

## ***Maḥabbah*'s Mediating Role in Marine Ethics and Sustainability Practices**

Ahmiati<sup>1\*</sup>, Syaparuddin Razak<sup>2</sup>, Jumarni<sup>3</sup>

<sup>1</sup> Ahmiati, State Islamic Institute of Bone, Bone, South Sulawesi, Indonesia

<sup>2</sup> Syaparuddin Razak, State Islamic Institute of Bone, Bone, South Sulawesi, Indonesia

<sup>3</sup> Jumarni, State Islamic Institute of Bone, Bone, South Sulawesi, Indonesia

\*Corresponding author's e-mail: [ahmiatiar@gmail.com](mailto:ahmiatiar@gmail.com)

### **ABSTRACT**

*Marine ecosystem sustainability in coastal regions is increasingly challenged by climate change, overexploitation of marine resources, pollution, and weak community-based conservation, particularly in Muslim-majority societies where spiritual values shape everyday behavior but remain underrepresented in empirical sustainability studies. This study aims to examine the mediating role of maḥabbah (spiritual love and compassion in Islamic ethics) in the relationship between environmental ethics, marine resource utilization, marine protection, and marine ecosystem sustainability. Grounded in Islamic Environmental Ethics and Compassionate Conservation Theory, the research employs a quantitative explanatory design using Partial Least Squares–Structural Equation Modeling (PLS-SEM). Data were collected from 150 Muslim millennial fishers in South Sulawesi, Indonesia, through stratified random sampling. The findings reveal that maḥabbah has a strong and significant direct effect on marine ecosystem sustainability and significantly mediates the effects of environmental ethics, sustainable marine resource utilization, and marine protection practices. These results indicate that internalized spiritual–ethical values play a crucial role in transforming ethical awareness and conservation practices into sustained pro-environmental behavior. The study contributes theoretically by empirically positioning maḥabbah as a mediating construct within sustainability models and practically by offering a value-based framework for strengthening community-driven marine conservation policies in Muslim coastal contexts.*

**Keywords:** *Maḥabbah, Islamic Environmental Ethics, Sustainable Marine Resource Use, Marine Ecosystem Sustainability, PLS-SEM*

### **Introduction**

Marine ecosystem sustainability has become a critical issue in global natural resource governance, particularly in coastal regions that rely heavily on the sea as the foundation of their economic, social, and cultural systems. Pressures arising from overexploitation, pollution, climate change, and weakened conservation governance have contributed to ecosystem degradation across various regions, including Bone Regency, one of Indonesia's key fisheries areas (Arceo-Carranza et al., 2024; Filonov et al., 2025; (Jimenez et al., 2021). Conventional ecological approaches often fail to address these challenges comprehensively, as they tend to overlook the moral, spiritual, and local value dimensions that shape the behavior of coastal communities. Within Islamic tradition, however, the concept of *maḥabbah* offers an ethical perspective grounded in love, compassion, and care for nature as a divine trust. These values hold

strong potential for fostering sustainable practices among Muslim communities (Ward et al., 2022); (Lukambagire et al., 2024).

Despite this potential, scientific studies examining the role of *maḥabbah* in sustaining marine ecosystems remain limited. Previous research has predominantly focused on environmental ethics (Ulum et al., 2025), (Halim et al., 2023) and (Hafidh, 2025), blue economy initiatives (Spalding, 2016); Hasriyanti et al., 2021), maritime culture rooted in local wisdom (Nisa & Utanto, 2022), (Touwe, 2020) and (Karim et al., 2024), without exploring how Islamic spiritual values mediate ecological behavior among coastal populations, particularly Muslim millennials. This demographic has strategic significance, as millennial fishers are directly involved in marine resource utilization while simultaneously adapting to social, technological, and production shifts within modern fisheries. This research gap provides a compelling rationale for deeper exploration of the integration between spiritual values and conservation practices.

The novelty of this study lies in explicitly conceptualizing and empirically testing *maḥabbah* as a mediating spiritual–affective mechanism in marine ecosystem sustainability. Unlike previous studies that examine environmental ethics, local wisdom, or blue economy frameworks in isolation, this research integrates Islamic spiritual values into a quantitative PLS-SEM model to explain how ethical awareness, marine resource utilization, and conservation practices are translated into measurable sustainability outcomes (Joe F. Hair Jr, Marko Sarstedt, Lucas Hopkins, 2014). By positioning *maḥabbah* as a mediating variable rather than merely a normative religious concept, this study advances a novel Islamic value–based framework for understanding and strengthening marine ecosystem sustainability among Muslim millennial fishers (Rohmah & Sayuti, 2024).

