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Qur'anic and Hadith-Based Ecological Education as a Non-Formal Approach to Address Environmental Pollution

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ABSTRACT

Environmental pollution has become a serious issue in metropolitan areas, including Palembang, with a direct impact on community health and quality of life, particularly in relation to waste management at the final disposal site (*Tempat Pembuangan Akhir*/TPA). This study aims to explore ecological messages in the Qur'an and Hadith and examine their potential contribution to strengthening faith-based ecological awareness through non-formal Islamic education. This study employed a qualitative approach using a library research design. This study used the *Tafsir Mawdu'iy*. The data were collected from Qur'anic verses, Hadith, classical and contemporary tafsir, and scholarly literature on ecology and environmental education. Then, they were analysed contextually by integrating scientific and social perspectives. References to community-based educational practices around the Sukawinatan landfill are drawn from secondary sources and documented studies rather than direct field observation. The findings reveal that Qur'anic and Hadith-based ecological education can enhance faith-based environmental awareness. It is reflected in community initiatives such as tree planting and pollution reduction efforts. This study concludes that integrating Islamic ecological teachings into non-formal education has the potential to promote clean and healthy living behaviors and support sustainable environmental management.

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INTRODUCTION

In daily life, we are quite familiar with the word "waste". According to the Indonesian Dictionary (KBBI), waste is any object or item that is discarded because it is no longer useful.[1] According to Law No. 18 of 2008 on Waste Management, waste is defined as the residue of human daily activities and/or natural processes in solid form.[2] The issue of waste seems endless, given that humans produce waste every day. This is mainly due to consumptive lifestyles and household waste, which are causing the amount of waste in Indonesia to increase. Waste management solutions such as recycling and reuse, open burning, and the creation of final disposal sites (*Tempat Pembuangan Akhir*/TPA) are being offered to manage existing waste.[3] Non-biodegradable waste that ends up in landfills or is incinerated causes new problems, such as environmental pollution, air pollution, and health issues that affect the surrounding community.[4]

Problems in waste management often occur in metropolitan cities such as Jakarta, Surabaya, and Palembang. In this study, the author will further examine the waste problems in Palembang, particularly at the Sukawinatan landfill. Palembang, as one of the metropolitan cities with highly dynamic development, has experienced significant population growth, which in turn has led to a rapid increase in daily activities. As a result, the volume of waste and solid garbage continues to rise.[5] Waste is generated by individuals, groups of people, or legal entities that can produce waste accumulation. The source of waste can come from waste-generating activities such as markets, households,[6] street sweeping, industrial activities,[7] or other commercial activities.[8] The waste produced from human activities may contain hazardous materials such as dyes, batteries, pesticide residues, and industrial waste.[9] In terms of waste composition, the majority of waste in Indonesia is classified as biodegradable or organic waste, accounting for approximately 70%, followed by 28% inorganic waste, and 2% classified as hazardous and toxic waste (B3). The waste composition in the city of Palembang consists of 54% organic waste, 38% inorganic waste, and 8% other

[1] "KBBI VI Daring," accessed August 11, 2025, https://kbbi.kemdikbud.go.id/entri/sampah.

[2] Indonesian Central Government, *Law No. 18 of 2008 on Waste Management* (Jakarta, 2008).

[3] Maskun et al., "Legal Framework Model for Sustainable Solid Waste Management in Indonesia: A Contemporary Environmental Fiqh Perspective," *MILRev: Metro Islamic Law Review* 4, no. 2 (September 2025): 1097–122, https://doi.org/10.32332/milrev.v4i2.11104.

[4] Mayrianti Annisa Anwar et al., "Sustainable Waste Management Strategies for Multilayer Plastic in Indonesia," *Cleaner and Responsible Consumption* 16, no. 100254 (March 2025): 1–15, https://doi.org/10.1016/j.clrc.2025.100254.

[5] Ramadhani and Isdaryanto Iskandar, "Waste Management Sites - Reduce, Reuse, and Recycle (Tps3r) Construction Study in Sekanak Area, Palembang City," *International Journal of Engineering Applied Sciences and Technology* 7, no. 2 (June 2022): 16–23, https://doi.org/10.33564/IJEAST.2022.v07i02.003.

[6] Sonil Nanda and Franco Berruti, "Municipal Solid Waste Management and Landfilling Technologies: A Review," *Environmental Chemistry Letters* 19, no. 2 (April 2021): 1433–56, https://doi.org/10.1007/s10311-020-01100-y.

[7] Xiaoxuan Peng et al., "Recycling Municipal, Agricultural and Industrial Waste into Energy, Fertilizers, Food and Construction Materials, and Economic Feasibility: A Review," *Environmental Chemistry Letters* 21, no. 2 (April 2023): 765–801, https://doi.org/10.1007/s10311-022-01551-5.

[8] Rajeev Pratap Singh, Vishal Prasad, and Barkha Vaish, eds., *Advances in Waste-to-Energy Technologies*, 1st ed. (Boca Raton: CRC Press, 2019), 288, https://doi.org/10.1201/9780429423376.

