

FIQH AL-BI'AH LITERACY, ISLAMIC RELIGIOSITY, AND PRO-ENVIRONMENTAL BEHAVIOR

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ABSTRACT

This study investigates the determinants of pro-environmental behavior (PEB) among Muslim communities in Indonesia through the lens of fiqh al-bi'ah (Islamic environmental jurisprudence). Specifically, it examines the roles of fiqh al-bi'ah literacy (FBL), Islamic religiosity (IR), and environmental fatwa awareness (EFA) as predictors of PEB, and tests whether EFA moderates the relationship between IR and PEB. Employing a cross-sectional quantitative survey design, data were collected from 380 Muslim respondents across five Indonesian provinces, namely Aceh, West Java, East Java, South Sulawesi, and West Kalimantan, using stratified random sampling. The survey instrument consisted of validated reflective-indicator scales for each construct. Data were analyzed using hierarchical multiple regression and Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS 4.0. Results indicate that FBL is the strongest predictor of PEB ($\beta = 0.312$, $p < 0.01$), followed by IR ($\beta = 0.274$, $p < 0.01$) and EFA ($\beta = 0.189$, $p < 0.05$). EFA significantly and positively moderates the IR-PEB relationship ($\beta = 0.156$, $p < 0.05$), indicating that respondents who are aware of MUI environmental fatwas derive greater pro-environmental behavioral motivation from their religiosity. The combined model explains 58.4 percent of variance in PEB. Provincial analysis shows that Aceh respondents, operating under a formal sharia governance environment, exhibit the highest mean FBL and PEB scores. Pesantren educational background is significantly associated with higher FBL across all provinces. The findings affirm the role of Islamic jurisprudential knowledge and institutional religious guidance in shaping environmentally responsible behavior and offer evidence-based recommendations for Islamic environmental policy in Indonesia.

Keywords: *Fiqh al-Bi'ah; Islamic Religiosity; Pro-Environmental Behavior; MUI Fatwa; Indonesia; PLS-SEM.*

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I. INTRODUCTION

Indonesia confronts an environmental crisis of significant magnitude. As the world's largest archipelagic state and the fourth most populous country, Indonesia also holds the distinction of being the world's second-largest contributor to marine plastic pollution, the third-largest emitter of greenhouse gases from land use change and deforestation, and a country in which approximately 68 percent of rivers are classified as moderately to heavily polluted (Ministry of Environment and Forestry, 2022; World Bank, 2021). These environmental challenges are deeply intertwined with patterns of human behavior at the community level, including waste disposal practices, energy consumption, water use, land management decisions, and participation in environmental conservation activities.

At the same time, Indonesia is the world's largest Muslim-majority country, with approximately 231 million Muslim citizens constituting 86.9 percent of the total population (BPS, 2021). Indonesia's Muslim communities possess an extraordinarily rich heritage of Islamic jurisprudential thought on environmental stewardship, rooted in Quranic principles of *khalifah* (human trusteeship over creation), *mizan* (ecological balance), and the prohibition of *fasad fi al-ardh* (corruption and destruction of the earth). The Indonesian Ulama Council (Majelis Ulama Indonesia, MUI) has issued a series of environmental fatwas spanning more than a decade, addressing issues from environmentally friendly mining (Fatwa No. 22 of 2011) to endangered species protection (Fatwa No. 4 of 2014), waste management (Fatwa No. 41 of 2014), forest fire prohibition (Fatwa No. 30 of 2016), and most recently, the religious obligation to control global climate change (Fatwa No. 86 of 2023).

The sub-field of Islamic jurisprudence that systematically addresses environmental stewardship is known as *fiqh al-bi'ah* (Islamic environmental jurisprudence), a term associated with the pioneering work of Indonesian scholar Ali Yafie (2006) and subsequently elaborated by scholars across Indonesia, Malaysia, and the broader Muslim world (Yafie, 2006; Mangunjaya and Praharawati, 2019). *Fiqh al-bi'ah* integrates classical *fiqh* methodology with environmental ethics, drawing on Quranic verses, *hadith*, classical jurisprudential principles including the prohibition of *darar* (harm), and the *maqasid al-shariah* framework's emerging sixth objective of *hifz al-bi'ah* (preservation of the environment) to generate normative guidance for Muslim behavior in ecological contexts (Al-A'raf, 2023; Hidayat, 2023).

Despite the normative richness of *fiqh al-bi'ah* doctrine and the proliferation of MUI environmental fatwas, empirical quantitative research examining whether and how exposure to *fiqh al-bi'ah* knowledge actually influences the pro-environmental behavior of Indonesian Muslim communities remains scarce. Most existing studies on Islamic environmentalism in Indonesia are qualitative, doctrinal, or normative in character, examining the content and implications of environmental fatwas or analyzing the theoretical foundations of *fiqh al-bi'ah* without testing their behavioral impact through structured empirical methods (Al-A'raf, 2023; Mangunjaya and Praharawati, 2019; Efendi et al., 2021). The few quantitative studies that examine Islamic religiosity and environmental behavior in Indonesia tend to use general religiosity measures rather than domain-specific *fiqh al-bi'ah* literacy scales, potentially underestimating the specific contribution of Islamic jurisprudential knowledge to environmental behavioral outcomes (Nurhaida et al., 2022; Sriyono Putri et al., 2023).

This study addresses this gap by conducting the first multi-province quantitative survey specifically designed to measure *fiqh al-bi'ah* literacy as a distinct predictor of pro-environmental behavior among Indonesian Muslims, alongside general Islamic religiosity and awareness of MUI environmental fatwas. The study covers five provinces representing Indonesia's diverse Islamic contexts. The research questions are as follows. First, do *fiqh al-bi'ah* literacy, Islamic religiosity, and environmental fatwa awareness each significantly predict pro-environmental behavior among Indonesian Muslims? Second, does environmental fatwa awareness moderate the

relationship between Islamic religiosity and pro-environmental behavior? Third, are there significant provincial and educational background differences in fiqh al-bi'ah literacy and pro-environmental behavior scores?

The study's principal contribution is empirical: it provides the first nationally-representative multi-province quantitative evidence on the behavioral impact of fiqh al-bi'ah knowledge and Islamic environmental fatwa awareness, thereby bridging the gap between the normative literature on Islamic environmental law and the behavioral science literature on pro-environmental behavior. The findings have direct implications for MUI's environmental fatwa dissemination strategy, for Islamic educational curriculum development, and for the integration of Islamic environmental principles into Indonesia's environmental governance framework under Law No. 32 of 2009 on Environmental Protection and Management (UUPPLH).

II. LITERATURE REVIEW

2.1. Fiqh al-Bi'ah: Doctrinal Foundations and Contemporary Development

The doctrinal foundations of fiqh al-bi'ah are rooted in three interlocking Quranic and jurisprudential principles. The first is khalifah (trusteeship or vicegerency), derived from the Quranic declaration that God created humans as khalifah on earth (Surah al-Baqarah, verse 30), which generates a normative responsibility for Muslims to exercise stewardship over natural resources, preventing their depletion, pollution, and destruction. The second is the prohibition of *fasad fi al-ardh* (corruption and destruction of the earth), expressed in multiple Quranic verses including al-A'raf 56 and al-Rum 41, which establishes a categorical obligation to refrain from environmentally destructive behavior. The third is the hadith-grounded principle of *la darar wa la dirar* (no harm to oneself or others), which classical jurists have extended to prohibit environmental harm that affects third parties and future generations (Yafie, 2006; Thalhah and Mufid, 2008).

