



The Response of Dayah Residents to Hydrometeorological Disasters: An Exploratory Study from the Perspective of Islamic Ecotheology in Pidie Jaya Regency Aceh Province

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Abstract

Pidie Jaya Regency in Aceh Province is one of the regions highly vulnerable to hydrometeorological disasters, including floods, flash floods, strong winds, and extreme rainfall. Within the socio-religious context of Acehnese society, *dayah* (Islamic boarding schools) play a strategic role not only as centers of Islamic education but also as institutions that foster social values, spiritual resilience, and environmental awareness. This study aims to examine the responses of dayah communities to hydrometeorological disasters and to analyze the role of dayah in disaster management from the perspective of Islamic ecotheology. A qualitative approach with an exploratory case study design was employed in three dayahs located in Meurah Dua District, Pidie Jaya Regency. Data were collected through in-depth interviews, field observations, and document analysis and were analyzed using thematic analysis.

The findings reveal that dayah communities respond to disasters through pre-disaster preparedness, emergency response, and post-disaster recovery activities grounded in spiritual values, social solidarity, and local wisdom. Islamic ecotheological principles, particularly *khalifah* (stewardship), *amanah* (trust), and *mizan* (balance), serve as the foundation for environmental awareness, disaster preparedness, and community resilience. Dayahs also function as centers for disaster education, psychosocial support, humanitarian assistance, and the dissemination of environmental conservation values. However, limited mitigation infrastructure, inadequate technical disaster management capacity, and weak coordination with external institutions remain significant challenges. The study concludes that integrating Islamic ecotheology, local wisdom, and modern disaster science can strengthen community-based resilience and contribute to sustainable hydrometeorological disaster management.

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INTRODUCTION

Indonesia is widely recognized as one of the most disaster-prone countries in the world due to its geographical location, climatic conditions, and environmental characteristics (Bappenas, 2019). Among the various types of natural hazards, hydrometeorological disasters such as floods, landslides, droughts, and extreme weather events have become increasingly frequent and severe in recent years. These disasters are closely linked to climate variability, environmental degradation, and unsustainable land-use practices that have intensified ecological vulnerability in many regions (Rahmawati & Rahmawati, 2022). Aceh Province, located at the northern tip of Sumatra, is particularly susceptible to hydrometeorological hazards because of its mountainous terrain, extensive watershed systems, and high annual rainfall. Although the province still possesses significant forest resources, continuous environmental pressure and forest loss have weakened ecological resilience and increased disaster risks (Hayati et al., 2025). Consequently, understanding how local communities respond to recurring hydrometeorological disasters has become an increasingly important area of academic and policy concern.

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One of the regions most affected by hydrometeorological disasters in Aceh is Pidie Jaya Regency. This area frequently experiences riverine flooding, flash floods, strong winds, and prolonged rainfall events that threaten both livelihoods and public infrastructure. According to BNPB (2025), severe hydrometeorological disasters in Pidie Jaya affected hundreds of villages, causing extensive damage to settlements, educational facilities, and public services. Beyond physical destruction, these events also generated long-term social, economic, and psychological consequences for affected communities. The impacts were particularly significant for rural populations whose livelihoods depend heavily on natural resources and environmental stability. Such conditions highlight the need to examine not only the physical consequences of disasters but also the social and cultural mechanisms through which communities cope with and recover from these events.

Disaster studies increasingly emphasize that community resilience cannot be understood solely through technical or infrastructural perspectives. Social values, cultural traditions, religious beliefs, and local knowledge systems play critical roles in shaping how people interpret risks and respond to crises (Parto et al., 2024). In many Muslim societies, environmental ethics and disaster responses are closely connected to religious worldviews that emphasize human responsibility toward nature. Islamic teachings introduce concepts such as *khalifah* (stewardship), *mizan* (balance), and accountability before God, all of which provide ethical foundations for environmental protection and disaster preparedness (Rusli et al., 2025). These principles offer a meaningful framework for understanding how communities construct resilience while maintaining spiritual commitments. Therefore, exploring disaster response through an Islamic ecotheological lens can provide a more holistic understanding of the relationship between religion, society, and environmental sustainability.

