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ARTIFICIAL INTELLIGENCE-BASED CLIMATE WAQF ECOSYSTEM: TRANSFORMING ABANDONED WAQF ASSETS INTO SUSTAINABLE CLIMATE FINANCING TO ACCELERATE THE SDGS

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ABSTRACT
The climate crisis and the financing deficit for the Sustainable Development Goals (SDGs) are two interrelated existential threats. The OECD (2025) notes that the SDG financing gap has surged 60% to USD 4 trillion annually, while global climate finance needs reach USD 6.4 trillion annually by 2030. Paradoxically, the world's waqf assets, estimated at USD 1 trillion annually, are largely idle and unproductive due to weak management and a lack of management technology. This study integrates Artificial Intelligence (AI) with abandoned waqf assets to create an ethical, scalable, and sustainable climate finance mechanism. Using a PRISMA protocol-based Systematic Literature Review of 50 scholarly sources (2023–2026) analyzed thematically and bibliometrically, the study identifies four critical gaps: the absence of an integrated AI–waqf–climate finance–SDGs model; the absence of a machine learning-based Social Return on Waqf Investment (SROWI) metric; The absence of an AI-based inventory system for idle waqf assets; and the lack of integration of Islamic Social Finance Theory with the Resource-Based View. In response, this study proposes the Climate Waqf Intelligence Framework (CWIF), an original four-layer conceptual framework—asset mapping (Computer Vision/GIS), climate project intelligence (ESG-SDGs-based ML), impact forecasting (Deep Learning LSTM), and SROWI measurement (NLP)—based on a synthesis of the three theories and principles of Maqasid al-Shariah. Its contributions are both theoretical and practical through policy recommendations for BWI, the Financial Services Authority (OJK), and relevant ministries.

Keywords : *Climate Waqf Intelligence, Artificial Intelligence, Idle Waqf Assets, Sustainable Climate Finance, Maqasid al-Shariah*

INTRODUCTION

The world is facing what economists call a "perfect storm" in sustainable finance: the funding needs to achieve the Sustainable Development Goals (SDGs) continue to increase, while developing countries' financial capacity declines and international donor commitments weaken. The Global Outlook on Financing for Sustainable Development (OECD, 2025) report notes that the annual funding needs to achieve the SDGs in developing countries will increase from USD 2.5 trillion in 2015 to USD 4 trillion in 2025—a 60% increase, largely driven by the rising costs of climate change adaptation and mitigation. Meanwhile, the estimated global climate finance need is USD 5.4 to 6.4 trillion annually until 2030 (IPCC, 2023), but to date only about USD 1 trillion has been achieved—still far short of the target, resulting in a deficit of more than USD 4 to 5 trillion.

Amid this deficit lies a hidden resource unmentioned in the mainstream literature on climate finance: waqf assets. Its potential value is estimated at US$1 trillion annually worldwide (Islamic Development Bank, 2023), and Indonesia is one of the countries with the greatest potential—over 420,000 waqf plots covering an area of 55,259 hectares (BWI, 2024). However, over 60% of these assets remain unused due to a lack of competent nazirs, inadequate inventory management, and limited innovation in their utilization. This gap between the vast potential of waqf and the pressing need for climate finance opens up a vast opportunity for innovation that has yet to be systematically tapped. Simultaneously, the artificial intelligence (AI) revolution is also transforming financial perspectives and systems worldwide. Vargas and team (2026) demonstrated that AI can improve the accuracy of environmental risk assessments by up to 40%, help optimize ESG portfolios, and measure social impact directly and quickly. Meanwhile, Roncoroni and colleagues (2024) demonstrated that machine learning can create models that analyze the complex relationships between climate, financial, and social variables. An unanswered question remains: can AI be the bridge that transforms dormant waqf assets into productive and scalable climate finance instruments? This research addresses this by developing the Climate Waqf Intelligence Framework (CWIF), an academic contribution that places Islamic social finance at the center of the global climate finance agenda.

This research builds on four critical gaps identified through an initial literature review, which justifies its originality. First, although Green Waqf is increasingly becoming a widely discussed topic in the ISF literature (Othman et al., 2025; Rahmawati et al., 2025; Rusydiana et al., 2023), no research to date has integrated AI as an operational tool in managing and developing Green Waqf. These studies remain at a conceptual level without technological tools capable of implementing the concept at scale. Second, research on AI in climate finance (Roncoroni et al., 2024; Vargas et al., 2026) and AI in Islamic finance (Zahid et al., 2025) has developed separately in different fields. There has been no attempt to combine these two domains into an integrated ecosystem based on waqf tools. Third, current methods for measuring the impact of waqf investments still use conventional methods, thus failing to fully reflect the complexity of the social and environmental impacts generated by waqf. The concept of Social Return on Waqf Investment (SROWI), which combines sharia, social, and environmental aspects into a single measurable measure, has not been developed in

previous research. Fourth, there is no framework that combines the Resource Perspective with Islamic Social Finance Theory in the context of climate finance. This theoretical combination makes logical sense but has never been empirically tested.

