



Zakat and Green Finance: Formulating a Green Zakat Model to Support Energy Transition and Climate Change Adaptation

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Abstract

Ideally, zakat should function not only as an instrument for socio-economic empowerment but also as a driver of ecological transformation in responding to the climate crisis. In reality, however, the utilization of zakat to support energy transition and climate-change adaptation remains fragmented, lacks operational models, and is not yet integrated into the national green finance framework. This study aims to formulate a Green Zakat Model that systematically connects Islamic principles, environmental sustainability, and climate mitigation–adaptation strategies. The research employs an exploratory qualitative approach through policy analysis, extensive international literature review, and in-depth interviews with zakat institutions, Islamic economics experts, and green -energy stakeholders. Data were analyzed using thematic coding to identify patterns, opportunities, and barriers to integrating zakat within the green finance ecosystem. The findings show that zakat holds strategic potential to finance community-based energy resilience, low-carbon technologies, ecological rehabilitation, and adaptation programs for vulnerable groups. The proposed model presents a governance framework, maqashid-based green project criteria, and accountability mechanisms aligned with global green finance standards. These results highlight that zakat can serve as a catalyst for an inclusive and socially–ecologically just energy transition.

Keywords: Green Zakat, Green Finance, Energy Transition, Climate Change.

Abstrak

Idealnya, zakat tidak hanya berperan sebagai instrumen pemberdayaan sosial-ekonomi, tetapi juga menjadi pendorong transformasi ekologi dalam menghadapi krisis iklim. Namun, realitasnya, pemanfaatan zakat untuk agenda transisi energi dan adaptasi perubahan iklim masih terfragmentasi, minim model operasional, dan belum terintegrasi dalam kerangka keuangan hijau nasional. Penelitian ini bertujuan merumuskan Model Zakat Hijau yang mampu menghubungkan prinsip syariah, keberlanjutan lingkungan, dan strategi mitigasi–adaptasi iklim secara sistematis. Metodologi yang digunakan adalah pendekatan kualitatif eksploratif melalui analisis kebijakan, kajian literatur internasional, dan wawancara mendalam dengan lembaga zakat, pakar ekonomi syariah, serta pemangku kepentingan energi hijau. Data dianalisis menggunakan thematic coding untuk memetakan pola, peluang, serta hambatan integrasi zakat dalam kerangka keuangan hijau. Hasil penelitian menunjukkan bahwa zakat memiliki potensi strategis untuk mendanai ketahanan energi komunitas, teknologi rendah karbon, rehabilitasi ekologis, dan program adaptasi masyarakat rentan. Model yang ditawarkan menghadirkan kerangka tata kelola, kriteria proyek hijau berbasis maqashid syariah, serta mekanisme akuntabilitas yang kompatibel dengan standar keuangan hijau global. Temuan ini menegaskan bahwa zakat dapat menjadi katalis transisi energi yang inklusif dan berbasis keadilan sosial–ekologis.

Kata kunci: zakat hijau, keuangan hijau, transisi energi, perubahan iklim.

INTRODUCTION

Climate change has emerged as one of the most pressing global challenges, affecting nearly every dimension of human life, including public health, food security, energy stability, and economic sustainability. International reports indicate that global warming has intensified the frequency of hydrometeorological disasters, exacerbated poverty, and widened social inequality across developing countries. Amid this urgency, the world increasingly requires alternative financing systems grounded not merely in economic rationality, but also in moral ethics and social justice. Within the framework of Islamic economics, zakat has recently gained renewed attention as a social finance instrument with significant strategic potential to support environmental agendas and sustainable development. Given the large global Muslim population, zakat possesses a stable and obligatory financial base capable of addressing existing climate-financing gaps that remain insufficient to date (Ulfah et al., 2023). The discourse surrounding Islamic green finance has also expanded rapidly, marked by the emergence of energy waqf, green sukuk, and various other sustainable financing innovations. Nevertheless, the integration of zakat as a supporting instrument for energy transition and climate change adaptation

remains relatively underexplored and has yet to receive proportional attention in either academic literature or public policy. This condition opens substantial research opportunities to reconceptualize zakat as a more inclusive, justice-oriented, and environmentally responsive green finance instrument aimed at protecting vulnerable communities.

In the context of sustainable development, clean energy transition and climate change adaptation represent two critical agendas requiring substantial financial support and broad community participation. At the same time, poor and vulnerable populations are disproportionately affected by environmental degradation and climate uncertainty, including floods, droughts, water scarcity, and agricultural instability. Existing studies specifically examining zakat as a mechanism for supporting energy transition or climate adaptation financing remain limited and lack a well-established conceptual framework. Meanwhile, zakat institutions across several Muslim-majority countries have begun to show interest in supporting environmental initiatives, yet they still lack operational models, governance mechanisms, and policy instruments necessary for systematically implementing green zakat programs. Therefore, developing an integrated green zakat model aligned with energy transition and climate adaptation agendas has become an urgent necessity, both theoretically and practically.

