



An Eco-theological Model for Strengthening Environmental Resilience in Pasir Village, Sumenep Regency, Madura

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Abstract: The coastal environmental crisis is a serious problem that demands a multidimensional approach that is not only technical, but also touches on the spiritual and socio-cultural aspects of the community. This study aims to formulate a Madurese contextual ecotheology model as a strategy to strengthen coastal environmental resilience, with a case study in Kampung Pasir, Sumenep Regency. This study uses a qualitative approach with ethnographic and phenomenological methods, through participatory observation, in-depth interviews, and documentation studies of the socio-religious life of coastal communities. Data analysis was carried out with a thematic and interpretative approach to identify the relationship between religious values and ecological practices of the community. The results of the study indicate that theological values such as the concept of caliph, *trust*, prohibition *fasad*(damage), as well as the principles of blessing and harmony have shaped the environmental ethics that live within the community. These values are internalized through the role of religious leaders, social interaction patterns, religious traditions, and mutual cooperation mechanisms that regulate human relations with nature. This study also formulates a Madurese contextual ecotheology model that encompasses five main dimensions: theological, socio-communal, environmental education, ecological practices, and local policies. This model offers an integrative framework that connects faith, local culture, and environmental conservation strategies in a sustainable manner. This study concludes that the Madurese coastal context-based ecotheology approach has strategic potential as a guideline for strengthening environmental resilience rooted in spirituality and local wisdom, and is relevant for the development of community-based environmental policies in coastal areas of Indonesia.

Keywords: ecotheology; environmental resilience; Madura Island; religious tradition.

1. Introduction

The ecological crisis is one of the most serious challenges facing contemporary civilization. Technological advances, industrial expansion, and modern consumption patterns have significantly impacted the balance of the Earth's ecosystems. Climate change, coastal erosion, coastal degradation, and biodiversity loss are no longer local issues but are emerging as global problems that threaten environmental resilience and the sustainability of human life. According to Intergovernmental Panel on Climate Change, (2023), the global temperature increase of 1.1°C in the last century has had a direct impact on rising sea levels, intensified tropical storms, and accelerated loss of coastal ecosystems. This phenomenon shows that the world's ecological structure is in a vulnerable condition, thus requiring interdisciplinary attention, including from theological and religious perspectives (Intergovernmental Panel on Climate Change (IPCC), 2023).

In the context of Indonesia's coastal areas, including Madura Island, ecological vulnerability is increasingly apparent due to its geographic characteristics and the community's high economic dependence on marine resources. A study by the Geospatial Information Agency (2021) shows that

more than 60% of Indonesia's coastal areas experience moderate to severe levels of abrasion, much of which occurs on small islands and areas with lower-middle socioeconomic characteristics. Sumenep Regency, located at the eastern tip of Madura Island, is one of the areas facing significant environmental pressures from abrasion, coastal pollution, and the exploitation of marine resources. Kampung Pasir, a coastal area known for its fishing activities and strong religious traditions, is not immune to these challenges (Badan Informasi Geospasial Indonesia, 2021).

Climate change is a major factor exacerbating ecological vulnerability in coastal areas. A 2021 report from the United Nations Environment Programme (UNEP) confirms that sea-level rise has the potential to eliminate significant living space for coastal communities, increase groundwater salinization, and damage mangrove and coral reef ecosystems, which serve as natural coastal barriers. In Kampung Pasir, residents are directly impacting these changes through reduced fish catches, increased frequency of high waves, and shifting shorelines that damage settlements and public facilities. These conditions not only threaten ecological sustainability but also impact the social, economic, and cultural stability of local communities (UNEP, 2021).

Besides climate change, abrasion is a crucial problem in several coastal areas of Madura. Abrasion on the Madura coast, including Sumenep, has increased over the past two decades due to a combination of natural factors and human activities such as sand dredging, coastal land conversion, and minimal mangrove vegetation. Uncontrolled abrasion has resulted in the loss of productive land, the destruction of fish habitats, and the reduction of social spaces that have traditionally served as sites for rituals, cultural activities, and economic activity.

Coastal exploitation is also at an alarming level. Many coastal communities, including those in Kampung Pasir, depend on marine resources for their survival. However, overfishing, the use of environmentally unsustainable fishing gear, and high economic market pressures are increasingly depleting marine ecosystems. According to the Food and Agriculture Organization (2020), more than 34% of global fish stocks are overexploited. If left unchecked, this situation could lead to the extinction of certain species, the collapse of local economies, and the loss of cultural identity of coastal communities that have coexisted with the sea for centuries (FAO, 2020).

Amidst the complexity of these ecological challenges, environmental conservation efforts require not only an ecological or technical approach, but also one that addresses the meaning of life, moral values, and spiritual awareness of society. This is where ecotheology, a combination of ecological science and theology, becomes relevant. Ecotheology presents itself as a perspective that sees the earth not merely as a space for exploitation, but as a trust, a gift, and a sacred space imbued with spiritual value. Figures such as Seyyed Hossein Nasr (1968) assert that ecological damage is the result of a spiritual crisis in modern humanity, where nature is no longer viewed as a divine creation to be respected, but rather as a material object to be exploited to the fullest (Nasr, 1968).

Ecotheology emphasizes not only religious doctrine but also daily practices that foster harmony between humans and nature. In Islamic tradition, the concept of the caliph (QS. Al-Baqarah: 30), trust (*amanah*), and the prohibition of causing harm (*fasad fil-ard*, QS. Al-A'raf: 56) serve as ethical foundations that guide humans to maintain ecosystem balance (Al-Qur'an, 2022). Kampung Pasir, Madura, has a strong socio-religious character and is rich in local traditions. This makes it fertile ground for developing an eco-theological model that is not only theoretical, but also applicable and contextual. By emphasizing religious values, coastal traditions, and community social practices, the eco-theological model can be an alternative strategy for strengthening environmental resilience, building collective awareness, and restoring a harmonious relationship between humans and nature.