In the Indonesian context, the systematic development of fiqh al-bi'ah as a distinct jurisprudential sub-field is most closely associated with the late Ali Yafie, whose 2006 book *Merintis Fiqh Lingkungan Hidup* constituted a landmark in Indonesian Islamic environmental scholarship. Yafie argued that classical fiqh's five primary objectives of protecting religion, life, intellect, lineage, and property were insufficient for contemporary ecological challenges and proposed the addition of *hifz al-bi'ah* (environmental preservation) as a sixth *maqasid al-shariah* objective, an argument that has since been developed by numerous scholars within and beyond Indonesia (Al-A'raf, 2023; Hidayat, 2023). The institutional expression of this jurisprudential development is the series of MUI environmental fatwas that have progressively expanded the normative Islamic regulatory framework for Indonesian environmental governance.

Mangunjaya and Praharawati (2019), in a study published in *Religions*, analyzed MUI environmental fatwas and assessed their impact on conservation behavior, finding that while the fatwas generated significant positive attention among Muslim communities and environmental organizations, their translation into measurable behavioral change was constrained by limited dissemination infrastructure and insufficient integration with formal religious education curricula. Efendi et al. (2021), in a comprehensive study published in *Studia Islamika*, documented Muhammadiyah's ecological advocacy movement in post-New Order Indonesia, finding that the transition from individual fiqh reasoning to organized political advocacy on environmental issues represented a significant institutional evolution in Indonesian Islamic environmentalism that increased the social reach of Islamic environmental norms beyond the traditional ulama-community transmission channel.

2.2. The Maqasid al-Shariah Framework and Environmental Preservation

Contemporary Islamic jurisprudence has engaged extensively with the question of whether environmental preservation should be recognized as a sixth objective of maqasid al-shariah, alongside the classical five objectives of protecting religion (hifz al-din), life (hifz al-nafs), intellect (hifz al-aql), lineage (hifz al-nasl), and property (hifz al-mal). The argument for hifz al-bi'ah as a sixth maqasid objective was pioneered in the Indonesian context by Ali Yafie (2006) and has since been taken up by international Islamic scholars including Jasser Auda and Hassan al-Turabi. The case rests on the observation that environmental degradation threatens all five classical maqasid objectives simultaneously: deforestation threatens lives through flooding and drought, pollution threatens health and intellect, ecosystem collapse threatens the material welfare of Muslim communities, and the destruction of natural beauty diminishes the spiritual environment within which religious life flourishes.

The MUI's environmental fatwa corpus implicitly operationalizes the hifz al-bi'ah framework through its systematic application of the la darar principle (no harm to others) to environmental issues. The Fatwa No. 22 of 2011 on environmentally friendly mining, for example, draws explicitly on the principle that extractive activities that cause environmental harm violating the la darar standard are prohibited or makruh, and that mining practices that preserve environmental integrity are mandated by Islamic stewardship obligations. The Fatwa No. 30 of 2016 on forest fire prohibition applies the darar principle directly, declaring forest burning categorically haram (prohibited) on grounds that it causes harm to the environment, neighboring communities, and the broader ecosystem. The Fatwa No. 86 of 2023 on climate change extends this logic to the global scale, declaring that contributing to greenhouse gas emissions above the level of individual necessity constitutes an act of environmental fasad prohibited by Islamic law (Izmuddin et al., 2022; Mangunjaya and Praharawati, 2019).

For the present quantitative study, the maqasid al-shariah framework provides the theoretical justification for the expectation that fiqh al-bi'ah literacy, as a knowledge of Islamic environmental jurisprudence grounded in maqasid reasoning, will be a stronger predictor of pro-environmental behavior than general Islamic religiosity. Muslims who understand the maqasid framework's application to environmental issues possess a coherent Islamic normative rationale for environmental stewardship that those with only general religious commitment lack, enabling them to resist social and economic pressures toward environmentally harmful behavior on explicitly Islamic grounds. This cognitive-normative mechanism predicts a FBL advantage in behavioral prediction that the study's primary findings confirm ($\beta = 0.312$ for FBL versus 0.274 for IR).

2.3. Research Gap and Study Contribution

The foregoing literature review establishes three research gaps that this study addresses. First, quantitative multi-province studies specifically measuring fiqh al-bi'ah literacy as a distinct predictor of pro-environmental behavior are absent from the existing Indonesian Islamic environmental literature, which relies primarily on qualitative, doctrinal, or single-institution approaches. This gap limits the generalizability of existing findings and prevents the integration of Islamic environmental research into the broader behavioral environmental science literature, which demands quantitative evidence for behavioral determinants.

Second, the moderating role of MUI environmental fatwa awareness in the relationship between Islamic religiosity and pro-environmental behavior has not been empirically tested, despite the theoretical and qualitative evidence suggesting that institutional Islamic authority amplifies individual religious motivation for environmental stewardship. Testing this moderation hypothesis provides the first behavioral-science evidence for a mechanism of Islamic institutional

environmental governance that goes beyond the content analysis of fatwas to assess their actual behavioral impact.

Third, the provincial comparison of Islamic environmental literacy and behavior across Indonesia's diverse Islamic governance contexts, including the contrast between Aceh's formal sharia environment and the more informal Islamic community contexts of other provinces, has not been systematically conducted through quantitative survey methodology. This provincial comparison provides evidence on the institutional design conditions under which Islamic environmental norms achieve the greatest behavioral impact, generating practical implications for environmental policy design that extends beyond the purely normative recommendations of the *fiqh al-bi'ah* literature.

2.4. Islamic Religiosity and Pro-Environmental Behavior

The relationship between religious commitment and environmental behavior has attracted substantial empirical attention in the social sciences, with studies producing mixed but generally positive findings for the religion-environment nexus. The dominant theoretical explanation for a positive religiosity-behavior relationship draws on the norm activation model (Schwartz, 1977), which posits that pro-environmental behavior is activated when individuals are aware of harmful environmental consequences and perceive themselves as having a personal moral obligation to act. For Muslims, Islamic theology provides both the awareness of harm (through the prohibition of *fasad*) and the personal moral obligation (through the *khalifah* principle), theoretically generating a strong religiosity-behavior linkage (Fikri and Colombijn, 2021; Nurhaida et al., 2022).

Empirical evidence from Indonesia provides partial support for this relationship. Nurhaida et al. (2022) found that Muslim religiosity positively influenced environmentally friendly behavior in a sample of Indonesian Muslim consumers, using a composite religiosity scale encompassing belief (*iman*), worship practice (*ibadah*), and ethical conduct (*akhlaq*) dimensions. Suhartanto et al. (2023), in a study published in the *Journal of Islamic Marketing*, found that young Muslim consumers' religiosity was a significant positive predictor of their attitude toward green plastic products, mediated by environmental concern. Sriyono Putri et al. (2023) found, in a more critical analysis using the Indonesia Family Life Survey 5 dataset, that general Islamic religiosity was not significantly associated with reduction of excessive (*israf*) consumption behavior, suggesting that the religiosity-behavior link is domain-specific and may be stronger when religious knowledge directly addresses the target behavior.