The relevance of this perspective becomes particularly evident in Aceh, where Islamic values remain deeply embedded in social institutions and daily life. Among these institutions, the *dayah*, or traditional Islamic boarding school, occupies a strategic position as a center of religious education, community leadership, and social mobilization. *Dayahs* not only educate students but also influence broader community attitudes through religious teachings, sermons, and social networks (Arijuddin et al., 2025). During times of crisis, religious leaders and *dayah* communities often become important sources of guidance, support, and collective action. Their responses to disasters frequently combine practical measures with spiritual approaches, creating unique forms of resilience rooted in both faith and local wisdom. Despite this significant social role, the contribution of *dayahs* to disaster management remains relatively underexplored in contemporary disaster studies.

Previous studies on hydrometeorological disasters have predominantly focused on climatic processes, environmental change, and disaster prediction. Marengo et al. (2024) examined long-term hydrometeorological variability in the Amazon region, while Moghim (2018) analyzed the impacts of climate variability on hydrometeorological systems in Iran. Similarly, Cudennec et al. (2020) highlighted the growing importance of hydroclimatic approaches in understanding interactions between climate and water systems. Although these studies provide valuable scientific insights into disaster mechanisms, they largely emphasize environmental and technical dimensions rather than community experiences and sociocultural responses. As a result, the human and religious dimensions of disaster resilience remain insufficiently addressed within the hydrometeorological literature.

Research on ecotheology has also expanded considerably in recent years. Middleton (2022) explored ecological trauma through theological perspectives and proposed the concept of Christic witnessing as a response to environmental suffering. In a subsequent study, Middleton (2025) examined how theological understandings of deep time can motivate ecological action in the present. Lybke (2024) emphasized respect and reverence for creation as essential foundations for environmental responsibility, while Bobbette (2023) demonstrated how religious institutions can function as alternative sites for climate observation and environmental engagement. Within the Indonesian context, studies have discussed ecological ethics, environmental spirituality, and ecotheological perspectives in religious education (Abubakar, 2025; Jamal, 2025; Ramadhona et al., 2023). Nevertheless, these studies generally focus on theological concepts or environmental ethics and rarely investigate how ecotheological values influence community responses during and after hydrometeorological disasters.

Studies concerning disasters in Aceh have largely concentrated on mitigation strategies, rehabilitation programs, and institutional disaster management (UNESCO, 2024). Meanwhile, investigations into the role of religious educational institutions in disaster resilience remain limited. Existing research has not adequately examined how dayah communities interpret hydrometeorological disasters, how Islamic ecotheological values shape their responses, and how these values contribute to preparedness, emergency response, and recovery processes. Furthermore, there remains a lack of micro-level qualitative studies focusing on survivor communities within dayah environments. This gap is particularly important because religious institutions often serve as influential actors in shaping environmental attitudes, social solidarity, and collective resilience. Therefore, a more context-specific exploration of dayah communities is needed to enrich current understandings of religion-based disaster resilience.

Based on these considerations, this study aims to explore the responses of dayah residents to hydrometeorological disasters and to analyze the role of dayahs in disaster management from the perspective of Islamic ecotheology in Pidie Jaya Regency, Aceh Province. Specifically, the study seeks to understand how dayah communities respond to disasters before, during, and after disaster events, and how Islamic ecotheological values influence these responses. The study contributes theoretically by extending discussions on Islamic ecotheology beyond environmental ethics toward disaster resilience and community adaptation. Practically, it provides insights for policymakers, disaster management agencies, and Islamic educational institutions regarding the development of community-based disaster preparedness programs. Furthermore, the study proposes a foundation for integrating modern disaster science with local religious knowledge in the formulation of a more sustainable and culturally relevant disaster resilience framework.

METHOD

Research Design

This study employed a qualitative research approach using an exploratory case study design. The qualitative approach was selected because the study sought to understand the experiences, perceptions, and interpretations of dayah residents regarding hydrometeorological disasters within their socio-religious context. An exploratory case study was considered appropriate because limited empirical research has examined the relationship between Islamic ecotheology and disaster response among dayah communities in Aceh. This design enabled the researchers to investigate the phenomenon in depth and to capture the complex interactions between religious beliefs, environmental ethics, local wisdom, and disaster resilience practices. Furthermore, the case study approach facilitated a contextualized understanding of how dayah communities respond to disasters before, during, and after disaster events.