The coastal areas of Madura, including Kampung Pasir in Sumenep Regency, have experienced increasing ecological pressure over the past two decades. As a living space for communities whose economy depends on marine resources, environmental vulnerability in this area arises from the interaction between ecological dynamics, economic constraints, and unsustainable coastal use practices. Phenomena such as coastal ecosystem damage, increasing waste volume, ecological poverty, and strong dependence on natural resources create complex conditions that impact the socio-ecological sustainability of local communities. Kampung Pasir is located in an area characterized by the ecological

presence of mangroves, coral reefs, and seagrass beds, three essential components for maintaining coastal stability. However, various studies have shown that the coastal areas of Sumenep are experiencing ecosystem degradation due to anthropogenic pressures and climate dynamics. Mangroves in several coastal districts in Sumenep have decreased in extent due to land conversion, logging, and the use of mangrove wood for household fuel, particularly in low-income villages (Ramadhani et al., 2024).

Coral reef degradation is also a serious issue. Anthropogenic pressures, such as large-scale fishing, sedimentation from land conversion, and rising sea temperatures associated with climate change, have been shown to cause a decline in coral reef cover in many coastal areas of the Asia-Pacific (Burke et al., 2012; Hoegh-Guldberg et al., 2007; Wilkinson, 2008). Similar conditions are particularly at risk along the coast of Madura, including Kampung Pasir, placing fishing communities vulnerable to declining marine productivity. In the context of Kampung Pasir, the decline in coral reef cover directly impacts the decline of small-scale fisheries resources, which are the community's primary economic source. Seagrass beds, which serve as habitat for juvenile fish, are also threatened by boat activity, sand mining, and pollution. The loss of seagrass beds reduces aquatic productivity and worsens the conditions of traditional capture fisheries. This situation creates a cycle of ecological vulnerability that amplifies the community's socio-economic pressures.

Waste, especially plastic waste, has become a major environmental issue in coastal areas of Indonesia, including Sumenep. Research by Purba et al. (2019) indicates that Madura is part of a marine debris accumulation pathway driven by regional currents in the Java Sea and the Madura Strait. Kampung Pasir experiences two types of pressure: waste originating from local activities and waste shipped from upstream areas and major cities (Purba et al., 2019). Household waste is the largest contributor, particularly single-use plastic, due to the lack of waste management infrastructure in coastal villages. Open waste disposal systems, or dumping waste directly onto the shoreline, remain common practices. This accumulation of waste degrades coastal ecosystems, threatens marine life, and damages the area's aesthetic appeal. The waste problem is not only environmental but also social. When waste accumulates in areas where people depend on their livelihoods, such as boat moorings, fish auction sites, or residential areas on the water, it degrades public health. This is exacerbated by uneven environmental education, limited waste disposal facilities, and the community's reliance on cheap and readily available plastic products.

The concept of "ecological poverty" refers to a condition where communities live in an increasingly degraded environment, to the point that the area's ecological capacity is no longer able to support economic life or public health (Dasgupta, 2021). Kampung Pasir is a prime example of coastal ecological poverty: ongoing environmental degradation reduces the productivity of natural resources, thus exacerbating economic poverty. The majority of Kampung Pasir residents work as small-scale fishermen using traditional fishing gear. When coastal ecosystems are damaged, catches decline, leading to unstable family incomes. This situation is exacerbated by limited access to education, business capital, and sustainable fishing technologies. Ecological poverty is also linked to vulnerability to climate change. The IPCC (2023) report notes that coastal communities in developing countries are the most impacted by sea-level rise, erosion, and changing weather patterns. Kampung Pasir is considered a highly vulnerable area due to its proximity to the coastline and lack of adaptive infrastructure (Intergovernmental Panel on Climate Change (IPCC), 2023).

Limited employment options cause the people of Kampung Pasir to rely heavily on natural resources. This dependence includes capture fisheries, shellfish collection, simple cultivation, and the use of mangrove wood for fuel. High dependence, if not accompanied by sustainable management, encourages overexploitation. For example, the use of environmentally unfriendly fishing gear, the extraction of coral or sand, and the felling of mangroves for household needs are economic adaptation mechanisms that actually accelerate ecological damage. Within a socio-ecological framework, this condition is known as a poverty-environment trap, where poor communities are forced to extract more resources to meet basic needs, but these actions exacerbate ecological damage and deepen poverty (Barbier, 2010).

Amid the global ecological crisis characterized by climate change, coastal degradation, biodiversity loss, and increased exploitation of natural resources, various new approaches in environmental science have emerged to respond to the decline in the Earth's carrying capacity. One approach that has gained widespread attention in the past two decades is ecotheology, a discipline that connects religious teachings, spirituality, and ecological responsibility. Ecotheology views environmental issues not only as scientific or technical crises, but also as moral, spiritual, and civilizational crises. Therefore, ecotheology is relevant for local contexts such as Madura, including Kampung Pasir in Sumenep, which faces environmental pressures while possessing unique cultural and spiritual strengths.

The concept of ecotheology began to develop strongly after Lynn White Jr. (1967) published his influential article "The Historical Roots of Our Ecological Crisis" in *Science*, which emphasized that the environmental crisis has theological and moral roots. Since then, theologians and environmental thinkers have developed approaches that emphasize that religion is not the cause of environmental degradation but rather provides spiritual values for ecosystem restoration (White Jr, 1967). Seyyed Hossein Nasr (1968) in *Man and Nature* asserted that modernity has separated humans from nature and eroded their spiritual awareness as stewards of the earth. Nasr called this a "crisis of ecological spirituality," in which humans have lost their sacred relationship with nature. Environmental theology, in Nasr's view, is necessary to restore humans to the principles of sustainability, balance, and servitude to God through ethical management of nature (Nasr, 1968). In the Islamic tradition, this thinking developed through the works of Fazlun Khalid, Richard Foltz, and Ibrahim Abdul-Matin. In Indonesia, eco-theological studies have found space through religious institutions, ecological Islamic boarding schools, and indigenous movements. All of this fosters an understanding that ecotheology is not merely a theoretical idea, but a practical movement to address ecological damage.