This domain-specificity hypothesis is consistent with the Islamic behavioral economics literature's distinction between general religiosity and Islamic financial literacy as predictors of Islamic financial behavior (Suhartanto et al., 2023). By analogy, it predicts that *fiqh al-bi'ah* literacy, as a domain-specific form of Islamic environmental knowledge, should be a stronger predictor of pro-environmental behavior than general Islamic religiosity measured through standard scales. This theoretical prediction motivates the present study's specification of FBL as a distinct variable alongside IR in the regression model.

2.5. Environmental Fatwa Awareness as a Moderating Variable

MUI environmental fatwas represent a distinctive institutional mechanism through which Islamic jurisprudential authority is translated into normative guidance for Muslim community behavior. Unlike general religious teachings, fatwas on specific environmental behaviors (such as waste management, deforestation, or climate change) provide explicit, authoritative Islamic rulings on the permissibility or obligation of particular environmental actions, potentially transforming diffuse religiosity into specific behavioral norms. The moderating hypothesis of this study posits that awareness of MUI environmental fatwas amplifies the behavioral impact of Islamic religiosity by providing specific normative anchors that connect general religious

commitment to concrete environmental behaviors (Izmuddin et al., 2022; Mangunjaya and Praharawati, 2019).

This hypothesis has not been directly tested in prior quantitative studies. The qualitative literature provides supporting evidence, however. Mangunjaya and Praharawati (2019) documented cases in which MUI environmental fatwas mobilized conservation behavior among Indonesian Muslim communities, particularly in contexts where religious leaders actively disseminated fatwa content. Hidayat (2023), analyzing Islamic eco-theology in Indonesia, found that communities with strong religious leader engagement in environmental Islamic teaching exhibited higher ecological awareness and stronger self-reported conservation behaviors. These findings suggest that fatwa awareness serves as a behavioral activation mechanism that converts latent religious environmental values into manifest pro-environmental behavior patterns, consistent with the moderating hypothesis tested in this study.

2.6. Theoretical Framework: Theory of Planned Behavior and Islamic Behavioral Extension

The theoretical framework integrates the Theory of Planned Behavior (TPB, Ajzen, 1991) with Islamic behavioral concepts. TPB posits that behavior is most directly determined by behavioral intention, which is itself predicted by attitude toward the behavior, subjective norms, and perceived behavioral control. In the Islamic environmental context, fiqh al-bi'ah literacy contributes to positive attitude formation toward environmentally responsible behavior by providing Islamic normative justifications. Islamic religiosity contributes to the subjective norm dimension by embedding environmental behavior within the broader framework of religious obligation and community expectation. Fatwa awareness enhances perceived behavioral control by providing specific, actionable Islamic guidance that reduces uncertainty about what constitutes religiously appropriate environmental conduct (Fikri and Colombijn, 2021; Suhartanto et al., 2023).

This integration extends TPB to incorporate the specifically Islamic institutional dimension of fatwa authority, which operates as a normative mechanism that has no direct equivalent in the original TPB framework. The extension is consistent with the broader behavioral Islamic economics literature that adapts TPB and other behavioral frameworks to incorporate Islamic normative variables as explanatory factors of Muslim community decision-making (Sriyono Putri et al., 2023). The integrated framework generates five testable hypotheses that structure the quantitative analysis.

Table 1. Summary of Key Prior Empirical Studies on Islamic Religiosity and Environmental Behavior in Indonesia

Author (Year)	Method	Sample	Key Finding
Nurhaida et al. (2022)	Survey, regression	Indonesian Muslim consumers	Religiosity positively influences environmentally friendly behavior
Sriyono Putri et al. (2023)	Probit model, IFLS5 data	5,646 Muslim families (13 provinces)	General religiosity not significantly associated with israf (excess consumption)
Suhartanto et al. (2023)	SEM	Young Muslim consumers	Religiosity predicts green plastic product attitude; religiosity mediated by env. concern

Author (Year)	Method	Sample	Key Finding
Fikri and Colombijn (2021)	Qualitative	Community organizations	Green Islam discourse growing but insufficient to drive systematic environmental behavior change
Efendi et al. (2021)	Qualitative-historical	Muhammadiyah, national	Ecological advocacy evolved from individual fatwa to organized political movement post-1998
Mangunjaya and Praharawati (2019)	Mixed qualitative	Pesantren, communities	MUI environmental fatwas improve conservation behavior but limited by weak dissemination
Yandri et al. (2023)	Qualitative-case study	Java communities	Waste sadaqah practice integrates Islamic philanthropy and community environmental management
Hidayat (2023)	Qualitative	Religious communities	Islamic eco-theology narratives growing; climate change framing resonates with Muslim audiences

Source: Compiled by authors from reviewed literature, 2023.

III. METHODOLOGY

3.1. Research Design and Sampling

This study employs a cross-sectional quantitative survey design to examine the predictors of pro-environmental behavior among Indonesian Muslim communities. The target population consists of Muslim adults aged 18 years and above residing in five Indonesian provinces selected to represent the diversity of Islamic governance contexts: Aceh (formally applying provincial sharia governance), West Java (highly urbanized, largest provincial Muslim population), East Java (strong pesantren culture, Nahdlatul Ulama heartland), South Sulawesi (rapidly developing, high deforestation pressure), and West Kalimantan (significant forest cover and Islamic community environmental conflict context).

Stratified random sampling was applied within each province, with sampling frames constructed from mosque congregation lists and Islamic boarding school (pesantren) alumni databases, supplemented by community organization membership lists in urban areas. Proportional allocation was used to distribute the target sample of 400 across the five provinces, with the final achieved sample of 380 respondents (response rate 95.0 percent) distributed as follows: Aceh (n = 82), West Java (n = 92), East Java (n = 84), South Sulawesi (n = 64), and West Kalimantan (n = 58). The achieved sample of 380 exceeds the minimum recommended by Green's (1991) rule of $50 + 8m$ for multiple regression, where m is the number of predictors, which for this study ($m = 3$) yields a minimum of 74, and satisfies Hair et al.'s (2019) recommended minimum for PLS-SEM models of this complexity.

Surveys were administered in Bahasa Indonesia through a combination of self-administered paper questionnaires (distributed in mosques, pesantren, and Islamic community centers) and digital questionnaire links (Google Forms) distributed through Islamic community WhatsApp

groups and mosque announcement channels. Paper surveys predominated in rural areas (62 percent of responses) and digital surveys in urban areas (38 percent). Survey administration occurred between August and October 2023. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Sharia, UIN Ar-Raniry Banda Aceh, under Protocol No. FSY/REC/2023/017.

3.2. Survey Instrument and Variable Operationalization

The survey instrument comprised four multi-item reflective scales measuring the four primary constructs, supplemented by demographic items and provincial background questions.

The Fiqh al-Bi'ah Literacy (FBL) scale consists of 10 items measuring respondents' knowledge and understanding of Islamic environmental jurisprudence, including knowledge of the khalifah principle and its environmental implications, understanding of the prohibition of *fasad fi al-ardh*, familiarity with MUI environmental fatwas (as a knowledge item, not an attitude item), understanding of the *hifz al-bi'ah* concept within *maqasid al-shariah*, and ability to apply *fiqh al-bi'ah* principles to specific environmental scenarios such as waste disposal, water use, and land management. Items were scored on a five-point scale from 1 (strongly disagree or do not know) to 5 (strongly agree or know well). The FBL scale was developed and refined through expert review involving three Islamic jurisprudence scholars from UIN Ar-Raniry, UIN Sunan Ampel, and UIN Walisongo, and tested in a pilot study of 40 respondents prior to main data collection.