Research Site and Period

The study was conducted in Pidie Jaya Regency, Aceh Province, Indonesia, an area frequently affected by hydrometeorological disasters such as floods, flash floods, strong winds, and extreme rainfall. Three dayahs located in Meurah Dua District were purposively selected as research sites: Dayah Mudil Hasani Al-Aziziyah in Meunasah Raya Village, Dayah Ribatul Muta'allimin Al-Aziziyah in Meunasah Dayah Usen Village, and Dayah Darul Muta'allimin in Meunasah Jurong Village. These institutions were chosen because they had directly experienced hydrometeorological disasters and actively participated in disaster preparedness, emergency response, and recovery activities. Data collection was conducted between January and April 2026, including preliminary observations, interviews, document collection, and data verification activities.

Population and Participants

The population of this study consisted of members of dayah communities residing in disaster-prone areas of Pidie Jaya Regency. Participants were selected using purposive sampling to ensure that the collected information reflected direct experiences related to hydrometeorological disasters. The inclusion criteria required participants to have experienced at least one hydrometeorological disaster while residing or working in a dayah and to possess sufficient knowledge regarding disaster-related activities within the institution. A total of twenty-one participants were involved in the study, including three dayah leaders (Abu/Waled), six teachers (teungku), nine students (santri), and three administrative staff members. The diversity of participants allowed the researchers to obtain

multiple perspectives regarding disaster response, environmental awareness, and the implementation of Islamic ecotheological values.

Research Instruments

Data were collected through semi-structured interviews, non-participant observations, and document analysis. The primary instrument was an interview guide developed based on key concepts derived from disaster resilience literature and Islamic ecotheology. The interview questions explored participants' experiences during disasters, preparedness strategies, environmental conservation practices, religious interpretations of disasters, and post-disaster recovery efforts. An observation checklist was used to document physical conditions, environmental management practices, disaster mitigation facilities, and community activities within the dayahs. Documentary evidence, including institutional reports, photographs, educational materials, and disaster-related records, was also collected to support and triangulate the findings obtained from interviews and observations.

Validity and Reliability of Instruments

Several procedures were implemented to ensure the trustworthiness of the research instruments and findings. First, the interview protocol and observation guide were reviewed by two experts in disaster studies and Islamic education to establish content validity and ensure alignment with the research objectives. Second, pilot interviews were conducted with two participants outside the selected research sites to evaluate question clarity, relevance, and comprehensibility. Third, credibility was strengthened through source triangulation, method triangulation, and member checking. Information obtained from interviews was compared with observation records and documentary evidence to verify consistency. Additionally, selected participants were invited to review interview summaries and preliminary interpretations to confirm the accuracy of the researchers' understanding. These procedures enhanced the credibility, dependability, and confirmability of the findings.

Data Collection Procedures

Data collection was carried out in several sequential stages. The first stage involved identifying the research problem, conducting preliminary field observations, and obtaining permission from dayah authorities. The second stage consisted of developing and validating research instruments based on relevant theoretical frameworks and expert recommendations. The third stage involved conducting field observations to identify environmental conditions, disaster preparedness measures, and community practices within each dayah. Subsequently, in-depth semi-structured interviews were conducted with participants, with each interview lasting approximately 45–90 minutes and recorded with participant consent. The fourth stage focused on collecting supporting documents and visual materials relevant to disaster management and environmental practices. Finally, all collected data were transcribed, organized, and verified prior to the analysis stage.