Ecotheology begins its approach from the belief that every religion has teachings about creation, interconnectedness, and human responsibility. In Islam, for example, the concepts of *khalifah* (caretaker of the earth) and *amanah* (moral and spiritual responsibility) form the ethical basis for environmental management. Foltz, Denny, and Baharuddin (2003) in *Islam and Ecology* emphasize that these teachings provide a strong foundation for Muslim communities to maintain ecosystem balance (Foltz et al., 2003). Values such as simplicity, gratitude, and prohibitions against destructive behavior (*fasad fil-ard*) make it clear that religion provides a moral framework that can be applied to contemporary ecological challenges. The sustainability ethic born of this faith is not only religiously relevant but also scientifically relevant, as it encourages sustainable consumption behavior and maintains ecosystem balance.

The strength of ecotheology lies not only in its theological dimension, but also in its ability to integrate local wisdom. Many traditional communities possess ecological knowledge passed down through generations that has been proven to maintain the sustainability of nature. In Madura, including Kampung Pasir, local wisdom can include knowledge about ocean currents, seasonal patterns, fish resource management, and traditions governing the limited use of nature. A study by Berkes (2012) in *Sacred Ecology* confirms that indigenous communities possess invaluable ecological knowledge born from long-term interaction with nature. This knowledge is not only technical but also spiritual. Nature is understood not only as a resource but as a living space with moral and sacred value (Berkes, 2012). In the Madurese context, values such as communal responsibility, a hard work ethic, and respect for coastal nature can form part of the basis of local ecotheology. The integration of local faith and culture creates a stronger ecological foundation than a purely technocratic approach.

Ecotheology teaches that the responsibility to protect the environment is not mere discourse, but rather concrete action. The essence of ecological responsibility is the awareness that humans are part of the web of life, not the sole rulers of nature. This concept aligns with what Aldo Leopold (1968) called the land ethic, an ethic that expands human moral boundaries to encompass land, water, plants, and animals (Leopold, 1968). In the context of coastal communities like Kampung Pasir, ecological responsibility can be realized through community-based waste management, mangrove rehabilitation, sustainable fishing practices, environmental education based on religious and cultural values, and

collaboration between the community, academics, and the government. The eco-theological approach emphasizes that these actions are not merely technical programs, but part of humanity's moral responsibility to God, nature, and future generations.

Conceptually, ecotheology is essentially a holistic approach. It works by exploring religious spiritual values to shape ecological ethics, activating local knowledge for sustainable ecological practices, and building social awareness that protecting the environment is a form of worship and a moral responsibility. This approach is particularly relevant for Madura and Kampung Pasir, which face environmental pressures but possess strong spiritual strength and traditions. With ecotheology, environmental conservation programs are not only strengthened technically but also embedded in spiritual and cultural values that underpin daily life.

Indonesia's coastal environmental issues are increasingly pressing and require serious attention. As an archipelagic nation, more than 60% of Indonesia's population lives in coastal areas and relies on marine resources for its livelihood. The coastal areas of Madura, including Sumenep Regency and villages like Kampung Pasir, face environmental pressures such as mangrove ecosystem degradation, overfishing, plastic waste, abrasion, and changes in social structures due to economic pressures and climate change. However, amidst this complexity, studies and models...ecotheologyResearch rooted in the local coastal context is still very limited. Yet, an eco-theological approach is crucial for integrating religious values, local wisdom, and sustainable ecological strategies relevant to the religious character of Madurese society with its strong coastal culture.

As a coastal and island region, Madura is highly dependent on marine natural resources. However, a report from the Ministry of Maritime Affairs and Fisheries (KKP) (2020) shows that the coastal areas of eastern East Java, including Madura, are facing pressures (Kementrian Kelautan dan Perikanan, 2020); declining coral reef quality, mangrove damage due to land conversion, increasing volumes of marine debris, pressure on small-scale capture fisheries, and increased risks of climate change such as rising sea levels. These ecological pressures directly impact the lives of coastal communities such as Kampung Pasir in Sumenep, where the majority of residents are fishermen with low incomes and a high dependence on natural resources. However, on the other hand, the Madurese people possess significant cultural capital that can support environmental sustainability. Strong Islamic religious values, traditions of mutual cooperation, respect for the sea, and maritime rituals such as rokat tase' contain elements of ecological spirituality. Berkes (2012) in Sacred Ecology explains that traditional communities possess a culturally based ecological knowledge system that can serve as a foundation for environmental conservation (Berkes, 2012). Unfortunately, this enormous potential is not widely utilized in environmental management models in Madura. Environmental programs tend to come from outside, are technical in nature, and are not rooted in local values and beliefs. This is where the urgency of an eco-theological model emerges.

Ecotheology emerged in response to criticism of technocratic approaches that failed to change human behavior toward the environment. White (1967), in his article, stated that the ecological crisis is essentially a moral and spiritual crisis. Ecotheology then developed to integrate religious teachings into environmental ethics, activate local wisdom as ecological practices, and build moral awareness that protecting the environment is a spiritual responsibility (White Jr, 1967).

In the coastal context of Madura, ecotheology can be a transformative framework because religious communities maintain religious values that strongly influence behavior, strong coastal culture that allows much ecological knowledge to be passed down from generation to generation, communal social structures that facilitate the implementation of community-based programs, and high dependence on nature for sustainability directly impact well-being. Therefore, a Madura-based ecotheology model must combine Islamic values of caliphate, trust, and the prohibition of facade fil-ardh; local traditions such as rokat tase, sirompet laut, knowledge of wind and seasons; and modern ecological science on coastal conservation. This model will be more effective than a purely technical approach, because it targets the spiritual and cultural roots of the community, two dimensions that drive ecological action more deeply.

The lack of eco-theological models based on the local context of Madura's coastal areas is a crucial issue in the discourse on sustainable development and environmental management based on local wisdom. Although ecotheology has developed as a framework that integrates religious values, spirituality, and environmental ethics across various cultural traditions, there remains a lack of research specifically exploring how this approach can be formulated based on the ecological, social, and cultural conditions of Madura's coastal communities. The Madura region, particularly coastal areas like Sumenep, faces complex ecological dynamics, ranging from coastal abrasion, shoreline changes, sedimentation, and coastal habitat degradation exacerbated by human activities. Several previous studies, such as those conducted by Khomsin et al. (2021), for example, revealed that the Javanese coast is experiencing significant shoreline changes, including in the Madura region, which faces abrasion and coastal dynamics due to human activities and natural oceanographic processes (Khomsin et al., 2021). This finding is in line with research by Suprijanto et al., (2019) which identified the coastal areas of Java as areas with a high level of vulnerability to abrasion, sea level rise, and increased intensity of coastal activities (Suprijanto et al., 2019).

