



Mapping the emerging landscape of green waqf: A scoping review of Islamic philanthropy for the environment

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ABSTRACT

Background: Green waqf refers to the utilization of Islamic endowments for environmental conservation while simultaneously generating socio-economic benefits for communities. Beyond its practical dimension, green waqf carries significant academic value as it bridges Islamic finance, sustainable development, and public policy. This study aims to synthesize and analyze existing literature on green waqf to provide a comprehensive understanding of its conceptual development and practical implementation. **Methods:** Employing a scoping review approach, this research systematically maps the evolution of green waqf studies, identifies research gaps, and offers policy insights for optimizing its implementation. The analysis draws on secondary data from English-language scholarly publications published between 2015 and 2025, retrieved primarily from Google Scholar and Scopus databases, with an emphasis on open-access sources. Following the PRISMA-ScR guidelines to ensure transparency and accountability. **Findings:** The review identifies five thematic domains: (1) Conceptual and Theoretical Foundations of Green Waqf, (2) Descriptive-Analytical Studies (Practice Mapping), (3) Practical and Model Implementation, (4) Governance, Regulation, and Institutional Framework, and (5) Public Awareness, Education, and Socio-Religious Engagement. Findings reveal that research on green waqf remains dominated by conceptual studies, mainly focusing on foundational frameworks, strategic formulations, and proposed models, while empirical analyses remain scarce. **Conclusion:** Despite widespread acknowledgment of green waqf's strategic potential to address socio-environmental challenges, its realization is hindered by institutional limitations, human resource capacity, regulatory constraints, and low public awareness. Strengthening the green waqf ecosystem therefore requires cross-sectoral policy harmonization among religious, forestry, energy, and financial institutions. **Novelty/Originality of this article:** The novelty of this study lies in its comprehensive mapping of green waqf research over the past decade, elucidating five thematic domains that clarify both theoretical and practical trajectories of green waqf development.

KEYWORDS: environmental waqf; green waqf; Islamic green finance; Islamic philanthropy.

1. Introduction

Waqf is one of the most significant Islamic social finance instruments with a profound historical role in the development of Islamic civilization. During the classical era, particularly under the Ottoman Empire, waqf functioned as a public financial mechanism that contributed substantially to the provision of social infrastructure such as schools, hospitals, and micro-enterprises (Mohamed et al., 2018; Quddus & Hasib, 2023). Over time, the concept and practice of waqf have evolved toward more modern forms, aiming to address various socio-economic challenges and enhance community welfare (Jafar et al., 2025). Waqf-based empowerment programs have also demonstrated alignment with the

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Sustainable Development Goals (SDGs) (Abdullah, 2018; Alasmari & Al-daeir, 2025). Through a maqasid al-shariah perspective, Rusydiana et al. (2024) emphasized that waqf holds great potential in supporting environmental sustainability. This approach extends the function of waqf from a purely social mechanism to a form of social investment that promotes green infrastructure and social well-being. Accordingly, developing innovative waqf models is a strategic effort to strengthen the foundational dimensions of welfare and sustainability in Muslim societies.

Islamic teachings comprehensively emphasize human responsibility toward all creations of Allah, not only fellow humans but also animals, plants, and the natural environment. This universal principle reflects Islam's essence as rahmatan li al-'alamin (a mercy to all creation). Within this ethical framework, the green waqf paradigm emerges as an innovative interpretation of traditional waqf, oriented toward environmental conservation and sustainable development. A growing number of studies in Islamic economics have proposed green waqf as a viable instrument to address environmental issues (Ibrahim, 2023; Jannah et al., 2024; Othman et al., 2025). Malahayati and Anggraeni (2025) further demonstrated that waqf can serve as a bridge linking Islamic ethical values with the global sustainability agenda. Similarly, Roslan (2024) highlighted the potential of waqf in sustainable resource management, particularly its contribution to addressing the clean water crisis.

Numerous studies suggest that waqf holds considerable promise as an innovative financial instrument for environmental and climate change initiatives (Ali & Kassim, 2021). Over the past decade, the implementation of green waqf has notably progressed in Indonesia and Malaysia, two nations that have emerged as leading contributors to the global waqf literature (Alshater et al., 2022; Qurrata et al., 2024). The expanding body of research on environmental waqf signifies a new direction in Islamic philanthropy, integrating maqasid al-shariah with environmental sustainability. However, existing bibliometric analyses indicate that research on green waqf remains fragmented and nascent, lacking a unified conceptual framework. Rahayu and Irfany (2022) identified approximately 30 Scopus-indexed articles between 2006 and 2021 that explicitly addressed waqf and environmental issues. Although the number of publications has increased since 2015, the volume remains relatively low, highlighting the need for further exploration into the integration of waqf with sustainability concerns.

Sukmana (2023) corroborated this observation, demonstrating a steady increase in research on waqf and sustainability within Islamic economics from 2003 to 2021. Similarly, Uluyol et al. (2021) observed that publications linking waqf and environmental issues began to emerge around 2008, coinciding with the global rise of Islamic banking. Notably, studies on waqf as a poverty-alleviation instrument only gained prominence later, around 2014 (Uluyol et al., 2021). Ecological interpretations of waqf have also expanded, as exemplified by the concept of waqf forests discussed by Ningsih (2021). Her study found only 70 publications (1986–2021) specifically examining forest waqf or forest management through endowment mechanisms. Notably, the United States and Australia were among the most active contributors in this field, suggesting that environmental endowment approaches possess universal relevance beyond the Islamic context.