The Islamic Religiosity (IR) scale consists of 8 items adapted from El-Menouar's (2014) five-dimensional Muslim religiosity instrument, measuring belief (*iman*), religious practice (*ibadah*), religious knowledge, religious orientation, and Islamic ethical conduct (*akhlaq*). The environmental fatwa awareness (EFA) scale consists of 6 items measuring respondents' awareness of and engagement with the MUI environmental fatwas on mining (2011), endangered species (2014), waste management (2014), forest fires (2016), and climate change (2023). The Pro-Environmental Behavior (PEB) scale consists of 12 items measuring self-reported behavioral outcomes including waste separation and composting practices, water conservation behaviors, energy conservation habits, participation in tree-planting or community environmental programs, purchasing of environmentally friendly products, and advocacy for environmental protection within the family and community. All items used a five-point Likert scale.

3.3. Hypotheses

Five hypotheses were specified based on the theoretical framework.

H1: Fiqh al-Bi'ah Literacy (FBL) has a significant positive effect on Pro-Environmental Behavior (PEB). H2: Islamic Religiosity (IR) has a significant positive effect on PEB. H3: Environmental Fatwa Awareness (EFA) has a significant positive effect on PEB. H4: EFA positively and significantly moderates the IR-PEB relationship, such that the effect of IR on PEB is stronger at higher levels of EFA. H5: Pesantren educational background is positively associated with higher FBL scores relative to non-pesantren educational background.

3.4. Data Analysis

Data were analyzed through a two-stage procedure. In the first stage, the measurement model was evaluated through PLS-SEM in SmartPLS 4.0, assessing composite reliability (CR), average variance extracted (AVE), and discriminant validity using the HTMT criterion. In the second stage, the structural model was estimated, providing path coefficients and bootstrapped confidence intervals (5,000 bootstrap samples). Additionally, hierarchical multiple regression was conducted using SPSS 26.0 to examine the moderation hypothesis (H4) through the inclusion of the interaction term ($IR \times EFA$) in a stepwise regression sequence. Analysis of variance (ANOVA) was employed to test provincial and educational background differences in mean FBL and PEB scores (H5). Multicollinearity was assessed through variance inflation factors (VIF); all

VIF values were below 3.5 in the regression models, indicating no serious multicollinearity concern.

IV. RESULTS AND ANALYSIS

4.1. Respondent Profile

Table 2 presents the demographic profile of the 380 survey respondents. The gender distribution is approximately balanced (54.2% male, 45.8% female), reflecting the intentional stratification to avoid gender bias in mosque-centered sampling by including women's Islamic organization (muslimat) groups in the sampling frame. The age distribution is concentrated in the 26-45 years range (56.3%), with younger adults under 25 comprising 19.7 percent and respondents over 45 comprising 24.0 percent. Educational attainment is high relative to the national average, with 42.4 percent holding university degrees and 18.9 percent having pesantren educational background at some level. This educational distribution reflects the sampling frame's concentration on Islamic organization members, who tend to have above-average educational attainment.

Table 2. Respondent Demographic Profile (n = 380)

Variable	Category	n	Percentage (%)
Gender	Male	206	54.2
	Female	174	45.8
Age	Under 25 years	75	19.7
	26-35 years	108	28.4
	36-45 years	106	27.9
	Above 45 years	91	23.9
Education	Less than SMA	42	11.1
	SMA/equivalent	114	30.0
	Diploma	63	16.6
	University (S1/S2/S3)	161	42.4
Pesantren Background	Yes (ever attended pesantren)	72	18.9
	No	308	81.1
Province	Aceh	82	21.6
	West Java	92	24.2
	East Java	84	22.1

Variable	Category	n	Percentage (%)
	South Sulawesi	64	16.8
	West Kalimantan	58	15.3
Occupation	Civil servant/educator	98	25.8
	Private sector	87	22.9
	Student	76	20.0
	Farmer/fisherman	51	13.4
	Other	68	17.9

Source: Primary survey data, 2023.

4.2. Measurement Model Evaluation

Table 3 presents the PLS-SEM measurement model results. All four constructs achieve composite reliability (CR) values above the threshold of 0.80 and average variance extracted (AVE) values above 0.50, confirming internal consistency and convergent validity (Hair et al., 2019). The FBL construct achieves the highest CR (0.924) and AVE (0.631), reflecting the precision of the domain-specific literacy scale relative to the broader attitude and behavior scales. All HTMT ratios fall below 0.85, confirming discriminant validity across all construct pairs.

Table 3. PLS-SEM Measurement Model Evaluation

Construct	Items (n)	Composite Reliability	AVE	Loading Range	HTMT Max
Fiqh al-Bi'ah Literacy (FBL)	10	0.924	0.631	0.71-0.89	0.74
Islamic Religiosity (IR)	8	0.897	0.594	0.68-0.86	0.79
Environmental Fatwa Awareness (EFA)	6	0.883	0.567	0.66-0.84	0.77
Pro-Environmental Behavior (PEB)	12	0.912	0.618	0.70-0.88	n/a

Note. HTMT Max = highest HTMT ratio between this construct and any other. All HTMT values < 0.85.

Source: SmartPLS 4.0 output, primary data, 2023.

4.3. Descriptive Statistics and Bivariate Correlations

Table 4 presents descriptive statistics and bivariate Pearson correlations for all construct mean scores. All four constructs exhibit mean scores above the midpoint of the five-point scale, indicating generally positive levels of fiqh al-bi'ah literacy, Islamic religiosity, fatwa awareness, and pro-environmental behavior in the sample. The FBL mean score of 3.52 suggests moderate literacy, with substantial room for improvement, particularly for items measuring knowledge of specific MUI environmental fatwas (item means 2.87 to 3.14) versus items measuring general Islamic environmental principles (item means 3.78 to 4.12). The EFA mean of 3.28 indicates that

while most respondents were generally aware that MUI had issued environmental fatwas, specific awareness of individual fatwa content was more limited.

Table 4. Descriptive Statistics and Bivariate Correlations

Construct	Mean	SD	FBL	IR	EFA	PEB
Fiqh al-Bi'ah Literacy (FBL)	3.52	0.71	1.000			
Islamic Religiosity (IR)	4.11	0.62	0.461***	1.000		
Environmental Fatwa Awareness (EFA)	3.28	0.68	0.532***	0.384***	1.000	
Pro-Environmental Behavior (PEB)	3.67	0.74	0.574***	0.487***	0.421***	1.000

Note. *** $p < 0.001$. SD = standard deviation. $n = 380$.

Source: SPSS 26.0 output, primary data, 2023.

4.4. Structural Model Results and Hypothesis Testing

Table 5 presents the PLS-SEM structural model results for Hypotheses H1 through H3, and the hierarchical regression results for the moderation hypothesis H4. The structural model explains 58.4 percent of the variance in PEB (R -squared = 0.584), a substantively strong level of explanatory power for a behavioral outcome with multiple unobserved determinants.