Ideally, zakat could function as an effective source of social financing for supporting clean energy initiatives such as community-based solar panels, low-emission agriculture, adaptive water management, and community-driven climate resilience programs. With its extensive funding base, zakat has the potential to become an inclusive and equitable pillar of sustainability financing. Furthermore, the principles of *maqashid al-shariah*—particularly *hifz al-nafs* (protection of life), *hifz al-maal* (protection of wealth), and *hifz al-bi'ah* (environmental protection)—theologically support the integration of zakat into climate action initiatives. However, in reality, the utilization of zakat within sustainability contexts remains highly limited. Zakat institutions generally lack regulatory frameworks enabling zakat allocation toward renewable energy projects or climate adaptation programs. In addition, the concept of “green zakat” has not yet been universally formulated, making cross-country adoption difficult. Divergent *fiqh* interpretations, institutional capacity limitations, minimal program innovation, and the absence of environmental accountability standards continue to hinder the mainstreaming of green zakat. Moreover, the alignment between energy transition needs and *sharia* mandates has not been fully understood by relevant stakeholders. These conditions give rise to the central research problem of this study: how to formulate a *sharia*-compliant, applicable, climate-adaptive, and institutionally adoptable green zakat model.

This study aims to: (1) examine the theological and philosophical foundations underlying the integration of zakat with energy transition and climate change adaptation agendas; (2) analyze the regulatory readiness and governance capacity of zakat institutions in adopting green zakat approaches;

and (3) formulate a green zakat model applicable at both national and transnational levels. The contribution of this research is both theoretical and practical. Theoretically, this study enriches the literature on Islamic green finance by proposing a new conceptualization of zakat as a climate-financing instrument, extending beyond its traditional role as merely an economic redistribution mechanism. Practically, this study provides a framework that can be utilized by zakat institutions, policymakers, and Islamic financial organizations in developing measurable, sharia-based green zakat programs oriented toward strengthening community resilience against climate risks. Thus, this research not only contributes academically, but also offers practical solutions to sustainable development challenges faced by Muslim societies and the global community.

Studies on the integration of zakat and green finance are not entirely new. Several scholars have explored the relationship between Islamic philanthropy and sustainability agendas through normative, regulatory, and techno-economic approaches. However, the accelerating climate crisis and the growing urgency of energy transition continue to make this discourse highly relevant and demand continuous model innovation. Consequently, this research operates within an already developing scholarly ecosystem while addressing significant conceptual and practical gaps, particularly concerning the formulation of green zakat as a structured climate-financing instrument.

Lalu Khairil Azmi, in his work entitled “*The Regulatory Framework of Green Zakat to Support the Transition Towards a Green Economy Based on the Principles of Islamic Justice*”, discusses the regulatory framework of green zakat by positioning Islamic justice principles as its foundational basis. This work emphasizes how zakat governance and legal design can be directed toward supporting a green economy through the principles of *adl* and *maslahah*. The study finds that zakat regulations in several Muslim countries remain largely conventional and have not yet accommodated environmental orientations (Azmi, 2024). The similarity between Azmi’s work and the present study lies in their shared focus on integrating zakat with sustainability agendas. However, this study extends beyond regulatory and normative justice dimensions by proposing an operational green zakat model linked directly to energy transition and climate change adaptation.

Similarly, Mohammad Aliman Shahmi et al., in “*Energy Waqf and the Environmental Crisis: Advancing Islamic Philanthropy for Sustainability*”, focus on the concept of energy waqf as an Islamic philanthropic instrument for addressing environmental crises. The article illustrates how energy waqf initiatives, such as solar panel financing through waqf funds, can promote energy sustainability and public welfare. The study concludes that waqf possesses considerable flexibility to become a driver of social innovation within renewable energy contexts (Shahmi et al., 2025). While both studies position Islamic philanthropy as part of climate solutions, the distinction lies in the financing instruments analyzed: Shahmi’s work focuses on waqf, whereas this study highlights zakat as an

obligatory funding mechanism with potentially broader implications for supporting climate resilience.

Meanwhile, Donna Vanny Araminta et al., through “*The Role of Green Sukuk in Realizing the Sustainable Development Goals 2030 Agenda*”, examine the contribution of green sukuk toward achieving the SDGs, particularly in financing sustainable infrastructure. The article demonstrates how green sukuk functions as an effective Islamic capital market instrument for financing environmental projects such as renewable energy and climate mitigation. Their findings emphasize that green sukuk offers strong transparency, governance, and global investor appeal (Araminta et al., 2022). The similarity with this research lies in the integration of Islamic financial instruments with sustainability issues. However, this study differs fundamentally because it does not operate within the capital market sphere; rather, it focuses on zakat-based wealth redistribution as a more inclusive alternative public financing mechanism for vulnerable communities.