[9] Catur Retnaningdyah and Viky Vidayanti, "Characteristics of Anthropogenic Solid Waste in Some Mangrove Ecosystems of East Java, Indonesia," *BIO Web of Conferences* 154, no. 01001 (2025): 1–10, https://doi.org/10.1051/bioconf/202515401001.

types of waste.[10]

According to Detik News, on Friday, November 24, 2023, Dr. Eng. Muhammad Syamsiro wrote in "Addressing the Waste Emergency in Palembang City" that recently, several fires have occurred at the Sukawinatan TPA in Palembang, seriously disrupting community activities due to smoke pollution and foul odors in the surrounding areas. This phenomenon has also been observed in many other major cities in Indonesia, such as at TPA Bantar Gebang in Jakarta, TPA Sarimukti in Bandung, and TPA Jatibarang in Semarang. Hence, serious and integrated handling by both government and community is required to address these issues. In Palembang City, the total volume of waste transported to the Sukawinatan landfill reaches 1.200 tons per day. On the other hand, waste management has not been fully optimized. Therefore, according to Bakohumas Palembang, on July 3, 2024, the Acting Mayor of Palembang, Dr. Ucok Abdul Rauf Damenta, responded to this condition by conducting a coordination meeting with the central government (Directorate General of Regional Development and Bappenas), discussing large-scale urban waste issues. He stated that for waste processing at TPA Sukawinatan, a grant from the Ministry of Home Affairs through the World Bank would be provided.

There are several technological alternatives for waste destruction, including thermal (high-temperature) methods, biological, and physical methods. Among them, thermal technology is recognized as the most effective, capable of destroying up to 90% of waste and leaving only 10% as residue. This method can also generate electricity through the PTLsa system.[11] Fortunately, the Palembang City Government, through the Environmental Agency, has adopted this method—utilizing incinerator technology to process community waste while generating electricity. This choice is considered appropriate and offers a viable solution to the waste emergency in Palembang. However, unavoidable consequences still occur, especially in emergencies such as floods or uncontrolled fires.

Despite the ongoing processing, residual impact remains—particularly air, soil, and water pollution—which the Sukawinatan waste management system has tried to minimize. For example, several studies documented in academic journals have identified these environmental issues, including the following: the paper is written by Achmad Fickry Faisya, Dini Arista Putri, and Yustini Ardillah. Sukawinatan is one of the actively operating final disposal sites in Palembang. It uses a controlled landfill system with a high risk of increased anaerobic microbial decomposition, which produces hydrogen sulfide and ammonia gases after the waste burial process. This study aimed to analyze the environmental health risks of H_2S and NH_3 exposure on the local community near the Sukawinatan TPA. The research employed a descriptive study with a quantitative analysis method, specifically using the Environmental Health Risk Analysis (EHRA) approach. The study sample consisted of 50 community members selected through purposive sampling within a radius of 300 to 600 meters from the landfill. The data were analyzed using univariate analysis and risk analysis.

[10] Mega Putri et al., "Characteristics, Distribution Patterns and Efforts to Handle Macroplastic Waste on the Border of the Musi River, Palembang City, Indonesia," *Glasnik Srpskog Geografskog Drustva* 104, no. 2 (2024): 197–212, https://doi.org/10.2298/GSGD2402197P.

[11] Shamshad Khan et al., "Technologies for Municipal Solid Waste Management: Current Status, Challenges, and Future Perspectives," *Chemosphere* 288, no. 1 (February 2022): 132403, https://doi.org/10.1016/j.chemosphere.2021.132403.

Research findings that the highest H_2S concentration measured was 0.003 mg/m³, and for NH_3 it was 0.031 mg/m³. The Risk Quotient (RQ) value for NH_3 was below 1 at all observed locations, indicating low risk. However, the RQ value for H_2S at certain locations was found to be above 1, suggesting potential health risks. Based on these results, the study concluded that H_2S exposure around Sukawinatan posed a risk to community health, as the RQ value exceeded the threshold. It was recommended that the Palembang City Sanitation and Environment Agency implement risk management strategies for the affected communities.[12]

In Discretie, Azalia Deselta, Waluyo, and Asianto Nugroho authored. Their article elaborated on the role of the Environmental and Sanitation Agency of Palembang City in managing waste at the Sukawinatan TPA. While the agency's role was described as well-organized in terms of coordination and reporting, several critical issues remained unresolved and were inconsistent with existing regulations. In addition, the waste management system that does not yen utilize advanced equipment often hampers the waste processing, resulting in controlled landfill methods that do not meet the requirements stipulated in Article 1, Paragraph (22) of Ministerial Regulation Number 3 of 2013. The management of hazardous and toxic waste (B3) that still ends up in the landfill is also not in accordance with Article 34 of the same regulation. Furthermore, the management of energy and the 3Rs (Reuse, Recycle, Reduce) is not fully optimal. Article 23 of the Palembang City Regional Regulation Number 3 of 2015 states that non-recyclable waste must be processed at the landfill and converted into an energy source. However, the Sukawinatan landfill has not yet been able to continuously manage energy from methane gas and is only capable of implementing the 3R system. Thus, the role of the Environmental and Sanitation Department (DLHK) of Palembang City in managing waste at the Sukawinatan landfill has been running properly, with coordination and reporting systems also in good order. However, Palembang City still requires more attention in terms of advanced technology-based waste management, especially at the Sukawinatan landfill.[13]

In her academic work, Warsinah from the Environmental Management Postgraduate Program at Sriwijaya University concluded the following: lead concentration in water compartments was lower than in sediment, plants, and fish. Lead levels in water were still below environmental quality standards set by South Sumatra Governor Regulation No. 8 of 2012, Lead bioconcentration in fish products cultivated in buffer zones exceeded permissible limits, Lead bioconcentration in water spinach (Ipomoea aquatica) also exceeded the maximum allowable heavy metal contamination for fruits and vegetables, making it risky for consumption, Lead distribution in water and sediment compartments decreased with increasing distance from the landfill core zone. The study of lead (Pb) heavy metals is necessary because exposure to heavy metals that exceed threshold limits is highly hazardous to human health. In the leachate water from the Sukawinatan landfill, the concentrations of

