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The Philosophy of Solid Waste Management from The Perspective of Islamic Developmental Worldview



Abstract: - This study explores the philosophy of solid waste management through the lens of the Islamic developmental worldview, presenting a comprehensive framework rooted in ethical, spiritual, and practical principles. Conventional waste management systems predominantly emphasize technical and economic aspects, often overlooking cultural, ethical, and spiritual dimensions that are critical for achieving sustainable solutions. Employing qualitative content analysis, this research identifies the foundational philosophy of waste management and examines it through Islamic teachings such as *tawhid* (oneness of God), *khalifah* (stewardship), and *maqasid al-Shariah* (higher objectives of Islamic law). The findings highlight that waste management, conceptualized as an act of stewardship, aligns with Islamic values of cleanliness, moderation, and sustainability. These principles foster ethical and holistic practices for societal and environmental well-being. Integrating Islamic principles into waste management not only addresses ethical deficiencies in conventional practices but also provides a transformative pathway toward sustainable development.

Keywords: - Islamic development, Islamic worldview, Solid waste management, Sustainability.

I. INTRODUCTION

Solid waste management has become an increasingly critical global issue with profound implications for environmental sustainability, public health, and societal well-being. Rapid urbanization and industrialization have led to exponential growth in waste generation, placing unprecedented strain on existing management systems. According to the [33], global waste production is projected to rise from 2.01 billion tons in 2016 to an alarming 3.4 billion tons by 2050—a staggering 70% increase within a few decades. This trend underscores the urgent need to reassess current waste management approaches and develop holistic, sustainable solutions that address environmental, social, and ethical dimensions.

Historically, waste management practices have evolved from basic disposal methods to complex technical systems influenced by industrial and technological advancements. However, the rapid expansion of urban centers has outpaced the capacity of traditional systems, exacerbating the global waste crisis. In countries such as India and Indonesia, millions of tons of waste are generated annually, much of which ends up in open dumps or waterways, triggering severe environmental and public health crises. The challenges are particularly acute in low- and middle-income nations, where inadequate infrastructure and limited financial resources impede effective waste management [3]. The environmental repercussions of improper waste management are extensive. Open dumping and poorly managed landfills contribute to soil and water contamination, jeopardizing biodiversity and agricultural productivity [31]. Additionally, waste incineration without adequate safeguards releases harmful pollutants, such as dioxins and heavy metals, into the atmosphere, exacerbating air quality issues and accelerating climate change. Methane emissions from unmanaged waste sites constitute a significant portion of global greenhouse gas emissions, with the Intergovernmental Panel on Climate Change (IPCC) identifying waste management as a major contributor to anthropogenic methane, accounting for nearly 20% of global emissions [16].

Public health challenges associated with mismanaged waste are equally alarming. Uncollected and improperly disposed waste provides breeding grounds for disease vectors such as mosquitoes and rodents, facilitating the spread of infectious diseases like malaria, dengue fever, and cholera [34]. Informal waste pickers, who often operate in hazardous conditions, face significant risks of exposure to toxic substances and physical injury due to a lack of protective measures. These systemic inequities highlight the disproportionate burden borne by marginalized communities in the absence of equitable waste management systems. Urbanization and industrialization further compound waste management challenges. Megacities such as Jakarta, Lagos, and Mumbai generate daily waste volumes that far exceed the capacity of existing municipal infrastructure, leading to illegal dumping and widespread environmental pollution. The issue is further exacerbated by industrial waste, which often contains hazardous materials requiring specialized treatment methods unavailable in many developing regions [3]. Conventional approaches to waste management, which focus on technical efficiency, economic feasibility, and regulatory

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compliance, frequently overlook cultural, ethical, and social dimensions. This neglect leads to unintended consequences such as public apathy, resistance to technological interventions, and perpetuation of unsustainable practices.