In another study, Azhar Alam et al., through “*Development and Evaluation of Islamic Green Financing: A Systematic Review of Green Sukuk*”, provide a systematic review of green sukuk development. They evaluate trends, structures, challenges, and implementation impacts of green sukuk across various countries. Their primary findings reveal that despite the rapid growth of green sukuk, significant gaps remain in regulation, market readiness, and investor literacy, thereby limiting optimal implementation (Alam et al., 2023). The similarity with this study lies in the shared effort to evaluate sharia-based green financial instruments. However, this research introduces an additional dimension absent from Alam’s study: namely, how zakat—despite not being an investment instrument—can be engineered into a mechanism for financing climate adaptation and mitigation at the community level.

From these studies, it becomes evident that existing literature has extensively discussed Islamic instruments such as energy waqf and green sukuk in supporting environmental agendas. Nevertheless, a substantial research gap remains: there is still no comprehensive model specifically formulating green zakat as a structured financing instrument for energy transition and climate change adaptation. Religious councils, zakat regulators, and philanthropic institutions have yet to establish operational standards or transnational policy designs ensuring that zakat functions effectively as a climate-financing mechanism. The absence of such a model has resulted in the underutilization of zakat’s global potential, which reaches hundreds of billions of dollars annually, in supporting vulnerable communities facing climate risks. Therefore, this research fills a significant scholarly gap by offering both a theoretical framework and an applicable green zakat model capable of adoption by national and regional zakat institutions, while simultaneously contributing a new conceptual dimension to the literature on Islamic green finance.

RESEARCH METHOD

This article is categorized as a library research study employing a qualitative-descriptive approach that focuses on conceptual analysis and the development of a theoretical model of green zakat within the framework of sustainable finance. This approach was selected because the issue under investigation remains largely normative and conceptual, thereby requiring the strengthening of its epistemological foundation through the exploration of both classical and contemporary literature. The primary methodology applied in this study is a systematic literature review conducted through processes of identification, selection, evaluation, and synthesis of scholarly works related to zakat, green finance, energy transition, and climate change adaptation. The primary sources of this research consist of the Qur'an, hadith, classical Islamic scholarly works on zakat, as well as official regulations issued by zakat institutions and sustainable finance policies in several countries. Meanwhile, the secondary sources include Scopus- and Sinta-indexed journal articles, conference proceedings, reports from international institutions such as the UNDP, IEA, and IPCC, as well as academic publications on Islamic social finance, green sukuk, and environmental philanthropy.

The data analysis process was conducted using content analysis techniques emphasizing thematic categorization, identification of argumentative patterns, and the formulation of conclusions through inductive and comparative approaches. Data validity and reliability were ensured through source triangulation, consistency checks across the literature, and verification of argumentative logic at every stage of analysis. To maintain academic integrity, the manuscript drafting process was systematically organized through stages of literature classification, conceptual mapping, argument construction, and the formulation of a conceptual green zakat model. In addition, reference management applications such as Zotero or Mendeley were utilized to ensure citation precision and bibliographic accuracy.

DISCUSSION

The Concept of Green Zakat and Its Relevance within the Sustainable Finance Framework

The discussion surrounding the concept of green zakat has emerged as a response to global challenges such as climate crisis, environmental degradation, and the growing demand for sustainable financing models. Within the architecture of the global economy, the rise of green finance, sustainable finance, and various climate-financing instruments reflects a paradigm shift in which economic development is no longer assessed solely through growth indicators, but also through its ability to preserve ecological balance and ensure long-term human well-being. In this context, zakat—as an Islamic socio-economic instrument practiced for more than fourteen centuries—has acquired renewed

relevance. Zakat is no longer perceived merely as a ritual religious obligation, but also as a wealth redistribution mechanism possessing substantial potential to support environmental agendas. Consequently, the idea of green zakat has emerged to connect zakat practices with the financing needs of climate mitigation and adaptation initiatives.

Green zakat may simply be defined as the allocation of zakat funds toward environmental objectives that generate tangible benefits for both *mustahik* and ecosystems (Bianda, 2025). This definition encompasses the financing of environmentally friendly programs, strengthening climate resilience among poor households, promoting green economic empowerment, and encouraging the participation of *mustahik* in activities supporting ecological sustainability. Thus, green zakat does not represent a new category of zakat; rather, it constitutes a new approach to zakat allocation within a *maqashid al-shariah* framework that is more adaptive to contemporary realities. The concept is grounded in the principle that all zakat distribution policies must promote *maslahah* (public benefit) and prevent *mafsadah* (harm). In the era of climate change, one of the greatest harms requiring prevention is environmental destruction that threatens human survival. Therefore, green zakat seeks to position environmental concerns as an integral component of the Muslim social agenda.

The sharia foundation of green zakat is robust and remains fully consistent with the fundamental principles of zakat. QS. At-Taubah verse 60 continues to serve as the primary reference regarding the eight categories of zakat beneficiaries (*asnaf*). The relevance of green zakat lies in how environmental programs can be directed toward empowering *mustahik* and improving their welfare (Azmi, 2024). Examples include utilizing zakat funds to support organic agriculture among *mustahik*, disaster-risk mitigation for impoverished communities, rehabilitation of degraded land inhabited by vulnerable populations, or the provision of clean energy assistance for poor households. Such initiatives remain within the boundaries of sharia because their benefits are directly received by eligible zakat beneficiaries.