Conceptually, this study is important because prevailing marine sustainability frameworks in coastal regions often rely heavily on regulatory, technological, and economic instruments, while underestimating the role of internal values that shape long-term conservation behavior. This limitation is particularly evident in Muslim coastal communities, where religious and spiritual values strongly influence everyday decision-making but remain marginal in empirical sustainability research. (Ni'mah et al., 2024) Addressing this gap, the present study explains how marine ecosystem sustainability operates through a value-based mechanism that integrates ethical, behavioral, and spiritual dimensions.

Specifically, environmental ethics, sustainable marine resource utilization, and marine protection practices shape *maḥabbah* as an affective–spiritual disposition rooted in Islamic values. This internalized sense of love, moral responsibility, and stewardship toward nature fosters ethical awareness that goes beyond external compliance. (Mayasari, 2023) Through this mechanism, *maḥabbah* motivates pro-environmental behavior, ethical decision-making, and conservation-oriented actions among Muslim millennial fishers. Consequently, *maḥabbah* functions not merely as a normative religious concept, but as a mediating variable that translates ethical values and regulatory practices into tangible and sustained contributions to marine ecosystem

sustainability. The phenomenon operates through a value-based mechanism in which ethical practices and conservation behaviors are internalized as *maḥabbah*, which in turn motivates sustained pro-environmental actions rather than short-term compliance.

Against this backdrop, the present study formulates three central research questions: How does *maḥabbah* influence marine ecosystem sustainability? How do environmental ethics, marine resource utilization, and marine protection shape *maḥabbah*? and What is the mediating role of *maḥabbah* in the relationships among these variables? The study aims to examine the direct and indirect effects within the proposed model and to advance theoretical understanding of spiritual–ecological mechanisms in marine ecosystem management (Ibrahim et al., 2024; Ulya et al., 2024). Consequently, this research offers both scientific and practical contributions by developing an Islamic value–based conservation model and informing the formulation of more sustainable, community-empowering marine policies.

### **Theoretical Framework and Hypothesis**

This study positions *maḥabbah* (compassionate love) as a driving force in natural resource management and employs two primary theoretical frameworks: the Islamic Environmental Ethics Theory and the Compassionate Conservation. These frameworks serve as the foundation for formulating research variables, hypotheses, and interpreting findings. The Islamic Environmental Ethics Theory is grounded in the principles of *mīzān* (balance), human responsibility as *khalīfah* (steward), and the prohibitions of *isrāf* (excess) and *fasād* (corruption) (Zuhdi et al., 2024). This ethical paradigm advocates for just and prudent environmental governance through the values of *‘adl* (justice), *iḥsān* (benevolence), and *tawḥīd* (unity of God), promoting conservation through protective zones such as *ḥimā* and *ḥarīm*, the adoption of eco-friendly technologies, and sustainable consumption patterns. (Ali & Agushi, 2024) and Conversely, the Compassionate Conservation Theory prioritizes the principles of "do no harm", ecological justice, and interspecies coexistence (Ibrahim et al., 2024). This approach rejects harmful conservation methods and instead emphasizes solutions such as relocation, ecology-based mitigation strategies, and public education. It upholds the intrinsic value of individual sentient beings and underscores the importance of ethical relationships between humans and nature (Ulya et al., 2024). Together, these two theories construct a comprehensive conceptual framework that underscores the significance of *maḥabbah* in conservation, positioning natural resource management as an integral expression of Islamic spiritual values.

A substantial body of empirical research reinforces the relevance of these theories. Previous studies indicate that strong environmental ethics significantly influence pro-conservation behavior and resource management (Ali & Agushi, 2024; Ahmed & Tamim, 2025). Community-based marine studies also demonstrate that sustainable resource utilization improves ecological resilience when guided by ethical and participatory governance (Zuhdi et al., 2024). Moreover, several scholars have shown that spiritual and moral values such as gratitude, stewardship, and compassion serve as

mediating factors linking environmental attitudes with ecological behavior (Basri et al., 2025). These findings support the proposition that *maḥabbah* can function as a psychological and spiritual mechanism that strengthens ethical decision-making and sustainability practices in coastal communities.