Green waqf refers to the dedication of assets, such as land, forests, or cash, under Islamic law for long-term environmental conservation and community welfare (Hasan & Syahrudin, 2022; Mahsun, Djalaluddin, et al., 2022; Restiyani et al., 2023; Rusydiana et al., 2023; Rusydiana, 2023). Unlike conventional waqf, which often supports mosques or social facilities, green waqf emphasizes ecological projects such as afforestation, renewable energy, waste management, and biodiversity conservation (Yavarpanah, 2025; Hatimah et al., 2023; Mahsun et al., 2022). Its mechanisms may take various forms, including cash waqf, land or forest waqf, and community empowerment through environmentally sustainable asset management (Anwar et al., 2025; N et al., 2025; Restiyani et al., 2023). Emerging initiatives include the integration of forest waqf with carbon trading in several Indonesian enterprises (Ali et al., 2025), the development of Tamanu-based green waqf projects (Asih

et al., 2024; Fikri & Andrean, 2023), and the management of forest waqf programs in regions such as Bogor, Indonesia (Ali & Kassim, 2021; Jannah et al., 2021; Restiyani et al., 2023).

Conceptually, green waqf represents an innovative adaptation of the classical waqf, with a focus on ecological preservation. This model is consistent with the circular economy approach and aligns with several Sustainable Development Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities), Goal 13 (Climate Action), and Goal 15 (Life on Land) (Malaab, 2024; Rusydiana et al., 2023). The potential for the development of green waqf in Muslim-majority countries is substantial, offering a faith-based solution to environmental challenges. However, the existing literature is limited and fragmented. Most studies concentrate on conceptual discussions or the opportunities for waqf in environmental and renewable energy contexts (Ali & Kassim, 2021; Hatimah et al., 2023; Maulida & Rusydiana, 2025), such as clean water provision, productive plantation initiatives, and forest conservation (A. Ibrahim, 2023; Jannah et al., 2021; Malahayati & Anggraeni, 2025; Restiyani et al., 2023). Other studies highlight managerial, regulatory, and transparency challenges (Afrianty et al., 2024; Alshater et al., 2022; Jafar et al., 2025).

Recent research has also examined specific aspects such as coastal development through mangrove-based waqf (Annisa Qurrata et al., 2024), behavioral analysis of waqf motivation influenced by knowledge and subjective norms (Huda et al., 2024), and the significance of digitalization and regulatory synergy in green waqf implementation (Saputra, 2025). Meanwhile, Maulida and Rusydiana (2025) observed that green waqf and sustainable agriculture have received a positive image in social media discourse, indicating rising public awareness of environmental issues in Islamic philanthropy. Nevertheless, most of these studies have yet to provide a comprehensive mapping of the academic and practical discourse on green waqf. In the context of accelerating climate change and environmental crises, green waqf holds an important epistemic position, reaffirming Islam's contribution to the global sustainability discourse.

Beyond its practical relevance in Islamic philanthropy management, green waqf research carries substantial academic value by bridging Islamic finance, sustainability economics, and public policy. The fragmented and predominantly conceptual nature of current studies underscores the need for evidence-based synthesis through systematic mapping. Such an approach ensures that the discourse on green waqf transcends normative idealism and evolves into an applicable analytical framework. There is thus a pressing need to conduct a comprehensive synthesis of existing literature to understand the conceptual and practical evolution of green waqf. This mapping is crucial not only for identifying key themes and trends but also for uncovering knowledge gaps that can inform future research and environmental policy development.

Accordingly, this study aims to explore the extent of conceptual, discursive, and practical development in green waqf research. Employing a scoping review methodology, this study contributes methodologically by integrating literature across multiple disciplines, Islamic philanthropy, sustainable finance, and green development. Specifically, the objectives of this study are to: (1) Map the evolution of green waqf within academic literature, (2) Identify research gaps for future theoretical and practical advancement; and (3) Provide policy recommendations to optimize the implementation of green waqf in addressing environmental challenges.

2. Methods

2.1 Research methodology

This study employs a scoping review methodology to systematically map the evolution of the concept and implementation of green waqf within the academic literature. This method is particularly suitable for comprehensively examining and synthesizing a wide range of studies with diverse methodological approaches (Arksey & O'Malley, 2005; Sucharew & Macaluso, 2019; Tricco et al., 2016). It enables the identification of key themes,

conceptual trends, and knowledge gaps, while also providing strategic insights for future research and policy development.

A key strength of the scoping review lies in its flexibility, as it does not restrict the analysis to a single methodological design while maintaining systematic rigor in mapping the literature (Arksey & O'Malley, 2005; Westphaln et al., 2021). However, this approach has limitations, particularly in its inability to critically assess the methodological quality of individual studies in depth, as typically conducted in systematic reviews or meta-analyses (Munn et al., 2018; Tricco et al., 2018). Despite this limitation, the method remains appropriate for generating a broad conceptual framework and capturing the development of an emerging research field.

2.2. Research framework and review procedure

The scoping review procedure in this study follows the framework proposed by Arksey and O'Malley (2005), which consists of four main stages: (1) identifying research questions and objectives, (2) identifying relevant studies, (3) selecting studies based on predefined criteria, and (4) analyzing and synthesizing the findings. To ensure transparency, consistency, and replicability, this study adopts the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco et al., 2018). These guidelines structure the reporting process and enhance the methodological rigor of the review.

2.3 Data sources and search strategy

Due to limited access to subscription-based databases, this study adopts an open-access search strategy to maintain inclusivity and transparency. The literature search was conducted between September and October 2025 using two primary databases: Google Scholar and Scopus, selected for their broad coverage of peer-reviewed and indexed publications. The search was limited to publications from 2015 to 2025 to capture the rise of sustainability discourse in Islamic finance following the adoption of the Sustainable Development Goals (SDGs) in 2015. Literature retrieval was supported by Publish or Perish software. The search employed a combination of keywords, including "green waqf", "Islamic green finance", "sustainable", "environmental", "renewable", "climate", and "conservation". These keywords were derived from the conceptual understanding of green waqf as the utilization of waqf for environmental sustainability with socio-economic impact.