The Islamic developmental worldview offers a transformative framework for addressing these complex challenges. Rooted in principles such as *tawhid* (oneness of God) and *khalifah* (stewardship), the Islamic perspective emphasizes the interconnectedness of creation and the moral responsibility of humans as custodians of the Earth. The Quran reinforces this ethos, stating, "*and eat and drink, but do not waste extravagantly. Indeed, He does not like the wasteful.*" (Surah Al-A'raf: 7:31) and "*and do not waste [your wealth] extravagantly. Indeed, the wasteful are brothers of the devils, and Satan is ever ungrateful to his Lord.*" (Surah Al-Isra: 17:26-27). This verse underscores the Islamic imperatives of moderation (*wasatiyyah*) and accountability (*hisab*) in resource consumption and waste generation. Moreover, the concept of *maqasid al-Shariah* (higher objectives of Islamic law) provides a comprehensive ethical framework for waste management. By prioritizing the preservation of life, intellect, lineage, property, and faith, *maqasid al-Shariah* aligns seamlessly with the goals of environmental sustainability and public well-being.

This study is particularly relevant in the context of Malaysia, a rapidly developing nation grappling with the dual challenges of economic growth and environmental sustainability. Malaysia generates approximately 38,000 tons of solid waste daily, with recycling rates remaining low despite national initiatives to promote waste reduction and circular economy principles [30]. By integrating Islamic principles into waste management, Malaysia has a unique opportunity to address ethical gaps in conventional practices while fostering community engagement through culturally resonant solutions. This research aims to explore the philosophy of solid waste management through the lens of the Islamic developmental worldview. The study seeks to make both theoretical and practical contributions to the sustainability discourse. Theoretically, it expands the understanding of how ethical and spiritual dimensions can enhance waste management frameworks. Practically, it provides actionable insights for policymakers, educators, and community leaders to develop holistic systems that align with societal values and environmental imperatives.

II. LITERATURE REVIEW

Solid waste management has emerged as a critical area of research, reflecting its significance in addressing environmental, social, and economic challenges. The existing body of literature highlights diverse approaches, including technological innovations, policy frameworks, and socio-cultural perspectives, underscoring the interdisciplinary nature of sustainable waste management.

Conventional solid waste management systems primarily focus on technical solutions, regulatory compliance, and economic efficiency. While these approaches have achieved notable success in developed nations, their applicability in low- and middle-income countries is often limited by resource constraints, policy gaps, and infrastructural inadequacies [10]. For instance, in Southeast Asia, fragmented governance structures and insufficient funding remain persistent barriers to effective waste management [21][22]. Moreover, a growing body of research highlights the implementation gap between policy design and execution. Governance challenges, such as weak inter-agency coordination and a lack of adaptive mechanisms, hinder the realization of sustainability goals [14]. [25] emphasize the need for greater integration of community input into local government planning processes. In Malaysia, governance issues are particularly pronounced, with inefficiencies arising from a lack of harmonization between federal and state-level policies [25]. These findings underscore the need for comprehensive frameworks that address both structural and community-level barriers.

The adoption of advanced technologies has transformed the waste management landscape, offering solutions to enhance operational efficiency and mitigate environmental impacts. [2] identify the potential of artificial intelligence (AI) in optimizing waste collection, sorting, and recycling processes. Similarly, Internet of Things (IoT)-based systems and blockchain technology have been proposed to improve traceability and transparency in waste management operations [27] [24]. In tackling plastic waste, pyrolysis has emerged as a promising alternative to traditional landfilling and incineration methods. Studies by [6] and [23] advocate for pyrolysis as an effective method for converting plastic waste into usable energy, although they note the high costs and technical expertise required for widespread implementation.

Incorporating technological innovations into a circular economy framework has been proposed as a pathway to achieving sustainable development goals. [9] argue that Industry 4.0 technologies can enable smart waste systems that integrate waste-to-energy solutions with recycling initiatives. However, the successful implementation of such systems requires substantial policy support and stakeholder collaboration. The role of socio-cultural and ethical

considerations in waste management is also increasingly emphasized in recent literature. [26] highlight the importance of cultural sensitivity and public participation in municipal waste management policies, particularly in diverse societies where cultural norms significantly influence waste disposal behaviours. Stakeholder engagement has been identified as a critical factor in overcoming capacity constraints in rapidly urbanizing regions. Studies by [7] and [28] demonstrate that public awareness campaigns and community-driven approaches enhance the effectiveness of waste reduction initiatives. Additionally, ethical principles such as inclusivity and fairness have been linked to the development of sustainable environmental policies [13].

