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From Theology to Practice: Developing Indicators for Eco-Theological Implementation in Madrasah Settings

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Abstract. Eco-theology has gained substantial momentum in Indonesian education, reflected in the Ministry of Religious Affairs' publication of a dedicated volume on the subject. Its operationalisation within formal education, and particularly at madrasah level, nevertheless remains underexplored, and the field still lacks clearly articulated indicators against which the practical implementation of eco-theology can be assessed. Existing studies report a persistent value-action gap, in which students display ecological behaviour inside school but do not sustain it beyond institutional boundaries, together with a recurring absence of structured evaluation mechanisms capable of detecting that gap. This study formulates a set of implementation indicators for eco-theology in education, so that institutional readiness can be assessed and the translation of eco-theological principles into school practice measured. A systematic literature review of three databases, Lens.org, OpenAlex, and the Directory of Open Access Journals, yielded 38 peer-reviewed articles, which were analysed thematically. The analysis identifies nine domains: theological grounding and ecological worldview, including the correction of anthropocentric misreadings of stewardship; curriculum and learning design integration; teacher capacity and pedagogical practice; spiritual and affective internalisation; ecological habituation, behaviour, and school culture; institutional policy, leadership, and governance; green infrastructure and enabling facilities; family, community, and multi-stakeholder engagement; and monitoring, evaluation, and continuous improvement. A total of 54 indicators are specified across these domains. The framework extends prior work by shifting the unit of analysis beyond student outcomes to the institutional and teacher-level conditions that the reviewed literature consistently identifies as decisive for implementation, and it offers a conceptual foundation for the development of assessment instruments and policy frameworks.
Keywords: *eco-theology; education; framework; indicators; madrasah*
Abbreviations: DOAJ, Directory of Open Access Journals; MA, Madrasah Aliyah; MI, Madrasah Ibtidaiyah; MTs, Madrasah Tsanawiyah; PAI, Pendidikan Agama Islam (Islamic Religious Education); PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

INTRODUCTION

The global ecological crisis can no longer be reduced to a technical or economic problem; it has become a moral and spiritual one [1]. Environmental degradation on the present scale is rooted in an anthropocentric worldview in which human beings claim absolute authority to exploit nature without regard for its preservation [2]. If the crisis is in part a manifestation of the spiritual condition of modern humanity, then the response required extends beyond technology to the restoration of ethical awareness through religion [3], [4].

Islamic eco-theology offers such a response, treating the preservation of nature as an act of worship and a religious responsibility [5]. It rests on three theological pillars: tawhid, the unity and order of all creation under the sovereignty of God; khilafah, the human mandate as steward and guardian of the earth rather than its exploiter; and mizan, the maintenance of cosmic balance and the divine ecological order.

This paradigm carries particular weight in Indonesia. A country of exceptional biodiversity that simultaneously faces high rates of deforestation and pollution, and home to the world's largest Muslim population, Indonesia is a setting in which religious teaching and environmental sustainability can be brought together to strategic effect [6]. That convergence has begun to enter national policy: the Ministry of Religious Affairs has published a dedicated volume on eco-theology [7], positioning the paradigm not only as guidance for domestic education but as Indonesia's contribution to the global response to climate change.

Islamic educational institutions, and madrasahs and pesantren in particular, are central to realising that vision [8]. They function not merely as centres for transmitting doctrine but as institutions capable of combining spiritual formation with environmental education. Islamic education offers a distinctive pedagogical pathway in which care for nature is framed as the actualisation of a divine trust in daily life [9]. Grounding environmental education in faith should therefore mean more than cognitive transfer; it

should mean the systemic internalisation of eco-theological values into curriculum, habituation, and the assessment of student character.

Academic interest in Islamic eco-theology has grown quickly, yet its practical operationalisation in formal institutions remains substantially underexplored. Existing reviews are dominated by theological and normative exposition and give insufficient attention to pedagogical strategy or to measurable institutional frameworks [10], [11]. In practice, environmentally friendly initiatives in Islamic schools are frequently ad hoc, dependent on a small number of individuals, and imperfectly aligned with Islamic doctrine [12], [13], [14]. The principal gap is the continued absence of articulated indicators for evaluating implementation in the field. Without structured measurement it is very difficult to assess institutional readiness, or to establish how far theological principles have been translated into actual school practice and culture.

This study therefore aims to formulate a set of indicators for the implementation of eco-theology in educational settings, with particular reference to madrasahs and pesantren, so that education managers and policymakers can assess institutional readiness and measure the extent to which eco-theological principles are applied, from doctrinal foundation through to practical implementation in the field.

METHODS

Design

This study is a systematic literature review conducted in accordance with the PRISMA 2020 statement. The review question was framed as follows: which conditions, practices, and institutional arrangements does the empirical literature identify as constitutive of eco-theological implementation in Islamic educational settings, and how might these be expressed as assessable indicators? Because the aim was to construct a framework rather than to estimate an effect, the synthesis is qualitative and thematic. No meta-analysis was attempted and no formal risk-of-bias instrument was applied.