The oceanographic characteristics of the waters around Madura also contribute to the dynamics of coastal environmental damage. Research by Yasmin & Pudjaprasetya (2018) explains how seasonal current variations in the Java Sea can affect sediment distribution and shoreline stability. This variability, coupled with human pressures such as the exploitation of marine resources, coastal development without long-term environmental planning, and unsustainable fishing practices, contribute to coastal ecosystem damage (Yasmin & Pudjaprasetya, 2018). However, although these ecological conditions have been widely discussed in the oceanographic and environmental studies literature, an ecotheology-based approach as a model for environmental reflection and action has not received equal academic attention in the Madurese context.

This research gap becomes even more apparent when considering the crucial role of local wisdom and religious values in the social structure of Madurese society. Coastal communities in Madura have strong religious traditions and a historical connection to the sea as a source of livelihood. If these values are combined with eco-theological principles, the potential for developing a participatory, holistic, and culturally based conservation model can be achieved. However, to date, no eco-theological model has been explicitly developed based on the local conditions of Madurese coastlines. Existing research focuses more on the biophysical characteristics of ecosystems, for example, research conducted by Rachman et al. (2024) which explains shoreline changes, sediment dynamics, and seasonal currents, rather than ecological-religious integration oriented towards community empowerment and ecological behavioral transformation (Rachman et al., 2024).

In fact, in many other regions, ecotheology has proven to be an effective approach to building community-based ecological awareness. For example, the Christian eco-theological approach in the African context emphasizes spiritual responsibility for the environment (Conradie, 2006) or the Islamic eco-theological model that emphasizes the principles of *khalifah*, *amanah*, and *hablun minal 'alam* as the basis for ecological concern (Nasr, 1968). However, such models must be developed with local context in mind to avoid being generic and to address specific ecological needs, particularly in coastal areas with socio-cultural and biophysical dynamics that differ from those of inland areas.

There are at least four academic reasons why Madurese-based ecotheology models are still minimal: first, most research on Madurese coasts focuses on currents, sedimentation, fisheries, and geomorphology, for example, a report by (Kementrian Kelautan dan Perikanan, 2020); second, studies on Madurese culture and Islam are abundant, but rarely linked to marine or environmental issues; third, ecotheology requires dialogue between theology, ecology, anthropology, and social sciences. This has not been widely done; fourth, there is no standard framework that systematically describes how Madurese religious and cultural teachings can be used as a basis for coastal conservation.

Understanding the complexity of Madura's coastal vulnerabilities, as outlined in various oceanographic and environmental geography studies, the need for locally based eco-theological models becomes increasingly urgent. Such models can bridge scientific knowledge, the spirituality of coastal communities, and adaptive ecological mitigation strategies. Therefore, research on developing eco-

theological models rooted in the socio-cultural conditions and ecological characteristics of Madura's coast is not only academically important but also strategically important for mitigating environmental crises and strengthening local community resilience.

2. Research Method

This study uses a descriptive qualitative approach to deeply understand the relationship between spirituality, ecological practices, and the socio-ecological conditions of the community in Kampung Pasir, Sumenep. A phenomenological and mini-ethnographic approach was used to capture the lived experiences of coastal communities in interpreting the environment and religion, while a contextual theological framework was used to interpret religious values relevant to the development of a local eco-theological model (Creswell & Poth, 2018). Data were collected through observations of coastal activities, in-depth interviews with religious leaders, fishermen, coastal women, and village officials, as well as documentation and desk studies using relevant academic literature. Site selection was carried out purposively based on the level of ecological vulnerability and religious-cultural richness that have been identified in coastal research in Java and Indonesia (Khomsin et al., 2021; Lumban-Gaol et al., 2018; Rahmadi et al., 2022; Suprijanto et al., 2019; Yasmin & Pudjaprasetya, 2018).

Data were analyzed using the Miles, Huberman, & Saldaña (2018) model through a thematic and interpretive data reduction, data presentation, and conclusion drawing (Miles, M. B., Huberman, A. M., & Saldaña, 2018). Data validity was strengthened by triangulation of sources and methods, member checking, and an audit trail that ensured transparency of the research process. Ethical aspects of the research were maintained through informant consent, data confidentiality, and respect for local cultural beliefs and practices. With this combination of methods, the study aims to develop an eco-theological model based on the Madurese coastal context, while simultaneously providing theoretical and practical contributions to strengthening religious-based environmental resilience.

3. Research Results and Discussion

3.1. Socio-ecological Description of Pasir Village, Sumenep, Madura

Kampung Pasir in Sumenep Regency is one of Madura's coastal areas with unique and vulnerable ecological characteristics. Geographically, this area is located on the north-eastern coast of Madura, which is influenced by the dynamics of Java Sea currents and fluctuating sedimentation processes. These coastal conditions play a significant role in shaping the social, economic, and cultural life of the community. On the other hand, ecological pressures in the form of abrasion, shoreline changes, and natural resource exploitation are also increasing with climate change and human activities. A coastal study in East Java conducted by Yasmin & Pudjaprasetya (2018) shows that the coastline in the north-eastern region of Java has undergone significant changes in the last two decades, caused by a combination of natural factors such as seasonal waves and anthropogenic factors such as reclamation, sand mining, and minimal coastal area management. These findings provide an initial overview that Kampung Pasir is located in a constantly changing ecological landscape and requires adaptive social responses (Yasmin & Pudjaprasetya, 2018).