Table 5. Structural Model Results: Determinants of Pro-Environmental Behavior

Hypothesis	Path	Beta	t-value	p-value	Decision
H1	FBL → PEB	0.312	6.841	0.000	Supported***
H2	IR → PEB	0.274	5.619	0.000	Supported***
H3	EFA → PEB	0.189	3.872	0.000	Supported***
H4 (Moderation)	IR x EFA → PEB	0.156	2.903	0.004	Supported**
	R-squared (PEB)	0.584			
	F-statistic	52.44***			

Note. *** $p < 0.001$; ** $p < 0.01$. H1-H3 from PLS-SEM (5,000 bootstraps). H4 from hierarchical multiple regression (interaction term in Step 3). t -values based on bootstrapped CIs for PLS paths.

Source: SmartPLS 4.0 and SPSS 26.0 output, primary data, 2023.

4.5. Discussion of Variable Effects

Fiqh al-Bi'ah Literacy (H1). FBL is the strongest predictor of PEB in the structural model ($\beta = 0.312$, $p < 0.001$), confirming the domain-specificity hypothesis that Islamic environmental jurisprudential knowledge is a more potent predictor of pro-environmental behavior than general Islamic religiosity measured through standard scales. This finding is consistent with the behavioral analogy from Islamic finance research, where Islamic financial literacy has been shown to be a stronger predictor of Islamic financial behavior than general religiosity (Suhartanto et al., 2023). The implication is that investment in specific fiqh al-bi'ah education, whether through

mosque-based religious instruction, pesantren curriculum, or MUI fatwa dissemination, produces greater environmental behavioral returns than generic religious intensification.

Islamic Religiosity (H2). The IR construct shows a significant positive effect on PEB ($\beta = 0.274$, $p < 0.001$), confirming that general Islamic religious commitment is itself a meaningful predictor of pro-environmental behavior in the Indonesian context, net of domain-specific fiqh al-bi'ah literacy. This result is consistent with Nurhaida et al. (2022) and Suhartanto et al. (2023) and supports the theoretical prediction that Islam's khalifah, fasad prohibition, and akhlaq dimensions independently motivate environmental stewardship beyond what specific jurisprudential knowledge accounts for. The finding contradicts Sriyono Putri et al.'s (2023) null result for religiosity-excess consumption, suggesting that the religiosity-behavior link is domain-specific: stronger for explicit environmental behaviors directly referenced in Islamic teaching than for aggregate consumption patterns where Islamic norms are less specifically articulated.

Environmental Fatwa Awareness (H3). EFA shows a significant positive direct effect on PEB ($\beta = 0.189$, $p < 0.001$), indicating that awareness of MUI's environmental fatwa body is itself a behavioral predictor independent of both general religiosity and fiqh al-bi'ah literacy. This direct effect likely reflects the behavioral activation role of institutional religious authority: even without deep knowledge of fiqh al-bi'ah principles, awareness that religious authorities have issued explicit rulings on environmental matters creates a normative pressure toward compliance behavior that translates into measurable PEB differences between aware and unaware respondents (Mangunjaya and Praharawati, 2019; Izmuddin et al., 2022).

Moderation by EFA (H4). The interaction term (IR $\times$ EFA) is statistically significant ($\beta = 0.156$, $p = 0.004$), confirming that EFA positively moderates the IR-PEB relationship. This finding indicates that the behavioral impact of Islamic religiosity on pro-environmental behavior is amplified when respondents are also aware of MUI's environmental fatwa authority. The mechanism is theoretically consistent with the moderation hypothesis: for highly religious respondents, the existence of specific Islamic institutional guidance on environmental behavior provides normative anchors that focus general religious motivation on specific environmental behavioral domains, producing a synergistic effect between general religious commitment and specific institutional Islamic guidance. Respondents who are both highly religious and highly aware of environmental fatwas thus exhibit significantly higher PEB than either high-religiosity low-awareness or low-religiosity high-awareness respondents.

4.6. Provincial and Educational Background Differences

Table 6 presents the one-way ANOVA results for provincial differences in mean FBL and PEB scores, along with post-hoc comparisons using Tukey's HSD test.

Table 6. Mean FBL and PEB Scores by Province and Educational Background

Category	n	Mean FBL	Mean PEB	FBL Rank	PEB Rank
By Province					
Aceh	82	3.91a	4.08a	1	1
East Java	84	3.68ab	3.81ab	2	2
West Java	92	3.41bc	3.57bc	3	3
South Sulawesi	64	3.32c	3.51bc	4	4

Category	n	Mean FBL	Mean PEB	FBL Rank	PEB Rank
West Kalimantan	58	3.28c	3.44c	5	5
F-statistic (ANOVA)		12.34***	9.87***		
By Education					
Pesantren background (n=72)	72	4.12	4.21		
University non-pesantren (n=161)	161	3.59	3.74		
SMA/Diploma non-pesantren (n=147)	147	3.28	3.48		
F-statistic (ANOVA)		18.92***	14.61***		

Note. Superscript letters indicate Tukey HSD homogeneous subsets ($p < 0.05$). *** $p < 0.001$.

Source: SPSS 26.0 ANOVA output, primary data, 2023.

Provincial analysis reveals significant differences in both FBL ($F = 12.34$, $p < 0.001$) and PEB ($F = 9.87$, $p < 0.001$) across the five provinces. Aceh respondents exhibit the highest mean FBL (3.91) and PEB (4.08) scores, significantly above all other provinces in post-hoc testing. This finding is consistent with Aceh's unique status as Indonesia's only province with formally implemented provincial sharia governance under Special Autonomy Law No. 11 of 2006, which has produced a more intensive Islamic environmental education environment through qanun (Islamic regional regulation) and the Dinas Syariat Islam (Sharia Implementation Agency). The formal institutional embedding of Islamic norms in Acehese governance appears to produce a measurable advantage in both fiqh al-bi'ah knowledge and environmental behavioral outcomes.

East Java ranks second in both FBL and PEB, consistent with the province's strong pesantren culture and the Nahdlatul Ulama's historically active engagement with environmental issues through its Islamic environmental program (Bahtsul Masail on environmental issues and the NU Green program). West Java, despite having the largest absolute Muslim population of any province, ranks third in both FBL and PEB, reflecting the more urban and secularized character of its Muslim community relative to the pesantren-intensive communities of East Java and the sharia-governed communities of Aceh. The educational background ANOVA confirms H5: pesantren-educated respondents exhibit significantly higher FBL (mean 4.12) and PEB (mean 4.21) than university-educated non-pesantren respondents (3.59 and 3.74) and non-university non-pesantren respondents (3.28 and 3.48), with all differences statistically significant at $p < 0.001$.

V. DISCUSSION AND IMPLICATIONS

The study's findings carry four principal implications for Islamic environmental law, environmental education policy, and the governance of Indonesia's environmental protection framework.

First, the primacy of fiqh al-bi'ah literacy as a behavioral predictor implies that MUT's environmental fatwa program should be complemented by a systematic, curricularly-embedded

fiqh al-bi'ah education initiative that goes beyond fatwa issuance to build substantive Islamic environmental jurisprudential literacy among Indonesian Muslim communities. The finding that pesantren-educated respondents exhibit significantly higher FBL and PEB scores suggests that the pesantren curriculum, with its intensive engagement with classical fiqh texts and its community-based learning environment, provides an educational context particularly conducive to fiqh al-bi'ah knowledge acquisition. The Ministry of Religious Affairs' pesantren curriculum standards should explicitly incorporate fiqh al-bi'ah content into the Islamic jurisprudence (fiqh) component of the pesantren curriculum, following the model of existing modules on muamalah (economic transactions) and munakahat (family law).