Information sources and search strategy

Three databases were searched: Lens.org, OpenAlex, and DOAJ. These were selected for their coverage of Indonesian and Southeast Asian journals, where the empirical literature on eco-theology in madrasah settings is concentrated and which is unevenly represented in Scopus and Web of Science. All searches were run on 25 August 2026.

In Lens.org and OpenAlex the query was ("Eco theology" OR Ecotheology) AND (school AND Education). In DOAJ the query was "Eco theology" AND (school AND Education); the disjunction was not required there because DOAJ’s term matching already returned records using the variants "ecotheology" and "eco-theology". In each database the result set was then narrowed using the platform's own filters, first to journal articles and then to the indexing window 2021 to 2026. Table 1 reports the record counts at each stage.

Table 1. Search Procedure and Record Counts by Database (search date 25 August 2026)

Stage	Lens.org	OpenAlex	DOAJ	Total
Records returned by query	313	79	28	420
After filtering to journal articles	230	66	28	324
After filtering to 2021 to 2026	118	64	27	209
Excluded at title: not relevant	69	21	13	103
Excluded at title: literature study	3	3	0	8
Excluded at title: not English or Bahasa Indonesia	3	0	0	3
Retained after title screening	43	40	12	95
Duplicates removed across databases				37
Assessed by abstract				58
Excluded at abstract				20
Included in the review				38

Note: Duplicate removal was carried out across the three result sets after title screening, so the per-database counts at the retention stage sum to 95 before de-duplication.

Eligibility criteria

Records were eligible if they were journal articles, were indexed within the window 2021 to 2026, were written in English or Bahasa Indonesia, reported primary empirical research, and addressed the

implementation of eco-theological or equivalent religiously grounded environmental values in an educational setting. Records were excluded if they were conceptual or literature-review papers without primary data, if the setting fell outside formal or non-formal education, if the source type could not be established as a peer-reviewed journal article, if no research method was reported, or if the publishing journal could not be verified.

The window is expressed as the year of indexing rather than the year of publication. This is deliberate: several eligible articles were released online first and carry a 2026 issue date while having entered the databases within the search window. Defining the criterion by indexing date retains these articles without distorting the flow of records.

Eligibility was assessed at title and then at abstract level. No separate full-text eligibility stage was carried out; full texts were obtained for all included records and used for data extraction rather than for a further round of exclusion. This is a deviation from the flow of records set out in the PRISMA 2020 flow diagram [15, p. 5, Figure 1], in which reports retrieved in full are assessed for eligibility as a distinct stage, and is reported here so that it can be weighed by the reader.

Selection process

The searches returned 420 records. Before screening, 96 were removed because they were not journal articles and a further 115 because they fell outside the window, leaving 209 records for title screening. Title screening excluded 114 records: 103 as not relevant to the topic, eight as literature studies, and three as not written in English or Bahasa Indonesia. Ninety-five records were retained, from which 37 duplicates were removed, leaving 58 records for abstract assessment. Abstract assessment excluded 20 records: seven literature studies, five on setting, five on source type, two for reporting no method, and one whose journal could not be verified. A total of 38 studies were included. The full flow is shown in Figure 1.