Based on the identified gaps, this study formulates three research questions: What are the remaining research gaps in the literature regarding the integration of AI, waqf, climate finance, and the SDGs, based on the 2023-2026 Systematic Literature Review? How can the conceptual framework of the Climate Waqf Intelligence Framework (CWIF) be developed as a model that combines artificial intelligence, unused waqf assets, climate finance, and accelerates the achievement of the SDGs within a single integrated ecosystem? What is the impact of CWIF's theory and practical suggestions on the development of Islamic social finance, accelerating the achievement of the Sustainable Development Goals, and national waqf management policies?

This study aims to: (1) systematically identify research gaps through a PRISMA-based systematic literature review; (2) develop the CWIF as an original conceptual framework to address these gaps; and (3) establish theoretical implications and implementable policy recommendations. The main contributions of this study are to theoretically design the CWIF and SROWI as new concepts that can enhance knowledge in the field of Islamic social finance and climate finance; and, in practice, to provide operational guidance to the Indonesian Waqf Board (BWI), the Financial Services Authority (OJK), and relevant Ministries in utilizing unused waqf as part of national climate policy.

LITERATURE REVIEW

Sustainable Development Theory and Islamic Finance

The theory of sustainable development (Brundtland Commission/WCED, 1987) explains that sustainable development is a way to meet the needs of society today without compromising the ability of society to meet the needs of the future. This is the basis of the SDGs (Sustainable Development Goals) adopted by the UN in 2015, which consist of 17 goals and 169 targets. Theoretically, the principle of waqf actually predates the Brundtland concept. Etymologically, the word waqf means "to hold," that is, to lock up an asset permanently to provide benefits in perpetuity, thus naturally having a dimension of intergenerational sustainability. Hassan and his team (2025) demonstrated that the ISF can be applied to achieve the Sustainable Development Goals (SDGs) through Maqasid al-Shariah, confirming the fundamental compatibility between the two theories. The CWIF emphasizes this compatibility by adding AI as an operational capability.

Islamic Social Finance Theory and Maqasid al-Shariah

Islamic Social Finance theory views instruments such as waqf, zakat, and sadaqah not only as forms of philanthropic activity, but also as a framework for wealth redistribution based on ethical values and integrated into the institutional system (Kunhibava et al., 2024). Specifically, in the context of waqf, this theory emphasizes two important points: first, waqf assets may not be used or transferred, ensuring their continued benefit; second, the objectives of waqf must align with the public interest. The objectives of Islamic law, as outlined by al-Ghazali and al-Shatibi, include the protection

of five primary objectives: life, intellect, posterity, property, and religion. In the context of the CWIF, waqf funds for climate projects directly protect human lives by providing clean water and sufficient food, protect posterity by creating a comfortable environment, and safeguard property by preventing damage from climate change. This means that CWIF is not only recognized by Sharia but must also be developed as a concrete manifestation of Maqasid al-Shariah in the present day.

Resource-Based View as a Strategic Framework

The Resource-Based View (Barney, 1991; Wernerfelt, 1984) states that sustainable competitive advantage comes from internal resources that are rare, valuable, difficult to imitate, and non-substitutable. These four criteria are known as VRIN. In CWIF, inactive waqf assets meet all four VRIN criteria, namely rare because not all countries have a developed waqf system; valuable because they have great economic potential; cannot be recreated because they are protected by religious and state laws; and cannot be replaced because their nature is eternal, unlike ordinary financial instruments. AI functions as a dynamic capability (Teece et al., 1997) that enables the transformation of inactive resources (inactive waqf assets) into active resources (climate investment assets).