Islamic ethical perspectives provide a profound framework for integrating socio-cultural dimensions into waste management practices, as they offer a unique blend of moral, spiritual, and practical guidelines rooted in the Islamic worldview. [19] highlights key principles such as *tawhid* (oneness of God), *khalifah* (stewardship), *maslahah* (public interest), and *maqasid al-Shariah* (higher objectives of Islamic law), which collectively emphasize the interconnectedness of human actions, society, and the environment. The principle of *tawhid* stresses the unity of all creation under the divine order, establishing that all natural resources are entrusted to humans as a test of their responsibility and gratitude. This perspective directly ties ethical waste management practices to an individual's faith, encouraging mindfulness in consumption and waste disposal. For instance, wastefulness is considered contrary to the principle of *tawhid*, as highlighted in the Quran: "Indeed, the wasteful are brothers of the devils" (Surah Al-Isra: 27). This reinforces the socio-cultural norm of moderation (*wasatiyyah*) and its application in reducing wasteful behaviours across communities.

The concept of *khalifah* frames humans as stewards of the Earth, holding them accountable for the preservation and sustainable use of its resources. This stewardship is not limited to individual actions but extends to collective responsibility, encouraging community-driven approaches to waste management. According to the reference, this principle fosters a shared commitment to protect the environment, integrating socio-cultural values such as cooperation and mutual respect. By emphasizing the spiritual dimension of stewardship, *khalifah* inspires community-based waste initiatives, such as mosque-led recycling programs or eco-awareness campaigns, which resonate with cultural and religious sensibilities [19].

Another core element, *maslahah*, prioritizes public interest and societal well-being in all forms of decision-making. This principle guides the development of waste management policies that align with community needs and cultural practices. For example, the reference points out that integrating Islamic ethics into human development management ensures inclusivity and fairness, which can be applied to waste management by incorporating marginalized groups, such as informal waste pickers, into formal systems. This creates opportunities for social equity while fostering environmental sustainability. The *maqasid al-Shariah* offers a holistic framework for aligning waste management practices with broader societal objectives, including the preservation of life, intellect, property, and the environment. This framework supports the integration of socio-cultural dimensions by ensuring that waste management systems address not only environmental concerns but also social justice and community empowerment. For instance, the reference explains how Islamic ethical perspectives prioritize collective well-being, which can manifest in policies that encourage community participation in recycling initiatives or the equitable distribution of resources [19].

Islamic ethical perspectives provide a distinctive and comprehensive lens for incorporating socio-cultural dimensions into waste management practices. By emphasizing principles such as *tawhid*, *khalifah*, *maslahah*, and *maqasid al-Shariah*, these perspectives ensure that waste management strategies are not only environmentally sustainable but also culturally and socially relevant. The reference underscores the potential of Islamic ethics to inspire practical solutions that align with community values, promote public interest, and foster collective responsibility for a sustainable future [19].

[4] and [18] emphasize the potential of integrating Islamic principles into waste management in Muslim-majority countries, where environmental stewardship is framed as both a moral obligation and an act of worship. While the theoretical alignment between Islamic teachings and sustainability goals is well-established, empirical studies on the practical application of these principles remain limited. This highlights the need for research that develops actionable frameworks for operationalizing Islamic ethics within existing waste management systems.

Governance and policy frameworks are central to shaping the effectiveness of waste management systems. Recent studies underscore the importance of coherent policies that align local, national, and international objectives. Policy fragmentation is identified as a critical challenge in Sub-Saharan Africa [5], while adaptive governance models are advocated to address the dynamic nature of environmental issues [14]. In Malaysia, the Strategic Environmental Assessment Policy Integration Model proposed by [32] offers a blueprint for incorporating sustainability into waste management planning. However, enforcement challenges and limited cross-sectoral

collaboration continue to hinder progress [15]. Globally, integrating community participation into policymaking has yielded mixed results. [22] observe that while such approaches enhance public engagement, they require substantial investment in education and capacity-building to be effective.

The Islamic worldview provides a holistic framework for addressing waste management challenges by emphasizing the interconnectedness of all creation. Core principles, including *tawhid* (oneness of God), *khalifah* (stewardship), and *maqasid al-Shariah* (higher objectives of Islamic law), promote environmental conservation and sustainable resource use [12]. Research by [4] and [18] highlights the potential of Islamic principles in encouraging waste reduction, recycling, and community-driven solutions. These principles frame environmental stewardship as an ethical imperative, aligning with the broader objectives of sustainability.