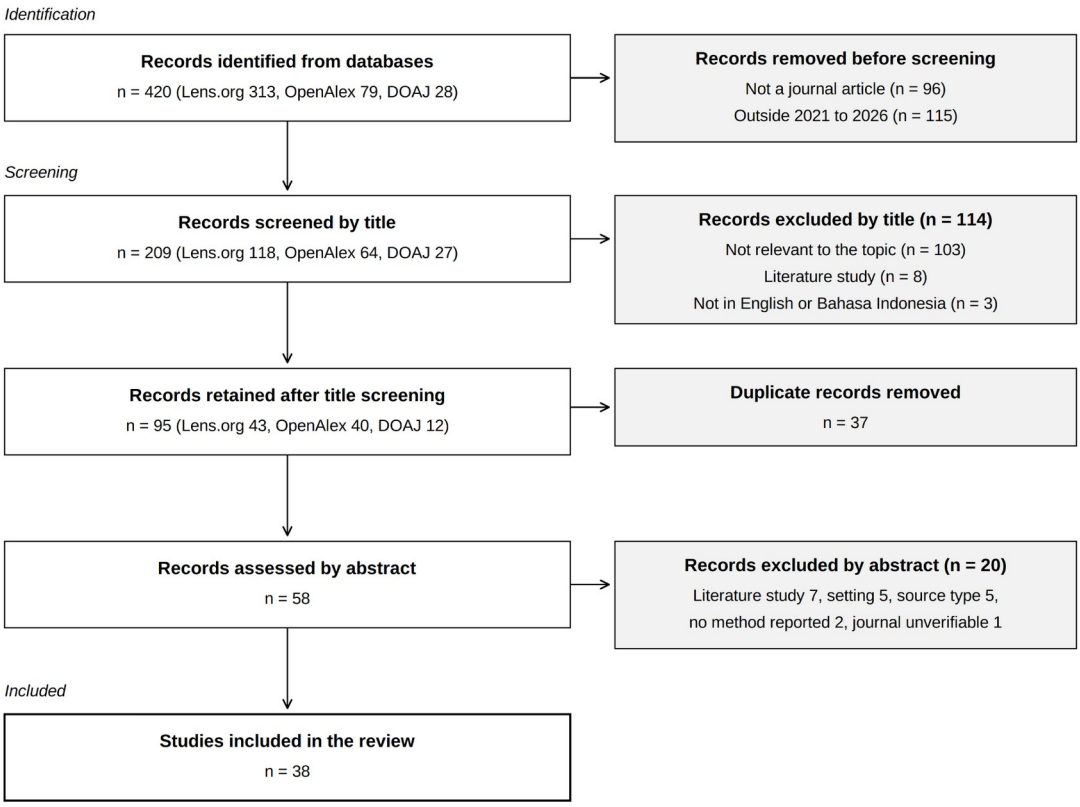

Figure 1. PRISMA 2020 flow diagram for the selection of studies. Diagram template adapted from Page et al. (2021, p. 5, Figure 1).

Data analysis

For each included study the following were extracted: full bibliographic details, year, research setting, research design and sample, and all reported findings bearing on the conditions or practices of eco-theological implementation. Study settings were verified against the full text of each article rather than against the title or abstract alone, since several articles name the author's institutional affiliation in the header while conducting fieldwork elsewhere.

Synthesis proceeded inductively. Findings were coded, clustered into candidate themes, and then consolidated into domains. A candidate theme was retained as a domain only where it recurred across

multiple independent studies rather than appearing in a single report; the nine domains reported below draw on between six and fifteen studies each, as set out in Table 3. Indicators were then written for each domain so that each is, in principle, verifiable within a school. Three modes of verification were specified, namely document inspection, observation, and interview, on two grounds: documentary evidence is conventionally used alongside interviews and observation to corroborate findings in qualitative inquiry [16, p. 28], and an indicator is only useful if it offers a simple and reliable means of measuring achievement [17, p. 25], which presumes that more than one source of evidence is available to substantiate it [17, p. 37].

RESULTS AND DISCUSSION

Corpus profile

Table 2 profiles the 38 included articles by year, research setting, and research design. The corpus is dominated by qualitative case studies in Javanese and Sumatran institutions, with a small number of quantitative, mixed-method, and development studies. Two features warrant note. First, 31 of the 38 articles carry a 2025 or 2026 date, so the evidence base is recent and in several cases still consolidating. Second, a substantial share of the corpus appears in journals with rapid publication cycles. This does not disqualify the findings, but the framework below should be read as a synthesis of an emerging literature rather than of a settled one.

Table 2. Profile of the 38 Reviewed Articles

Articles	Year	Research area	Type of research
Akbar, M., Rohman, D. A., Mustahdi, D., & Syahidah, S. (2026).	2026	SMP Mizani Wanajaya, Majalengka, West Java	Qualitative case study (observation, in-depth interview, documentation)
Aryanto, T., Na'imah, Prasetyo, S., & Shaleh. (2025).	2025	MTs Sunan Pandanaran, Yogyakarta	Qualitative descriptive
Ashar, Y. K., Indriani, F., Iqbal, M., Siregar, P. A., Safira, P., & Lauchan, A. M. (2025).	2025	Pesantren Uswatun Hasanah, Langkat, North Sumatra	Quasi-experimental, one-group pretest posttest (n = 30)
Azizah, N., & Faishol, L. (2025).	2025	MTs Pakis Cilongok, Banyumas, Central Java	Qualitative descriptive case study
Azizah, W., & Ahsani, E. L. F. (2026).	2026	MI Darul Ulum 02 Kudus, Central Java	Qualitative field research with attitude scale and response questionnaire (n = 29)
Cholil, S., & Parker, L. (2021).	2021	Franciscan Catholic senior high schools, Jakarta and Bekasi	Qualitative ethnographic fieldwork with student survey (n = 200)
Hamzan, & Rofiah, T. D. (2026).	2026	Elementary schools, Mataram City, West Nusa Tenggara	Qualitative, instructional design analysis (interview, observation, document)
Hasyim, M., Wijaya, M., Nurchayati, S., & Taubah, M. (2026).	2026	Official Arabic textbooks for Madrasah Aliyah, Indonesia (no single school site)	Document and content analysis (ecolinguistic coding)
Hidayati, R. E. (2026).	2026	MAN 1 Kota Malang, East Java	Qualitative case study (2 teachers, 12 students, 1 vice-principal, 6 observed sessions)
Ikhwansyah, M. F., Normuslim, & Hamdanah. (2025).	2025	SMK Kesehatan Muhammadiyah Palangka Raya, Central Kalimantan	Research and development (modified Borg & Gall, six stages)
Karman, Anwar, R., & Hakim, L. (2023).	2023	Pesantren Biharul Ulum Agroekologi (BUAP), Bogor, West Java	Qualitative field research (interview, observation)
Khotimah, K., & Susanti, S. S. (2026).	2026	SD Alam Azzahra, Way Jepara, East Lampung	Qualitative content analysis (6 informants, 2 months)
Laksono, P., & Milah, L. Z. (2025).	2025	MA Al-Manar Tengaran, Semarang Regency, Central Java	Qualitative case study with source and method triangulation
Marpaung, J. (2024).	2024	Pesantren in South Tapanuli, North Sumatra	Qualitative (direct observation and in-depth interview)
Martanti, F., & Maskur. (2025).	2025	SDN 1 Medani, Central Java	Qualitative case study (16 grade V students)
Maylawati, D. S., Slamet, C., Umana, M. K., Rifa'i, A. R., Mulyana, R., Ramdhani, M. A., & Syafi'i, S. (2026).	2026	Islamic schools (MI, MTs, MA) nationwide, Indonesia (EMIS sampling frame)	Quantitative data science; CRISP-DM, machine learning classification and sentiment analysis (n = 22,933)