[12] Achmad Fickry Faisya, Dini Arista Putri, and Yustini Ardillah, "Environmental Health Risk Analysis of Hydrogen Sulfide (H2S) and Ammonia (NH3) Exposure in the Community of the Sukawinatan Landfill Area, Palembang City, 2018", *Jurnal Kesehatan Lingkungan Indonesia* 18, no. 2 (October 2019): 126, https://doi.org/10.14710/jkli.18.2.126-134.

[13] Azalia Deselta and Asianto Nugroho, "Analysis of Waste Management at the Sukawinatan Final Processing Site in the Role of the Palembang City Environment and Sanitation Agency", *Jurnal Discretie* 2, no. 1 (July 2021): 1, https://doi.org/10.20961/jd.v2i1.52854.

heavy metals found were: Ni 0.04 ppm, Cu 0.30 ppm, Cd 0.03 ppm, Cr 0.05 ppm, Pb 2.050 ppm, As 0.05 ppm, and Hg 0.35 ppm. The study suspected that the high levels of heavy metals such as Ni, Cu, Cd, Cr, Pb, As, and Hg had been exposed and accumulated in the aquatic compartments surrounding the landfill. As outlined above, the government's role has been evident in addressing urban waste issues, particularly the Palembang City Government's efforts to resolve problems around the Sukawinatan landfill. The development of a region will run smoothly if it receives full support from the surrounding community. Therefore, it is essential to raise awareness and understanding among the public regarding cleanliness and environmental health, as well as protecting themselves, their families, and their surroundings, so that the impacts of hazardous waste can be minimized or even completely avoided. The people of Palembang, as devout Muslims, need to be educated about environmental issues through religious forums and teaching sessions held in communities affected by the landfill. According to a previous study, the Sukawinatan landfill area is surrounded by non-formal Islamic institutions, including Pesantren Nurul Huda Sukawinatan, and is located approximately 1 km from the landfill site, along with some mosques in the area, including Masjid Ummul Yakin (NU), Masjid At-Thoriq Mardhotillah, and Masjid Al-Ikhlas Griya Sejahtera Sukawinatan.[14]

Within these pesantren and mosques, religious teachings and sermons are routinely conducted. These sessions often include messages from the Qur'an and Hadith related to cleanliness, health, and environmental stewardship. Some of the key verses taught include QS. Al-Baqarah[2]: 11, 12 and QS. Al-A'raf [7]: 56. Considering the role of religious messages through pesantren and mosques, it is important to understand and examine how these teachings influence the surrounding communities, particularly those living near TPA Sukawinatan. The religious messages derived from Qur'anic verses and Hadiths that relate to ecology or environmental science could encourage community awareness regarding the importance of protecting the environment. Such awareness would extend beyond the individual to include their families and the entire neighborhood. This study fills the research gap by contextualizing Qur'anic Verses and Hadiths on ecology through a thematic *Tafsir Mawdhu'iy* approach and integrating them with contemporary scientific and social perspectives, a method rarely applied in waste management studies; its novelty lies in promoting faith-based ecological consciousness as a transformative non-formal education strategy to foster sustainable behavioral change in communities directly affected by landfill pollution.

Based on the explanation, this study proposes the following research question: How can the interpretation of ecological verses and hadiths be used to overcome environmental pollution in the community surrounding the Sukawinatan landfill? Based on those questions, the objective of this research is to provide an understanding of the interpretation of ecological verses and hadiths as one solution to overcome environmental pollution around the Sukawinatan landfill.

The significance of this research includes providing scientific insight into the level of

[14] Warsinah Warsinah, Suheryanto Suheryanto, and Yuanita Windusari, "Study of Heavy Metal Lead (Pb) Contamination in Compartments Around the Sukawinatan Landfill in Palembang," *Jurnal Penelitian Sains* 17, no. 2 (May 2015): 78–81.

public understanding regarding ecological verses and Hadiths among communities living near TPA Sukawinatan, and providing data that can be used as a reference for community development and non-formal environmental education in the affected areas.

RESEARCH METHOD

This study employed a qualitative method with a descriptive-analytical approach based on library research. Data were obtained through a literature review of relevant studies on environmental pollution and waste issues, particularly in the Sukawinatan landfill area. The analysis focuses on the collected data and design solutions through socialization or communication using a theological approach based on the interpretation of verses and hadiths related to ecology.[15] The interpretation of Qur'anic verses and Hadith related to ecology was conducted through a thematic interpretation (*tafsir mawdhu'iy*) approach, in which relevant texts were collected, categorized, and examined comprehensively in relation to contemporary environmental issues, especially waste management.[16] The analysis integrated theological insights with social and environmental perspectives to contextualize Islamic teachings on environmental conservation.

References to affected communities around the Sukawinatan landfill, including Islamic boarding schools and mosque congregations, were used as contextual illustration based on documented secondary sources. The findings of this study are formulated as conceptual insights that serve as a basis for faith-based environmental communication and education. The theological-ecological approach aims to enhance ecological awareness and promote responsible environmental behaviour in addressing environmental pollution.