Despite these advancements, several gaps persist in the literature. The integration of advanced technologies with socio-cultural and ethical approaches remains underexplored. Empirical research on the practical application of Islamic principles in waste management is limited, and the role of governance in bridging policy and community engagement requires further investigation. Future studies should adopt interdisciplinary approaches that combine technological innovations, ethical considerations, and robust governance mechanisms. By addressing these gaps, researchers can contribute to the development of more inclusive and sustainable waste management systems. The incorporation of Islamic principles offers a promising pathway for fostering sustainability, particularly in Muslim-majority regions, and bridging the gap between theoretical frameworks and practical solutions to the global waste crisis.

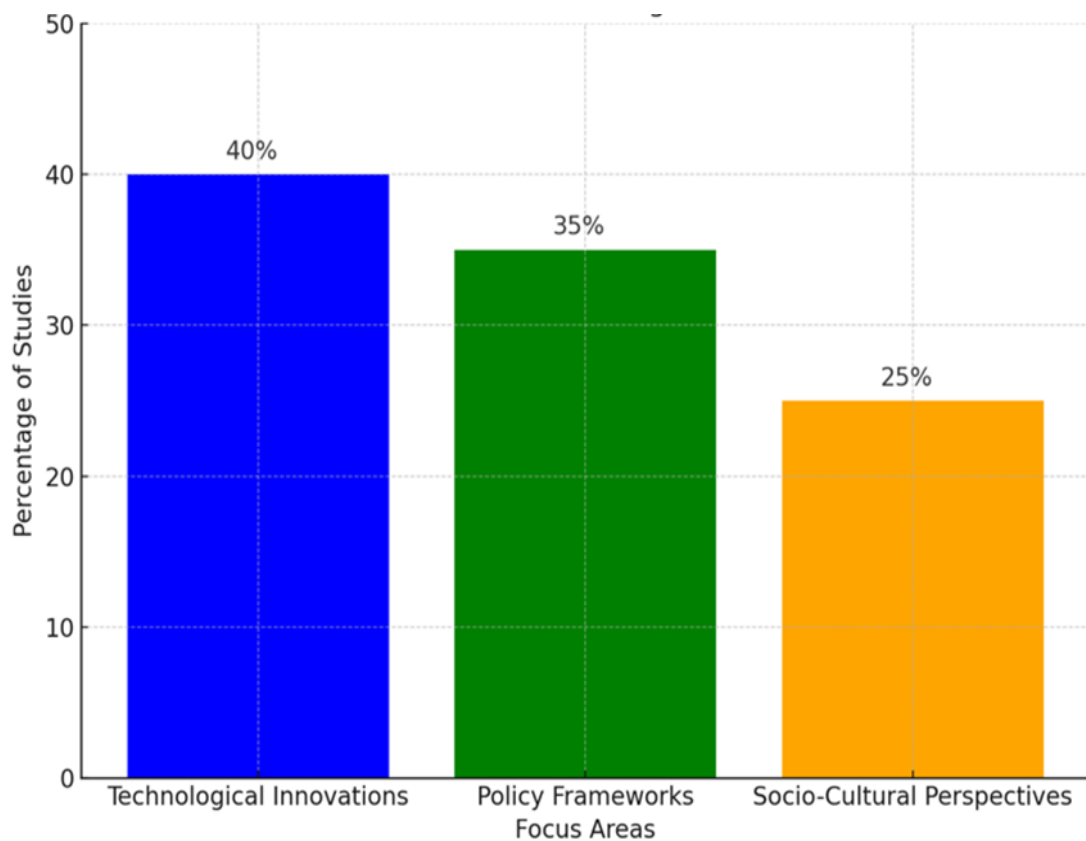


Figure 1: Percentage of Studies

III. METHODOLOGY

This study employs a qualitative research design to explore the philosophy of solid waste management through the lens of the Islamic developmental worldview. A qualitative approach is particularly suited to the study's objectives, as it allows for an in-depth examination of complex philosophical and ethical concepts rooted in Islamic principles such as *tawhid* (oneness of God), *khalifah* (stewardship), and *maqasid al-Shariah* (higher objectives of Islamic law). Adopting an interpretive perspective, the research aims to provide nuanced insights into how these principles can inform sustainable waste management practices.