2.4 Study selection criteria and data analysis

This study applied strict inclusion and exclusion criteria to ensure the relevance and quality of the selected literature. The inclusion criteria were: (1) studies addressing green waqf or the role of waqf in environmental sustainability; (2) publications in peer-reviewed journals, indexed conference proceedings, or institutional reports; and (3) full-text availability in English. The exclusion criteria included: (1) studies not relevant to green waqf or environmental issues; (2) non-academic sources such as news articles or blogs; (3) incomplete or inaccessible documents; and (4) publications in languages other than English.

This study utilized Rayyan, an artificial intelligence-based tool, to support the screening and management of literature. The tool facilitated the identification, categorization, and exclusion of irrelevant records based on the predefined criteria. During the data charting phase, each selected study was systematically coded using a standardized data extraction form to capture key information. The collected data were then analyzed using thematic and descriptive approaches to identify patterns, research trends, and gaps in the existing literature.

3. Results and Discussion

This section presents the mapping results of green waqf literature based on the scoping review framework. The screening process was conducted through multiple sequential stages, beginning with an initial review of titles and keywords, followed by abstract screening, and concluding with a full-text evaluation (Tricco et al., 2018), ensuring methodological transparency and consistency. The initial search yielded 819 records, comprising 569 from Google Scholar and 250 from Scopus. After duplicate removal, 729 unique records remained. As shown in Figure 1, these records underwent a rigorous and systematic screening process based on their titles and abstracts, followed by a comprehensive full-text assessment. Applying the predetermined inclusion and exclusion criteria resulted in 45 studies deemed relevant to the objectives of this research.

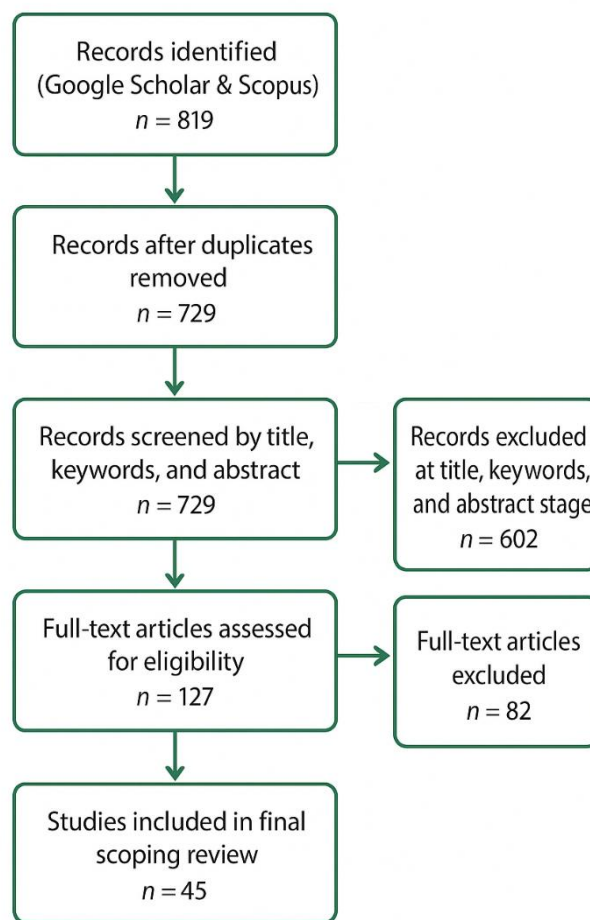


Fig. 1. PRISMA flowchart of the screening process

A thorough review of these 45 studies was conducted to systematize their central themes and major findings. Based on thematic synthesis, the selected literature was categorized into five major themes, enabling a structured mapping of research areas that have shaped the discourse on green waqf: (1) Conceptual and Theoretical Foundations of Green Waqf; (2) Descriptive–Analytical Studies (Practice Mapping); (3) Practical and Model Implementation; (4) Governance, Regulation, and Institutional Framework; and (5) Public Awareness, Education, and Socio-Religious Engagement. It is important to note that this thematic classification was not strictly exclusive; several studies overlapped across categories. For instance, Hatimah et al., (2023) primarily focused on conceptual construction but also incorporated an applied literature analysis. Similarly, Asih et al., (2024) and Fikri and Andrean (2023) discussed the Tamanu-based green waqf model

within both practical and governance dimensions. Nevertheless, the classification remains contingent upon the most prominent subject addressed within the article.

3.1 Conceptual and theoretical foundations of green waqf

A total of twenty-four papers were reviewed, predominantly focusing on the development of conceptual frameworks and proposed models of green waqf. Much of the literature situates green waqf within broader normative paradigms, particularly its alignment with maqasid al-Shari'ah and the Sustainable Development Goals (SDGs), thereby framing it as both a religiously grounded and globally relevant instrument. Beyond this alignment, the studies also elaborate on the conceptual foundations of green waqf, emphasizing its theoretical justification as a form of Islamic philanthropy designed to respond to contemporary environmental challenges.

The literature collectively repositions waqf beyond its traditional socio-economic domain toward a broader role in environmental sustainability (Hatimah et al., 2023; Othman et al., 2025; Riani, 2023; Raniah & Rohim, 2025; Rusydiana et al., 2023; Shahmi et al., 2025). Ibrahim A. J. (2023) and (2022) identified inefficiencies in energy utilization across 30 countries with Islamic banking institutions and proposed community-based green waqf as part of the Islamic circular economy framework, especially for rural development. From a jurisprudential perspective, Fedro and Ekayani (2024) provided a fiqh-based framework for implementing productive forest waqf aligned with social welfare and environmental objectives. Other theoretical explorations examined the potential of green waqf in addressing issues such as clean water access, climate change mitigation, mangrove restoration, and forest conservation (Muhammad et al., 2025; Wulansari, 2025; Shafiai, 2023).