RESULT AND DISCUSSION

Final Disposal Site (*Tempat Pembuangan Akhir*/TPA)

TPA is a designated area for the disposal of domestic waste using specific techniques to minimize environmental disruption. According to Law No. 18 of 2008, the meaning of TPA has shifted from merely "Final Dumping Place" to "Final Processing Place".[17] Therefore, it can be concluded that a TPA is a place for processing and returning waste to the environment in a manner that is safe for humans and the environment. For this purpose, the government has established regulations on the spatial planning of landfills, waste management laws, and national waste management standards. All these regulations are designed and implemented to ensure the safety and comfort of humans. One provision of these regulations states that the public and private sectors have equal rights and obligations in waste management, meaning that waste management is not solely the responsibility of the government.[18]

Currently, Palembang City has two TPAs: TPA Sukawinatan and TPA Karya Jaya. The

[15] Fery Agusman Motuho Mendrofa, *Qualitative Research Methodology* (Yogyakarta: PT Penerbit Penamuda Media, 2024), 3–4.

[16] Akhmad Bazith, *Study of Interpretation Methodology* (Solok: Insan Cendekia Mandiri, 2021), 24–25.

[17] Indonesia, *UU*, 18.

[18] Rika Santina et al., "Implementation of Spatial Planning Law in Addressing Environmental Problems in Urban Areas," *International Journal of Law, Crime and Justice* 1, no. 2 (June 2024): 236–245, https://doi.org/10.62951/ijlcj.v1i2.164.

area of each site is 25 and 40 hectares, respectively. At TPA Sukawinatan, approximately 15 hectares have been used, or about 60% of the total available land. Due to the increasing volume of waste being dumped each year, community and private sector participation is necessary to extend the landfill's operational life. This participation can take the form of managing waste at its source, such as at the household or community level, to reduce the volume of waste transported to TPA Sukawinatan (Palembang City Sanitation Department, 2023).

Geographically, Palembang is located between 2°52'–3°50' S and 104°37'–104°52' E, with a total area of 400.6 km², comprising 16 districts, 107 urban villages, 989 neighborhood units (RW), and 4,040 sub-units (RT). The city's topography is predominantly lowland, with an average elevation of 4 to 12 meters above sea level, and is crossed by 4 major rivers and 68 tributaries. This relatively flat terrain causes flooding during heavy rain or high river tides. This factor must be considered in waste management at TPAs, since leachate from waste can pollute groundwater and surrounding water bodies.[19]

Administratively, TPA Sukawinatan is located in Sukajaya Sub-district, Sukarami District, Palembang City, as shown in Figure 1.

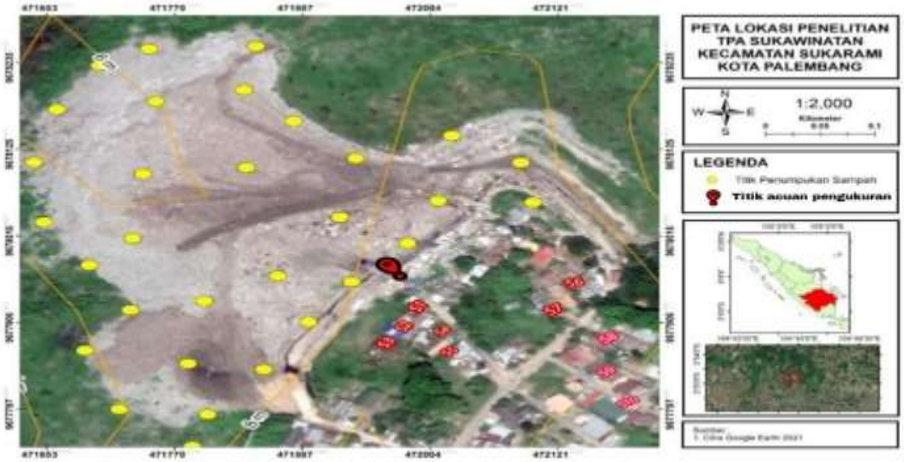

Figure 1. The Location of TPA Sukawinatan

Figure 1 shows the location of TPA Sukawinatan. The photo is taken from a research journal by Septi, Vrinsyih Virgo, and Siti Sailah. The red dots indicate wells where the pH, COD, and BOD levels in the water exceed the permissible limits. Septi, Vrinsyah Virgo, and Siti Sailah concluded that based on the analysis of several parameters conducted on residents' well water, it was found that the pH, BOD, COD, Electrical Conductivity (DHL), and Zn levels in some samples were quite high and exceeded the quality standards. The distribution of leachate in the well water samples also surpassed the quality standards, as indicated by elevated pH, BOD, and COD levels in the residents' wells. The increase in pH, COD, and BOD values was also found to be related to the distance of the wells from and the flow direction of the leachate.[20]

[19] Septi Septi, Frinsyah Virgo, and Siti Sailah, "Analysis of Groundwater Quality in the Area Surrounding the Sukawinatan Landfill in Palembang," *JPF (Jurnal Pendidikan Fisika) Universitas Islam Negeri Alauddin Makassar* 10, no. 1 (December 2021): 1–8, https://doi.org/10.24252/jpf.v10i1.25335.