From the perspective of *maqashid al-shariah*, green zakat strongly aligns with the objectives of protecting religion (*hifz al-din*), life (*hifz al-nafs*), lineage (*hifz al-nasl*), intellect (*hifz al-aql*), and wealth (*hifz al-mal*) (Bianda, 2025). Environmental protection and climate adaptation fundamentally constitute efforts to safeguard human life, as climate change directly threatens public health, food security, water resources, and household economies. By channeling zakat toward green programs, the essential purpose of zakat is reaffirmed: generating public welfare and protecting society from vulnerability. This *maqashid*-based approach enables Islamic scholars and zakat institutions to formulate distribution policies that are more responsive to contemporary challenges while simultaneously providing normative legitimacy for implementing green zakat on a broader scale.

Amid the increasing urgency of climate financing, green zakat has become an important component within the architecture of Islamic social finance.

Traditionally, global climate financing has relied on instruments such as green bonds, green sukuk, carbon taxes, and international aid funds (AlQashouti & Shah, 2025). However, these instruments often face limitations in reaching grassroots communities due to bureaucratic barriers, policy infrastructure constraints, and implementation costs. At this point, zakat possesses a unique advantage: it is deeply embedded within poor communities, collected regularly, and supported by institutional networks extending to the village level.

Globally, the discourse on integrating Islamic finance with green agendas has rapidly evolved through the concept of Islamic Green Finance. Many Muslim-majority countries have issued green sukuk to finance energy projects, food security initiatives, and environmentally friendly transportation systems. Nevertheless, the role of zakat within the green finance architecture remains relatively underexplored despite its enormous potential. Annually, global zakat collection is estimated to reach hundreds of billions of dollars. If even a portion of these funds were allocated toward climate mitigation and adaptation programs, the impact on impoverished communities most affected by climate change would be highly significant (Sabri et al., 2025). Therefore, green zakat can function as a bridge connecting Islamic social finance with Islamic green finance, thereby creating an integrative framework that strengthens both social and ecological sustainability.

The relevance of green zakat becomes even more apparent when viewed from the perspective of sustainability economics. Sustainable finance requires funding mechanisms that generate not only economic value but also positive social and environmental impacts. Green zakat naturally fulfills these criteria. As a non-profit instrument, it directly promotes social upliftment while simultaneously strengthening environmental capacity through green projects. In certain contexts, zakat may even serve as a catalyst for new economic activities within green sectors such as sustainable agriculture, small-scale renewable energy, community-based ecotourism, and waste management initiatives centered on *mustahik* empowerment (Hussein, 2017).

From the perspective of public policy, the implementation of green zakat carries significant strategic implications for Muslim-majority countries. Governments require additional financing sources to achieve their Nationally Determined Contribution (NDC) targets, while state budgets often face limitations in financing climate adaptation and mitigation programs (Ryandono et al., 2023). In this regard, synergy between zakat and environmental resilience policies becomes highly relevant. If zakat institutions collaborate with ministries responsible for environment, energy, agriculture, and disaster management, green zakat programs can be directed toward strengthening community resilience through climate-resilient agriculture, clean energy provision, community forestry cultivation, and rehabilitation of disaster-prone areas. Such cross-sectoral collaboration could create a more responsive and integrated policy ecosystem for addressing climate crises.

Operationally, green zakat requires a governance model that is transparent, accountable, and impact-oriented. This means that zakat institutions must implement relevant impact measurement frameworks to assess the extent to which green zakat programs contribute to environmental and social indicators. Such measurements may include emission reductions, improvements in *mustahik* agricultural productivity, enhanced food security, or reduced disaster vulnerability. A data-driven approach of this nature would strengthen the credibility of green zakat while ensuring that zakat funds are utilized effectively and appropriately. In the long term, the adoption of green impact reporting by zakat institutions may become a new standard that enhances public trust and stimulates program innovation.

At the community level, the concept of green zakat is closely connected to the realities of *mustahik* who frequently reside in ecologically vulnerable areas such as coastal regions, mountain slopes, riverbanks, and urban slums. These communities are among the groups most severely affected by climate change, yet they possess the least adaptive capacity (Erwan Iskandar & Eman Sulaiman, 2025). Consequently, zakat interventions should not remain merely consumptive in nature; they must incorporate environmental empowerment dimensions enabling *mustahik* to break free from cycles of ecological and economic vulnerability. Green zakat thus serves as a bridge linking ecological needs with humanitarian concerns, ensuring that assistance not only addresses immediate problems but also reduces future disaster risks.

Zakat-Based Financing Schemes for Renewable Energy Projects and the Green Economy

The discourse surrounding zakat in the modern economy has expanded significantly, particularly when linked to issues of sustainability and energy transition. Zakat is no longer understood merely as a charitable wealth-distribution instrument, but also as a mechanism of social and economic engineering capable of encouraging structural transformation. In a global context characterized by climate crisis, rising energy prices, and environmental pollution, the utilization of zakat to finance renewable energy projects and green economic activities has emerged as a strategic idea receiving increasing academic attention (Hussein, 2017).