Ecologically, the coastal ecosystem in Kampung Pasir exhibits several forms of degradation common in coastal areas of Madura. Research by Radita et al., (2023) on coastal damage in East Java confirms that the greatest pressures on the coastal environment are excessive sedimentation, increasing plastic waste, declining seawater quality, and damage to coastal vegetation such as mangroves (Anggreini, 2023). Although Kampung Pasir does not entirely have extensive mangrove areas, the loss of coastal vegetation makes the area increasingly vulnerable to tidal waves and abrasion. Furthermore, Suprijanto et al., (2019) identified that the northern part of Java, including Madura, is experiencing rapid coastal morphological changes due to current and tidal dynamics, causing some areas to experience accretion while others experience severe erosion. This condition is also felt by the residents of Kampung Pasir, who acknowledge that the distance between settlements and the coastline has continued to decrease in recent years, especially during the easterly wind season when waves are stronger (Suprijanto et al., 2019).

From a socio-economic perspective, the people of Kampung Pasir largely depend on the coastal sector for their livelihoods, such as traditional fishermen, shellfish collectors, and fisheries laborers. This dependence creates an economic structure that is highly vulnerable to ecological change. Small-scale fishermen with limited equipment are often unable to go to sea during bad weather or high waves, thus affecting their daily income. This pattern aligns with the findings of Rahmadi et al. (2020), who stated that the East Java coast has a high level of socio-economic vulnerability due to limited assets, high dependence on natural resources, and low economic diversification. This condition is also clearly evident in Kampung Pasir, where most families lack access to higher education, business capital, or alternative employment outside the coastal sector. This creates an ecological cycle of poverty, where ecological vulnerability worsens the economic conditions of the community, while economic limitations accelerate environmental damage due to unmanaged exploitation (Rahmadi et al., 2022).

One of the key issues in the ecological dynamics of Kampung Pasir is the problem of coastal waste. Plastic waste and household waste carried by ocean currents often accumulate on the shore, degrading environmental quality and disrupting fishing activities. Local residents frequently complain of declining catches due to changes in fish migration patterns, which are sensitive to water quality. This finding aligns with research by Syakti et al. (2017), which found high levels of microplastics in Indonesian waters, including the Java Sea, impacting marine life and environmental health. Although not all waste originates from the Kampung Pasir community, the accumulation of waste entering from other areas worsens coastal conditions. This situation indicates a structural problem in coastal waste management that cannot be resolved solely at the local community level (Syakti, 2017).

Human-environmental interactions in Kampung Pasir exhibit complex patterns. On the one hand, the community possesses local wisdom that has been passed down through generations, such as understanding the wind seasons, knowledge of weather changes, and certain rituals related to the sea. For example, some fishing communities still practice the tradition of "sea salvation" as a form of respect for nature and an expression of gratitude for the catch. This tradition demonstrates that the community's relationship with the environment is not merely instrumental, but also spiritual and symbolic. This tradition aligns with the findings of Sumintarsih et al. (2005), who studied maritime culture in Madura and stated that coastal Madurese communities have a strong belief system regarding the sea as a living entity that must be respected (Sumintarsih et al., 2005).

However, on the other hand, changes in modern lifestyles have led to the abandonment of some traditional practices, particularly by the younger generation, who are more pragmatic and less involved in cultural rituals. This creates a gap between traditional ecological knowledge and everyday practices. Furthermore, intensive exploitation of natural resources, such as illegal sand mining and overfishing, further exacerbates ecological conditions. Research by Anjani & Puspaningtyas (2023) shows that several coastal areas in East Java face severe ecological pressures due to unsustainable economic activities, particularly when government oversight is weak (Anjani & Puspaningtyas, 2023).

In the context of ecological resilience, Kampung Pasir is in a fragile position. Ecological vulnerability stems not only from physical environmental factors, but also from social, economic, and political conditions. The lack of environmental management infrastructure, the absence of a sustainable disaster mitigation program, and limited public access to information and technology increase the risk of ecological disaster. Local communities are generally aware of the symptoms of abrasion and sedimentation based on empirical experience, but lack adequate technical support and policies for long-term adaptation.

Thus, the socio-ecological picture of Kampung Pasir shows that the human-environmental dynamics in this region are rooted in economic dependence on coastal natural resources, rapid ecological change, and limited community adaptive capacity. This is where an eco-theological approach becomes relevant, as it integrates spirituality, religious values, and local wisdom as a basis for building ecological awareness and more sustainable environmental management practices. The religious values that thrive in Madurese society, particularly the deeply rooted Islamic tradition, have great potential to serve as an ethical foundation for building community-based ecological resilience.

3.2. Religious Practices and Local Wisdom

The spirituality of the Madurese people, including coastal communities such as Kampung Pasir in Sumenep, has unique characteristics formed through a combination of Islamic teachings, local culture, and daily practices rooted in the close relationship between humans and the environment. In the context of coastal communities, religion functions not only as a doctrine, but also as a guide to life that regulates social behavior, environmental management, and how humans understand the natural world. Islamic religious traditions in Madura cannot be separated from the social identity of the community, because religion is a source of morality, wisdom, and a way of life. According to research by Kuntowijoyo (2002), Islam in Madura developed in the form of cultural Islam that is strongly entwined with local traditions, thus presenting a form of religiosity that is more down-to-earth, concrete, and contextual to the conditions of community life (Kuntowijoyo, 2002).

For the Madurese, Islam is not simply a belief system but a structure of life. Kiai (Islamic religious leaders) and Islamic boarding schools (*pesantren*) hold the highest moral authority, and Islamic values permeate economic activities, family life, and social interactions. Research by Sumintarsih (2005) on Madurese maritime culture shows that Islamic teachings are practiced in a manner closely related to maritime life, including in procedures for going to sea, determining auspicious days, and performing safety rituals at sea. Values such as trustworthiness, *ikhtiar* (indifferent from God), *tawakkal* (religious obedience), and social piety shape the community's view of nature as God's creation that must be respected, not exploited arbitrarily (Sumintarsih et al., 2005).