CWIF Theoretical Synthesis

This synthesis of RBV and ISF theories forms the theoretical basis of the Climate Waqf Intelligence Framework (CWIF), a combination that, based on the literature review, has not been applied before. Sustainable Development Theory provides guidance for achieving sustainable development. Islamic Social Finance Theory explains how to collect and channel waqf benefits for the benefit of the general public. Meanwhile, the Resource-Based View explains how unused waqf assets can be transformed into strategically valuable resources with the help of artificial intelligence. Combining these three theories forms the conceptual basis of the Climate Waqf Intelligence Framework (CWIF). A systematic review of scientific papers provides a comprehensive overview of the existing gaps, as shown in Figure 1 below:

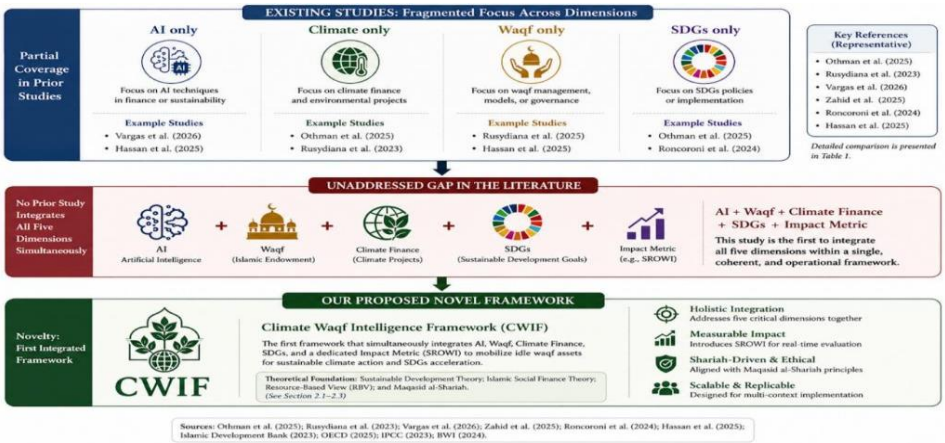

Figure 1. Research Gap and Novelty Positioning Map

Figure 1 clearly shows that no previous research has addressed all five dimensions simultaneously. Based on the literature found in this research, no study has combined AI, waqf, climate finance, SDGs, and impact measurement mechanisms into a single integrated framework. This gap formed the basis for the creation of the Climate Waqf Intelligence Framework (CWIF).

METHODOLOGY

This study employed a conceptual framework development design created through a systematic literature review (SLR) using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol. SLR was chosen because: (a) allows for a systematic, transparent, and reproducible literature review; (b) suitable for research that aims to produce a new conceptual framework based on current research; and (c) recognized as a valid method in conceptual research in the field of Islamic Finance and Sustainable Development (Hassan et al., 2025; Rahmawati et al., 2025).

The literature search was conducted in three major databases using organized search terms: Scopus (Main Database): Title-Keywords ("waqf" OR "wakaf" OR "waqf") AND ("artificial intelligence" OR "machine learning" OR "deep learning" OR "AI") AND ("climate" OR "climate finance" OR "green finance" OR "SDGs" OR "sustainability"). Filter: Publication Year: 2023-2026; Field of Study: Economics, Finance, Social Sciences. Google Scholar and the Garuda Portal can be used to supplement Indonesian-language Sinta 1 articles by adding keywords such as "climate waqf," "Islamic social finance," "AI in Islamic finance," and "SDG financing." International books published by Springer Nature, Oxford University Press, and Wiley-Scrivener on topics such as Islamic social finance, AI in finance, and sustainable development finance, published between 2023 and 2026.

The literature selection process followed the PRISMA guidelines, which consist of several stages: identification, screening, eligibility assessment, and selection of appropriate articles, as seen in Figure 2.

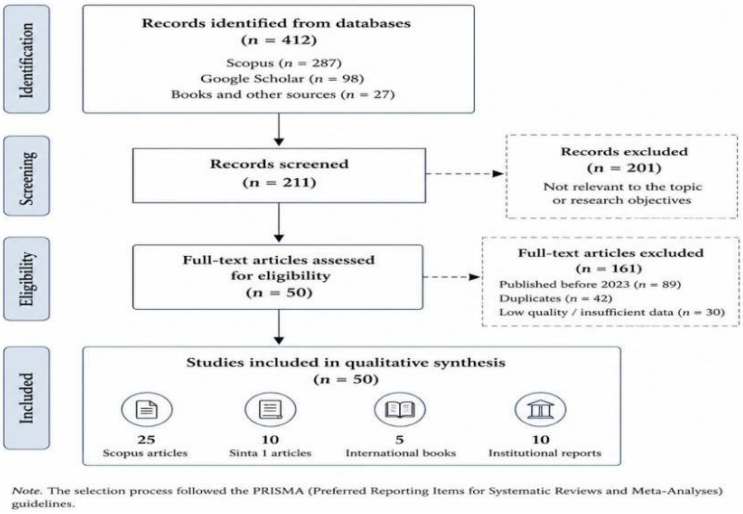

Figure 2. Prisma Literature Selection Process

Figure 2 shows that of the 412 documents found in the initial stage, only 50 sources met all the categorization criteria and were of adequate quality. This selected literature served as the basis for developing a theoretical synthesis and developing the CWIF.