[20] Septi Septi, Frinsyah Virgo, and Siti Sailah, "Analysis of Groundwater Quality in the Area Surrounding

Qur'anic Verses and Hadiths on Ecology

The ecological verses that will be studied in this research are a collection of messages related to the creation of nature, the preservation of the universe, and its contents related to the local environment, to overcome the impact of waste from waste processing that may occur in the environment of residents living around the Sukawinatan landfill. The verses examined in this study are divided into two topics. First, the prohibition of destroying the earth (QS. Al-Baqarah: 11, 12, 205, QS. Al-A'raf: 56, and QS. Ar-Rum: 41). Second, the preservation and utilization of the earth (QS. Lukman: 10, QS. An-Nahl: 81, QS. Az-Zukhruf: 12, QS. Qaf: 7, QS. Al-An'am: 99, QS. Al-Furqan: 25, and QS. Hud: 61).

In addition to explaining Qur'an Verses, in this discussion, the author will explain the hadiths related to ecology and divide them based on topics relevant to this study, including First, the hadith about the recommendation to plant trees, narrated form Anas bin Malik r.a, who said that the Prophet Muhammad said, *"No Muslim plants a tree or sows a seed, and then that plant is eaten by a bird, a person, or an animal, but it will be considered charity for him"* (HR. Bukhari).[21] Second, the hadith about the prohibition of polluting the environment, narrated by Mu'adz bin Jabal, said that Rasulullah said, "*Fear three things that cause damnation: defecating in waterways (water sources), in the middle of the road, and in the shade."* (HR. Abu Daud).[22] Third, the hadith about reviving barren land, narrated from Abu Hurairah, may Allah be pleased with him, that Rasulullah said, *"Whoever has farmland should cultivate it or give it to his brother (to cultivate). If he does not do so, then he should leave his land alone."* (HR. Al-Bukhari).[23]

Fourth, the hadith about saving water, narrated from Abdullah bin Amru, that the Prophet passed by Sa'd who was performing wudu, then said, *"Why are you being excessive?" Sa'd said, "Is there such a thing as being excessive in wudu?" He replied, "Yes, even if you are at a flowing river."*[24] Fifth, a hadith about caring for animals and plants, narrated from Abdullah bin Amr, ra said, *"Those who are merciful will be shown mercy by ar-Rahman. Be merciful to anyone on earth, and surely those in heaven will be merciful to you."* (HR. Tirmizi).[25] Sixth, a hadith about protecting the environment, narrated from Abu Hurairah, that Rasulullah said, *"A man was walking along the road when he found a thorny branch on the road, so he picked it up. Then Allah praised him and forgave (his sins)."* (HR. Bukhari).[26]

Socialization Theory in Faith-Based Ecological Education

The term socialization is commonly heard in society and refers to the formal process of instilling values, habits, and rules from one generation to the next within a group or community. Socialization is a lifelong learning process that occurs from birth until the end of a person's life. Socialization serves functions for both individuals and society, namely: for individuals, socialization is a means of recognizing, acknowledging, and adapting to values,

the Sukawinatan Landfill in Palembang," *JPF (Jurnal Pendidikan Fisika) Universitas Islam Negeri Alauddin Makassar* 10, no. 1 (December 2021): 1–8, https://doi.org/10.24252/jpf.v10i1.25335.

[21] Muhammad ibn Ismail al-Bukhari, *Sahih Al-Bukhari*, al-Maktabah al-Syamilah (Beirut: Muassasah al-Risalah, 2001).

[22] Sulaiman ibn al-Ash'ath Abu Dawud, *Sunan Abu Dawud* (Beirut: Dar al-Risalah al-Alamiyyah, 2009).

[23] Muhammad ibn Ismail al-Bukhari, *Sahih Al-Bukhari* (Beirut: Dar al-Ma'rifah, 1960).

[24] Ahmad ibn Hanbal, *Musnad Ahmad Ibn Hanbal* (Beirut: Muassasah al-Risalah, 2001).

[25] Muhammad ibn Isa ar-Tirmizi, *Jami' at-Tirmizi* (Beirut: Dar al-Gharb al-Islami, 1998).

[26] Muhammad ibn Ismail al-Bukhari, *Sahih Al-Bukhari* (Beirut: Dar Tawq an-Najah, 2001).

norms, and social structures. For society, socialization is a means of preserving, disseminating, and passing on social values and norms.[27]

Socialization can occur through various agents, such as family, peers, religion, educational institutions, workplaces, and social media. Socialization can be categorised into two types: primary and secondary socialization. Primary socialization is acquired from birth to adulthood within the family. Then, secondary socialization is acquired through interaction within the community. Socialization refers to the mechanism by which individuals learn the knowledge, skills, attitudes, values, norms, and suitable behaviors of their community.[28] Based on the above theories, this research aims to address—or at least illustrate—how to solve the issue of humans as dependent variables and environmental damage or its impacts as independent variables. It does so by exploring how people acquire knowledge, values, and norms—in this case, Qur'anic verses and Hadiths as ecological messages—so that individuals may participate as members of society in responding to the environmental damage surrounding the Sukawinatan landfill, in accordance with David Gaslin's socialization theory.

From these theories, if the ecological verses and Hadiths are well socialized, then these messages will become the community's reference values or norms for acting in response to their environmental conditions, so that the people who apply them will see these actions as acts of worship with intrinsic value — as intended by the Creator of those verses, Allah SWT, and the one who conveyed the Hadiths, Prophet Muhammad SAW.