The primary method of inquiry is document analysis, focusing on a wide range of textual materials. Primary data is derived from Islamic scriptures, including verses from the Quran and Hadiths, to identify ethical principles related to environmental stewardship, waste reduction, and resource management. These texts form the

foundational basis for contextualizing the Islamic worldview in waste management. Secondary sources include academic publications, policy documents, and reports on solid waste management, sustainability, and Islamic ethics. Additionally, case studies of Islamic-based waste management initiatives provide empirical insights that enrich the analysis. The study emphasizes contemporary relevance by incorporating sources published between 2019 and 2024, while older foundational works are included selectively to provide historical context.

Data Collection involves systematic searches in academic databases such as Scopus, Web of Science, and Google Scholar. Keywords such as "Islamic worldview," "solid waste management," "environmental ethics," and "maqasid al-Shariah" are used to locate relevant studies. Policy documents and reports from institutions and organizations in Muslim-majority countries, particularly Malaysia, are also reviewed to ensure contextual relevance. Inclusion criteria prioritize recent and thematically relevant publications, while exclusion criteria filter out outdated or irrelevant sources.

For the data analysis, qualitative content analysis is utilized to interpret textual data and uncover recurring themes. This method enables a deep understanding of the philosophical underpinnings of solid waste management as viewed through the lens of the Islamic worldview. The analysis is systematically structured around four fundamental components derived from Islamic teachings. First, *tawhid* emphasizes the spiritual and ethical dimensions of waste management, encouraging the recognition of interconnectedness and divine accountability in the treatment of resources. Second, the principle of *khalifah* highlights human responsibility as stewards of the Earth, emphasizing the need for sustainable and conscientious resource management. Third, ethical values such as moderation (*wasatiyyah*) and accountability (*hisab*) are integral to fostering sustainable consumption patterns and ensuring transparency in waste management practices. Lastly, the framework incorporates *maqasid al-Shariah*, which aligns waste management strategies with broader objectives such as preserving life, property, and the environment. Together, these components provide a comprehensive and morally anchored approach to understanding and addressing the challenges of waste management within an Islamic context.

The analysis involves a systematic coding process, beginning with open coding to identify key concepts, followed by axial coding to group related ideas, and selective coding to refine categories into overarching themes. NVivo software is utilized to organize and code textual data, ensuring a systematic and efficient analytical process. Manual reviews are also conducted for primary religious texts to maintain contextual sensitivity and interpretative accuracy. To enhance the validity and reliability of the findings, triangulation is employed by comparing data from multiple sources. Peer debriefing is integrated into the process, involving experts in Islamic studies and solid waste management to review and provide feedback on the interpretations. This collaborative approach ensures the rigor and credibility of the analysis. Ethical Considerations are central to this study, particularly given the sensitivity of interpreting Islamic scriptures. Religious texts are analysed with scholarly rigor to ensure accuracy and alignment with established interpretations. Secondary sources are properly attributed, and potential biases in the analysis are mitigated through transparent methodological practices.

In summary, this methodology integrates a qualitative research design, document analysis, and content analysis to explore the philosophical dimensions of solid waste management within the Islamic worldview. By synthesizing primary religious texts with contemporary academic and policy literature, the study aims to contribute to both theoretical understanding and practical applications in sustainable waste management.