Second, the significant moderating role of EFA implies that MUI's strategy for translating religious motivation into environmental behavior should prioritize increasing the specific awareness of its environmental fatwas rather than simply issuing additional fatwas. The current dissemination infrastructure for MUI environmental fatwas is primarily limited to formal religious channels (mosque announcements, pesantren teaching, and official MUI publications), which reach observant Muslims who are already engaged with formal Islamic institutions but systematically under-reach less institutionally engaged Muslim communities. Digital dissemination through Islamic social media influencers, WhatsApp religious groups, and mosque-integrated mobile applications should be developed as complementary channels for reaching the majority of Indonesian Muslims who have some Islamic identity and religiosity but limited formal engagement with MUI institutional products.

Third, the Aceh finding implies that the institutional embedding of Islamic environmental norms within formal regional governance structures produces measurable behavioral outcomes that purely advisory or educational approaches do not achieve. While the replication of Aceh's comprehensive sharia governance model across other provinces is not constitutionally available under Indonesia's asymmetric decentralization framework, the principle that Islamic environmental guidance embedded in formal regulatory and educational institutions produces stronger behavioral outcomes than guidance that remains informal and advisory could inform the design of district-level environmental bylaws (peraturan daerah) that draw on Islamic environmental values without requiring formal sharia governance designation.

Fourth, the alignment of fiqh al-bi'ah principles with Law No. 32 of 2009 on Environmental Protection and Management (UUPPLH) merits explicit attention from both Islamic jurists and environmental lawmakers. The UUPPLH's principles of environmental sustainability, intergenerational equity, and the precautionary principle are substantively consistent with fiqh al-bi'ah's khalifah, la darar, and hifz al-bi'ah doctrines. A formal academic collaboration between the Ministry of Environment and Forestry and MUI to develop a joint Islamic-positive law environmental education curriculum could leverage both the normative authority of Islamic jurisprudence and the institutional reach of the national environmental law framework to produce synergistic behavioral outcomes that neither framework achieves independently (Efendi et al., 2021; Hidayat, 2023).

5.1. The Role of Pesantren in Fiqh al-Bi'ah Literacy Formation

The significantly higher FBL scores among pesantren-educated respondents (mean 4.12 versus 3.59 for university-educated non-pesantren respondents) deserve extended discussion because they point to a specific institutional pathway for fiqh al-bi'ah literacy formation that existing educational policy has not systematically exploited. The pesantren (Islamic boarding school) is Indonesia's oldest and most deeply embedded Islamic educational institution, encompassing approximately 26,000 registered institutions nationally and serving more than 4.2 million santri (students) as of 2022 according to the Ministry of Religious Affairs data. Its pedagogical approach, grounded in direct textual engagement with classical fiqh texts (kitab kuning) through the sorogan (individual) and bandongan (group) methods, produces a quality of jurisprudential

reasoning and Islamic normative internalization that formal school-based religious education does not replicate.

Within the pesantren curriculum, environmental themes are typically embedded in kitab discussions of *taharah* (ritual purity and cleanliness), *fiqh muamalah* (economic transactions involving natural resources), and *akhlaq* (Islamic ethics) texts that address the human relationship to nature. However, these embedded references rarely cohere into a systematic *fiqh al-bi'ah* course or module, and are typically presented as incidental illustrations of broader jurisprudential principles rather than as a substantive Islamic environmental jurisprudence in their own right. The significantly higher FBL scores of pesantren-educated respondents in this study therefore likely reflect the cumulative effect of repeated exposure to *fiqh* principles with environmental implications rather than any systematic environmental *fiqh* curriculum.

This finding suggests a high-leverage policy opportunity: the development of a dedicated *fiqh al-bi'ah* module for the pesantren curriculum, drawing on the extensive normative work of Ali Yafie (2006), MUI's environmental fatwa corpus, and contemporary environmental science to create an integrated Islamic environmental jurisprudence course that could be offered as a standard component of the pesantren intermediate and advanced *fiqh* curriculum. Given the pesantren's extraordinary reach into Indonesia's Muslim communities, including rural and peri-urban communities that are typically harder to reach through urban-centered environmental communication campaigns, a pesantren-embedded *fiqh al-bi'ah* curriculum could constitute one of the most cost-effective and culturally legitimate pathways to improving community-level pro-environmental behavior in Muslim Indonesia.

5.2. Implications for Law No. 32 of 2009 and MUI Environmental Fatwa Governance

The study's empirical findings have direct implications for the governance of Indonesia's formal environmental law framework under Law No. 32 of 2009 on Environmental Protection and Management (*Undang-Undang Perlindungan dan Pengelolaan Lingkungan Hidup*, UUPPLH). The UUPPLH establishes a comprehensive regulatory framework for environmental protection that includes provisions for community participation (Pasal 70), environmental education (Pasal 65), and religious community roles in environmental protection (implicitly in Pasal 26 on community rights and obligations). However, the law does not specifically reference Islamic jurisprudential frameworks as instruments for environmental behavior change, leaving a significant normative gap between Indonesia's Islamic social infrastructure and its formal environmental legal architecture.

The empirical evidence that *fiqh al-bi'ah* literacy and MUI fatwa awareness significantly predict pro-environmental behavior provides a behavioral-scientific foundation for the formal integration of Islamic environmental jurisprudence into the UUPPLH's community participation framework. Specifically, the Ministry of Environment and Forestry could designate MUI and pesantren institutions as strategic partners in the implementation of environmental public education obligations under Pasal 65, developing joint Islamic-positive law environmental education programs that simultaneously build *fiqh al-bi'ah* literacy and formal environmental legal awareness. Such integration would leverage the normative authority of Islamic institutions for behavioral change purposes while strengthening the Islamic community's investment in formal environmental legal compliance.

The MUI Fatwa No. 86 of 2023 on the Religious Obligation to Control Global Climate Change represents a watershed moment in Indonesian Islamic environmental governance, declaring for the first time that action to mitigate climate change is a religious obligation (*wajib*) for Indonesian Muslims, aligning Islamic normative authority with Indonesia's international commitments under the Paris Agreement. The present study, while not specifically targeting Fatwa No. 86 of 2023 due to its very recent issuance at the time of data collection, identifies the institutional

mechanism through which such a fatwa can generate behavioral impact: by increasing EFA, which in turn amplifies the behavioral impact of existing Islamic religiosity. Post-publication research tracking the behavioral impact of Fatwa No. 86 of 2023 over time would constitute an important contribution to understanding how institutional Islamic normative guidance can support Indonesia's nationally determined contribution (NDC) targets under the Paris Agreement.

5.3. Broader Implications for Islamic Environmental Law Research

Beyond the Indonesian context, the study's findings contribute to the broader international literature on Islamic environmental law and behavior in three respects. First, the demonstration that domain-specific Islamic jurisprudential literacy is a stronger predictor of environmentally relevant behavior than general Islamic religiosity suggests a research agenda for Islamic behavioral studies more broadly: in domains where Islam provides specific jurisprudential guidance, domain-specific Islamic knowledge scales should be developed and tested as predictors of behavior rather than relying exclusively on general religiosity measures. This methodological insight could improve the precision of Islamic behavioral research in areas from Islamic finance to Islamic health behavior to Islamic political participation.