The analysis was carried out in four sequential and mutually supporting stages : Gap Matrix Analysis: Each selected book was placed in a 5x5 matrix indicating the extent to which each book covered five key variables (AI, Waqf, Climate Finance, SDGs, SROWI), resulting in a clear and visible picture of the gaps. Thematic Content Analysis: The literature was categorized into five main themes using open coding and axial coding techniques adapted from correlation theory. Theory Synthesis: Three theories, namely Sustainable Development Theory, ISF Theory, and RBV Theory, were synthesized using theory-building techniques developed by Wacker (1998) and updated by Fawcett & Waller (2011). Framework Validation: Validating the CWIF framework by: (a) examining internal consistency between layers, (b) ensuring compliance with the principles of Maqasid al-Shariah, and (c) comparing it with existing climate waqf projects in Malaysia and Bangladesh.

RESULTS AND DISCUSSION

The Reality of the Crisis: Empirical Data Speaks

Before discussing the framework, it is important to clearly understand the scale of the crisis, as the justification for the CWIF relies on concrete, measurable empirical evidence. Funding gap: The OECD (2025) report states that the annual funding requirement to achieve the SDGs in developing countries increased by 36% between 2015 and 2022, despite only a 22% increase in available resources. As a result, the annual financing gap has increased by 60%, from US$2.5 billion in 2015 to US$4 billion in 2025. For climate finance, the IPCC (2023) estimates that investments of between US$5.4 and US$6.4 trillion are needed annually to keep global temperature rise below 1.5 degrees Celsius.

Untapped waqf potential: BWI (2024) notes that there are more than 420,000 waqf plots in Indonesia, covering an area of 55,259 hectares, but more than 60% of this land remains unused or underutilized. Assuming an average of IDR 1 million per square meter, the value of inactive waqf assets in Indonesia alone is already more than IDR 300 trillion—equivalent to nearly 15% of the 2024 state budget. Internationally, the Islamic Development Bank (2023) estimates that if 10% of the waqf potential could be mobilized, it would generate approximately US$100 billion annually for sustainable development. Proven AI capacity: Zahid and team (2025) show that incorporating Green AI into a sukuk portfolio can reduce carbon emissions by up to 30% thanks to automated allocation optimization. Meanwhile, Roncoroni and colleagues (2024) note that machine learning improves the accuracy of climate risk predictions by up to 40% compared to traditional methods. These three empirical facts form a strong argument that CWIF is not just a proposed idea, but an action that responds to a real opportunity that has been well documented.

Climate Waqf Intelligence Framework (CWIF): Arsitektur Lengkap

The CWIF designed in this study consists of four interrelated layers, with Maqasid al-Shariah serving as the primary guideline that underpins the operation of the entire system. Each layer was created to address specific barriers that have hindered the use of waqf to fund climate change efforts. Based on research findings and established theory, this study proposes a Climate Waqf Intelligence Framework (CWIF) model as a system that combines unused waqf assets, artificial intelligence technology, climate finance, and accelerated achievement of the SDGs in a single, integrated environment, as shown in Figure 3.