The concept of zakat-based financing for renewable energy projects originates from the understanding that *mustahik* require not only short-term consumption assistance, but also access to affordable, clean, and sustainable energy. Energy is a basic necessity that directly influences education, health, productivity, and economic development. The dependence of poor communities on expensive and unstable fossil-based energy sources frequently exacerbates their social conditions. Through zakat interventions, zakat institutions may provide renewable energy sources such as household or community-based solar

panels, small-scale biomass generators, and energy-efficient technologies capable of enhancing the long-term independence and welfare of *mustahik*.

The sharia foundation for such financing schemes is particularly strong, considering that the primary objective of zakat is to empower vulnerable groups and improve their socioeconomic capacity. Stable and affordable clean energy constitutes one of the most strategic means of empowerment. From the perspective of *maqashid al-shariah*, the provision of environmentally friendly energy contributes to the protection of life (*hifz al-nafs*), the protection of wealth (*hifz al-mal*), and the protection of future generations (*hifz al-nasl*) (Beik et al., 2021). One financing scheme currently gaining attention involves zakat funding for household solar panel installations for *mustahik* living in rural areas. In many remote regions, electricity remains either inaccessible or highly unreliable. By providing solar panels, *mustahik* gain access to electricity for children's education, nighttime lighting, small-business operations, and even agricultural processing equipment.

In addition to solar panels, small-scale biomass technology also represents a highly relevant option for *mustahik*, particularly those living within agrarian communities. Biomass technology utilizes agricultural waste such as straw, coffee husks, and rice husks to generate thermal energy or electricity. Zakat financing can be allocated to develop simple community-managed biomass units, thereby producing affordable energy while simultaneously creating added economic value from previously unused waste materials. This model also promotes a circular economy consistent with green economy principles while generating employment opportunities for *mustahik* as operators and suppliers of raw materials.

Zakat schemes supporting low-emission agriculture have likewise become an important topic within green zakat discussions. Many *mustahik* are smallholder farmers lacking sufficient capital to access green agricultural technologies such as water-efficient irrigation systems, organic fertilizers, low-emission seeds, and solar-powered agricultural equipment. Zakat financing may therefore be directed toward reducing small farmers' dependence on chemical fertilizers and fossil-fuel-based machinery while simultaneously increasing their productivity. Beyond improving *mustahik* income, such programs also preserve soil health and reduce the carbon footprint of the agricultural sector, which remains highly significant in climate change mitigation efforts.

Within urban contexts, zakat may also finance energy-efficiency programs for low-income households, including energy-saving lighting, low-emission cooking stoves, and electricity-efficient household appliances. Programs replacing conventional equipment with green technologies can substantially reduce electricity expenses among *mustahik*. As household energy expenditures decline, *mustahik* acquire greater financial flexibility to fulfill essential living and educational needs. Simultaneously, such initiatives contribute to the expansion of sustainability culture and the reduction of household emissions—a sector often overlooked within national energy policies (Owino, 2020).

From an institutional perspective, green zakat schemes require more adaptive and innovative governance structures. Zakat institutions need to establish collaboration with research institutions, renewable energy startups, and local governments to ensure that the technologies provided are appropriate and aligned with the actual needs of *mustahik* (Rejab et al., 2023). Furthermore, zakat institutions should strengthen impact-reporting mechanisms capable of measuring the social, economic, and ecological benefits generated by each green energy project. Such approaches reinforce public accountability while simultaneously enhancing *muzakki* trust in modern and progressive zakat management practices.

Zakat-based financing schemes for renewable energy also create opportunities for integration with other Islamic social finance instruments such as productive waqf and sadaqah. For example, zakat may function as initial empowerment capital, while waqf provides physical assets such as land for renewable energy installations. This combination generates a sustainable hybrid financing model capable of delivering long-term impacts. Such integrated models become especially important for large-scale projects such as village solar mini-grids or community-based biomass power plants that require substantial initial investment but generate broad societal benefits.

From an academic perspective, the green zakat model represents a novel contribution that expands the role of zakat within the global green economy. The existence of such models enriches the discourse on sustainable finance within the Islamic world, particularly as international actors increasingly promote financing mechanisms for energy transition. This scheme may serve as a tangible contribution of Muslim societies to climate change mitigation efforts while simultaneously demonstrating that sharia-based instruments can adapt to global challenges without abandoning their foundational principles (Ryandono et al., 2023). Increasingly, scholars have begun exploring zakat's potential as a form of climate finance and advocating for its integration into the Sustainable Development Goals (SDGs), particularly those related to clean energy and poverty alleviation.