Taken together, the integration of Islamic Environmental Ethics and Compassionate Conservation Theory constructs a comprehensive conceptual framework that highlights *maḥabbah* as a transformative force in conservation efforts. Through this lens, natural resource management becomes not only a technical activity but an expression of Islamic spiritual values, reinforcing the idea that ecological care is an extension of faith and ethical responsibility.

### ***Maḥabbah* and the Sustainability of Marine Ecosystems**

*Maḥabbah*, which signifies love and compassion in Islam, plays a vital role in promoting marine ecosystem sustainability by fostering ethical awareness toward nature as Allah's creation. From an Islamic ethical perspective, the ocean is viewed as a divine trust (*amānah*) that must be preserved responsibly (Karhunmaa, 2020). Empirical studies adopting sustainability and ethical frameworks indicate that affective values significantly influence conservation behavior. For instance, (Diana, 2024) using a survey-based quantitative approach, found that compassion-based values positively affect sustainable fishing practices and pollution prevention. These findings suggest that *maḥabbah* encourages ethical marine resource management and collective responsibility among coastal communities. Based on this theoretical and empirical foundation, the following hypothesis is formulated:

**H1:** It is assumed that *maḥabbah* has a significant influence on marine ecosystem sustainability.

### **Environmental Ethics and *Maḥabbah***

Environmental ethics emphasizes moral responsibility in maintaining ecological balance, while *maḥabbah* serves as a spiritual driver that internalizes these ethical principles (Basri et al., 2025). Employing Structural Equation Modeling (SEM), demonstrate that ethical awareness significantly strengthens affective commitment toward environmental protection. Similarly, (Uzzlya et al., 2024) show that Islamic ethical values cultivate emotional attachment to nature, motivating individuals to avoid pollution and ecological degradation. These findings indicate that environmental ethics can shape *maḥabbah* by transforming moral understanding into spiritual affection toward the environment. Accordingly, the following hypothesis is proposed:

**H2:** It is assumed that environmental ethics has a significant influence on *maḥabbah*.

### **Utilization of Marine Resources and *Maḥabbah***

The utilization of marine resources is closely related to *maḥabbah* from spiritual and social perspectives. In Islamic teachings, the ocean is regarded as a divine blessing (*ni'mah*) that must be used responsibly (Jamal et al., 2025). Empirical evidence from (Sule & Musa, 2025), using mixed-method analysis, indicates that ethical and equitable marine resource utilization strengthens collective responsibility and long-term sustainability awareness among fishing communities. These findings suggest that

responsible utilization practices foster *maḥabbah* by reinforcing moral concern for both nature and fellow human beings. Thus, the following hypothesis is formulated:

**H3:** It is assumed that marine resource utilization has a significant influence on *maḥabbah*.

#### **Marine Protection and *Maḥabbah***

Marine protection practices aim to prevent ecosystem degradation through conservation measures and sustainable governance (Abadee et al., 2025). Using policy analysis and community-based surveys, find that moral values significantly enhance participation in marine protection initiatives. Similarly, (Fannani & Ma'arif, 2024) demonstrate that spiritually grounded conservation values encourage the adoption of environmentally friendly fishing practices. These findings indicate that marine protection efforts can strengthen *maḥabbah* by cultivating compassion and moral responsibility toward marine ecosystems. Based on this reasoning, the following hypothesis is proposed:

**H4:** It is assumed that marine protection has a significant influence on *maḥabbah*.

#### ***Maḥabbah* as a Mediating Variable**

*Maḥabbah* plays a strategic mediating role by internalizing ethical and regulatory practices into sustainable behavior (Ni'mah et al., 2024). Using mediation analysis, demonstrate that affective–spiritual values significantly mediate the relationship between ethical awareness and sustainability outcomes. Furthermore, (Mayasari, 2023) highlights that *maḥabbah* strengthens social responsibility and equitable resource utilization, thereby supporting long-term socio-ecological sustainability. These findings support the conceptualization of *maḥabbah* as a mediating mechanism linking environmental ethics, marine resource utilization, and marine protection with marine ecosystem sustainability. Accordingly, the following hypothesis is proposed:

**H5:** It is assumed that *maḥabbah* mediates the relationship between

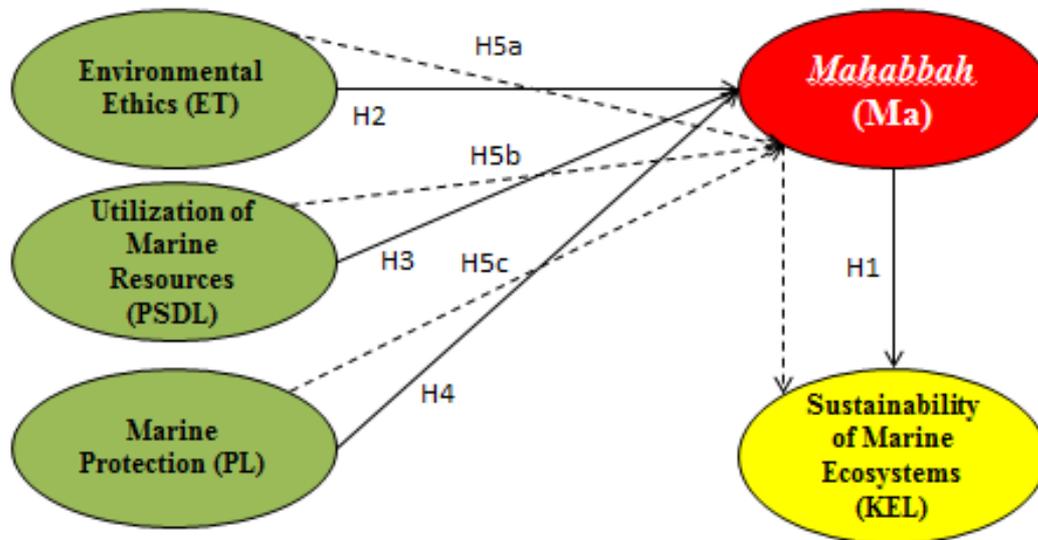
- (a) environmental ethics and marine ecosystem sustainability, (b) marine resource utilization and marine ecosystem sustainability, and (c) marine protection and marine ecosystem sustainability.

## **Research Methods**

### **Samples and sampling techniques**

This study employs a quantitative approach with a descriptive–explanatory research design to objectively examine the causal relationships among variables based on the proposed conceptual model. The dependent variable is Marine Ecosystem Sustainability (Y), while the independent variables consist of Environmental Ethics (X1), Marine Resource Utilization (X2), and Marine Protection (X3), with *Maḥabbah* (M) positioned as a mediating variable representing an affective–spiritual driver grounded in Islamic ethical principles. The hypothesized structural relationships among these variables are explicitly specified and tested using a PLS-SEM framework, as illustrated in Figure 1. PLS-SEM is employed not because an established empirical model already exists, but because it is suitable for theory development and testing

complex mediation models involving latent constructs in an exploratory and theory-building context.



**Figure 1.**  
**Conceptual Model of the Study**

The population of this research is statistically treated as an infinite population because no official sampling frame exists for millennial Muslim fishers, and their engagement in marine activities is highly dynamic, seasonal, and mobile across coastal areas. Under such conditions, the total population size cannot be accurately enumerated, which justifies the assumption of an infinite population in accordance with established practices in social and environmental research involving unregistered and fluctuating populations. To obtain a representative sample despite this limitation, the study adopts a stratified random sampling technique. From a statistical perspective, when the population size is unknown and no reliable sampling frame is available, the population is conventionally treated as infinite, as finite population parameters cannot be applied. Therefore, no finite population correction is required, and sample adequacy is determined based on model complexity rather than population size.

The sample size was determined based on the requirements of Partial Least Squares Structural Equation Modeling (PLS-SEM). Following the guidelines proposed by (Joe F. Hair Jr, Marko Sarstedt, Lucas Hopkins, 2014), a minimum of five to ten respondents per indicator is recommended to achieve stable model estimation. With 15 measurement indicators included in this study, the required sample size ranges from 75 to 150 respondents. Accordingly, a total of 150 respondents were selected, meeting both the minimum and upper threshold recommended for multivariate SEM analysis and ensuring adequate statistical power.

Data collection was conducted over a three-month period, from early April to the end of June 2025. Questionnaires were distributed to millennial Muslim fishing

communities in South Sulawesi, Indonesia, using Google Forms disseminated through WhatsApp groups. A total of 150 fully completed responses were obtained and used as the final dataset. This sample size is also consistent with additional methodological recommendations for SEM analysis (Sarstedt et al., 2020; Kyriazos, 2018; Schermelleh-Engel et al., 2003).