Articles	Year	Research area	Type of research
Mu'min, U. A., Khutomi, B. M., & Bakar, A. A. (2025).	2025	SMPIT Sahabat Alam, Palabuhanratu, Sukabumi, West Java	Qualitative single-case study (2 teachers, 12 students, 4 weeks observation)
Munawir, Yani, A., & Syafi'i, I. (2026).	2026	MAN 7 Jombang, East Java	Qualitative case study (interview, observation, analysis of 24 lesson plans)
Mustofa, T., Nurhasan, Farida, N. A., Zahra, D. N., & Nurseha, A. (2025).	2025	Secondary schools, Karawang Regency, West Java	Qualitative case study (purposive, multiple schools)
Muttaqin, M. A., Sulaeman, & Fattah, A. (2026).	2026	SMPN 11 Makassar (Provincial Adiwiyata school), South Sulawesi	Qualitative case study (interview, observation, document analysis)
Muzammil, M., & Al-Asy'ari, M. K. H. (2025).	2025	Pesantren Bustanul Ulum Mlokorejo, Puger, Jember, East Java	Qualitative descriptive with thematic analysis
Nazar, I. A., Muhammad, F., Rachmawati, S., & Naim, D. M. (2025).	2025	KINARA Islamic Boarding School, Kuningan, West Java	Mixed methods (structured questionnaire scoring, observation checklist, SWOT analysis)
Prima, C., Abdurahman, I., & Jafar, A. (2026).	2026	Pesantren Minhajul Haq, Purwakarta, West Java	Qualitative Husserlian phenomenology; a modified Eco-Spiritual Efficacy Scale (n = 60) was used as a purposive screening instrument, not as an intervention and control design
Qamariah, S., Ilyasin, M., & Bahrani, B. (2025).	2025	Al-Hikmah Kindergarten, Kampung Ketupat, Samarinda, East Kalimantan	Qualitative case study (early childhood setting)
Rasyid, I., Zakiyah, Z., Lestari, S. I., & Akhyari, I. (2026).	2026	MTs Quranic Scientia, UIN Imam Bonjol Padang, West Sumatra	Qualitative intrinsic case study
Ratnasari, D., Putri, L. A., Widiandari, F., & Setiyawan, A. (2025).	2024	SDIT Alam Nurul Islam, Gamping, Sleman, Yogyakarta	Qualitative, Living Quran approach (sociological and phenomenological)
Rifa'i. (2026).	2026	Pesantren Nurul Jadid Paiton, Probolinggo, East Java	Qualitative case study (snowball sampling, approx. 20-25 participants)
Rinaldi, R., & Siregar, N. S. (2026).	2026	UPT SDN 064027, Medan, North Sumatra	Qualitative descriptive field research (Feb to Apr 2026)
Rohman, A., Kurniawan, E., Syifauddin, M., Muthohar, A., & Muhtamiroh, S. (2024).	2024	National PAI and character education curriculum, Indonesia (no single school site)	Curriculum and document analysis, literature based
Sabtina, D., & Mahariah. (2025).	2025	Azzakiyah Islamic School, North Sumatra	Qualitative phenomenological
Safei, A. A., Kusnawan, A., AS, E., & Aliyudin, M. (2025).	2025	Pesantren Al Ittifaq (Ciwidey, Bandung, West Java) and Pesantren Assalaam (Manado, North Sulawesi)	Qualitative comparative case study (two sites)
Sari, M. S., Anwar, R., Supiana, & Karman. (2026).	2026	SMP Daarut Tauhiid Boarding School, Bandung, West Java	Qualitative case study combined with library research
Suraijiah, Rusdiah, & Surawardi. (2025).	2025	Pesantren Darul Hijrah Putera, Martapura, South Kalimantan	Qualitative (15 participants; 3 months of interview, participatory observation, documentation)
Taufikin. (2025).	2025	Three Islamic elementary schools, Demak Regency, Central Java (MIN 4 Demak, SDN Batursari 5, SDN Batursari 6)	Qualitative case study (semi-structured interview, observation, document analysis)
Umam, K., Karim, A., & Dasuki, Moh. (2024).	2024	Pesantren Nurul Qornain, Jember, East Java	Qualitative, social construction framework (Berger and Luckmann)
Wahid, M. (2026).	2026	Pesantren Al-Amien Prenduan, Sumenep, Madura, East Java	Qualitative case study (interview, observation, documentation; expert content validity)
Yardlo, M., Muktafi, Mahzumi, F., Arifka, A., & Sudarman, M. A. (2024).	2024	Pesantren Langitan, Widang, Tuban, East Java	Participatory action research (FGD, policy formulation, dissemination, action)