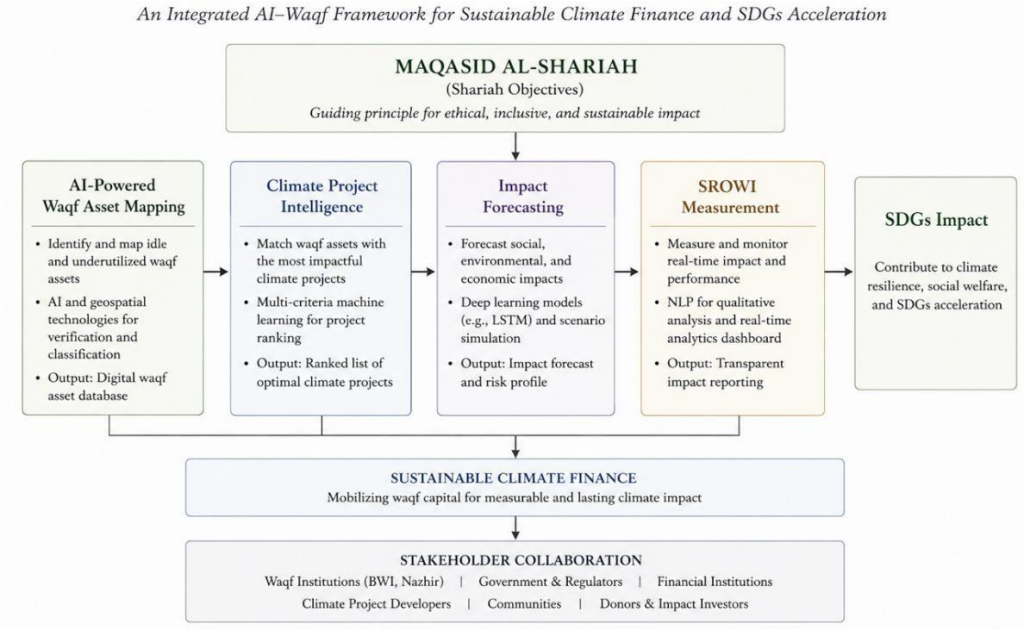

Figure 3. Climate Waqf Intelligence Framework (CWIF)

As seen in Figure 3, the CWIF consists of four main, interrelated components that operate based on the Maqasid al-Shariah principles. These four components form a value process that begins with identifying waqf assets and continues with measuring their social, environmental, and spiritual impacts.

Layer 1 (L1): AI-Powered Waqf Asset Mapping Addresses the Invisibility Problem

A key issue often overlooked in discussions about productive waqf is that nazirs (Islamic trustees) and supervisors often lack knowledge of the exact location of waqf assets, their condition, and their best potential. This asset opacity means that waqf potential remains largely a figure on paper. CWIF-L1 addresses this issue with an integrated AI system: (a) CNN-based computer vision to analyze high-resolution satellite imagery and identify neglected assets based on visual characteristics such as building condition, vegetation, and land use; (b) GIS connected to Waqf Certificate data from the Ministry of Religious Affairs to link locations and evaluate asset values; and (c) NLP used to extract information from digital documents such as waqf pledges, nazir documents, and previous reports to supplement uncertified assets. The output of L1 is

the National Waqf Asset Registry (NWAR)—a dynamic, automatically updated database that includes the precise location (GPS coordinates), area, physical condition, legal status, usage history, and suitability score for each asset across various climate project categories. NWAR provides a database that Indonesia previously lacked, while also addressing repeated requests from BWI for the creation of a comprehensive national waqf inventory system.

Layer 2 (L2): Climate Project Intelligence Optimal Matching based on SDGs

Once the NWAR is available, L2 plays a role in connecting each waqf asset with the most suitable climate project. CWIF-L2 uses a Machine Learning-based Multicriteria Decision-Making (MCDM) algorithm. This algorithm evaluates each analyzed climate project simultaneously based on five assessment dimensions.

Table 2. CWIF-L2 Assessment Dimensions for Climate Project Selection

Dimension	Weight	Measurable Indicator	SDGs Contributed
Climate Impact	30%	Tons of CO_2 equivalent reduced per year; clean energy capacity (MW)	SDG 7 (Clean Energy), SDG 13 (Climate Action)
Social Impact	25%	Number of direct beneficiaries; increased community income (%)	SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 3 (Good Health)
Sharia Feasibility	20%	Compliance with Maqasid al-Shariah (score 1-10); fatwas and regulations of the Financial Services Authority (OJK/BWI)	All SDGs - through the principle of maslahah 'ammah
Financial Feasibility	15%	Net Present Value (NPV); Payback Period; Financial Risk Score	SDG 8 (Decent Work), SDG 9 (Infrastructure), SDG 17 (Partnerships)
Asset Suitability	10%	Suitability of the location, size, and condition of the waqf asset to the project's needs	Project specific

The weights in Table 2 are conceptual and are compiled based on a combination of various literature discussing climate finance priorities, Maqasid al-Shariah principles, and the feasibility of sustainable projects. Further research could use the Delphi method or the Analytical Hierarchy Process (AHP) to obtain more objective weights. Four types of environmental projects prioritized in CWIF-L2 were selected based on their significant environmental impact and suitability with existing waqf assets in Indonesia, namely: (1) Solar power plants on vacant waqf land (achieving SDGs 7 and

13); (2) Conservation and restoration of mangrove forests on waqf land in coastal areas (achieving SDGs 13, 14, 15); (3) Sustainable agriculture and food security on waqf land used for agriculture (achieving SDGs 2 and 1); and (4) Clean water infrastructure based on waqf land (achieving SDGs 6 and 3)