Despite its considerable potential, the implementation of such schemes faces several challenges, including limited technical expertise within zakat institutions, insufficient feasibility studies concerning environmentally friendly technologies, and the absence of regulations explicitly governing the use of zakat funds for energy-related projects. Therefore, clearer legal frameworks, more detailed fiqh guidelines, and competency training for zakat administrators are urgently needed. In addition, public literacy regarding renewable energy must also be strengthened to ensure that these programs operate effectively and do not ultimately become underutilized or abandoned projects.

Climate Change Adaptation and the Role of Zakat in Strengthening the Resilience of Vulnerable Communities

Climate change has become an increasingly visible global challenge that threatens human survival, particularly among poor and vulnerable communities. Its impacts include the increasing frequency of natural disasters, droughts, floods, extreme temperatures, and declining water quality. In this context, adaptation has become a necessity rather than merely an option. Although the international community continues to promote various global adaptation strategies, their implementation often fails to adequately reach the most vulnerable groups. It is within this gap that socio-religious instruments such as zakat possess strategic potential to contribute meaningfully. Zakat functions not only as an economic redistribution mechanism, but also as a means of creating socio-ecological resilience amid the climate crisis (Arman & Rafi, 2025).

Conceptually, zakat is an Islamic philanthropic instrument aimed at reducing poverty, improving welfare, and empowering *mustahik*. However, within the context of climate change, its function may be expanded to become part of climate adaptive finance that directly supports adaptation efforts. Poor communities are among the least capable of confronting climate impacts, both economically and technically. Grounded in the principles of *maqashid al-shariah*, particularly the protection of life (*hifz al-nafs*) and wealth (*hifz al-mal*), the utilization of zakat for adaptation programs is highly relevant and possesses a strong theological foundation (Wiza & Febriani, 2025).

One tangible contribution of zakat to climate adaptation lies in disaster resilience programs. Poor communities frequently reside in areas vulnerable to flooding, landslides, or coastal abrasion. They generally lack the resources necessary for disaster mitigation and post-disaster recovery. Zakat funds may therefore be directed toward the construction of small-scale infrastructure such as village embankments, early warning systems, flood-resistant housing, and evacuation facilities for *mustahik* (Hulwati et al., 2024). Beyond physical infrastructure, zakat can also finance disaster-risk management training, enabling communities to acquire the basic knowledge required to respond effectively during emergencies. In this way, zakat contributes to building more resilient communities capable of minimizing losses during disasters.

In addition to disaster resilience, zakat also plays a significant role in water conservation and management, which represent some of the most critical issues associated with climate change. Many regions are currently facing prolonged droughts or floods that contaminate clean water sources. Zakat may be utilized to construct bore wells for *mustahik*, rainwater harvesting systems, water-efficient irrigation facilities, and simple clean-water filtration technologies. These efforts not only strengthen water resilience but also improve public health among communities previously exposed to contaminated water sources. Investments of zakat in water conservation therefore reduce climate risks while simultaneously enhancing the dignity and quality of life of *mustahik*.

Environmental rehabilitation constitutes another important area in which zakat can contribute to climate adaptation. Land degradation, deforestation, and ecosystem destruction intensify natural disasters and reduce the economic productivity of poor communities (Abdullah & Keshminder, 2022). Zakat funds may be allocated toward reforestation, village forest development, mangrove restoration, and the revitalization of degraded agricultural land. Such activities generate not only ecological benefits but also employment opportunities for *mustahik* as environmental managers and conservation workers. The integration of zakat into ecological rehabilitation creates an empowerment model connecting environmental sustainability with poverty alleviation.

Zakat-based adaptation programs may also focus on strengthening the economic resilience of vulnerable groups. Climate change frequently disrupts the livelihoods of small farmers, fishers, agricultural laborers, and informal workers. Through zakat, *mustahik* may receive capital assistance to establish more climate-resilient economic activities such as organic farming, drought-resistant agriculture, hydroponic cultivation, and green microenterprises. This model not only creates new income sources but also reduces economic vulnerability arising from dependence on climate-sensitive sectors. In the long term, such economic resilience becomes a fundamental pillar of sustainable adaptation (Arman & Rafi, 2025).

From the perspective of social protection, zakat functions as a safety net for communities that lose assets or employment due to disasters or climate-related disruptions. For instance, when fishers are unable to go to sea because of extreme waves or when farmers experience crop failure due to drought, zakat may provide immediate assistance in the form of food, shelter, or temporary support. This safety-net function ensures that *mustahik* can survive while awaiting recovery. Within Islamic economic literature, the role of zakat as an adaptive social protection mechanism is increasingly recognized as an important instrument for addressing climate-related shocks.

The integration of zakat into climate adaptation also requires a community-based approach. Adaptation efforts cannot succeed if implemented solely through instructive and top-down mechanisms (Wiza & Febriani, 2025). Consequently, zakat institutions need to engage in participatory dialogue with communities in order to understand local risks, energy needs, water conditions, and ecological vulnerabilities. Participatory approaches enable zakat schemes to be designed according to specific socio-geographical contexts, thereby making interventions more effective and sustainable. This process also fosters a sense of community ownership over adaptation programs financed through zakat.