Articles	Year	Research area	Type of research
Zahro, F. A., Mukni'ah, Nawangsari, D., & Rizal, S. (2026).	2026	SD Darus Sholah, Jember, East Java	Qualitative case study

Note: Research settings and designs were verified against the full text of each article. Where an article's header names only the author's affiliation, the setting reported here is the fieldwork site given in the article's methods section.

The framework

Table 3 sets out 54 indicators across nine domains. The number of independent articles supporting each domain ranges from six to fifteen. The subsections that follow explain the rationale for each domain and its relation to the evidence.

The indicators in Table 3 were not adopted from an existing instrument. Each was written by the authors as a paraphrase and synthesis of findings reported in the articles listed in the supporting articles column, and no indicator reproduces the wording of a source article. The domains and the indicators within them are therefore derived from the corpus rather than imposed upon it.

Table 3. Nine Domains and 54 Indicators of Eco-Theological Implementation

Domain	Indicators	Supporting articles
D1 Theological grounding and ecological worldview	1.1 Core Islamic ecological concepts (tawhid, khalifah fil-ardh, amanah, mizan, hifzh al-bi'ah, prohibition of fasad) are explicitly named in learning documents and in classroom teaching. 1.2 Environmental fiqh (fiqh al-bi'ah) or equivalent normative and legal material is taught. 1.3 Qur'anic and hadith texts are treated contextually and linked to concrete local ecological conditions, not cited verbatim as decoration. 1.4 Nature is framed as ayat kauniyah, a sign of the Creator with intrinsic value, and not solely as a resource for human use. 1.5 Anthropocentric misreadings are explicitly identified and corrected in teaching. 1.6 Learners can articulate the shift from an anthropocentric to an ecocentric or theocentric framing of the human and nature relationship.	Cholil & Parker [18]; Aryanto et al. [19]; Hamzan & Rofiah [20]; Karman et al. [21]; Sari et al. [22]; Azizah & Ahsani [23]; Ratnasari et al. [24]; Khotimah & Susanti [25]; Muttaqin et al. [26]; Muzammil & Al-Asy'ari [27]; Rinaldi & Siregar [28]; Rohman et al. [29]; Suraijiah et al. [30]; Umam et al. [31]; Yardlo et al. [32]
D2 Curriculum and learning design integration	2.1 Ecological learning objectives appear in formal curriculum documents across more than one subject. 2.2 Proportion of lesson plans containing explicit eco-theological learning indicators. 2.3 Dedicated teaching materials exist and are in use (modules, worksheets, media, games, digital platforms). 2.4 Assessment rubrics include environmental attitude or behaviour indicators. 2.5 Local wisdom and local ecological problems are used as curriculum content. 2.6 Integration extends into non-religious subjects such as science, chemistry, or language.	Hasyim et al. [33]; Hamzan & Rofiah [20]; Ikhwansyah et al. [14]; Mustofa et al. [34]; Martanti & Maskur [35]; Azizah & Ahsani [23]; Hidayati [36]; Munawir et al. [37]; Rasyid et al. [38]; Rohman et al. [29]
D3 Teacher capacity and pedagogical practice	3.1 Proportion of teachers who have received eco-theology-specific professional development. 3.2 Teachers report that adequate ready-to-use teaching material is available to them. 3.3 Use of project-based, problem-based, and experiential methods in eco-theological teaching. 3.4 Teacher modelling is observable and consistent with taught content. 3.5 Internal teacher forums or collaborative structures for eco-	Zahro et al. [39]; Mustofa et al. [34]; Akbar et al. [40]; Azizah & Ahsani [23]; Hidayati [36]; Mu'min et al. [41]; Munawir et al. [37]; Muttaqin et al. [26]; Rinaldi & Siregar [28]; Taufikin [42]