Layer 3 (L3): Social-Environmental Impact Forecasting

The third layer addresses a major weakness in evaluating waqf projects: the inability to accurately estimate long-term impacts. CWIF-L3 integrates two complementary AI approaches: First, a Long Short-Term Memory (LSTM) model, a type of Deep Learning, is recommended for training using historical data from existing renewable energy and environmental conservation projects for future implementation. This model can predict environmental impact trajectories, such as CO_2 emission reduction, biodiversity restoration, and water quality, up to 20 years into the future with significantly greater accuracy than traditional statistical models. Second, an agent-based simulation (ABS) model is proposed to model the project's social and economic impacts on beneficiary communities. ABS simulates how thousands of individual agents, such as farmers, fishers, and poor households, interact in response to project-induced climate change. This simulation yields more in-depth and comprehensive projections of how benefits are distributed, the likelihood of conflict, and the risk of social exclusion within communities.

Layer 4 (L4): Social Return on Waqf Investment (SROWI)

The most significant and original innovation within the CWIF is the development of the Social Return on Waqf Investment (SROWI) metric, a new impact measurement tool specifically designed for the unique characteristics of climate waqf investments.

SROWI is formulated as:

$$\textbf{\textit{SROWI}} = \textit{(Social Impact Value + Environmental Impact Value + Spiritual Impact Value) / Value of the Invested Waqf Asset.}$$

Where:

1. Social impact value is calculated by converting changes in community welfare indicators into monetary values, using a social value database developed specifically for the context of the Indonesian Muslim community.
2. Environmental impact value is calculated using market carbon prices and ecosystem service valuation (EV) in accordance with the TEEB (Economics of Ecosystems and Biodiversity) standards; and
3. The spiritual impact value is represented by the Spiritual Impact Index, which measures donors' perceptions of the program's benefits, blessings, and alignment with the principles of Maqasid al-Shariah.

AI plays a crucial role in L4 through several key components: NLP, which is used to extract public sentiment and views from digital reports and social media; real-time IoT sensor-based analytics to continuously monitor environmental impacts; and an automated dashboard that generates SROWI reports that can be reviewed by Shariah

auditors and international ESG assessment agencies. To provide a more structured way to measure impact, this study created the SROWI, which combines social, environmental, and spiritual aspects into a single, integrated measure.

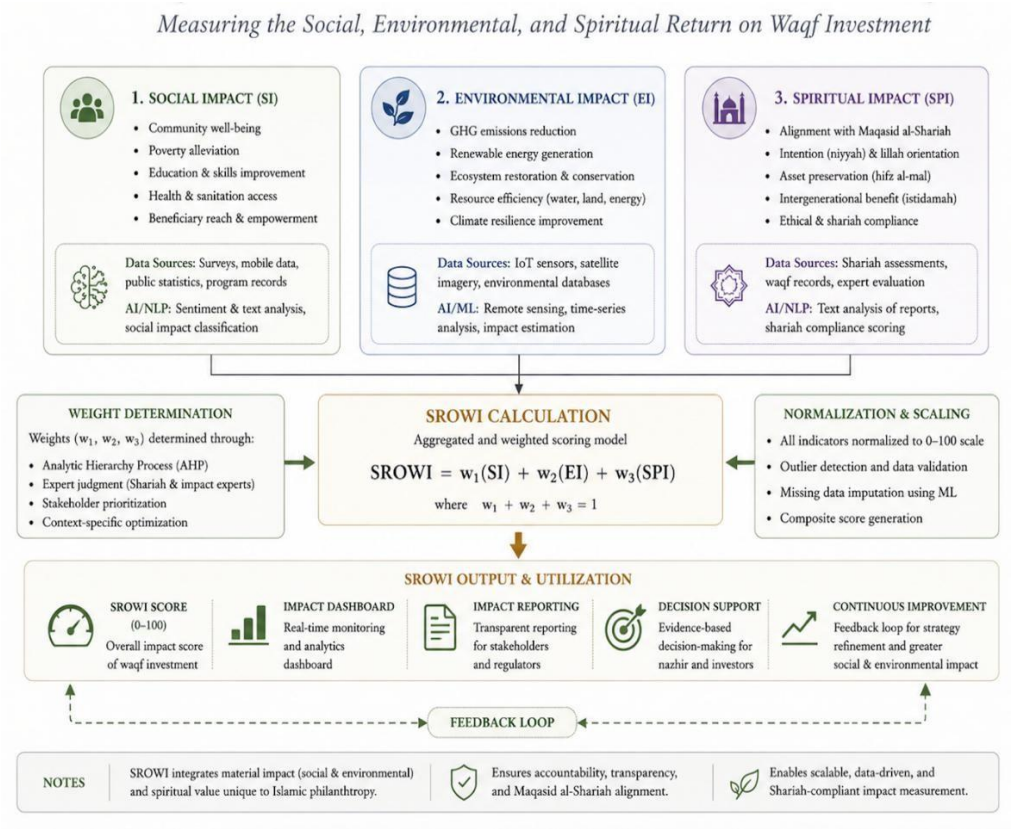

Figure 4. SROWI Architecture and Measurement Logic

Figure 4 shows that SROWI not only assesses economic impacts but also considers social, environmental, and spiritual values, which were previously excluded from the commonly used SROI approach.