Data analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS version 4.0.8.9 (Becker et al., 2022). The analysis followed a two-stage procedure. First, the measurement model (outer model) was evaluated through tests of convergent validity (outer loadings and Average Variance Extracted), discriminant validity (Fornell–Larcker criterion and cross-loadings), and reliability (Cronbach’s alpha and composite reliability). Second, the structural model (inner model) was assessed by examining R-square values, F-square effect sizes, Q-square predictive relevance, and the statistical significance of path coefficients. Particular emphasis was placed on testing the mediating role of Maḥabbah, enabling the evaluation of both direct and indirect effects within the proposed PLS-SEM model (Gottens et al., 2018).

### Results and Discussion

The demographic profile of the respondents indicates that the majority of the 150 participants were male (64.7%) and married (63.3%). Most respondents were within the age range of 29–31 years (54%). In terms of educational attainment, senior high school graduates constituted the largest group (45.7%). The primary occupation reported was fishing (36%). Regarding monthly income, 57.3% of respondents earned between IDR 1 million and IDR 5 million, while 22.7% reported irregular income, and only 1.3% earned more than IDR 15 million per month.

**Table 1.**  
**Demographic Profile of the Respondents**

Criteria / Category	Frequency	Percentage (%)
Gender		
Male	97	64,7 %
Female	53	35,3 %
Marital Status		
Married	95	63,3 %
Unmarried	55	36,7 %
Age (Years)		
29-31	82	54%
32-34	29	19,3 %
35-38	23	15,3 %
39-41	17	11,3 %
Educational Background		

Criteria / Category	Frequency	Percentage (%)
Elementary School (or equivalent)	23	15,3 %
Junior High School (or equivalent)	33	22 %
Senior High School (or equivalent)	69	45,7 %
Diploma (D2/D3/D4)	8	5,3 %
Bachelor's Degree (S1)	17	11,3 %
Master's Degree (S2)	1	0,7 %
Doctorate (S3)	0	0 %
Occupation		
Lecturer/Teacher	8	5,3 %
Military/Police	5	3,3 %
Trader/Entrepreneur	27	17,9 %
Fisherman	54	36 %
Others	56	37,3 %
Monthly Income (in IDR)		
IDR 1,000,000 – 5,000,000	86	57,3 %
IDR 5,000,000 – 7,000,000	23	15,3 %
Above IDR 7,000,000 – 10,000,000	4	2,7 %
Above IDR 10,000,000 – 15,000,000	1	0,7 %
Above IDR 15,000,000	2	1,3 %
Uncertain/Others	34	22,7 %

Source: Primary data processed in 2025.

### Measurement Model Assessment

The validity and reliability results in Table 2 show strong measurement quality across all constructs. Cronbach's Alpha values exceed 0.70, with Marine Protection showing the highest reliability (0.910) and *maḥabbah* the lowest (0.867), both categorized as very good. Composite Reliability values (0.919–0.943) further confirm excellent internal consistency. All AVE values surpass the 0.50 threshold, indicating solid convergent validity. Marine Protection (0.847) and Marine Ecosystem Sustainability (0.832) demonstrate the strongest convergent validity among the constructs.

Table 3 shows strong predictive power in the structural model, with Marine Ecosystem Sustainability explained by *maḥabbah* at 63.3% ( $R^2 = 0.633$ ) and *maḥabbah* explained by its predictors at 69.4% ( $R^2 = 0.694$ ). The identical Adjusted  $R^2$  values indicate model stability and the absence of overfitting. Overall, all  $R^2$  values exceed the 0.60 threshold, confirming strong explanatory capability.

**Table 2.**  
**Validity and Reliability Test Results**

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Environmental Ethics	0.884	0.887	0.928	0.811
Marine Ecosystem Sustainability	0.899	0.900	0.937	0.832
<i>Maḥabbah</i>	0.867	0.869	0.919	0.791
Marine Protection	0.910	0.911	0.943	0.847
Marine Resource Utilization	0.894	0.895	0.934	0.825

Source: Primary data processed by using SmartPLS 4, 2025.

**Table 3.**  
**R-Squared and Adjusted R-Squared**

Variable	R-square	R-square adjusted
Marine Ecosystem Sustainability	0.633	0.633
<i>Maḥabbah</i>	0.694	0.694

Source: Primary data processed by using SmartPLS 4, 2025.