The emergence of digital and financial innovations in green waqf is another significant conceptual development. Fikri and Andrian (2023) proposed a Sharia crowdfunding platform as a financing mechanism for green projects, integrating Islamic social finance with modern digital systems to enhance efficiency and inclusion. This direction aligns with Ningsih (2021), who emphasized the necessity of technological adaptation in future waqf-based resource management. Most studies within this category conceptualized green waqf as an Islamic philanthropic tool capable of addressing environmental crises such as deforestation, water scarcity, and climate degradation, reinforcing its potential to advance ecological and social welfare simultaneously (Malaab, 2024; N et al., 2025). However, the literature remains largely normative and conceptual, emphasizing theoretical frameworks rather than empirical validation. Financial modeling for green waqf, though frequently discussed, also lacks quantitative assessment.

This reflects a persistent research gap between conceptual idealism and practical application, suggesting that the green waqf discourse remains in its formative stage following the introduction of environmental themes in the 2015 UN SDGs (Dirie et al., 2023; Rusydiana et al., 2024). Nevertheless, the majority of studies on green waqf remain predominantly normative and conceptual, indicating that current research is still oriented toward concept-building rather than evidence-based analysis. This is particularly evident in the discussion of financial models for green waqf, which largely remain theoretical, as reflected in the work of Fikri and Andrian (2023).

Consequently, it must be acknowledged that scholarly inquiry into green waqf has yet to reach a stage of extensive empirical validation, particularly regarding its effectiveness, associated risks, and alignment with both shariah principles and economic sustainability. This highlights a persistent gap between conceptual idealism and field-level implementation, where most studies are confined to proposing theoretical frameworks, model formulations, or strategic approaches without substantial empirical substantiation. Such a condition may be attributed to the relatively recent emergence of green waqf as an innovative response to environmental issues following the integration of sustainability agendas within the United Nations Sustainable Development Goals (SDGs) framework in 2015 (Dirie et al., 2023; Rusydiana et al., 2024).

3.2 Descriptive–analytical studies (practice mapping)

This category included nine studies employing literature review or descriptive–analytical approaches to map green waqf practices and discourses. These studies reviewed both theoretical and practical works covering a wide temporal range, from 1986 to 2006 (Anwar et al., 2025; Ningsih, 2021; Rahayu & Irfany, 2022; Sukmana et al., 2024). Two studies specifically explored the use of Tamanu trees as a model for green waqf implementation (Asih et al., 2024; Fikri & Andrean, 2023). Others examined the role of green waqf as an instrument for environmental conservation using mixed-method approaches, combining literature synthesis with empirical observation of waqf forest management in Indonesia (Malahayati & Anggraeni, 2025). Furthermore, the study conducted by Mahsun et al., (2022) revealed several green waqf practices characterized by suboptimal governance structures and management performance

Within this category, several studies employed a literature review approach to map the conceptualization and practices of green waqf. These studies have played an important role in identifying the intellectual direction of the discourse; however, most remain largely descriptive and have yet to explore the micro-level determinants of successful implementation, such as institutional efficiency, community participation, or the effectiveness of waqf fund allocation. Although some attempts have been made to link green waqf with real-world practices, such as forest management and Tamanu-based plantation projects, such research remains limited in number. Therefore, a paradigm shift toward analytical–empirical approaches is needed to assess the socio-environmental impacts of green waqf implementation. In essence, the thematic scope of this research cluster closely aligns with that of the first category, focusing primarily on the conceptual dimensions of green waqf, despite the inclusion of some secondary data derived from observed program implementations.

3.3 Practical and model implementation

A total of seven articles were classified within this category. Several studies focused on the implementation of forest waqf initiatives in Indonesia, emphasizing their dual impact on environmental conservation and socio-economic empowerment. For instance, the study on the Bogor Waqf Forest highlighted not only its contribution to community economic and social empowerment but also its role in forest preservation and the provision of clean water and sanitation for surrounding areas (Fathurrahman & Rahmawati, 2023; Jannah et al., 2021). Another study, also examining the Bogor Waqf Forest, discussed optimal forest management through various agroforestry programs (Restiyani et al., 2023). Moreover, mosque-based green waqf initiatives employing greenhouse technology have demonstrated the potential to empower local communities while simultaneously supporting mosque operational sustainability (Fikri, 2024). However, the utilization of Muhammadiyah’s waqf land assets in Bojonegoro under the green waqf framework remains suboptimal (Setiyowati et al., 2025), although a conceptual and practical shift toward environmental sustainability-oriented waqf programs has begun to take shape.

Several articles in this category highlight diverse implementations of green waqf across Indonesia. The data indicate concrete efforts to integrate Islamic values with environmental and social sustainability objectives. A key focus has been the management of waqf forests, particularly in Bogor, which frequently serves as a prominent reference point in productive green waqf research (Fathurrahman & Rahmawati, 2023; Restiyani et al., 2023). These studies affirm that waqf holds strategic potential in addressing Indonesia’s socio-environmental challenges, especially when managed within a sustainable development framework that involves multi-sectoral collaboration.