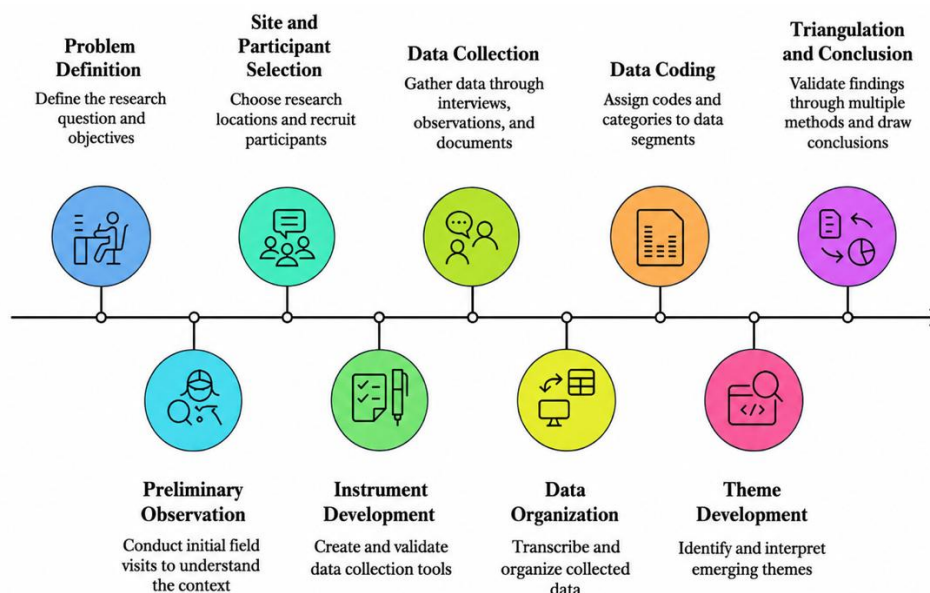


Figure 1. Research Procedure Flowchart**Data Analysis Techniques**

The collected data were analyzed using thematic analysis following the framework proposed by Braun and Clarke. The analysis began with data familiarization through repeated reading of interview transcripts, observation notes, and documentary materials. Subsequently, open coding was conducted to identify meaningful units of information related to disaster preparedness, emergency response, recovery practices, environmental ethics, and Islamic ecotheological values. Similar codes were then grouped into categories and organized into broader themes. The themes were continuously reviewed and refined to ensure coherence and representativeness of the data. The final stage involved interpreting the themes in relation to existing literature on disaster resilience, Islamic ecotheology, and community-based disaster management. NVivo software was utilized to facilitate data organization, coding, and thematic development.

This study adhered to established ethical principles governing social research. Participation was entirely voluntary, and all participants provided informed consent prior to data collection. Participants were informed about the objectives of the study, their right to withdraw at any stage of the research process, and the intended use of the collected information. To protect confidentiality and anonymity, participants' identities were replaced with pseudonyms and all identifying information was removed from research records and publications. Digital recordings, transcripts, and supporting documents were stored securely and accessed only by the research team. Throughout the study, the researchers maintained respect for participants' rights, cultural values, and religious sensitivities while ensuring academic integrity and responsible research conduct.

RESULTS AND DISCUSSION***The Response of Dayah Residents to Hydrometeorological Disasters***

Pre-disaster responses among *dayah* communities in Pidie Jaya Regency are characterized by a blend of interpreting natural signs and deeply rooted spirituality. As an area frequently hit by flash floods, storm winds, and droughts, *dayah* residents (comprising *dayah* leaders, *Teungku*, and *santri*) have developed preparedness through traditional mechanisms. Culturally, spiritual preparedness is carried out by holding communal prayers, prayers to ward off calamities, and *zikir* in the *dayah's* mushalla or mosque at least once a year (Nurhikmah & Aisyah, 2025). These actions are not viewed as passive resignation but rather as an inner effort to seek protection from the ruler of the universe to avoid harm.

In practical terms, structural mitigation efforts are carried out within the constraints of institutional limitations. Students are instructed to work together to periodically clean the drainage channels around the pesantren complex to prevent flooding. Additionally, the evacuation of important *dayah* documents such as classical Islamic texts (*kitab turats*), administrative archives, and the relocation of communal kitchen supplies to higher ground (such as the second floor of the dormitory or mosque) constitutes an internal protocol passed down through generations based on experiences from previous years' floods. However, these pre-disaster responses are generally still reactive and culturally driven and have not been documented in written contingency plans, as is common in modern disaster management institutions.