The Islamic faith of Madurese coastal communities can also be seen in the strong tradition of Koran reading in small prayer rooms (*langgar*), the practice of *istighotsah* (recitation of the Koran), the recitation of *tahlil* (recitation of the Koran), and the veneration of *ulama* and religious figures. These practices serve to strengthen social solidarity and reinforce a collective vision of living in harmony with nature. As Nurdin (2020) explains in his study of coastal Islam, religious rituals such as *tahlilan* (recitation of the Koran), *yasinan* (recitation of the Yasin), and *selamatan* (celebration) are not only spiritual expressions but also social mechanisms for strengthening community networks and fostering moral awareness of the surrounding environment (Nurdin, 2020).

One of the most tangible forms of religious, cultural, and ecological integration in the coastal communities of Madura is the existence of sea rituals (*rokat tase'* or *petik laut*). This tradition has been researched in several ethnographic studies and has been shown to play an important role in building ecological awareness, although it is not always formally referred to as "ecotheology". According to Badrud Tamam's research, (2021), sea rituals in Madura are a form of community respect for nature, especially the sea as a source of life. This ritual usually involves reciting Islamic prayers, *selawat*, and giving symbolic offerings that reflect gratitude to Allah for the sustenance of the sea, as well as a request for safety while at sea (Badrud Tamam, 2021).

The *rokat tase'* ritual in Madura uniquely combines religious and local cultural elements: prayers by religious leaders (*kiai*), religious studies, a boat procession, and the release of offerings into the sea. This ceremony demonstrates how the environment is viewed as a spiritual space, not simply an economic resource. This ritual is not merely a religious act, but an ecological strategy that strengthens social solidarity, regulates the rhythm of environmental exploitation, and marks the moral boundaries of humanity's relationship with the sea.

This practice shares similarities with similar traditions on the Javanese coast, such as the sea almsgiving studied by Novita Sari (2022), where communities link ecological safety with spiritual piety. In the Madurese context, this ritual also serves as a platform for informal ecological education, especially for the younger generation, to respect the sea, maintain its safety, and refrain from destructive exploitation practices. This tradition, while not referred to as an "ecoteological" concept, is essentially a local eco-theological expression, in which nature is understood as a divine gift, and its preservation becomes part of worship (Novita Sari, 2022).

The tradition of thanksgiving is a very important religio-cultural practice in Madurese society. This tradition is not only performed at life moments such as births, weddings, and deaths, but also relates to nature and maritime work. For example, before the start of the fishing season, some fishing

families hold small thanksgiving ceremonies led by religious figures to ask for protection and a smooth flow of income. These thanksgiving ceremonies demonstrate how the community interprets their relationship with the sea through the lens of Islamic spirituality.

The celebration also has a significant social function. It serves as a meeting point for spirituality, social solidarity, and moral education. During the celebration, prayers and tahlil (recitation of the Koran) are often accompanied by moral messages about environmental protection, honesty in trade, and the importance of sustainability in harvesting marine resources. According to Koentjaraningrat (1990), the celebration is a cultural mechanism that maintains balance between humans, nature, and supernatural powers. In Madurese Islamic society, this dimension is combined with the teachings of monotheism, so that nature is viewed as part of God's creation and must be treated responsibly (Koentjaraningrat, 1990).

In daily life, the Islamic values embraced by the Madurese people influence their ecological behavior. Values such as amanah (responsibility), tawazun (balance), tadayyun (ecological piety), and ihsan (doing good) serve as moral guidelines for interacting with nature. From an Islamic perspective, preserving nature is not merely a worldly matter, but also an act of worship. This concept aligns with the theological thinking expounded by Nasr (1968), who argued that the modern ecological crisis stems from the loss of human spiritual awareness of the sacredness of nature. In the local Madurese context, this spiritual awareness manifests itself in cultural-religious traditions, not in formal theoretical discourse (Nasr, 1968).

For example, the prohibition against excessive harvesting of marine resources is often conveyed by religious leaders (kyai) in religious studies. The kiai reminds us that taking more than we need is a form of injustice to nature. The principle of "ngakolih sè cekèp" (taking just enough) is a local moral teaching that serves as an informal ecological regulation. This value aligns with the teachings of the Quran in Surah Al-A'raf, verse 31, which emphasizes moderation in all things. Although the community may not call it a "principle of sustainability," their practices demonstrate an ecological awareness based on religious values.

On the other hand, social and economic changes are beginning to influence the ecological behavior patterns of coastal communities. Economic pressures are driving some fishermen to engage in less environmentally friendly practices, such as using destructive fishing gear or harvesting large quantities of seafood without considering sustainability. This indicates a tension between traditional moral values and modern economic needs. This finding aligns with research by Anjani & Puspaningtyas (2023), which shows that economic pressures often undermine traditional ecological practices in Madurese coastal communities (Anjani & Puspaningtyas, 2023).

3.3. Eco-theological Analysis of Pasir Village, Sumenep, Madura

An eco-theological analysis of Kampung Pasir in Sumenep Regency, Madura, begins with the understanding that human relations with the environment are determined not only by economic and technological factors, but also by the spiritual and moral constructs that exist within the community. Ecotheology, as an approach that integrates theology and environmental ethics, provides an analytical framework for understanding how religious values shape the ecological behavior of coastal communities. In Kampung Pasir, Islam serves not only as a belief system but also as a central factor in shaping environmental ethics and cultural natural resource management.

The primary spiritual value in the Kampung Pasir community is trust. In Islamic theology, humans are viewed as recipients of a trust from God to safeguard the earth as His creation (Quran, Al-Ahzab: 72). This concept is reflected in the way the community views the sea and coastline as a trust that should not be excessively damaged. Many traditional fishermen still adhere to the principle of "taking just enough" and avoid fishing practices that damage habitats such as the use of poison or explosives (Al-Qur'an, 2022). Ecologically, this trust serves as a form of moral control over the exploitation of marine resources. The meaning of the environment as a trust has been discussed in an academic study by Foltz, Denny, & Baharuddin (2003), who asserted that Islam provides a strong theological foundation for environmental ethics (Foltz et al., 2003).