Furthermore, several studies emphasize that integrating waqf into sustainable development strategies can significantly enhance environmental and social governance (Fathurrahman & Rahmawati, 2023; Malahayati & Anggraeni, 2025; Restiyani et al., 2023). Recent findings reveal measurable improvements in waqf governance and management

quality, shifting from “poor” to “good” between 2020 and 2023 (Malahayati & Anggraeni, 2025). This progression reflects increased transparency, operational efficiency, and institutional awareness in waqf asset management. However, the same study also identified regional disparities in the certification and allocation of waqf land across provinces, indicating that the optimization of green waqf requires adaptive, context-specific policy interventions. Additionally, policy reform, institutional capacity-building of nazhir, and innovative financing mechanisms are essential prerequisites for unlocking the broader transformational potential of waqf in sustainable development.

Furthermore, the management of the Bogor waqf forest demonstrates an effective collaboration between waqf institutions, government agencies, and local communities. It is noteworthy that the management adopts an integrated Islamic social finance scheme, comprising zakat, infaq, sadaqah, and waqf, to fund environmentally productive activities. Collaborative partnerships with governmental bodies such as BAZNAS and the Ministry of Religious Affairs have strengthened governance structures and enhanced the economic sustainability of the projects.

A recent notable innovation identified in the literature is the potential role of waqf-based forests in carbon trading (Ali et al., 2025). The study outlines two principal mechanisms for waqf participation in carbon markets: first, carbon trading through the National Registry System for Climate Change Control (SRN-PPI) platform, which involves state oversight for validation and certification; and second, a direct business-to-business (B2B) model that operates without state intervention. These findings highlight the expanding potential of green waqf to position Islamic social finance not only as a socio-environmental instrument but also as a key participant in the rapidly growing global carbon market, thereby contributing to climate change mitigation efforts.

3.4 Governance, regulation, and institutional framework

Five scholarly articles predominantly investigate this subject. This theme included studies addressing regulatory, managerial, and institutional dimensions of green waqf. Several focused on internal human resource management and program models (Asih et al., 2024; Murtadha, 2025), while others emphasized regulatory reform and digitalization to enhance waqf efficiency (Saputra, 2025). Irfany and Ningsih (2023) demonstrated that optimizing cash waqf management significantly contributes to sustainability-oriented development. Jannah, Sarkawi, Othman, et al., (2024) identified multiple determinants of waqf forest management effectiveness, including legal, ecological, socio-economic, and aesthetic dimensions. Collectively, these studies reveal institutional fragility as a key challenge—weak legal frameworks, limited managerial capacity, and insufficient cross-sectoral collaboration hinder optimal outcomes. The need for integrated governance frameworks involving religious authorities, waqf bodies, and Islamic financial regulators is evident (Ali & Kassim, 2021).

The foregoing studies indicate that institutional and governance challenges remain among the most critical weaknesses within the green waqf ecosystem. Non-adaptive regulations, limited managerial capacity among nazhir (waqf managers), and insufficient inter-institutional synergy have significantly hindered the optimization of green waqf potential. Previous studies emphasize the importance of multi-stakeholder collaboration, spanning policymakers, professionals, local communities, and volunteers (Ali & Kassim, 2021), as well as the necessity of innovation, legal instruments, and fatwa-based regulations to enhance the effectiveness of green waqf initiatives (Irfany et al., 2023).

Although efforts toward digitalization and fatwa-based legitimization have emerged to strengthen the governance of green waqf, existing studies reveal that these processes remain suboptimal. This underscores the urgent need for an integrated policy framework that aligns religious authorities, waqf institutions, and Islamic financial regulators under a unified governance system oriented toward sustainability. Consistent with this view, Restiyani (2023) found that the management of the Bogor Waqf Forest successfully improved both productivity and sustainability through collaboration with local

communities and diverse organizations. Cross-sectoral engagement, encompassing governmental bodies, civil society, and waqf management institutions, thus continues to play a pivotal role in realizing the full potential of green waqf programs.

3.5 Public awareness, education, and socio-religious engagement

Three studies examined various aspects of public awareness related to green waqf. Collectively, these works identify several dominant themes, including determinants of community participation, the influence of knowledge and attitudes, as well as the roles of social norms and perceived behavioral control in shaping donor or waqif engagement (Rachmad & Akbar, 2025; Huda et al., 2024; Nurfajariyati et al., 2025). Consistent with these findings, Rachmad & Akbar (2025) revealed that knowledge and subjective norms significantly influence participation in green waqf programs. Subjective norms, in turn, may be shaped by individual religiosity, given that waqf is inherently rooted in Islamic teachings. This notion is reinforced by Huda and Trianto (2025), who found that religiosity contributes positively to individuals' willingness to donate. Their study also reported relatively high levels of knowledge regarding the mechanisms of cash waqf in green waqf programs, suggesting a solid foundation for broader future participation.

Empirical evidence further indicates that public awareness of the green waqf concept in Indonesia has begun to develop, albeit still concentrated among academic circles and certain communities. Moreover, environmental knowledge plays an important role in shaping positive attitudes toward donation-based sustainability initiatives (Nurfajariyati et al., 2025). The same study also emphasizes that perceived behavioral control and social norms influence engagement in land restoration activities. These findings suggest that although social and religious values provide motivational support, societal awareness and engagement in green waqf practices remain limited. The weak influence of social norms further implies that the green waqf movement has yet to achieve strong social legitimacy within the wider community.

Green waqf remains a relatively new concept in Indonesia, and its development faces numerous challenges, one of the most critical being donor participation. Several factors influence individuals' willingness and intention to donate, including attitudes, social norms, trust, and knowledge about waqf instruments. Although religiosity exerts a measurable influence, its effect tends to be indirect, operating primarily through the formation of positive attitudes toward green waqf rather than serving as a dominant independent determinant (Nurfajariyati et al., 2025). Educational initiatives, information dissemination, and the active involvement of religious institutions are therefore key in broadening public understanding of green waqf. Efforts to enhance green waqf literacy, through religious preaching (dakwah), formal education, and digital platforms, should be strengthened to transform positive attitudes and participation intentions into tangible behavioral actions. In other words, public awareness and socio-religious participation remain the prevailing dimensions at this stage, requiring systematic support from policy frameworks, religious institutions, and media engagement to realize a more widespread implementation of green waqf initiatives.

