavioural instruments. Further studies should also incorporate the perspectives of families, communities, and educational policymakers to examine how ecological character is reinforced beyond the madrasah environment. Comparative studies across different ecological and cultural settings would be valuable for assessing the model's adaptability, while the development of validated instruments for measuring Islamic ecotheological character—including dimensions of *tawhid, khalifah, amanah, mizan,* and *ihsan*—could strengthen the methodological contribution of future research. Ultimately, subsequent studies should move beyond conceptual development toward systematic validation and empirical testing to establish a more robust, adaptive, and potentially scalable model of ecotheology-based character education.

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