The second value is the concept of the caliph, which views humans as God's representatives on earth (Quran, Al-Baqarah: 30). In the context of Kampung Pasir, the role of caliph is not understood as absolute authority to control nature, but rather as a responsibility to manage the environment fairly. This practice is evident in the informal division of fishing areas, respect for the fishing season, and the unwritten prohibition against mangrove destruction (Al-Qur'an, 2022). A study by Izzi Dien (2000) confirms that the concept of the caliph in Islam is ethical and ecological, where humans must act as stewards of nature, not as destroyers (Dien, 2000).

Furthermore, the concept of blessing (*barakah*) holds a crucial position. Blessing is understood as a living condition measured not only by the abundance of produce, but also by the sustainability and tranquility of life. The fishermen of Kampung Pasir believe that marine products obtained through destructive means will not bring blessings to the family. This view aligns with Nasr's (1968) findings, which show that traditional Islamic spirituality views nature as a sacred cosmic order. In social practice, belief in blessings shapes ethical standards in the extraction of natural resources (Nasr, 1968).

The value of harmony is also a primary foundation. Harmony is understood as a balance between humans, nature, and God. This concept is similar to the principle of *mizan* in the Qur'an, which emphasizes cosmic balance (QS. Ar-Rahman: 7–9). In Kampung Pasir, harmony is reflected in the practice of simple living, mutual cooperation in beach cleaning, and an attitude of respect for the sea as a shared living space (Al-Qur'an, 2022). According to Tucker & Grim (2001), the concept of harmony in religious traditions is a crucial ethical capital in building religious-based ecological awareness (Tucker & Grim, 2001).

Religious values in Kampung Pasir are not merely normative doctrines but are institutionalized in daily social interactions. Mosques and prayer rooms (*langgar*) are not only centers of worship but also spaces where social norms are produced. Through Friday sermons, regular religious studies, and religious gatherings, the community receives moral messages about responsibility for nature. Religious leaders play a strategic role as mediators of values between religious texts and ecological realities. In social life, religious norms govern relationships between fishermen and their relationship with the environment. For example, conflicts over fishing grounds are more often resolved through deliberation facilitated by religious leaders, rather than through formal legal mechanisms. Values of justice and the prohibition of injustice are also translated into environmental ethics: destroying coral reefs or mangroves is perceived as an injustice to God's creatures. This approach aligns with the findings of Wagiu et al. (2022), who stated that religious communities possess socio-ecological regulatory mechanisms based on religious norms (Wagiu et al., 2022).

Religion also serves as a medium for internalizing ecological awareness across generations. Children in Kampung Pasir learn to respect the sea not only through formal education, but also through religious stories, parental advice, and everyday examples. This process creates what Bandura (1977) calls social learning, where ecological behavior is passed down through socio-spiritual role models. Thus, religion becomes a "moral school" that continues to shape the community's ecological orientation (Bandura, 1997). The religiosity of the Pasir Village community holds great potential as a social force for environmental conservation. Collective practices such as beach cleanups, community-based mangrove planting, and sea thanksgiving rituals strengthen social bonds that can be mobilized for more systematic conservation goals. Research by Mangunjaya (2011) shows that religious communities in Indonesia have significant social capacity to support environmental conservation agendas if managed through a participatory approach (Mangunjaya, 2011). This potential is also evident in the public's openness to conservation initiatives framed in religious terms. Environmental conservation programs that use narratives of trust, worship, and moral responsibility have proven more readily accepted than purely technocratic approaches. This aligns with the findings of Palmer & Finlay (2003), who stated that religion can be an effective social capital in the global environmental movement (Palmer & Finlay, 2003).

However, this potential has not yet been fully structured into a sustainable conservation movement. The main challenges stem from economic pressures, the modernization of fishing gear, and

the influx of market logic, which often conflicts with traditional ethical values. Nevertheless, an eco-theological framework suggests that long-term solutions cannot rely solely on state regulations but also require reinforcing the spiritual and moral dimensions that already exist within the community. An eco-theological analysis of Kampung Pasir demonstrates that the ecological crisis cannot be separated from spiritual and cultural dimensions. The values of trust, caliphate, blessing, and harmony are not merely normative concepts but rather sources of living socio-ecological ethics. The integration of religion and conservation, as developed in eco-theological studies (Tucker & Grim, 2001), is highly relevant to the Madurese coastal context (Tucker & Grim, 2001).

3.4. Eco-theological Model for Environmental Resilience

The formulation of Madura's contextual ecotheology model stems from the realization that the environmental crisis in coastal areas cannot be resolved solely through technocratic approaches or formal policies, but requires a vibrant ethical-spiritual foundation within the community. Ecotheology offers an integrative framework that connects faith values, social responsibility, and ecological practices as a unified system. In the context of coastal communities like Kampung Pasir in Sumenep, Madura, this model is not intended to replace local traditions, but rather to strengthen existing culturally embedded values.

a. *Theological Dimension: Foundations of Environmental Ethics*

The theological dimension is the primary foundation of this model. The concept of the caliphate is understood as a mandate for ecological leadership, where humans are tasked with managing the earth fairly and wisely, rather than exploiting nature without limits. The value of trust affirms that the sea, sand, and coastal areas are not the absolute property of humans, but rather are entrusted by God to be preserved for their sustainability. The prohibition against *facade* (damage) on the earth's surface is a highly relevant normative principle in responding to practices that damage ecosystems, such as indiscriminate logging of mangroves or dumping waste into the sea. This theological approach aligns with the study of Foltz, Denny, and Baharuddin (2003), which asserts that Islam provides a strong normative framework for building environmental ethics based on spiritual responsibility (Foltz et al., 2003). Furthermore, Izzi Dien (2000) emphasizes that the concept of caliphate should be interpreted as a stewardship, not a domination of nature (Dien, 2000). In the Madurese context, this dimension is manifested through mosque sermons, village religious studies, and the advice of Islamic boarding school clerics, who emphasize the prohibition of destroying nature as a form of moral and religious violation.