When hydrometeorological disasters such as flash floods or the overflowing of the Meureudu River strike a *dayah* complex, the command structure within the *dayah* immediately transforms into a highly robust emergency response system. The students' (*santri*) absolute obedience to the instructions of the *dayah* leadership (*Teungku/Ayah/Waled/Abu/Abon*) ensures that the internal evacuation process proceeds in an orderly manner with minimal panic. The top priority during evacuation is to save the male and female students, as well as the holy books and religious literature. *Dayah* complexes with multi-story buildings or raised-platform mosques are immediately designated as internal evacuation centers, where all activities are concentrated in these safe areas.

The following is a summary of the interview with the head of *Dayah* Darul Mudil Hasani Al-Aziziyah regarding the initial situation of the hydrometeorological disaster:

This hydrometeorological disaster was like a flood accompanied by strong winds. It rained continuously without stopping. Water suddenly came from the direction of the river, and the heavy rain further increased the water flow. The situation was also

exacerbated by the poor drainage system in the *dayah's* vicinity, causing water to pool and flood the *dayah's* grounds.

The following is the result of an interview with the head of *Dayah* Ribatul Muta'allimin Al-Aziziyah regarding the initial conditions of the hydrometeorological disaster:

In my view, this hydrometeorological disaster is like a flood accompanied by strong winds. Such events have occurred frequently in recent times in Pidie Jaya. However, this year's event was the most severe and devastating. The loss of many lives and the destruction of numerous buildings swept away by the floodwaters clearly demonstrate the immense severity of this disaster.

The following is a summary of the interview with the head of *Dayah* Darul Muta'allimin Al-Aziziyah regarding the initial circumstances of the hydrometeorological disaster:

The cause of this hydrometeorological disaster is not solely due to natural factors. Rather, it is primarily influenced by damage caused intentionally by humans. Deforestation in the Sumatran rainforest is the main factor that has eliminated water catchment areas in the mountains. Consequently, water is no longer retained and flows directly toward residential areas.

Interviews with three Islamic boarding school leaders in Meurah Dua Subdistrict, Pidie Jaya Regency, revealed consistent accounts of how the initial stages of this hydrometeorological disaster were described explicitly and clearly. Continuous rain rapidly increased the water flow, and before long, a flash flood swept unimpeded through residential areas including the Islamic boarding school compounds without warning. This disaster required an immediate response from the school leaders to coordinate all preventive measures with the teachers and students to ensure their safety and the safety of their belongings. From the perspective of the concept of the term *khalifah*, humans were created by God not as absolute rulers who may exploit nature as they please, but as representatives, stewards, and guardians of the earth. This role entails the responsibility to care for nature so that it remains sustainable (Syauqi et al., 2025).

During the emergency response period, the *dayah's* social capital manifested in a spirit of kinship and mutual aid took the form of a self-sustaining community kitchen. Although external supplies had not yet arrived due to blocked roads, the *dayah's* residents made the most of the food stocks in the *dayah's* warehouse to cook and share meals together. The *Teungku* and senior students also played an active role in securing the *dayah* environment from the potential danger of floodwaters, cutting off the electricity to prevent short circuits, and helping to evacuate residents around the *dayah* who were trapped by the flood to take shelter within the *dayah* complex.

The results of interviews with residents of *Dayah* Darul Mudil Hasani Al-Aziziyah regarding the initial situation of the hydrometeorological disaster are as follows:

When a hydrometeorological disaster strikes, we at the Islamic boarding school immediately coordinate rescue efforts for various school facilities, such as religious texts, books, students' lockers, and other items. We then ensure that the students are moved to an area safe from flooding. The following day, once the flooding has subsided, we coordinate relief efforts for the students, particularly regarding food, which becomes the primary challenge following such an event. Finally, we requested the deployment of heavy equipment (excavators) from the relevant authorities to assist in clearing the boarding school grounds of sediment left behind by the flood.