### Structural Model Assessment

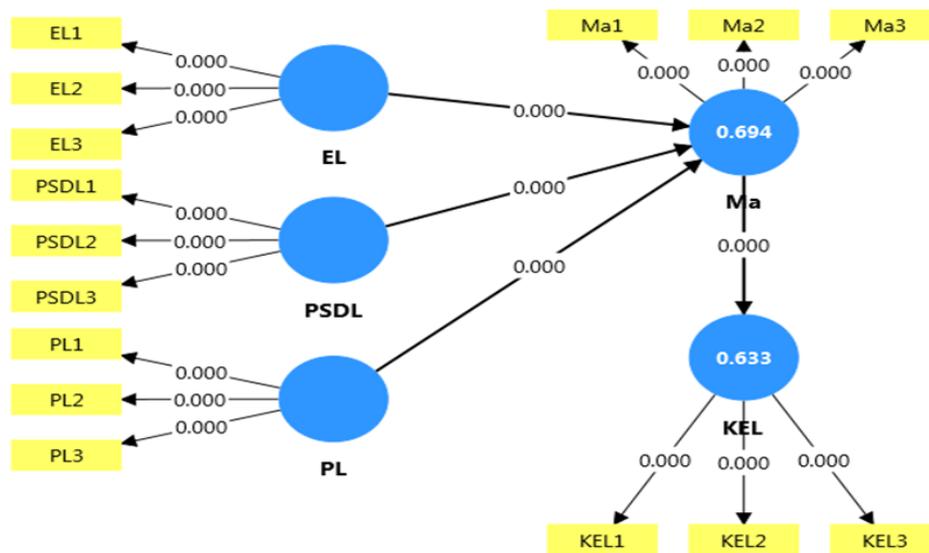
Table 4 shows that *maḥabbah* has the strongest effect on Marine Ecosystem Sustainability ( $\beta = 0.796$ ;  $p = 0.000$ ), highlighting its central role in supporting marine sustainability. Environmental Ethics ( $\beta = 0.320$ ), Marine Resource Utilization ( $\beta = 0.317$ ), and Marine Protection ( $\beta = 0.291$ ) also significantly enhance *maḥabbah*. All paths are statistically significant, confirming the robustness of the structural model. The results affirm *maḥabbah* as a key mediating construct linking ethics, protection, and resource use to ecosystem sustainability. The measurement model also meets all validity and reliability standards.

**Table 4.**  
**SEM-PLS: Direct Effect Testing Results**

Relationship of Variables		Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
H1	Environmental Ethics → <i>Maḥabbah</i>	0.320	0.313	0.075	4.241	0.000

Relationship of Variables		Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
H2	<i>Maḥabbah</i> → MarineEcosystem Sustainability	0.796	0.792	0.050	15.854	0.000
H3	Marine Protection → <i>Maḥabbah</i>	0.291	0.305	0.076	3.858	0.000
H4	Marine Resource Utilization → <i>Maḥabbah</i>	0.317	0.314	0.084	3.792	0.000

Source: Primary data processed by using SmartPLS 4, 2025.



**Figure 2.**  
Output of the structural model testing

Table 5 shows that *Maḥabbah* significantly mediates all indirect relationships toward Marine Ecosystem Sustainability. Environmental Ethics demonstrates an indirect effect of 0.254 ( $T = 4.040$ ;  $p = 0.000$ ), indicating that ethical values enhance *Maḥabbah*, which then drives pro-sustainability behavior. Marine Protection also shows a meaningful indirect effect of 0.232 ( $T = 3.822$ ;  $p = 0.000$ ), suggesting that conservation efforts strengthen emotional attachment to the sea. Marine Resource Utilization has an indirect effect of 0.252 ( $T = 3.473$ ;  $p = 0.001$ ), implying that responsible resource use fosters affective concern that promotes sustainability. Overall, the results reaffirm *Maḥabbah* as a pivotal mediator linking ethics, protection, and resource management with sustainability within the Sharia economic framework.

**Table 5.**  
**SEM-PLS: Indirect Effect Testing Results**

Relationship of Variables		Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
H5a	Environmental Ethics → Marine Ecosystem Sustainability	0.254	0.248	0.063	4.040	0.000
H5b	Marine Protection → Marine Ecosystem Sustainability	0.232	0.241	0.061	3.822	0.000
H5c	Marine Resource Utilization → Marine Ecosystem Sustainability	0.252	0.250	0.073	3.473	0.001

Source: Primary data processed by using SmartPLS 4, 2025.