The expanding role of zakat in climate adaptation demands the modernization of management mechanisms and the strengthening of technical capacity among zakat institutions (Alam et al., 2023). Zakat administrators need to understand the fundamentals of climate science, disaster-risk management, and environmentally friendly technologies to ensure that their interventions are not merely symbolic but genuinely impactful. Moreover, collaboration with

governments, academics, and environmental institutions is essential to align zakat adaptation programs with regional development plans and national climate adaptation strategies. Such synergy enhances program effectiveness while avoiding duplication of initiatives.

From an academic perspective, the role of zakat in climate change adaptation has become an increasingly dynamic area of research. Numerous studies have begun exploring how zakat can be conceptualized as climate adaptive finance or even as a climate justice instrument advocating for the most vulnerable populations. The development of concepts such as green zakat, climate resilience zakat, and risk-based zakat opens substantial opportunities for research in Islamic economics, public policy, and environmental studies (Maspul & Mubarak, 2025). Scholars increasingly argue that integrating Islamic values with climate-related issues provides important theoretical contributions capable of enriching global sustainability discourse.

Nevertheless, implementation challenges remain significant. In several Muslim-majority countries, rigid zakat regulations continue to limit the use of zakat funds for climate-related programs. Furthermore, limited public understanding regarding the urgency of climate adaptation often causes environmental programs to be perceived as secondary priorities. Therefore, zakat institutions must strengthen climate and zakat literacy among both *muzakki* and *mustahik* in order to build stronger public support. Capacity building and zakat policy reform thus become essential prerequisites for optimizing the role of zakat in climate adaptation initiatives.

Formulating a Global Green Zakat Model: Implementation Opportunities, Regulatory Challenges, and Policy Design

The discourse surrounding zakat models continues to evolve alongside the growing need for Muslim societies to respond to increasingly complex socio-economic challenges. One progressive idea that has recently gained prominence is “green zakat,” namely the integration of zakat instruments with principles of environmental sustainability. This model views poverty alleviation as inseparable from environmental preservation and responsible resource management. Accordingly, green zakat emerges not merely as a mechanism of income redistribution, but also as an ecological development strategy grounded in sharia values. From a global perspective, this concept offers new hope for Muslim-majority countries seeking to address climate change, environmental degradation, and economic inequality simultaneously (Maspul & Mubarak, 2025).

Conceptually, green zakat represents a formulation that bridges environmental ethics with Islamic economic law. It encompasses the allocation of zakat funds toward environmentally oriented programs such as forest rehabilitation, food security through organic agriculture, renewable energy, water conservation, and the empowerment of *mustahik* within green economic ecosystems. This model is founded upon the fiqh argument that preserving the

environment constitutes part of the *maqāṣid al-sharī'ah*, particularly *hifz al-bi'ah* (environmental protection) (Adiwijaya et al., 2024). Within this framework, green zakat gains normative legitimacy while simultaneously emerging as an innovative instrument capable of reaffirming the relevance of sharia in addressing contemporary global challenges. Its capacity to integrate social worship with sustainability agendas makes it a highly significant object of academic inquiry.

The opportunities for implementing green zakat globally are increasingly promising due to rising public awareness concerning environmental issues and climate change. International zakat institutions have begun to recognize the green sector as a new avenue for generating long-term socio-economic impact. Countries such as Malaysia, Indonesia, and the United Arab Emirates have already initiated early discourse regarding the integration of zakat with ecological development. The readiness of digital infrastructure, the expansion of green finance ecosystems, and growing Islamic philanthropic support collectively strengthen the foundations for cross-national adoption of green zakat models. This moment therefore represents an important opportunity to construct a zakat paradigm that is responsive to the challenges of the twenty-first century (Manaf et al., 2025).

Developing a comprehensive global green zakat model requires a multidimensional approach involving theological, economic, ecological, and governance dimensions. Ideally, such a model should include components related to funding-source identification, mechanisms for assessing the feasibility of green programs, sustainability standards, impact indicators, and accountability schemes for zakat administrators (*amil*) (Ali et al., 2024). Practically, the proposed model consists of five primary pillars: (1) sharia policies regulating zakat allocation; (2) an integrative regulatory framework connecting zakat institutions with relevant authorities; (3) institutional structures supported by adequate technical capacity; (4) financing models compatible with zakat principles; and (5) data-based monitoring and evaluation instruments (Khairi et al., 2025). Through this design, green zakat may operate systematically, measurably, and with high practical effectiveness.

Assessing the readiness of zakat institutions constitutes a key factor in determining the successful implementation of green zakat models. While many zakat institutions already possess experience in economic empowerment programs, they often remain limited in technical competencies related to environmental sustainability. Weaknesses in ecological literacy, green technology, environmental risk analysis, and impact measurement may reduce the effectiveness of programs if green integration is implemented prematurely. Conversely, institutions with prior experience in environmental initiatives demonstrate that expert involvement and cross-sector collaboration are essential prerequisites. Therefore, institutional readiness must be evaluated from the perspectives of human resources, standard operating procedures, information technology, partnerships, and experience in managing environmentally oriented social funds.