CWIF Impact Projections: Quantifying Potential

Based on comparisons with similar projects already underway in Malaysia (Waqf Land Development Program), Bangladesh (Waqf-Based Microfinance), and Saudi Arabia (King's Commission for Jubail Waqf Project). To demonstrate how CWIF contributes to sustainable development goals, this study illustrates the impact pathway from the use of waqf assets to the achievement of the SDGs, as shown in Figure 5.

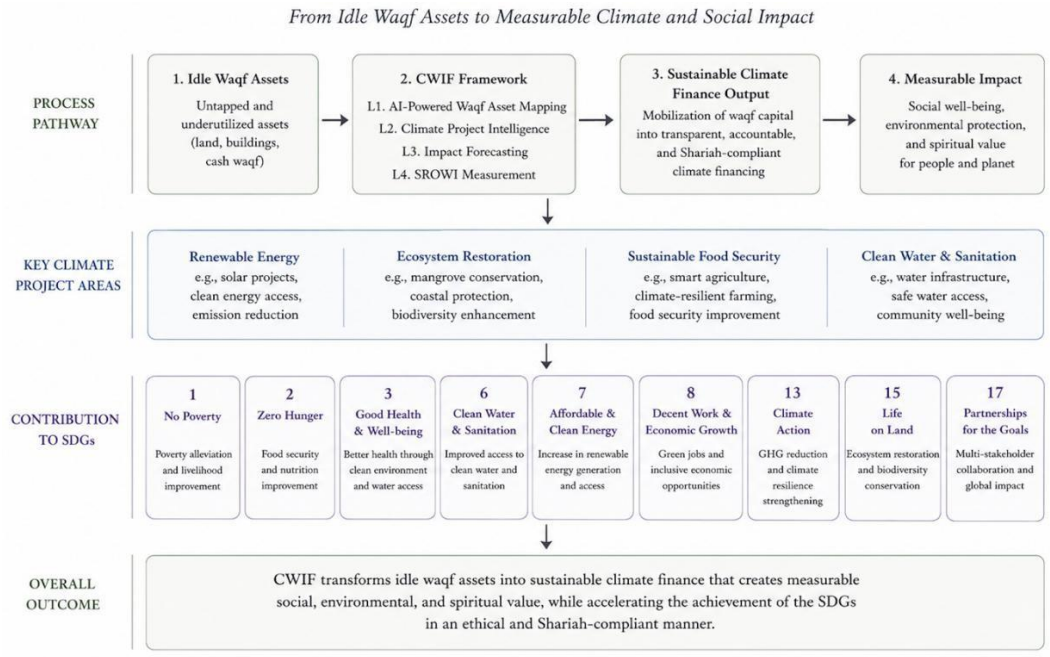

Figure 5. CWIF Impact Pathway toward SDGs

Based on the results of combining information from various sources and comparing it with similar initiatives in various countries, CWIF has the potential to contribute to increasing the use of renewable energy, protecting coastal ecosystems, improving food security, and meeting the need for clean water. These impacts directly support the achievement of Sustainable Development Goals (SDGs) 1, 2, 3, 6, 7, 13, 15, and 17. However, the magnitude of the actual impact needs to be verified through practical implementation and field testing.

Critical Analysis: CWIF Opportunities, Challenges, and Responses

The development of the CWIF faces challenges in its implementation, which must be recognized and addressed scientifically. First, the Sharia-compliant nature of AI: Hassan et al. (2025) warn that automation in decision-making raises questions about human oversight and accountability. The CWIF responds by utilizing AI as a decision-support system, not a decision-maker—the final decision remains with the certified nazir, while the AI only provides data and recommendations that can be reviewed by the Sharia Supervisory Board. Second, data and digital infrastructure: The CWIF requires a data infrastructure that is still incomplete in Indonesia, particularly regarding the digitization of waqf land documents and certificates. However, the Digital Waqf initiative developed by the Indonesian Waqf Board (BWI) in collaboration with the Ministry of Communication and Information Technology (Kemenkominfo) provides a foundation that can be accelerated through the CWIF. Third, digital literacy of nazirs: Most nazirs are unfamiliar with AI systems. The CWIF responds with an easy-to-use mobile app-based user interface in Indonesian, complemented by a Digital Nazir certification program that can be integrated into BWI's existing programs. Furthermore,

the use of AI can pose risks of bias in algorithm performance and data privacy violations, which must be addressed by conducting AI audits and managing data transparently.