Table 1. Classification of reviewed studies by thematic domains of green waqf research

Topic	Label	Title	Year
1	Conceptual and Theoretical Foundations of Green Waqf	An Analysis of Green Waqf as an Instrument for Sustainable Development	2025
		Blue Waqf Framework for Blue Forest Sustainability: A Conceptual Framework	2024
		Developing Green Waqf Model for Environmental Issues	2023
		Development of sustainable Tamanu industry in Indonesia based on the green waqf model through sharia crowdfunding platforms	2023

	Digital Green Waqf: A Systematic Literature Review on Sustainable Islamic Philanthropy in the Digital Era	2025
	Energy Waqf and the Environmental Crisis: Advancing Islamic Philanthropy for Sustainability	2025
	Environmentally Friendly Waqf Model: A Response to Sustainable Economic Development and the Presence of a Circular Economy	2025
	Exploring the Potential Benefits of Tamanu for the Green Waqf Project: Economic, Social, and Environmental Perspectives	2025
	Green Economy and Green Waqf Opportunities of Digital Assets	2023
	Green waqf implementation strategy as an acceleration of green project funding: A case study of Rongkop Gunungkidul special region of Yogyakarta	2025
	Green Waqf Model for Sustainable Waste Management: A Respond to the Economic and Environmental Development	2024
	Green Waqf: The Integration of Islamic Social Finance and green financing	2024
	Integrated Waqf Environment Model (IWEM): Proposal for funding sustainable agriculture through waqf to embrace the Era of Smart Agriculture 5.0	2025
	New Financial Innovation Approaches to Support the Implementation of the Sustainable Development Goals: A Trust Concept for a Waqf-based Alternative Financing Model for Renewable Energy Investments	2021
	Optimizing Cash Waqf for Financing Climate Change Mitigation Programs: Opportunities and Challenges	2025
	Renewable energy financing in Islamic finance: a community green Waqf financing model for rural electrification	2023
	Striking the balance: Fiqh Bi'ah and Productive Waqf Forests (PWFs) for sustainable forest management in Indonesia	2024
	The Need For A Strategic Framework For Sustainable Waqf Development In Addressing The Climate Crisis	2025
	The Role of Islamic Finance in the Growth of the Circular Economy	2023
	Towards Energy Security and Sustainability in Indonesia: Exploring The Waqf-Based Potential	2022
	Waqf as a Sustainable Economic Institution for Community Welfare	2025
	Waqf as a Tool for Climate Change Mitigation in Northern Nigeria	2025
	Waqf Model for Climate Change: A Delphi Method Approach	2023
	Waqf-based Waste Management: A Proposed Model in Indonesia	2023
2	Descriptive-Analytical Studies (Practice Mapping)	
	Green Waqf: Sustainable Surplus Perspective	2022
	Balanced Scorecard Analysis	
	How can Tamanu Green Waqf be Developed in Indonesia?	2024

		Optimizing Green Waqf as a Solution to Overcome Environmental Crisis	2025
		Researching Waqf Forest Studies	2021
		Waqf and Sustainability: A Text Mining	2023
		Waqf on Environmental Issue: A Systematic Review	2022
3	Practical and Model Implementation	Integrating Waqf-Based Forests and Carbon Trading: Opportunities, Challenges, and Strategies in Indonesia	2025
		Islamic Waqf: A Tool for Sustainable Forest Conservation and Livelihoods in Indonesia	2025
		Mosque Ta'mir Edupreneurship Through Green House Technology Based on Green Waqf (Study at Masjidpreneur Center for Islamic Studies at-Taufiq Mosque Pekalongan City)	2024
		Strategic Utilization of Muhammadiyah's Waqf Land Assets To Support Green Economy	2025
		The Contribution of Waqf Forests on Sustainable Development Goals	2023
		Waqf-based private forest management model: case study in Bogor Regency, Indonesia	2023
		Enhancing Waqf Forest Sustainability Through Agroforestry: Case Study from Bogor Waqf Forest, Bogor, Indonesia	2021
4	Governance, Regulation, and Institutional Framework	Development of Digital Green Waqf for Social Sustainability in Riau, Indonesia	2025
		Implementation of Prophetic Leadership in Green Waqf Management: A Comparative Case Study of Two Green Waqf Institutions in Indonesia	2025
		Proposing Green Waqf Development Strategy in Protecting Land Ecosystems in Indonesia: An Interpretive Structural Modeling Approach	2023
		Development of Waqf Forest in Indonesia: The SWOT-ANP Analysis of Bogor Waqf Forest Program by Bogor Waqf Forest Foundation	2021
		Management Strategies of a Productive Waqf-Based Forest in Bogor, Indonesia	2024
5	Public Awareness, Education, and Socio-Religious Engagement	Analysis of Intention to Participate in Green Waqf: A Theory of Planned Behavior Approach	2025
		Determinants of intention to become green waqf waqif in Indonesia	2025
		Intention to donate in green waqf among Muslim community: Indonesian case	2024

It can be concluded that approximately 55% of the reviewed papers focused on the conceptualization and proposed model of green waqf, examining its alignment with Islamic principles (maqashid al-shariah) and the Sustainable Development Goals (SDGs). As shown in (Table 1), research on green waqf is predominantly characterised by conceptual studies that propose foundational frameworks, strategies, and model developments. Based on publication trends, nearly all articles have appeared after 2020, reflecting that green waqf, as an innovative evolution of Islamic philanthropy integrating environmental sustainability, remains relatively nascent. This also explains why practical implementations are still limited in number and scope.