b. *Theological Dimension: Foundations of Environmental Ethics*

This model also places the socio-communal dimension as a crucial pillar. The environment is not solely an individual matter, but a collective responsibility. Community forums, village deliberations, and the role of religious leaders provide strategic spaces for building collective ecological awareness. In Kampung Pasir, social structures such as the religious study group (Majelis Taklim), fishermen's groups, and village community organizations serve as effective channels for conveying eco-theological values. Religious leaders play a central role as moral entrepreneurs, bridging religious texts and environmental realities. They not only convey spiritual messages but also guide social behavior toward environmentally friendly lifestyles. The practice of mutual cooperation (*gotong royong*) in beach cleanups, community service, and customary agreements regarding limits on marine resource use are concrete manifestations of this socio-communal dimension. Research by Mangunjaya (2011) shows that faith-based communities in Indonesia possess strong social capital for conservation agendas when facilitated in a participatory manner (Mangunjaya, 2011). This dimension also strengthens social cohesion and reduces ecological conflict. Deliberations based on religious values can create stronger social legitimacy than formal rules alone. As Ostrom (1990) explains, successful management of shared resources is often rooted in social norms and community trust (Ostrom, 1990).

c. *Dimensions of Environmental Education: Integration of Spirituality and Ecological Literacy*

The third pillar of this eco-theological model is faith-based environmental education. Formal and non-formal education are seen as crucial channels for instilling ecological values in the younger generation. Madrasahs, Islamic boarding schools, and mosques in Kampung Pasir have the potential to become effective centers for ecological education. Values such as *amanah* (trustworthiness) and *khalifah* (vicegerent) can be integrated into the curriculum, including *aqidah* (belief), *akhlak* (morality), *fiqh* (Islamic jurisprudence), and thematic environmental interpretation.

Mosque youth religious studies can be used to introduce themes of waste recycling, the importance of mangroves, and the impact of climate change in accessible theological language. A study by Palmer & Finlay (2003) showed that integrating religious education with environmental issues significantly increases empathy and ecological awareness (Palmer & Finlay, 2003). Meanwhile, Mangunjaya & McKay (2012) found that Islamic boarding schools (*pesantren*) in Indonesia have great potential as centers for the formation of faith-based environmental ethics (Mangunjaya & McKay, 2012). Mosque-based environmental education also serves as a space for spiritual reflection, where preserving nature is understood as part of worship. Thus, conservation is not perceived as an external burden, but rather as a pious practice.

d. *Dimensions of Ecological Practice: Real Implementation in Coastal Areas*

The fourth dimension is operational ecological practices. This model emphasizes that theological values must be embodied in concrete actions. Examples of ecological practices include sustainable coastal management, mangrove reforestation, plastic waste reduction, and environmentally friendly economic development. In Kampung Pasir, mangrove planting activities can be combined with religious rituals, giving ecological activities spiritual significance. Waste management can be implemented through the establishment of mosque-based waste banks. This system not only has ecological impacts but also strengthens social solidarity and economic independence. According to Ikkala (2011), community-based waste management is an effective strategy for increasing environmental resilience in coastal areas (Ikkala, 2011). This model also encourages the use of environmentally friendly fishing gear and limits the exploitation of sand and coral reefs. These practices demonstrate how the values of trust and the prohibition of *facades* are translated into everyday life.

e. *Local Policy Dimensions: Synergy between Actors*

The final dimension is collaboration-based local policy. Villages, Islamic boarding schools, fishing communities, and traditional institutions need to build shared governance oriented toward sustainability. Village regulations (*Perdes*) on coastal protection can be drafted with the involvement of religious leaders to establish strong moral legitimacy. Islamic boarding schools can serve as centers for the development of spiritually-based eco-leaders. This collaboration aligns with the concept of co-management in the literature on natural resource management, which emphasizes the importance of partnerships between local communities and formal institutions (Berkes, 2004). This model positions religiosity not as an obstacle to modernization but as a driving force for social innovation for conservation (Berkes, 2004).

Overall, this model places religion as the main source of values and moral orientation that guides human perspectives on nature and life, while also being an ethical foundation that instills awareness that the environment is not merely an economic resource, but a trust that must be maintained for its sustainability and sanctity, the community is positioned as a driving force for socio-ecological change that works through solidarity, mutual cooperation, and collective awareness, so that the responsibility for protecting the environment is no longer solely individual, but becomes a shared project that is institutionalized in social life. Education functions as a very strategic medium for transmitting values, because through madrasahs, Islamic boarding schools, mosques, and informal learning spaces, theological principles and ecological ethics are passed down continuously to the younger generation in order to form a strong, critical, and spiritually based ecological character.

Ecological practices are understood as concrete manifestations of faith in everyday life, which are seen through concrete actions such as sustainable coastal management, mangrove reforestation, waste reduction, and the development of environmentally friendly economic patterns that do not damage the carrying capacity of nature; meanwhile, local policies become a structural framework that binds and directs all these dimensions to run systematically and sustainably through collaboration between village governments, Islamic boarding schools, religious leaders, and fishing communities, so that this ecotheology model is ultimately expected to be able to strengthen the resilience of the Madura coastal environment through an approach that is not top-down, but grows organically from the culture, local wisdom, and spirituality of the local community.

4. Conclusion

This research demonstrates that the Madurese contextual ecotheology model has significant potential as an alternative approach to strengthening coastal environmental resilience, particularly in the Kampung Pasir area of Sumenep. Theological values such as caliphate, trust, the prohibition of facade (damage), and the principles of balance and blessing are proven to be more than normative concepts, but are deeply embedded in the community's social and cultural practices. These values are formed through religious traditions, the moral authority of religious figures, and social mechanisms such as mutual cooperation and deliberation, which serve as the foundation of the community's ecological ethics. Furthermore, this study confirms that community religiosity is not a barrier to environmental conservation, but rather can be an effective social force (social capital) to strengthen nature conservation practices. When religious values are integrated with environmental education in madrasas and mosques, and realized in concrete practices such as coastal management, mangrove rehabilitation, and waste reduction, sustainable ecological behavior patterns rooted in spiritual awareness are formed. Therefore, the Madurese contextual ecotheology model is not only theoretically relevant but also applicable as a guideline for local policies and community empowerment strategies in addressing the coastal ecological crisis. This model offers an important contribution to the development of religious and environmental studies, and opens up space for the integration of spiritual-cultural approaches into the sustainable development agenda in Indonesia's coastal areas.

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