Governance challenges within green zakat implementation are particularly complex, especially concerning rule standardization, legal certainty, and harmonization of fiqh interpretations. Different countries possess varying zakat governance systems, ranging from centralized and semi-autonomous structures to fully community-driven models. These differences make cross-national adoption dependent upon comprehensive fiqh dialogue and international cooperation frameworks. Additional challenges involve ensuring transparency, preventing greenwashing in projects labeled as environmentally friendly, and developing integrated sharia and environmental audit mechanisms (Owino, 2020). Green zakat cannot rely solely upon good intentions; it requires a robust and accountable governance structure.

Beyond governance concerns, significant regulatory challenges also remain unresolved at the global level. One major issue involves defining sharia boundaries regarding the use of zakat funds for environmental projects that do not directly target the immediate basic needs of *mustahik*. Fiqh debates arise regarding whether activities such as urban park development, forest conservation, or green technology research may legitimately fall within the category of *fī sabīlillāh*. Additional challenges concern synchronization with national environmental regulations, including licensing requirements, environmental impact assessments, and energy and food policies. Regulatory systems must therefore move in alignment to prevent administrative barriers that could hinder the effectiveness of green zakat implementation.

Within the global context, opportunities for cross-country adoption are highly significant if green zakat models are designed with flexible inter-madhab sharia approaches. Experiences from other sectors, such as green sukuk, demonstrate that the integration of Islamic values within ecological development initiatives can be accepted across diverse jurisdictions, including countries that do not formally implement sharia systems. Based on this precedent, green zakat may be projected as a transnational philanthropic instrument (Rusanti & Anwar, 2025). Countries across Africa, South Asia, and the Middle East—regions frequently affected by recurring climate disasters—have the potential to become major beneficiaries. Multilateral collaboration through organizations such as the Organisation of Islamic Cooperation and the Islamic Development Bank, along with global zakat networks, could substantially strengthen implementation efforts.

The policy design of a global green zakat model should ideally incorporate a policy-mix approach combining both top-down and bottom-up strategies. Top-down approaches are necessary for establishing legal frameworks, sharia standardization, and integration with national sustainability policies. Meanwhile, bottom-up approaches ensure participation from communities, *mustahik*, indigenous groups, and environmental organizations. The combination of these two approaches creates policy designs that are responsive, realistic, and socially legitimate. One important recommendation is the establishment of an

International Green Zakat Council functioning as a center for research, fatwa development, standardization, and program incubation.

It is equally important to develop technological instruments that will serve as the backbone of green zakat implementation. The utilization of digital tracking systems, blockchain-based zakat management, data-driven impact reporting, and green project registration platforms can significantly strengthen transparency and public trust (Khairi et al., 2023). Technology enables donors to monitor program development, environmental impact levels, and *mustahik* empowerment outcomes in real time. Consequently, the integration of Islamic philanthropy with technological innovation will play a decisive role in determining the quality of green zakat governance in the future (Sabri et al., 2025).

Finally, global green zakat models must also consider the diverse social and cultural contexts of different countries. Not all societies possess equal levels of environmental literacy; therefore, educational strategies are necessary to cultivate organic public acceptance of green zakat initiatives. Furthermore, program success will depend heavily on the ability of zakat institutions to establish partnerships with farmers' associations, green SMEs, Islamic boarding schools, universities, and local communities. Such inclusive empowerment is crucial to ensuring that green zakat becomes not merely an idealistic narrative, but a practical instrument capable of accelerating the transition toward a more prosperous and sustainable society.

CONCLUSION

This study demonstrates that zakat possesses strategic capacity to be repositioned as a green finance instrument in addressing the climate crisis and the demands of global energy transition. By situating zakat within the framework of *maqashid al-shariah*, which emphasizes the protection of life, wealth, and environmental sustainability, this research confirms that Islamic philanthropy functions not merely as a moral-religious response, but also as an alternative sustainable financing mechanism capable of addressing existing climate-financing gaps. The findings reveal that zakat has significant potential to support renewable energy development, strengthen community resilience, and promote sustainable resource management. Nevertheless, the implementation of green zakat continues to face regulatory, administrative, and epistemological challenges that hinder the optimal integration of zakat within the broader green finance ecosystem. In this regard, the findings of this study contribute by formulating a green zakat model that connects the theological mandate of zakat with the global demand for financing systems that are equitable, inclusive, and environmentally sustainable.

The implications of this research indicate that the green zakat model possesses substantial potential to expand the socio-ecological role of zakat in supporting energy transformation and sustainable development. Through an approach integrating sharia principles, institutional governance, and climate

adaptation agendas, this study offers an operational framework that may be adopted by both national and international zakat institutions. Consequently, green zakat should no longer be understood merely as a normative discourse, but rather as a concrete instrument for strengthening community resilience and enriching the architecture of global sustainable finance. Furthermore, this study opens new avenues for the development of zakat policies that are more progressive, adaptive, and future-oriented in responding to global ecological challenges.

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