From the background description regarding the polluted environment around the Sukawinatan landfill — including air, water, and soil contamination as a result of waste management practices in the area — it is crucial for the surrounding community to remain alert in protecting themselves from potential health impacts. Therefore, the understanding and internalization of Qur'anic verses and Hadiths related to ecology need to be socialized so they become societal norms to be implemented. From this, a possible hypothesis can be drawn:

If community members are familiar with and understand the Qur'anic Verses and Hadiths related to maintaining a clean and healthy environment, they are likely to apply them in several ways, such as, wearing masks when experiencing air polution, consuming only sterilized drinking water instead of well water from around the landfill, planting shady trees around their homes to produce clean oxygen sources, avoiding the consumption of potentially contaminated food such as vegetables or fruits grown near the landfill area. On the other hand, if community members are unfamiliar with or do not understand these verses and hadiths, they may be less likely to care for environmental health and may neglect the pollution impacts around the Sukawinatan landfill.

If we connect the ongoing environmental pollution to waste processing issues at the Sukawinatan landfill, Hadiths related to tree planting could be highly effective if implemented in contaminated areas. Planting trees is beneficial for reducing the greenhouse effect and

[27] Akira Takada and Elise Dan-Glauser, "Decoding the Complexities of Emotion Socialization: Cultures, Individual Features and Shared Information," *Scientific Reports* 14, no. 3536 (February 2024): 1–3, https://doi.org/10.1038/s41598-024-52885-9.

[28] Homa Sadeghi Avval Shahr, Shahram Yazdani, and Leila Afshar, "Professional Socialization: An Analytical Definition," *Journal of Medical Ethics and History of Medicine* 12, no. 17 (December 2019): 1–14, https://doi.org/10.18502/jmehm.v12i17.2016.

improving environmental quality. Trees absorb carbon dioxide (CO_2) from the atmosphere through photosynthesis and produce oxygen (O_2), helping reduce one of the major greenhouse gases. In addition, trees help maintain ecosystem balance, reduce air pollution, and provide habitats for various species. Mass tree planting can significantly impact climate change mitigation and environmental preservation.

From a descriptive perspective, plants can absorb air and soil pollutants in the following ways: leaves can absorb air pollutants such as, carbondioxide, through the photosynthesis process, nitrogen dioxide, sulphur dioxide, and ozone, fine particulate matter like dust, smoke, and other airborne particles, hazardous gases like hydrogen sulfide and ammonia. Leaves absorb air pollutants through several mechanisms, including stomata (small openings on the leaf surface that allow gas and particles to enter), leaf surface (pollutants can stick to the surface and be removed by dew or rain).

Examples of plants whose leaves can absorb pollutants include the Snake Plant (*sansevieria*)—absorbs pollutants like formaldehyde, benzene, and trichloroethylene, Spider Plant (*chlorophytum comosum*)—absorbs formaldehyde, xylene, and toluene, Peace Lily (*Spathiphyllum wallisii*)—absorbs ammonia and benzene, Dracaena—absorbs formaldehyde and benzene, and bamboo—absorb carbon dioxide and produce oxygen. Examples of plants that can absorb water pollutants include Water Hyacinth, Duckweed, Lotus, Hydrilla, and Cattail –all of which can absorb phosphorus, heavy metals, ammonia, benzene, formaldehyde, and carbon dioxide. Aquatic animals often consumed by humans that are vulnerable to water pollution include fish, shellfish, waterfowl, aquatic mammals, and aquatic invertebrates. Soil pollution can also have significant impacts on humans, both directly and indirectly. Some examples include poisoning from heavy metals, pesticides, and hazardous chemicals, which may cause disease and other health problems. Soil pollutants can be mitigated through the absorption capabilities of plant roots, which function in several ways, including phytoremediation, soil purification, soil stabilization, and nutrient absorption. Examples of plants used in phytoremediation include hyperaccumulator plants and aquatic plants such as water hyacinth and duckweed.

Analysis of Qur'an Verses

The ecological interpretation mentioned above is a paradigm that focuses on ecological themes found in the Qur'an. This interpretation also offers contributions and solutions to the ecological issues faced by modern society.[29] By caring for and preserving our surrounding environment, we foster a sense of collective responsibility as living beings on Earth.[30] Efforts to protect nature will not only benefit humans but also all other living creatures. Our concern for the environment helps maintain ecosystem balance, enabling each organism within it to fulfill its role optimally. When one species is disturbed or becomes extinct, it can trigger a chain reaction that affects other organisms, including humans.[31]

[29] Shahida, "Green Academia: Integrating Islamic Teachings in Education for a Sustainable Future," *Journal of Islamic Thought and Civilization* 13, no. 2 (2023): 86–103.

[30] Nur Adibah Mohidem and Zailina Hashim, "Integrating Environment with Health: An Islamic Perspective," *Social Sciences* 12, no. 6 (May 2023): 321, https://doi.org/10.3390/socsci12060321.