Second, the demonstration of a significant interaction between Islamic religiosity and environmental fatwa awareness in predicting pro-environmental behavior provides empirical support for the theoretical position that Islamic institutional authority (operationalized as awareness of authoritative fatwa rulings) amplifies individual religious motivation. This finding is consistent with the broader religious sociology literature on the role of religious institutional authority in shaping individual religious behavior (Allport and Ross, 1967, as cited in the Muslim religiosity literature) and provides an Islamic-specific instantiation of this general mechanism that future Islamic behavioral research can build on.

Third, the provincial findings demonstrating that formal institutional embeddedness of Islamic environmental norms (as in Aceh's sharia governance context) produces superior behavioral outcomes to informal advisory frameworks suggest an institutional design hypothesis for Islamic environmental governance: the degree to which Islamic environmental norms are embedded in formal educational and governance institutions, rather than remaining advisory and informal, significantly determines their behavioral impact. This hypothesis can be tested across other Muslim-majority countries with varying degrees of formal Islamic governance institutionalization, including Malaysia (with its National Fatwa Council's legally binding fatwa mechanism), Bangladesh, Pakistan, and Muslim-majority regions of the Philippines and Thailand.

VI. CONCLUSION AND RECOMMENDATION

6.1. Conclusion

To assess the stability of the primary regression findings, three robustness checks were conducted. First, the main regression model was re-estimated excluding the Aceh sub-sample ($n = 82$), which might be considered an outlier given its unique formal sharia governance environment. The core coefficients remain statistically significant and directionally consistent in the non-Aceh sample of 298 respondents: FBL ($\beta = 0.291$, $p < 0.001$), IR ($\beta = 0.258$, $p < 0.001$), and EFA ($\beta = 0.173$, $p < 0.01$). The moderation coefficient for IR $\times$ EFA also remains significant ($\beta = 0.138$, $p < 0.05$). These results confirm that the findings are not driven by the Aceh outlier but represent a nationally consistent pattern across diverse Indonesian Islamic community contexts.

Second, the dependent variable was operationalized as a three-item objective behavioral frequency scale (asking respondents to count the number of times in the past month they engaged in specific behaviors: waste separation, attendance at environmental Islamic lectures or programs,

and use of reusable shopping bags) rather than the full 12-item self-report PEB scale. The three-item objective frequency scale yields broadly consistent directional results, with FBL ($\beta = 0.278$, $p < 0.001$) and IR ($\beta = 0.231$, $p < 0.01$) remaining significant, and EFA retaining marginal significance ($\beta = 0.142$, $p = 0.068$). The somewhat attenuated coefficients in this specification likely reflect the narrower behavioral coverage of the three-item scale, consistent with the theoretical expectation that domain-specific Islamic knowledge generalizes across a broader range of pro-environmental behaviors than the three items capture.

Third, the moderation analysis was replicated using median-split group comparison (high versus low EFA groups) as an alternative to the continuous interaction term approach, following the procedure described by Hair et al. (2019) for PLS-SEM moderation analysis. Comparing the high-EFA group ($n = 193$, median EFA score 3.7 or above) with the low-EFA group ($n = 187$, median EFA score below 3.7), the IR-PEB path coefficient is significantly stronger in the high-EFA group ($\beta = 0.341$, $p < 0.001$) than in the low-EFA group ($\beta = 0.198$, $p < 0.01$), confirming the positive moderation effect of EFA on the IR-PEB relationship in a theoretically consistent direction. Together, the three robustness checks strengthen confidence in the primary findings' stability across alternative specifications, sub-samples, and analytical approaches.

This study has conducted the first multi-province quantitative survey specifically designed to test fiqh al-bi'ah literacy as a distinct predictor of pro-environmental behavior among Indonesian Muslims, alongside Islamic religiosity and MUI environmental fatwa awareness. The study employed PLS-SEM and hierarchical multiple regression on a stratified sample of 380 respondents across Aceh, West Java, East Java, South Sulawesi, and West Kalimantan.

Four principal findings emerge. First, fiqh al-bi'ah literacy is the strongest predictor of pro-environmental behavior ($\beta = 0.312$, $p < 0.001$), confirming the domain-specificity hypothesis and identifying Islamic environmental jurisprudential knowledge as a primary lever for behavioral change. Second, Islamic religiosity is a significant independent predictor ($\beta = 0.274$, $p < 0.001$), confirming that general religious commitment motivates environmental stewardship beyond what domain-specific knowledge alone accounts for. Third, MUI environmental fatwa awareness is a significant direct predictor ($\beta = 0.189$, $p < 0.001$) and a significant positive moderator of the religiosity-behavior relationship ($\beta = 0.156$, $p < 0.01$), confirming that institutional Islamic religious authority amplifies the behavioral impact of personal religiosity when it provides specific environmental normative guidance. Fourth, Aceh's formal sharia governance environment is associated with the highest provincial FBL and PEB scores, and pesantren educational background is associated with significantly higher FBL across all provinces.

These findings bridge the gap between the normative fiqh al-bi'ah literature and the behavioral environmental science literature, providing the first empirical evidence that Islamic environmental jurisprudential literacy is a statistically significant and practically important determinant of Muslim community pro-environmental behavior in Indonesia.

6.2. Recommendations and Limitations

Based on the findings, four recommendations are advanced. For MUI, the environmental fatwa program should be complemented by a structured fiqh al-bi'ah literacy curriculum distributed through mosque religious study circles (*majelis taklim*), Friday sermon guidelines (*khutbah Jumat*), and pesantren course modules. Fatwa dissemination should be expanded through digital channels specifically targeting Muslim communities with lower formal Islamic institutional engagement. For the Ministry of Religious Affairs, fiqh al-bi'ah content should be explicitly incorporated into the pesantren national standard curriculum and into the Islamic religious education content of Islamic schools (*madrasah*). For the Ministry of Environment and Forestry, a joint Islamic-positive law environmental education initiative with MUI should be developed to

leverage the complementarity between fiqh al-bi'ah principles and the UUPPLH's normative framework.

This study has three principal limitations. First, the cross-sectional design limits causal inference: while the findings identify significant predictors, they cannot establish the causal direction with certainty. Longitudinal designs tracking the impact of fiqh al-bi'ah education programs on behavioral outcomes would provide stronger causal evidence. Second, the sampling frame's concentration on Islamic organization members may over-represent highly religious and highly literate segments of the Indonesian Muslim population, potentially inflating both FBL and PEB scores relative to the general Muslim population. Third, self-reported pro-environmental behavior may be subject to social desirability bias in an Islamic community survey context. Future research should incorporate behavioral outcome measures (such as household waste audit data or energy use records) rather than relying exclusively on self-reported behavior.

Looking forward, this study lays the groundwork for several productive research directions. Longitudinal panel studies tracking changes in fiqh al-bi'ah literacy and pro-environmental behavior following specific MUI fatwa dissemination campaigns would provide causal identification that cross-sectional studies cannot offer. Experimental studies embedding fiqh al-bi'ah content in mosque religious study circles and measuring behavioral outcomes before and after the intervention would provide the cleanest evidence of the FBL-PEB causal pathway. Comparative international studies applying the FBL scale to Muslim communities in Malaysia, Bangladesh, and other Muslim-majority countries with different Islamic institutional environments would test the generalizability of the Indonesian findings and refine the theoretical understanding of how institutional Islamic environmental governance design affects community-level pro-environmental behavior. Each of these research directions would contribute to building the empirical foundation that Islamic environmental jurisprudence needs to translate its normative richness into effective behavioral governance instruments for the ecological challenges of the twenty-first century.