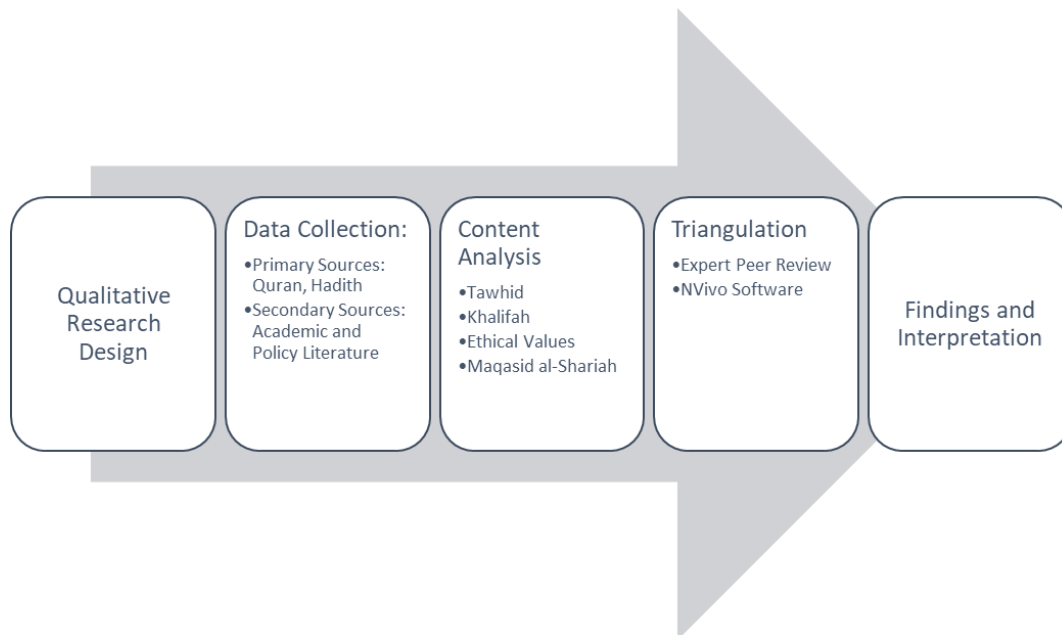


Figure 2: Methodology

IV. FINDINGS AND DISCUSSION

This section explores how Islamic principles can be integrated into solid waste management practices, aligning with the research objectives of identifying philosophical foundations and analysing them through the lens of the Islamic developmental worldview. By examining the principles of *tawhid* (oneness of God), *khalifah* (stewardship), moderation, accountability, and *maqasid al-Shariah* (higher objectives of Islamic law), the study provides a comprehensive framework for sustainable waste management.

The principle of *tawhid* emphasizes the interconnectedness of all creation, framing waste management as a moral and spiritual responsibility. The Quran explicitly states, "*and eat and drink, but do not waste extravagantly. Indeed, He does not like the wasteful.*" (Surah Al-A'raf: 7:31) and "*and do not waste [your wealth] extravagantly. Indeed, the wasteful are brothers of the devils, and Satan is ever ungrateful to his Lord.*" (Surah Al-Isra: 17:26-27), urging mindfulness in resource use. This principle challenges societal trends of overconsumption and neglect. Globally, waste mismanagement continues to have severe consequences. According to the [33], 33% of the 2.01 billion tons of municipal waste generated annually is mismanaged, causing significant environmental harm. In Malaysia, daily waste generation amounts to 38,000 tons, with a recycling rate of only 28.1% as of 2022 [30]. However, initiatives rooted in spiritual accountability have shown promise. For instance, Malaysia's mosque-led recycling campaigns effectively link waste reduction to acts of worship, mobilizing communities around shared values. Similarly, the Green Hajj Initiative incorporates Islamic teachings to encourage pilgrims to adopt sustainable practices, such as using reusable items and minimizing waste during the annual pilgrimage. This program demonstrates the scalability of spiritually motivated waste management practices.

The concept of *khalifah* highlights human responsibility and stewardship over the Earth. The Quran asserts, "*and it is He who has made you successors upon the earth and has raised some of you above others in rank, that He may try you through what He has given you.*" (Surah Al-An'am: 165), aligning waste management with collective responsibility. Community-driven initiatives exemplify this principle in action. Indonesia's Eco-Mosque Initiative transforms mosques into environmental hubs, integrating solar panels, rainwater harvesting systems, and waste segregation facilities. These efforts, combined with sermons on stewardship, have increased community recycling rates by 25% within the first year [9]. Likewise, Turkey's Zero Waste Program promotes waste reduction through the integration of Islamic values, leading to a 20% increase in national recycling rates. Despite these successes, challenges persist, particularly in Malaysia. Although the 2007 Solid Waste and Public Cleansing Management Act provides a regulatory framework, weak enforcement and limited public engagement hinder its effectiveness [3]. Incorporating *khalifah* into waste management policies can enhance public participation and foster collective accountability for sustainable practices.