[31] Lisa A. Blankinship, Sarah Gillaspie, and Basil H. Aboul-Enein, "Highlighting the Importance of Biodiversity Conservation through the Holy Qur'an," *Conservation Biology* 39, no. 1 (2025): e14309,

Caring for the environment also means safeguarding natural resources. A sustainable forest provides timber, oxygen, and habitats for various species.[32] Clean water and fertile soil are valuable assets that must be preserved for future generations to benefit from. The preservation of nature also enhances its beauty and provides invaluable aesthetic value. Mountains, forests, and oceans offer spaces for relaxation and recreation. Maintaining natural beauty is an investment in overall human well-being. Thus, environmental conservation is also a periodic contribution toward combating global climate change.[33]

Energy conservation, the use of renewable resources, and the reduction of greenhouse gas emissions are crucial steps in creating a sustainable environment. By protecting and preserving the environment, we are building a sustainable, healthy, and harmonious future for humans and all living beings. Small individual actions can have a significant impact when done collectively and with full awareness.[34] Islam, as a religion of mercy to all creation (*rahmatan lil 'aalamin*), has firmly emphasized to its followers the importance of protecting the environment as a manifestation of divine mercy on Earth. Therefore, as Muslims, it is our duty to carry out the commands of the Qur'an, as mentioned above. To understand the Qur'anic verses concerning environmental preservation, several scholarly studies published in various journals have been reviewed, including:

Muhammad's article, titled *"A Study of Qur'anic Verses on Environmental Preservation*, concludes the following.[35] First, Islam teaches humanity to preserve the environment in accordance with the guidance of the Qur'an. Humans are entrusted with the responsibility on Earth as *khalifah fil ardh* to protect and care for the Earth and its environment. Second, every human being must manage natural resources based on environmental ethics. Third, Allah promises great rewards for those who preserve and care for the environment.

Sulaiman Ibrahim's article titled *"Environmental Preservation from the Qur'anic Perspective: A Study of Thematic Interpretation (Tafsir al-Mawdu'iy)"*, concludes that the Qur'an, as *hudan linnas* (a guidance for mankind), provides direction not only for life but also for environmental preservation and the energy needs of living beings are interdependent, and the Qur'an implies the existence of an order in the universe that must be maintained.[36]

Andika Mubarak concludes that in his analysis of Tafsir al-Misbah, M. Quraish Shihab's thinking places environmental preservation as an inherent responsibility of humans, which is an integral part of the ecosystem.[37] The environmental damage that occurs is

https://doi.org/10.1111/cobi.14309.

[32] Yanto Rochmayanto et al., "Devolution of Forest Management to Local Communities and Its Impacts on Livelihoods and Deforestation in Berau, Indonesia," *Heliyon* 9, no. 5 (May 2023): e16115, https://doi.org/10.1016/j.heliyon.2023.e16115.

[33] Michelle Ann Miller and Prayoto Tonoto, "Leveraging Plural Valuations of Mangroves for Climate Interventions in Indonesia," *Sustainability Science* 18, no. 3 (May 2023): 1533–47, https://doi.org/10.1007/s11625-023-01297-1.

[34] Tomiwa Sunday Adebayo et al., "The Influence of Renewable Energy Usage on Consumption-Based Carbon Emissions in MINT Economies," *Heliyon* 8, no. 2 (February 2022): e08941, https://doi.org/10.1016/j.heliyon.2022.e08941.

[35] Muhammad Muhammad, "Study of Quranic Verses on Environmental Conservation," *Jurnal Alwatzikhoebillah : Kajian Islam, Pendidikan, Ekonomi, Humaniora* 9, no. 2 (August 2023): 528–540, https://doi.org/10.37567/alwatzikhoebillah.v9i2.2259.

[36] Sulaiman Ibrahim, "Environmental Preservation in the Perspective of the Qur'an: A Study of Maudu'iy Interpretation," *Jurnal Ilmiah Al-Jauhari* 1, no. 1 (Desember 2016): 109–132.

[37] Andika Mubarok, "Environmental Sustainability in the Qur'an: Analysis of M. Quraish Shihab's

identified as originating from two main factors. The first is human-induced factors, which manifest themselves in phenomena such as global warming and ecosystem damage caused by exploitative actions and human negligence. The second factor is natural factors, which include disasters such as floods and volcanic eruptions. However, the destructive impact of these natural factors is often exacerbated by unwise human intervention. Thus, Quraish Shihab asserts that environmental damage is essentially a reflection of humanity's failure to fulfil its mandate as stewards of the earth, whether arising from intent or ignorance. In response to this ecological crisis, Quraish Shihab, through the interpretation analysed in the source, proposes a series of practical measures focused on behavioural change and spatial planning policies. These conversation efforts begin with collective awareness among the community to refrain from dumping waste into rivers or the sea and to reduce dependence on non-biodegradable plastics. Furthermore, it is recommended to avoid development in ecologically vital areas such as riverbanks and coastlines in order to preserve the natural buffer function of the environment. At the resource management level, the concrete solution offered is the practice of recycling organic waste into compost that has economic value for the agriculture and livestock sectors. This series of solutions underlines the principle that preserving nature is essentially an effort to maintain the sustainability and safety of human life itself.

To preserve the environment, the following actions are recommended. First, the community should refrain from dumping waste into rivers or the sea and reduce the use of plastic. Second, people should avoid constructing buildings along riverbanks or the coastline. Third, organic waste should be recycled into compost to be used for agriculture and livestock purposes.

Analysis of Hadiths

The compiled ecological hadiths demonstrate the integration of Islamic values with environmental conservation, emphasizing human responsibility as *khalifah fi al-ardh*. The first hadith on planting trees highlights charitable deeds that contribute to pollutant absorption, encouraging concrete actions such as reforestation to combat air pollution. Critically, implementation in cities such as Palembang requires mass campaigns to ensure it is not merely rhetoric. The second hadith prohibits the pollution of water sources, emphasizing the ethics of cleanliness; however, in the modern era, this must be extended to industrial waste, which is often overlooked.