6.3. Study Limitations

Beyond the three principal limitations noted in Section VI.B, four additional methodological caveats merit acknowledgment. First, the FBL scale developed for this study constitutes a novel instrument that has not yet been validated in peer-reviewed psychometric studies. While expert review and pilot testing provide preliminary evidence for content validity and internal reliability, a formal confirmatory factor analysis in an independent replication sample is needed to establish the scale's psychometric properties with confidence. Future researchers are encouraged to replicate the FBL scale in diverse Indonesian Muslim community samples to build the cumulative psychometric evidence base required for it to serve as a standardized research instrument.

Second, the study's sampling frame, while covering five geographically diverse provinces, does not achieve full national representativeness: the five provinces account for approximately 55 percent of Indonesia's Muslim population but exclude significant Muslim communities in Kalimantan's interior, Papua, Nusa Tenggara, and Sulawesi's eastern regions, where Islamic institutional infrastructure and environmental challenges may differ substantially from those represented in the study. Extension of the provincial coverage to at least 10 provinces, including one province each from Kalimantan's interior, Papua, and the eastern islands, would substantially improve the study's national representativeness.

Third, the study measures pro-environmental behavior through self-report scales, which may be subject to social desirability bias in the specific context of an Islamic community survey. When respondents understand that the survey is conducted by Islamic university researchers and addresses Islamic environmental norms, they may over-report environmentally responsible behaviors that they perceive as aligned with Islamic expectations. Triangulation with objective

behavioral measures (such as household waste audit data, electricity and water consumption records, or GPS-tracked participation in environmental community programs) in a sub-sample of respondents would provide a validity check on the self-report PEB scores.

Fourth, while the moderation analysis confirms EFA as a significant moderator of the IR-PEB relationship, the study design cannot identify the precise cognitive and motivational mechanisms through which fatwa awareness amplifies the religiosity-behavior connection. Process-mediation studies incorporating mediating variables such as Islamic environmental obligation perception, environmental moral norm strength, and Islamic environmental collective efficacy would clarify the causal pathway from fatwa awareness through intermediate psychological states to behavioral outcomes, providing the mechanistic detail needed to design maximally effective Islamic environmental behavior change interventions.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Al-A'raf: Jurnal Pemikiran Islam dan Filsafat. (2023). Islamic approaches to the environmental preservation: A systematic literature review. *Al-A'raf*, 20(2), 115-148. <https://ejournal.uinsaid.ac.id/index.php/al-araf/article/view/7848>
- Badan Pusat Statistik. (2021). Hasil Sensus Penduduk 2020. Jakarta: BPS. <https://www.bps.go.id>
- Efendi, D., Kurniawan, N. I., and Santoso, P. (2021). From fiqh to political advocacy: Muhammadiyah's ecological movement in the post New Order Indonesia. *Studia Islamika*, 28(2), 349-383. <https://doi.org/10.36712/sdi.v28i2.14444>
- El-Menouar, Y. (2014). The five dimensions of Muslim religiosity: Results of an empirical study. *Methods, Data, Analyses*, 8(1), 53-78. <https://doi.org/10.12758/mda.2014.003>
- Fikri, I., and Colombijn, F. (2021). Is green Islam going to support environmentalism in Indonesia? *Anthropology Today*, 37(2), 15-18. <https://doi.org/10.1111/1467-8322.12642>
- Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research*, 26(3), 499-510. https://doi.org/10.1207/s15327906mbr2603_7
- Hair, J. F., Risher, J. J., Sarstedt, M., and Ringle, C. M. (2019). When to use and how to report results of PLS-SEM. *European Business Review*, 31(1), 2-24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hidayat, M. (2023). Islamic eco-theology: Religious narratives in the climate crisis in Indonesia. *Bulletin of Indonesian Islamic Studies*, 2(2), 197-212. <https://doi.org/10.51214/biis.v2i2.678>
- Izmuddin, I., Busro, B., Haridhi, H. A., and Ahmad, A. (2022). The Indonesian Ulema Council Fatwa analysis on the environment and their relationship to the green economics concept development. *Jurnal Syntax Admiration*, 3(12), 1559-1568. <https://doi.org/10.46799/jsa.v3i12.536>
- Majelis Ulama Indonesia. (2011). Fatwa No. 22 of 2011 tentang Pertambangan Ramah Lingkungan. Jakarta: MUI.
- Majelis Ulama Indonesia. (2014a). Fatwa No. 4 of 2014 tentang Pelestarian Satwa Langka untuk Menjaga Keseimbangan Ekosistem. Jakarta: MUI.
- Majelis Ulama Indonesia. (2014b). Fatwa No. 41 of 2014 tentang Pengelolaan Sampah untuk Mencegah Kerusakan Lingkungan. Jakarta: MUI.

- Majelis Ulama Indonesia. (2016). Fatwa No. 30 of 2016 tentang Hukum Pembakaran Hutan dan Lahan serta Pengendaliannya. Jakarta: MUI.
- Majelis Ulama Indonesia. (2023). Fatwa No. 86 of 2023 tentang Hukum Pengendalian Perubahan Iklim Global. Jakarta: MUI.
- Mangunjaya, F. M., and Praharawati, G. (2019). Fatwas on boosting environmental conservation in Indonesia. *Religions*, 10(10), 570. <https://doi.org/10.3390/rel10100570>
- Ministry of Environment and Forestry. (2022). Status Lingkungan Hidup Indonesia 2022. Jakarta: KLHK.
- Nurhaida, T., Qodariah, L., Rokhman, A., and Setiawan, A. (2022). Muslim religiosity and environmentally friendly behavior: Evidence from Indonesia. *Journal of Social Sciences and Humanities*, 28(2), 78-94.
- Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology*, 10, 221-279. [https://doi.org/10.1016/S0065-2601\(08\)60358-5](https://doi.org/10.1016/S0065-2601(08)60358-5)
- Sriyono Putri, C., Timur, Y. P., Auwalin, I., and Sulistya. (2023). Does religiosity respond to excessive consumption? Analysis of Indonesia Family Life Survey 5. *Indonesian Journal of Islamic Literature and Muslim Society*, 7(1). <https://doi.org/10.22515/islimus.v7i1.5434>
- Suhartanto, D., Suki, N. M., Najib, M., Suhaeni, T., and Kania, R. (2023). Young Muslim consumers' attitude towards green plastic products: The role of environmental concern, knowledge of the environment and religiosity. *Journal of Islamic Marketing*. <https://doi.org/10.1108/JIMA-08-2021-0277>
- Thalhah, M., and Mufid, A. (2008). *Fiqh Ekologi: Menjaga Bumi Memahami Makna Kitab Suci*. Yogyakarta: Total Media.
- World Bank. (2021). Plastic waste discharges from rivers and coastlines in Indonesia. World Bank. <https://doi.org/10.1596/35607>
- Yafie, A. (2006). *Merintis Fiqh Lingkungan Hidup*. Jakarta: Yayasan Amanah.
- Yandri, P., Budi, S., and Putri, I. A. P. (2023). Waste sadaqah: A new community-based waste-management practice in Java, Indonesia. *Sustainability: Science, Practice and Policy*, 19(1), 2212510. <https://doi.org/10.1080/15487733.2023.2212510>.