Islamic values such as moderation (*wasatiyyah*) and accountability (*hisab*) further contribute to promoting sustainable lifestyles. Moderation discourages overconsumption, while accountability reinforces individual and collective responsibility for environmental outcomes. The plastic waste crisis exemplifies the consequences of

neglecting these values. Globally, over 300 million tons of plastic waste are produced annually, with only 9% being recycled [6]. Southeast Asia accounts for 60% of global marine plastic pollution, highlighting the urgency of addressing this issue [21]. Initiatives such as Plastic-Free Fridays in the UAE encourage individuals to reduce their reliance on single-use plastics, resulting in a 40% decline in plastic bag usage among participants. Similarly, Islamic waste audits in Zanzibar involve households tracking their waste output and receiving tailored guidance, leading to a 15% reduction in household waste. These programs demonstrate the potential of accountability-driven approaches to foster behavioural change and sustainable consumption.

The *maqasid al-Shariah* provides an ethical framework for aligning waste management practices with broader societal goals, emphasizing the preservation of life, intellect, property, lineage, and faith. Effective waste management supports these objectives by safeguarding public health, promoting environmental sustainability, and ensuring resource efficiency. In Dhaka, Bangladesh, waste-to-energy plants convert organic waste into biogas, reducing landfill dependency while providing affordable energy to low-income households. These projects, often supported by Islamic charities, illustrate the preservation of resources and improvement of public health. Similarly, Jordan's Green Faith Initiative integrates Islamic principles into circular economy practices. Mosques and community centres host recycling and composting workshops, promoting resource efficiency and generating socio-economic benefits. These initiatives demonstrate how Islamic objectives can inspire innovative and inclusive solutions to waste management challenges.

Despite these promising applications, implementing Islamic principles in solid waste management faces significant challenges. Social barriers, including limited awareness of Islamic environmental ethics and resistance to behavioural change, restrict community engagement. A study in Malaysia and Indonesia revealed that while many individuals recognize wastefulness as contrary to Islamic teachings, only a small percentage actively participate in recycling programs [9]. Institutional challenges also undermine the effectiveness of Islamic-inspired waste management systems. Fragmented governance structures and overlapping responsibilities among federal, state, and local governments often lead to inefficiencies. For example, Malaysia's 2007 Solid Waste and Public Cleansing Management Act, while comprehensive, suffers from weak enforcement, particularly in rural areas [9].

Financial constraints further limit the scalability of sustainable waste management initiatives. Establishing infrastructure such as waste-to-energy plants and advanced recycling systems requires substantial investment, which is often lacking in developing countries. Many programs rely on external funding, which is unsustainable in the long term [21]. Technological challenges also persist, as innovations like AI-driven waste sorting and blockchain-enabled tracking systems remain inaccessible in many regions due to high costs and limited expertise [2].

Addressing these challenges requires a multi-faceted approach. Enhancing public awareness through religious leaders and mosque-based campaigns can inspire behavioural change. Governance reforms, including clearer coordination among government agencies and the inclusion of religious institutions in policymaking, can strengthen the effectiveness of waste management systems. Financial barriers can be addressed through Islamic finance mechanisms such as *waqf* (endowments) and *zakat* (almsgiving), which align funding sources with ethical principles [12]. Finally, investing in affordable and context-specific technologies, such as community-based recycling centres, can bridge gaps in infrastructure and capacity.

In conclusion, the Islamic developmental worldview offers a comprehensive and ethical framework for addressing waste management challenges. By integrating *tawhid*, *khalifah*, moderation, accountability, and *maqasid al-Shariah*, waste management becomes a moral and spiritual endeavour that promotes societal and environmental well-being. These principles provide actionable guidance for policymakers and community leaders, fostering sustainability while addressing global waste challenges. Future research should prioritize scaling successful initiatives and bridging theoretical frameworks with practical applications.

V. FINDINGS AND DISCUSSION

Islamic principles into solid waste management offers a holistic and ethical framework to address global waste challenges. The principles of *tawhid* (oneness of God), *khalifah* (stewardship), moderation (*wasatiyyah*), accountability (*hisab*), and *maqasid al-Shariah* (higher objectives of Islamic law) provide a comprehensive approach that aligns moral and spiritual obligations with practical waste management strategies. The findings highlight successful applications such as the Green Hajj Initiative, Indonesia's Eco-Mosque projects, and Bangladesh's waste-to-energy programs, illustrating the transformative potential of these principles in fostering sustainability and community engagement. These examples demonstrate that integrating Islamic teachings with

waste management practices can simultaneously address environmental degradation, enhance public participation, and promote socio-economic benefits [11].