Domain	Indicators	Supporting articles
	theological pedagogy exist and meet. 3.6 Degree of variance between teachers in implementation quality.	
D4 Spiritual and affective internalisation	4.1 Structured tafakkur or tadabbur alam activity is scheduled and recurring, not incidental. 4.2 Muraqabah, dhikr, or equivalent reflective practice is explicitly linked to environmental themes. 4.3 Reflective journals, portfolios, or post-activity reflection sessions are in use. 4.4 Evidence of gratitude, ecological empathy, and affective response to environmental damage. 4.5 Learners can be located on the internalisation sequence from knowing, through feeling, to acting. 4.6 Environmental action is framed and understood by learners as worship rather than as rule compliance.	Ashar et al. [43]; Azizah & Faishol [44]; Ratnasari et al. [24]; Mu'min et al. [41]; Rinaldi & Siregar [28]; Sabtina & Mahariah [45]; Umam et al. [31]
D5 Ecological habituation, behaviour, and school culture	5.1 Routine ecological practices are established and operating (waste sorting, waste bank, energy and water conservation, plant care). 5.2 Collective ritualised activity involving the whole school community (for example Jumat Bersih or communal cleaning). 5.3 Student green roles, clubs, or peer-led programmes exist and are active. 5.4 Self-regulated behaviour occurs without instruction or supervision. 5.5 Visible cultural markers are present and current (slogans, class gardens, message boards, behaviour codes). 5.6 Behavioural consistency outside school (home and public space): the value action gap.	Aryanto et al. [19]; Zahro et al. [39]; Nazar et al. [46]; Akbar et al. [40]; Marpaung [47]; Muttaqin et al. [26]; Qamariah et al. [48]; Rinaldi & Siregar [28]; Sabtina & Mahariah [45]
D6 Institutional policy, leadership, and governance	6.1 Eco-theology or environmental commitment is named in the vision, mission, statutes, or annual plan. 6.2 Written school regulation operationalises the commitment (for example a single-use plastic ban or student behaviour guidelines). 6.3 A designated cross-subject eco-theology team or coordinator exists. 6.4 Leadership commitment is demonstrated through resource allocation and personal participation. 6.5 A budget line for environmental programmes exists and is spent. 6.6 Programmes continue across personnel change and are not dependent on named individuals.	Zahro et al. [39]; Mustofa et al. [34]; Akbar et al. [40]; Azizah & Ahsani [23]; Muttaqin et al. [26]; Muzammil & Al-Asy'ari [27]; Qamariah et al. [48]; Rifa'i [49]; Taufikin [42]; Wahid [50]
D7 Green infrastructure and enabling facilities	7.1 Green open space is adequate relative to enrolment. 7.2 Labelled waste separation stations and waste processing capacity are present and functioning. 7.3 Water saving and water reuse facilities are installed (for example reuse of ablution water). 7.4 Energy saving fixtures and visible controls are present and used. 7.5 Facilities are used as learning spaces, not only as utilities. 7.6 Infrastructure adequacy is rated independently rather than self-declared.	Zahro et al. [39]; Marpaung [47]; Muttaqin et al. [26]; Qamariah et al. [48]; Rifa'i [49]; Taufikin [42]
D8 Family, community, and multi-stakeholder engagement	8.1 Structured parent socialisation or joint school and family programmes exist.	Zahro et al. [39]; Ikhwansyah et al. [14]; Ratnasari et al. [24]; Laksono & Milah [51]; Marpaung [47]; Muttaqin et al.

Domain	Indicators	Supporting articles
	8.2 Active partnerships with NGOs, government agencies, or universities. 8.3 Community service or green da'wah outreach beyond the institution. 8.4 Local wisdom and local religious or community figures are mobilised as social capital. 8.5 Documented transfer of ecological practice into the surrounding community. 8.6 A mechanism exists to reinforce school values in the home environment.	[26]; Safei et al. [52]; Wahid [50]; Yardlo et al. [32]
D9 Monitoring, evaluation, and continuous improvement	9.1 A structured evaluation framework for eco-theological implementation exists. 9.2 A validated instrument is in use, with piloting and reliability reported. 9.3 Behavioural indicators are tracked quantitatively (waste volume, energy use, participation rates). 9.4 Measurement is repeated or longitudinal rather than one-off. 9.5 Results are classified into levels or benchmarked against a standard. 9.6 Evaluation findings demonstrably feed into planning and resource decisions.	Nazar et al. [46]; Akbar et al. [40]; Ashar et al. [43]; Azizah & Ahsani [23]; Laksono & Milah [51]; Maylawati et al. [53]; Muttaqin et al. [26]; Prima et al. [54]; Taufikin [42]

Note: D1 to D9 denote the nine domains. Supporting articles are those in the corpus whose findings bear directly on the indicators in that domain; an article may support more than one domain.

Domain 1: Theological grounding and ecological worldview

This domain establishes whether the institution possesses a coherent and correctly framed theological basis for environmental responsibility. It is the foundation on which every other domain rests, because eco-theology is distinguished from generic environmental education precisely by its normative source. The domain covers two things that the literature treats as inseparable: the presence of core doctrinal content, and the capacity to reason critically with that content.

The second part matters because the same doctrine that grounds stewardship can also be misread as licence to exploit. Karman et al. [21, p. 178] warn that the development of eco-theology within Muslim communities may itself be captured by an anthropocentric perspective, one fuelled by the perception that human beings are uniquely privileged creatures entitled to manage natural resources at will. Aryanto et al. [19] describe the corrective directly, reporting pedagogical strategies of contextual reinterpretation and prophetic example that reconstruct students' framing from an anthropocentric to an ecocentric one, and that shift motivation from extrinsic obedience to amanah understood as autonomous spiritual trust. An institution that teaches the vocabulary without correcting the misreading has not implemented eco-theology; it has implemented a theological gloss on business as usual.