## Discussion

This study investigates the mediating role of *maḥabbah*—an affective–spiritual construct rooted in Islamic ethics—in linking environmental ethics, marine resource utilization, and marine protection to marine ecosystem sustainability. The empirical findings demonstrate that *maḥabbah* functions as a central psychological and spiritual mechanism that translates ethical awareness and conservation practices into sustained pro-environmental behavior. Notably, *maḥabbah* emerges as the strongest direct predictor of marine ecosystem sustainability, indicating that internalized spiritual motivation exerts a stronger influence on conservation behavior than external regulatory or structural factors alone.

While previous studies largely emphasize regulatory compliance or socio-economic drivers of marine conservation, the present findings indicate that internalized spiritual motivation (*maḥabbah*) exerts a stronger direct effect on sustainability outcomes. This difference can be attributed to the integration of affective–spiritual constructs within a mediation model, which captures internal moral mechanisms often overlooked in conventional sustainability frameworks.

These findings are consistent with prior research emphasizing the role of spiritual and ethical values in shaping environmental responsibility. (Rakhmat, 2022) reports that Islamic eco-sufism enhances environmental stewardship by cultivating inner spiritual awareness, which parallels the present finding that *maḥabbah* strengthens ecological commitment through affective internalization. Similarly, (Trisnawati, 2017; Sadali,

2023) identify *maḥabbah* and *mīzān* (balance) as foundational values that foster ecological concern in Muslim coastal communities. The alignment between these studies and the current results suggests that spiritual affection consistently operates as a motivational force across different environmental contexts.

The results also align with findings by (Sultoni et al., 2024), who demonstrate that Sharia-based marine practices enhance sustainability outcomes when the ocean is perceived as a divine trust rather than a mere economic resource. This explains why marine protection and responsible marine resource utilization significantly influence *maḥabbah* in the present model: conservation-oriented practices reinforce emotional attachment and moral responsibility toward the marine environment. In contrast to conventional sustainability models that emphasize compliance and enforcement, this study shows that internal spiritual values amplify the effectiveness of conservation measures by transforming obligation into moral devotion (Rohmah & Sayuti, 2024).

From a theoretical perspective, these findings are grounded in Islamic Environmental Ethics Theory, which emphasizes *tawḥīd* (divine unity), *amānah* (trust), and *khalīfah* (stewardship) as moral imperatives guiding human interaction with nature. The Qur’anic foundation of this model is reflected in several key verses. Al-Baqarah (2:30) states, “Indeed, I will place upon the earth a khalīfah (steward),” indicating a divinely assigned responsibility for humanity to manage natural resources wisely and prevent environmental degradation. Al-An‘ām (6:165) further declares, “It is He who has made you successors upon the earth... that He may test you in what He has given you,” reinforcing ethical accountability in the utilization and protection of natural resources, including marine ecosystems.

Additionally, the principle of *raḥmah* (compassion) articulated in Al-Anbiyā’ (21:107), “We have not sent you, [O Muhammad], except as a mercy to all creation” establishes a theological basis for compassionate environmental governance. This verse supports the empirical finding that *maḥabbah* as an expression of love and compassion toward nature plays a decisive role in motivating conservation behavior. Likewise, the concept of *mīzān* (balance) in Al-Ḥijr (15:19), which states that “the Earth has been set in balance,” underscores the obligation to maintain ecological equilibrium. This theological mandate explains why ethical marine protection and responsible resource utilization strengthen sustainability outcomes through the mediating role of *maḥabbah*.

The present findings also resonate with Compassionate Conservation Theory, which posits that empathy-based values and moral emotions are essential drivers of sustainable conservation behavior. Studies by (Rohmah & Sayuti, 2024) show that value-based education grounded in *maḥabbah* significantly enhances pro-environmental behavior, while (Ali & Agushi, 2024; Ulya et al., 2024; Rozaq & Zain, 2024) argue that compassion and ethical consciousness are foundational to long-term ecological awareness. The consistency between these studies and the current results reinforces the argument that spiritual affective dimensions are not merely normative ideals but empirically verifiable determinants of sustainability.

What distinguishes this study from previous research is the explicit positioning of *maḥabbah* as a mediating construct within a PLS-SEM framework. While earlier studies often treated spiritual values as contextual or descriptive factors, this research demonstrates statistically that *maḥabbah* mediates the effects of environmental ethics, marine protection, and marine resource utilization on marine ecosystem sustainability. The significant indirect effects confirm that spiritual affection magnifies the impact of ethical and regulatory practices by internalizing them into enduring moral commitments.