The post-disaster phase in the *dayah* community was marked by large-scale physical recovery efforts (*meuseuraya*). Immediately after the floodwaters receded or the storm subsided, the entire *dayah* community worked together to clear the mud that had settled in classrooms, students' dormitories, and the mosque. Wet books are carefully laid out to dry, and damaged sanitation facilities are repaired through self-help efforts. A strong spirit of resilience often allows religious study sessions and both formal and non-formal education programs at the *dayah* to resume within just a few days after a disaster, even though supporting facilities have not yet fully recovered.

In the context of long-term adaptation, residents of Islamic boarding schools in Pidie Jaya have begun to gradually adjust their lifestyles and infrastructure development. When constructing new buildings or renovating damaged dormitories, the boarding schools tend to raise the building foundations to anticipate future flood levels. In addition to physical adaptation, psychological and

spiritual adaptation processes are also taking place; the recent disaster is used as material for reflection and study in scholarly gatherings, where extreme weather phenomena are examined not merely as climate anomalies, but as a means of learning (ibrah) to improve the patterns of human interaction with the surrounding environment.

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The Role of Dayah in Hydrometeorological Disaster Management

As Islamic educational institutions deeply rooted in the fabric of Acehnese society, *dayahs* play a strategic role as the epicenter of disaster education (Arijuddin et al., 2025). The influence of *dayahs* extends beyond the boundaries of their compounds, reaching all segments of society through alumni networks and religious study groups. In the context of non-structural mitigation, *dayahs* integrate messages of environmental conservation and disaster preparedness into the curriculum for teaching classical Islamic texts, particularly those covering the chapters on *thaharah* (purification) and *muamalah* (social interaction), which include prohibitions against damaging nature and polluting water sources (Nurhikmah & Aisyah, 2025).

This awareness-raising process unfolds organically through Friday sermons delivered by religious leaders at neighborhood mosques, regular religious study sessions for men and women, and informal discussions at coffee shops. When the *dayah* educates its students on the importance of maintaining the cleanliness of watersheds and not cutting down trees indiscriminately, the students bring that knowledge back to their respective families and hometowns (Mangunjaya, 2014). Thus, the *dayah* functions as a cultural filter that translates the language of modern disaster science into religious language that is easily understood, believed in, and practiced by the general public in Pidie Jaya.

In Aceh, particularly in Pidie Jaya Regency, religious leaders or *Teungku* enjoy very high social and religious legitimacy (charismatic leadership) (Syiddik & Hsb, 2025). Fatwas and appeals issued by the head of a *dayah* are often followed more closely by the community than formal government regulations. In the context of disaster management, the figure of the *Teungku* holds full sway in

shaping residents' perceptions and psychological responses to a crisis. Through a persuasive-theological approach, the *Teungku* is able to quell mass panic when a disaster strikes by instilling inner calm, reminding people that every natural trial is accompanied by Allah's help for those who are patient and make sincere efforts (Safinah & Arifin, 2021).

Furthermore, the *Teungku* serve as mobilizers of the masses in humanitarian efforts. When the head of a *dayah* calls for the mobilization of aid or community service to clean up the environment after a flood, hundreds or even thousands of residents will step forward selflessly. The leadership of the *Teungku* also serves as a crucial bridge in correcting the misconception among some members of the community who view disasters solely as a matter of fate, without the need for mitigation efforts. Religious scholars guide the public's understanding that safeguarding human life (*hifdzun nafs*) is part of a religious obligation that must be fulfilled through rational preparedness measures.

The *dayah* serves as one of the main pillars safeguarding the stability and social resilience of the Pidie Jaya community when it is struck by hydrometeorological disasters. As an independent institution with centralized logistical assets and a solid social structure, the *dayah* acts as a safety net for the surrounding community (Ramadhan, 2025). When residents' homes were flooded, the *dayah* often opened its doors wide to serve as a temporary evacuation center, providing sanitation facilities and distributing food from the *dayah's* communal kitchen to nearby residents in need, regardless of their economic background.