Domain 2: Curriculum and learning design integration

This domain asks whether eco-theology has been written into the formal architecture of learning or whether it survives only as activity and campaign. The distinction matters for durability: Zahro et al. [39, p. 128] observe that a programme resting solely on individual initiative is vulnerable, and Mustofa et al. [34, p. 60] find that where integration is not anchored in curriculum documents the practice becomes sporadic and unstructured.

The domain is deliberately separated from teacher capacity because the two dissociate in practice. A madrasah may possess well-written modules that teachers are not equipped to deliver, or committed teachers working without any usable material. Evidence in the corpus points both ways, which is why they are scored apart. The domain also captures reach across subjects. Where eco-theology appears only in PAI, learners receive the signal that ecology is a religious topic rather than a lens; Hidayati [36] in chemistry, Hamzan and Rofiah [20] in primary science, and Rasyid et al. [38] in Arabic language demonstrate the alternative. Hasyim et al. [33] show the cost of the omission, finding that environmental themes appear only marginally in the official Madrasah Aliyah Arabic textbooks and are largely confined to descriptive references to school surroundings.

Domain 3: Teacher capacity and pedagogical practice

This is the domain the corpus identifies most consistently as the decisive constraint. Mustofa et al. [34] name limited resources, insufficient teacher training, and weak policy support as the obstacles to fuller

integration, and Taufikin [42, p. 24] reaches the same conclusion, recording gaps in training and a scarcity of usable materials alongside partial policy support. The recurring finding is that implementation quality varies more between teachers within one institution than it does between institutions; that variance is itself the diagnostic signal, which is why it appears here as an indicator in its own right.

The domain covers both capability, meaning whether the teacher has been trained and whether usable material exists, and enacted practice, meaning which methods are actually used and whether the teacher's own conduct matches what is taught. Teacher modelling is included here rather than under school culture because the corpus repeatedly identifies it as a pedagogical act with measurable effect on students. Hidayati [36] reports teachers functioning as role models through their own laboratory ethics and environmentally responsible behaviour, and Rinaldi and Siregar [28] place uswah hasanah at the centre of implementation at primary level, where imitation outweighs verbal instruction.

Domain 4: Spiritual and affective internalisation

This domain covers the mechanism by which doctrinal knowledge becomes motivation. It is included because the corpus repeatedly finds that cognitive understanding alone does not produce sustained ecological behaviour, and because eco-theology's distinctive claim is precisely that spiritual grounding supplies a more durable motive than technical or regulatory approaches.

The domain draws on a cluster of studies documenting structured reflective practice. Mu'min et al. [41, p. 312] describe a mindfulness-based programme in which participatory observation over four weeks with two teachers and 12 students traced gains in focus, inner calm, and spiritual reflection on Qur'anic verses concerning nature. Azizah and Faishol [44] report outdoor learning, observation of local flora and fauna, and nature reflection producing self-reflection, responsibility, and spiritual meaning-making. The domain also incorporates the three-stage internalisation sequence of value transformation, value transaction, and value transinternalisation reported by Sabtina and Mahariah [45, p. 21], which offers a usable developmental scale rather than a binary. The distinguishing outcome at the top of that scale is affective: learners report discomfort or a sense of moral responsibility when they witness environmental damage, without any external prompt.

Domain 5: Ecological habituation, behaviour, and school culture

This domain measures what learners actually do, and the cultural environment that sustains it. School culture is placed here rather than under governance because it operates at the level of daily practice and is reported on by the people who live in it, whereas formal policy is an institutional artefact assessed from documents.

The most important indicator in this domain is the last one. Muttaqin et al. [26, p. 120] report that students' ecological awareness tends to be inconsistent outside the school environment, and identify this as one of the two principal challenges facing implementation. Maylawati et al. [53] quantify the gap at scale, finding across 22,933 students that understanding of eco-theology is high while implementation remains only moderate. Habituation of this kind has produced situational compliance rather than habitus. Any instrument that measures only in-school behaviour will systematically overstate implementation, so the out-of-school measure is not optional.

Domain 6: Institutional policy, leadership, and governance

This domain assesses whether eco-theology has institutional standing. Taufikin [42, p. 24] characterises the typical situation bluntly: environmental initiatives are often ad hoc or personality driven, and policies are only partially supportive, which the study scores at 50% to 70%. Umam et al. [31] describe the converse pattern, a pesantren in which ecological values are realised in concrete and sustained practice through waste management, a health post, and the study of fiqh al-bi'ah, but are carried largely by tradition rather than by codified curriculum or governance.

The domain therefore looks for hard institutional evidence: named commitments in founding documents, written regulation, a designated cross-subject team, allocated budget, and leadership action that costs something. The final indicator, survivability across personnel change, is the practical test that the others are proxies for.