Empirical evidence shows that green waqf initiatives are predominantly concentrated in Indonesia. This finding aligns with Alshater et al. (2022) who assert that waqf-related research in general is largely dominated by contributions from Malaysia and Indonesia. Among the most frequently cited examples is the Waqf Forest Bogor project (Ali & Kassim,

2021a; Jannah et al., 2021; Jannah, Sarkawi, Othman, et al., 2024; Restiyani et al., 2023a). These studies demonstrate that green waqf programs extend beyond forest conservation to provide direct community benefits, particularly in improving access to clean water, sanitation, and irrigation systems. The management of water resources for domestic and agricultural purposes exemplifies waqf's practical role in enhancing both community welfare and environmental resilience.

The Bogor waqf forest also applies complex agroforestry models, such as agrosilvofishery, agrosilvopasture, apiculture, and agrisilviculture (Restiyani et al., 2023a), that not only improve land productivity but also create local employment and enhance socioeconomic well-being (Jannah et al., 2021). This reflects a paradigm shift from traditional waqf models to community-based green economy systems. Despite earlier challenges due to incompetent nazhir (waqf managers) (Yumarni et al., 2019), recent studies indicate notable improvements in human resource quality and management effectiveness. These developments signal a positive trajectory in professionalizing waqf management. However, several critical factors still determine the success of green waqf initiatives, including land legality, biophysical suitability, conservation value, and overall governance quality (Jannah, Sarkawi, & Othman, 2024).

A more recent green waqf development model involves the utilization of Tamanu (*Calophyllum inophyllum*) trees, a strategic commodity with economic, social, and ecological value. Tamanu offers potential as a source of pharmaceuticals and cosmetics (Raharivelomanana et al., 2018; Zalsabila et al., 2024), while also supporting community empowerment through job creation and economic self-reliance (Apriliani, 2025; Hatimah et al., 2023a, 2023b). Due to its adaptability across diverse soil types, including degraded lands, Tamanu cultivation also contributes to environmental restoration and renewable energy production.

The Tamanu-based green waqf industrial model demonstrates a synergistic integration between commercial finance and Islamic social finance, particularly through sharia crowdfunding mechanisms (M. Fikri & Andrean, 2023a). This approach enables the optimization of cash waqf as a financing instrument for green projects with measurable social, economic, and environmental impacts. However, existing studies also highlight a key limitation—namely, the lack of practical implementation and empirical evidence of successful programs in the field, with the exception of the studies conducted by Tamanu and Waqf Forest Bogor (Annisa Qurrata et al., 2024b; S Maulida, 2025; Wulansari & Rahmawati, 2025b). This indicates that the concept of green waqf industry largely remains at a conceptual and experimental stage.

Moreover, the competence of nazhir (waqf managers) in managing green assets, their technical knowledge of bioenergy, and their understanding of the industry's value chain continue to pose major challenges to effective implementation. Strengthening managerial competencies, particularly in ensuring operational efficiency, transparency, and adherence to maqasid al-shariah principles, is essential to institutionalize sustainable practices. The absence of such professional capacity remains a key structural barrier impeding the maturation and scalability of Tamanu-based green waqf initiatives (F. Asih et al., 2024). The findings emphasized by Rosyidah & Hidayati (2022) and Yumarni et al., (2020), suggest that challenges pertaining to the competence of nazhir remain a significant issue in waqf projects in Indonesia.

Nazhir professionalization is a strategic imperative to ensure efficient, transparent, and maqasid al-shariah-compliant governance. As noted by Fauzi et al., (2022), the broader waqf ecosystem still faces persistent barriers, namely inadequate managerial expertise, limited knowledge, and lack of institutional professionalism. Within the green waqf framework, Tamanu serves a dual function: as a means of ecosystem restoration and as an alternative renewable energy source. In this sense, the maqasid al-shariah principle, preserving ecological balance and natural resources, is operationalized through the deployment of waqf assets for environmental purposes (Gumansari et al., 2023). Hence, the professionalization of nazhir institutions represents a critical prerequisite for advancing the effectiveness and credibility of green waqf governance.

The Tamanu-based green waqf thus symbolizes a paradigm shift, from passive to productive waqf—anchored in environmental sustainability. If systematically implemented through collaboration among government bodies, nazhir institutions, communities, and halal industry stakeholders, Indonesia could emerge as a global pioneer in Islamic-based green economy initiatives. Despite growing enthusiasm, most Tamanu-based green waqf literature remains conceptual, with minimal empirical testing of its long-term economic and social feasibility. Consequently, the actual contributions of green waqf to environmental sustainability and poverty alleviation require further validation through evidence-based research. Among existing models, forest waqf remains the most studied and operationally viable, underscoring the adaptability of waqf as an instrument for addressing environmental challenges in alignment with the UN SDGs. Collectively, existing studies converge on one conclusion: green waqf possesses significant strategic potential to address Indonesia's socio-environmental challenges, particularly when managed within an integrated sustainable development framework that engages multi-sectoral actors.

Although some case-based green waqf implementations have demonstrated promising outcomes, most remain localized and lack comparative or multi-institutional analyses. The success of the Bogor waqf forest, frequently cited in literature (Fathurrahman & Rahmawati, 2023; Jannah et al., 2021; Restiyani et al., 2023), has not yet been replicated systematically across other regions, primarily due to constraints in nazhir capacity, institutional resources, and policy support. Furthermore, few studies have quantitatively measured the ecological or social impacts of green waqf programs.