These findings also extend existing sustainability theories by demonstrating that spiritual–affective constructs can be systematically operationalized and tested within quantitative structural models. In summary, the results validate both the scientific and spiritual significance of *maḥabbah* as a core mediating mechanism in marine conservation. Integrating Islamic ethical principles with empirical sustainability modeling provides a transformative pathway toward inclusive and enduring marine ecosystem management. These findings suggest that future conservation strategies in Muslim coastal communities should incorporate *maḥabbah*-oriented education and policy design to complement regulatory approaches and strengthen long-term sustainability outcomes.

### **Conclusion, Implications, Suggestions, and Limitations**

1. This study confirms that *maḥabbah* plays a pivotal mediating role in enhancing marine ecosystem sustainability among millennial Muslim fishing communities in Bone Regency. Environmental ethics, marine resource utilization, and marine protection were found to positively influence *maḥabbah*, which subsequently drives responsible conservation behavior and sustainable marine practices.
2. The findings demonstrate that Islamic spiritual values extend beyond ritual religious practices and exert a measurable ecological impact. *Mahabbah* functions as a psychological and spiritual mechanism that bridges ecological understanding with tangible conservation actions, thereby supporting all proposed hypotheses and strengthening the theoretical foundation of value-based environmental management.
3. From a theoretical perspective, this study contributes to the literature by empirically demonstrating that spiritual values can serve as an effective mediating construct within ecological behavior models—an aspect that remains underexplored in mainstream sustainability research.
4. Practically, the results offer actionable insights for policymakers, local governments, conservation agencies, and Islamic educational institutions. Integrating *maḥabbah*, environmental ethics, and conservation education into coastal management and marine preservation programs may foster sustainability approaches grounded not only in regulation but also in moral and spiritual transformation.

5. This study has several limitations, including the reliance on a quantitative design based on self-reported perceptions and the focus on millennial Muslim fishers within a single geographical context. These factors limit the generalizability of the findings to broader populations and ecological settings.
6. Future research is encouraged to employ qualitative or mixed-method approaches to capture the deeper spiritual and behavioral dynamics underlying conservation practices. Cross-regional and cross-cultural studies are also recommended to examine the consistency of *maḥabbah*'s mediating role across diverse marine conservation contexts.

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## Appendix

Tabel 6.  
Questionnaire

No.	Variabel	Measurements	Scale (Likert)
1	Environmental Ethics (EL)	1. I commit to understanding and being mindful of the environmental impact of every action I take.	1 - 5
		2. I pledge to protect the sea and the environment by avoiding littering and maintaining cleanliness.	1 - 5
		3. I vow to refrain from greed and to care for nature responsibly, as it is a trust from God.	1 - 5
2	Marine Resource Utilization (PSDL)	4. I believe that the ocean must be protected and not exploited indiscriminately to preserve marine life and ecological balance.	1 - 5
		5. I believe that the utilization of marine resources must be conducted equitably to ensure the welfare of fishing communities.	1 - 5
		6. I believe that protecting the sea and sharing its resources is a sincere expression of our love for God.	1 - 5
3	Marine Protection (PL)	7. I pledge to conserve coral reefs and various fish species to sustain a healthy and beneficial marine ecosystem.	1 - 5
		8. I commit to proper waste management, reducing single-use plastics, and safeguarding coastal environments.	1 - 5
		9. I am willing to support sustainable fishing practices and local economic development while remaining ecologically responsible and socially compassionate.	1 - 5
4	Marine Ecosystem Sustainability (KEL)	10. I promise to protect coral reefs, mangrove forests, and fish populations to sustain marine health and biodiversity.	1 - 5
		11. I pledge to use environmentally friendly fishing gear that does not harm marine habitats and supports future fish stocks.	1 - 5
		12. I am committed to protecting coastal areas by participating in environmental education, conservation initiatives, and compliance with eco-friendly regulations.	1 - 5
5	Mahabbah (Ma)	13. As an act of obedience to God, I strive to safeguard the ocean from degradation.	1 - 5
		14. I engage in remembrance of God ( <i>dhikr</i> ) while at sea, seeking blessings for a bountiful and harmonious ocean.	1 - 5

<b>No.</b>	<b>Variabel</b>	<b>Measurements</b>	<b>Scale (Likert)</b>
		15. I am willing to sacrifice by avoiding destructive fishing tools in support of long-term marine sustainability.	1 - 5