The third encourages the utilization of unused land, inspiring sustainable agriculture, though the challenges lie in accessing land in urban areas. The fourth emphasizes water conservation, relevant to the global water crisis, requiring education to change wasteful habits. The fifth is about compassion for living things to preserve biodiversity, with criticism that animal exploitation is still rampant. The sixth is about cleaning the streets, showing that small actions have a big impact, encouraging collective awareness. Comprehensively, these hadiths form the foundation of Islamic ecological ethics, capable of driving sustainable behavioral change if disseminated through non-formal education, such as in Islamic boarding

Thoughts in Tafsir Al-Misbah," *Hikmah* 19, no. 2 (Desember 2022): 227–237, https://doi.org/10.53802/hikmah.v19i2.174.

schools, to address pollution at the Palembang landfill.

Ways to Address Environmental Impacts

According to David Gaslin's theory, socialization is a learning process experienced by an individual to acquire knowledge, values, and norms so that they can participate as a member of a community group. Therefore, several efforts need to be made to ensure that the values and norms found in the Qur'an and Hadith become knowledge that aligns with the *text*, *context*, and *contemporaneity* faced by society, so that these verses and Hadiths may "live" within the culture of the community. This may lead to these environmental-related verses and Hadiths becoming "living verses and Hadiths" within the communities affected by environmental issues. Forms of socialization to communicate these verses and Hadiths may include:

Creating brochures that contain the relevant Qur'anic verses and Hadiths, producing banners to be placed in public service locations such as mosques, village offices, schools, roadside areas, etc, incorporating these verses and Hadiths into public lectures held in community activities, whether in mosques, schools, or government programs such as *Posyandu*, *Gotong Royong*, and similar events, and even better, if there are educational or community-based institutions that adopt a village for education and awareness related to these Qur'anic verses and Hadiths.

The purpose of disseminating ecological verses and hadiths is to foster understanding and awareness of environmental sustainability. Currently, the community around the Sukawinatan landfill has been quite successful in understanding ecological verses and hadiths by planting trees. These results indicate that the community has a good understanding of the hadith texts encouraging tree planting. Planting trees aims to overcome environmental pollution. This is revealed in Ahmad Fikri Faisyah's writing that H2S (Hydrogen Sulfide) can be explained that by planting many trees in the affected environment, the H2S can be absorbed by the leaves of the planted trees, which are then returned to the soil as sulfur compounds. In addition, the leaves of the planted trees can also absorb CO2 from harmful motor vehicle emissions and, conversely, the leaves of these trees can produce new and clean oxygen for human respiration. Furthermore, planting trees can also create a cool and lush environment even when adjacent to a final processing site (TPA) that tends to be full of garbage and slums. Similarly, water pollution in the affected environment can be overcome by using properly filtered water and drinking water that is completely free of pollution. As for the pollution of affected animal and plant life, it can be overcome by knowing and understanding the environmental conditions and how to overcome the impact of pollution, one of which is through continuous socialization.

This study makes a significant contribution by bridging Islamic theology and environmental education within a non-formal learning framework. Its implications extend to the development of faith-based ecological awareness as a transformative social tool for behavioral change among communities affected by landfill pollution. By contextualizing Quranic verses and hadiths on ecology through the Tafsir Mawdu'iy approach and integrating them with environmental and social sciences, the research advances and integrating them with environmental and social sciences, the research advances an

interdisciplinary model that aligns spiritual values with sustainability practices. This model provides a replicable framework for environmental policy and education in Muslim-majority societies, where religion remains a powerful medium for cultivating pro-environmental ethics, community resilience, and sustainable waste management behaviors.

CONCLUSION

Environmental pollution around the Sukawinatan landfill highlights the urgency of integrating ecological and religious approaches in efforts to combat it. Internalizing verses from the Qur'an and Hadith about the importance of maintaining cleanliness and caring for nature can serve as a normative basis that encourages the community to take concrete steps, such as using clean water that is guaranteed to be sterile, wearing masks when the air is polluted, planting trees to reduce pollutants, and avoiding the consumption of foodstuffs that are at risk of contamination. Socialization through various media, including brochures, banners, religious gatherings, and community service activities, has made the ecological values in religious texts a norm that guides people's daily behavior. This is reflected in the real practices of the community around the landfill, which responds to pollution by planting trees, which are not only spiritually beneficial but also ecologically beneficial through the ability of plants to absorb CO_2, H_2S, and other pollutants.

From a scientific perspective, this research has strength in its interdisciplinary nature, combining hadith interpretation, social theory, and environmental science to address contemporary issues. The effort to contextualize religious texts in the realm of ecology also demonstrates the relevance of religion as a source of solutions that are not only normative but also practical and transformative. However, this research is still limited to a descriptive approach without the support of quantitative empirical data. Generalization of findings also needs to be cautious, as the Sukawinatan community has certain socio-cultural characteristics. In addition, this research has not highlighted in depth the technical aspects of modern waste management and the public policies that surround it. Therefore, further research is expected to develop a more comprehensive approach by combining qualitative and quantitative methods to measure the effectiveness of the dissemination of ecological verses and hadiths on changing community behavior. Comparative studies in various regions with different landfill conditions are also needed so that the patterns of applying religious values in protecting the environment can be seen more holistically. In addition, exploring other texts relevant to ecological issues, such as the prohibition of tabdzir or the principle of mīzān in maintaining the balance of nature, can enrich the normative basis used. Thus, religion is not only a spiritual foundation but also a strategic instrument in building ecological awareness and environmental sustainability.

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