Domain 7: Green infrastructure and enabling facilities

This domain is kept separate from governance because the two dissociate empirically. Taufikin [42, p. 24] scores policy support at 50% to 70% in the same institutions where green space, waste stations, and water and energy controls are rated insufficient at or below 50%. Muttaqin et al. [26] document a school holding provincial Adiwiyata status that nonetheless reports limited facilities as one of its two main constraints. Merging the two domains would average that divergence away and destroy the diagnostic value.

The domain also carries a conceptual claim advanced in the corpus, that infrastructure should be treated as an active pedagogical agent rather than a passive facility. Rifa'i [49] frames sustainable infrastructure as constitutive of the green pesantren model rather than as a support for it, and Rinaldi and Siregar [28] give a concrete illustration in the use of containers to collect ablution water for plant conservation, where the physical arrangement is what converts intention into daily practice. The final indicator guards against self-assessment, which tends to be generous.

Domain 8: Family, community, and multi-stakeholder engagement

This domain addresses one of the most frequently cited causes of implementation failure in the corpus: values established at school decay when the home and community environment does not reinforce them. It is the structural counterpart to indicator 5.6, which measures the symptom. Cholil and Parker [18] put the problem plainly, finding that students identify as environmentalists and respect the environment but that their environmental practice is highly dependent on home life.

The corpus also documents the remedy. Muttaqin et al. [26] report that inconsistent out-of-school behaviour is addressed through partnerships and participatory programmes; Ratnasari et al. [24] describe Family Conservation Day and Parent Market Day as devices for drawing families into ownership of the surrounding environment. Pesantren cases are particularly instructive. Safei et al. [52] show transfer of practice outward through green da'wa, sustainable agriculture, and ecological awareness-building in the surrounding community, and Yardlo et al. [32] report participatory action research at Pesantren Langitan that moved from formulation to policy and dissemination. The domain is therefore not merely defensive; it can be a source of institutional impact.

Domain 9: Monitoring, evaluation, and continuous improvement

This domain is included because the corpus names its absence as the standing gap in the field. The evidence base for it therefore differs in kind from the others: it is derived in part from documented absence rather than from observed practice, which is legitimate grounds for inclusion in a readiness instrument but should be stated openly.

The corpus does contain constructive material. Ashar et al. [43, p. 78] report a one-group pretest and posttest design with 30 santri, recording a rise in mean attitude score from 26.60 to 36.10 with a p-value below .001, which demonstrates that short-cycle measurement of eco-theological outcomes is feasible. Maylawati et al. [53, p. 175] go further, classifying student implementation into four levels, low, moderate, high, and very high, using a validated 41-item instrument and ensemble learning, and propose the result as a maturity model. Nazar et al. [46] apply a scored programme checklist that yields an eco-pesantren score of 72% against ten programme criteria. These three approaches, respectively pre-post testing, classification into levels, and criterion-referenced scoring, inform indicators 9.2, 9.5, and 9.3.

CONCLUSION

This review set out to answer a practical question: what would it take to tell whether a madrasah has actually implemented eco-theology, as opposed to having adopted its vocabulary. Thematic synthesis of 38 empirical studies yields a nine-domain framework specified by 54 indicators, spanning theological grounding, curriculum design, teacher capacity, spiritual internalisation, habituation and culture, institutional governance, green infrastructure, community engagement, and monitoring and evaluation.

The framework's principal contribution is a shift in the unit of analysis. Most existing work measures eco-theological implementation through student outcomes, chiefly knowledge and attitude. The corpus reviewed here indicates that this is insufficient, because the conditions that determine whether those outcomes hold are institutional and pedagogical rather than individual. Teacher capacity emerges as the most consistently reported constraint; infrastructure dissociates from policy commitment often enough that the two must be scored apart; and the value-action gap is visible only when behaviour is measured outside the school gate.

Three implications follow for practice. First, an institutional readiness assessment should precede any programme design, since the corpus shows that identical curricula produce divergent results depending on teacher preparation and facility provision. Second, evaluation should be built in from the outset rather than retrofitted; the near-absence of structured evaluation frameworks in the corpus is the field's clearest gap. Third, family and community engagement should be treated as a core domain rather than as outreach, because it is the structural mechanism by which in-school values are either sustained or lost.

The study has limitations. Eligibility was assessed at title and abstract level without a separate full-text eligibility stage; screening and extraction were not independently duplicated; and the corpus is drawn from three databases whose coverage of Indonesian journals, while strong, is not exhaustive. The corpus is also weighted towards recent articles in journals with rapid publication cycles, which constrains how much

argumentative weight any single finding can bear. The framework is accordingly a synthesis of an emerging literature and a hypothesis for testing rather than a validated instrument.

Two lines of further work follow directly. The indicators require operationalisation into a scored instrument with reported reliability, piloted across a range of madrasah contexts. Thereafter, the framework's central claim is empirically testable: that institutional readiness, measured across these nine domains, predicts the sustainability of students' ecological attitudes, behaviours, and lifestyles beyond the boundaries of the school.

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