Theoretical Implications: CWIF's Contribution to Scientific Development

CWIF makes recognizable theoretical contributions at three levels: Level One - Theory Expansion: CWIF expands Islamic Social Finance theory from traditional social areas such as poverty alleviation, education, and health to new areas with similar Sharia legitimacy, although still very limited in the recognized literature. This expansion has a significant impact in positioning ISF as a major player in global climate issues, rather than simply a marginalized charitable organization. Level Two - New Construct: The development of SROWI as a new measurement construct addresses a clear gap in the literature, as no existing measurement tool is capable of simultaneously capturing the social, environmental, and spiritual dimensions of waqf investments. SROWI has the potential to become a benchmark in measuring the impact of ISF that can be applied internationally by the Islamic Development Bank and AAOIFI. Third Level - Theoretical Integration: Combining RBV with ISF Theory in CWIF opens new research opportunities on how to manage strategic religious assets with a modern strategic management approach, while maintaining their sharia integrity.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This research makes three important contributions to the fields of Islamic Social Finance and Sustainable Climate Finance. First, through a literature review of 50 selected sources (2023–2026), four critical research gaps are identified that have not been addressed simultaneously: the lack of integration between AI, waqf, climate funds, and the Sustainable Development Goals (SDGs), the absence of a SROWI metric, the absence of an AI-based inactive waqf inventory system, and the lack of a synthesis of RBV theory with ISF theory in the context of climate change. Second, this research proposes an original conceptual framework, the Climate Waqf Intelligence Framework (CWIF), that addresses these four gaps simultaneously. The CWIF consists of four integrated layers: AI-Based Waqf Asset Mapping, Climate Project Intelligence, Socio-Environmental Impact Prediction, and SROWI. The system is based on a combination of these three theories and is bound by the principles of Maqasid al-Shariah. Furthermore, the CWIF is designed with adequate technical specifications for practical implementation and verification. Third, the CWIF has significant theoretical implications, extending the ISF theory, developing the SROWI concept, and opening new research directions on strategic religious assets. Specifically, the CWIF can mobilize unused waqf assets to help fund renewable energy, environmental protection, food security, and clean water access, all of which contribute to the achievement of various SDGs.

Policy Recommendations

This study develops four strategic policy recommendations, each tailored to the role of each actor: The Indonesian Waqf Board (BWI) and the Indonesian Ministry of Religious Affairs should prioritize the development of a National Waqf Asset Registry (NWAR) utilizing AI technology as a top priority in the National Waqf Master Plan 2025–2045. They should allocate sufficient funds and collaborate with the Indonesian National Research and Innovation Agency (BRIN) to develop CV-based and NLP algorithms in the Indonesian language. The Financial Services Authority (OJK) and the Indonesian Ministry of Finance need to create creative regulations for a blended financing instrument called Climate Waqf Linked Sukuk (CWLS), which combines the potential of productive waqf with the green sukuk market as a Sharia-compliant climate financing alternative capable of attracting domestic and international institutional investors.

The Ministry of Environment and Forestry, together with the National Research and Innovation Agency (BRIN), should lead the development of an Indonesian Social Value Database specifically for the Muslim context, containing the economic value of various social and environmental impacts within the Indonesian Muslim community, as a key component in calculating SROWI (Indonesian Social Value). Second State Islamic Universities (PTKIN) should immediately launch a cross-disciplinary research and education program in Climate Islamic Finance and Technology (ClimateIFT). This program combines curriculum materials from Islamic economics, data science, and climate change studies, thereby producing the generation of Digital Nazir needed by the CWIF ecosystem.

Limitations and Future Research Agenda

This study has several shortcomings that must be frankly acknowledged. As a qualitative conceptual study, CWIF has not been tested in a real-world experiment. Furthermore, the impact projections presented are based on comparisons with projects in other countries that may have different backgrounds or circumstances. Two key areas for future research are: first, developing a computer-based SROWI model that can be tested using real-world data from BWI; and second, conducting preliminary research on CWIF in selected waqf clusters in the three provinces with the most waqf assets: West Java, Central Java, and West Sumatra, so that the results can be verified through empirical data.

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