The absence of robust impact assessments leaves the effectiveness of existing initiatives largely confined to descriptive narratives. Addressing this gap requires cross-disciplinary collaboration to substantiate green waqf as a credible environmental solution. Accordingly, multidisciplinary research integrating energy economics, fiqh al-muamalat, and applied ecology is necessary to transform green waqf from an idealized concept into a sustainable practice. Comparative institutional analyses and performance evaluations are equally crucial to objectively assess the effectiveness of diverse green waqf models. The integration of Islamic social finance, natural resource management, and environmental policy is fundamental for developing an evidence-based framework that bridges the gap between conceptual idealism and practical implementation.

The absence of policies that support the use of waqf land for environmentally sustainable economic activities remains a significant challenge. Effective policy coordination among ministries is urgently needed to accelerate the integration of green waqf within the national green economy framework. As Gumansari et al., (2023) emphasize, the optimization of productive waqf requires cross-sectoral policy harmonization. Consistent with the findings of Kamarudin et al., (2025) the waqf sector is generally confronted with four primary challenges: limited funding sources, regulatory ambiguity, insufficient professional management, and low public awareness.

To optimize green waqf implementation, a systemic policy framework is required, supported by national institutions such as the Indonesian Waqf Board (BWI), the Ministry of Religious Affairs, and Islamic financial authorities. Cross-sectoral policy harmonization, particularly among religious, forestry, energy, and financial agencies, is essential to strengthen the green waqf ecosystem. Capacity building through nazhir training, sustainable asset management certification, and the establishment of a Green Waqf Consortium that unites academia, government, and Islamic philanthropic organizations would further enhance governance transparency and long-term sustainability.

Furthermore, the discussion highlights that numerous studies employ normative or descriptive methodologies without robust empirical validation, resulting in a limited evidence base to substantiate theoretical assertions (Qurrata et al., 2024; Maulida, 2025; Wulansari & Rahmawati, 2025). This observation underscores the necessity for future research to utilize mixed methods, case studies, or quantitative impact assessments to enhance generalizability and policy relevance. Additionally, cross-country comparative studies, such as those involving Indonesia, Malaysia, and Middle Eastern contexts, would augment the understanding of governance diversity and institutional best practices.

Another area warranting further exploration is the connection between green waqf and national sustainability policies. Few studies investigate how waqf aligns with environmental regulatory frameworks (Hasan & Wigati, 2024) or carbon offset initiatives (Ali et al., 2025a). Integrating waqf into broader sustainability governance, such as ESG (Environmental, Social, and Governance) frameworks, could substantially amplify its systemic impact. Lastly, the findings also suggest that community awareness and public participation remain underdeveloped (Huda et al., 2024b; Nurfajariyati et al., 2025; Rachmad et al., 2025). Therefore, advancing the social dimension of green waqf through education, digital engagement, and religious institutions could convert conceptual enthusiasm into tangible environmental action.

4. Conclusions

The findings reaffirm that green waqf represents an emerging domain within contemporary Islamic philanthropy discourse. Current scholarship on green waqf is predominantly characterized by conceptual analyses, with a notable deficiency in empirical evaluations. Despite its considerable potential, both theoretical development and practical implementation remain in an embryonic phase, as reflected by the predominance of conceptual studies over field-based empirical research. Green waqf signifies an evolutionary shift from the traditional waqf paradigm toward an environmentally oriented philanthropic model emphasizing eco-social sustainability. The integration of maqāṣid al-sharīʿah principles with the SDGs reframes waqf not merely as a socio-religious instrument but also as a mechanism for managing natural resources in an intergenerationally just manner.

This scoping review demonstrates that realization of green waqf remains constrained by institutional limitations, human resource capacity, public awareness and regulatory gaps. Future research should adopt a broader, multidisciplinary approach integrating Islamic jurisprudence (fiqh), public policy, and green economics to construct a robust theoretical framework. Furthermore, increasing literacy through education, eco-theological discourse, and extensive outreach are crucial steps towards strengthening the green waqf ecosystem. Moreover, empirical evaluations are necessary to assess the effectiveness of different green waqf models across diverse socio-ecological contexts. Thus, green waqf can be positioned not only as an innovation in Islamic social finance but also as a strategic instrument bridging religious spirituality and environmental consciousness.

This study acknowledges several limitations. Due to restricted institutional access, data collection was limited to two primary databases (Google Scholar and Scopus) with a focus on open-access publications. Furthermore, the absence of advanced analytical tools (e.g., VOSviewer, NVivo, or the bibliometrix R-package) constrained the ability to perform quantitative visual analyses of citation networks and thematic trends. Nevertheless, the qualitative-comparative approach employed in this study remains sufficient to provide a comprehensive understanding of the direction and dynamics of green waqf development.

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Author Contribution

The author solely conceived, designed, conducted, analyzed, and wrote the entire manuscript. All stages of the research process, including data collection, synthesis, interpretation, and manuscript preparation, were independently carried out by the author.

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Conflicts of Interest

The author declare no conflict of interest.

Declaration of Generative AI Use

During the preparation of this work, the author used several AI-assisted tools to enhance research efficiency and language accuracy. Specifically, Paperpal was used to assist in improving the academic tone and language consistency of the manuscript; Rayyan AI was utilized to facilitate literature screening and selection based on PRISMA guidelines; Connected Papers helped identify the most relevant and interconnected research sources; and SciSpace was employed to assist in understanding and summarizing key aspects of reviewed papers, including objectives, methods, and findings. These tools were used solely to support and accelerate the research workflow, not to generate new content or interpretations. After using these tools, the author thoroughly reviewed and edited all sections of the manuscript and takes full responsibility for the accuracy and integrity of its final content.

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