Despite these promising outcomes, several challenges hinder the widespread adoption of Islamic-inspired waste management practices. Limited public awareness of Islamic environmental ethics, institutional inefficiencies, financial constraints, and technological barriers are significant obstacles. For instance, many communities are unaware of the practical implications of stewardship (*khalifah*) and waste reduction (*tawhid*), leading to low participation in recycling programs and sustainable practices. Similarly, fragmented governance structures and overlapping responsibilities among government agencies often result in inconsistent policy implementation, particularly in rural and underserved areas. Financial constraints further exacerbate these challenges, as the infrastructure required for advanced waste management—such as recycling facilities and waste-to-energy plants—requires substantial investment. Lastly, the high cost and limited accessibility of technological innovations, such as AI-driven waste sorting systems, restrict their application in many developing countries.

To address these challenges, several recommendations are proposed. First, enhancing public awareness and education is crucial. Religious leaders, mosques, and educational institutions should actively promote Islamic environmental ethics through sermons, workshops, and public campaigns. Initiatives such as mosque-based recycling drives and community-led waste audits have proven effective in mobilizing communities and fostering behavioural change. Second, strengthening governance and policy integration is essential. Governments must improve coordination among federal, state, and local agencies and include religious institutions in policymaking processes. Clear enforcement mechanisms and incentives for sustainable practices, such as penalties for illegal dumping and rewards for recycling, can further enhance compliance. Third, leveraging Islamic financial instruments, such as *waqf* (endowments) and *zakat* (almsgiving), can provide sustainable funding sources for community-led projects, particularly in underserved regions.

Table 1: Islamic Principle, Key Focus and Example Application

Islamic Principle	Key Focus	Example Application
Tawhid	Emphasizing the interconnectedness of creation and moral responsibility in waste management	Mosque-led recycling campaigns in Malaysia, Green Hajj Initiative promoting sustainable practices
Khalifah	Human responsibility to care for the Earth and its resources	Eco-Mosque Initiative in Indonesia, Turkey's Zero Waste Program
Moderation (<i>Wasatiyyah</i>)	Discouraging overconsumption and promoting balanced resource use	Plastic-Free Fridays in the UAE, Islamic waste audits in Zanzibar
Accountability (<i>Hisab</i>)	Reinforcing individual and collective responsibility for sustainable environmental practices	Plastic reduction campaigns in the UAE, Zanzibar's household waste audits
Maqasid al-Shariah	Aligning waste management with broader societal goals: preservation of life, intellect, property, lineage, and faith	Waste-to-energy projects in Dhaka, Bangladesh; Green Faith Initiative in Jordan

These instruments align financial mechanisms with ethical principles, ensuring long-term support for waste management initiatives.

Additionally, investing in technological innovation is critical for bridging infrastructure gaps. Developing affordable, context-specific solutions, such as community-based recycling centres and low-cost composting systems, can address the unique needs of diverse communities. Partnerships with international organizations can facilitate access to advanced technologies like AI and blockchain, improving efficiency and transparency in waste management systems. Scaling successful models is another key recommendation. Programs such as Indonesia's Eco-Mosque Initiative and Bangladesh's waste-to-energy projects should be expanded to new regions, drawing on their success to refine and replicate these approaches. Regional collaboration and knowledge-sharing platforms can further support the scaling of effective practices.

Finally, interdisciplinary research should be prioritized to bridge theoretical frameworks with practical applications. Studies that integrate advanced technologies, socio-cultural dimensions, and Islamic ethics can further enhance waste management systems globally. Such research can provide actionable insights for policymakers, religious leaders, and community organizations, ensuring that waste management practices are both sustainable and culturally resonant.

In conclusion, the integration of Islamic principles into solid waste management provides a transformative approach to addressing environmental challenges. By aligning spiritual, ethical, and practical dimensions, these

principles offer a pathway to sustainable development that resonates with cultural and religious values. Overcoming implementation barriers requires collaborative efforts among policymakers, religious leaders, communities, and researchers. Through education, governance reform, financial innovation, and technological advancement, Islamic-inspired waste management practices can achieve their full potential, contributing to environmental stewardship, societal well-being, and global sustainability.

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