In addition to physical and logistical resilience, the greatest contribution of Islamic boarding schools lies in strengthening mental and spiritual resilience (psychological-spiritual capital). In the aftermath of a disaster, communities are vulnerable to trauma, anxiety, and despair due to the loss of property or livelihoods. Through a spiritually-based counseling approach, collective recitation of *zikir*, and soothing religious counsel, *dayah* members help restore the psychological well-being of disaster victims (trauma healing) (Nurfuadah et al., 2025). The values of steadfast faith instilled by the *dayah* prevent the community from easily succumbing to their circumstances; instead, they quickly rise again to rebuild their lives with renewed optimism.

Finally, as a preventive measure, *dayah* can play a role in instilling a strong sense of environmental awareness among their students. This can be achieved by framing the natural environment as a trust (*amanah*) entrusted by Allah to humanity and all of God's creatures. The universe and all it contains are a trust (*amanah*) from God to humanity. Every trust must be safeguarded, must not be betrayed, and one day humanity will be held accountable for how they have treated nature (Hanief, 2025). This concept is directly linked to the moral consciousness and concrete actions of the *dayah* community. Their response to disasters whether before, during, or after a disaster will reflect the extent to which they have internalized this value of trust.

Analysis of Dayah Residents' Response from Social and Religious Perspectives

An analysis of the behavior of *dayah* residents in the face of hydrometeorological disasters reveals a very strong theological motivation rooted in Islamic teachings, particularly the concept of eco-theology (environmental jurisprudence/*fiqh al-bi'ah*) (Ramadhona et al., 2023). In the view of *dayah* residents, the universe is not merely a material object to be freely exploited, but rather a creation of Allah that glorifies Him and exists in a precise balance (*mizan*). Therefore, their response to phenomena such as floods or droughts is not viewed separately from the relationship between humans as vicegerents on earth (*khilafah fil-ardh*) and the Creator (*Hablum Minallah*) and with the universe (*Hablum Minal 'Alam*). Allah created this universe in a state of balance, harmony, and equilibrium. Everything has its proper measure, and if this balance is disrupted, the systems that sustain life will break down (Moge et al., 2025). Hydrometeorological disasters often occur due to the disruption of the natural balance caused by human activities, such as land conversion or deforestation.

Based on an interview with the head of the Darul Mudil Hasani Al-Aziziyah Islamic boarding school in Gampong Meunasah Raya, Pidie Jaya. Regarding the religious and social perspectives of the boarding school's leadership on hydrometeorological disasters in Pidie Jaya Regency, the following points were raised:

These hydrometeorological disasters are not merely ordinary natural events, but rather a sign of the power of Allah SWT that must be understood and believed by the

general public. We must believe that there is certainly a lesson to be learned from these events.

Additionally, an interview was conducted with residents of the Ribatul Muta'allimin Al-Aziziyah Islamic Boarding School in Meunasah Raya Village, Pidie Jaya. Regarding the religious and social perspectives of the boarding school leadership on hydrometeorological disasters in Pidie Jaya Regency, the following points were noted:

From a religious perspective, this hydrometeorological disaster can be seen as a test to prevent humans from becoming complacent. This disaster serves as a tangible warning from Allah that we, as humans, have caused significant damage to the earth. This disaster is Allah's way of restoring the damage we have inflicted over time.

Findings from the interviews indicate that there is a balanced perspective among Islamic boarding school leaders in Pidie Jaya regarding the interpretation of hydrometeorological disasters. Specifically, these disasters are not viewed merely as ordinary natural disasters or events. Rather, they are seen as a test from God in response to the damage caused by humans over time, including deforestation and neglect of the surrounding environment.

Every disaster mitigation and response action carried out by the *dayah* community is regarded as a form of *ghairu mahdah* worship (social worship). Preserving the environment, planting trees along riverbanks to prevent erosion, and cleaning waterways are interpreted as the practice of the principle of *amar ma'ruf nahi munkar* against the destruction of nature (*fasad fil-ardh*) (Sihombing et al., 2025). This perspective lends a transcendental dimension to disaster response efforts; *dayah* residents act not merely out of fear of material losses from flooding, but driven by a religious duty to safeguard the earth's trust so that it remains sustainable and safe for future generations.

Within the psychosocial dynamics of the *dayah* community, there exists a unique balance between the concepts of *tawakkal* (surrender) and *ikhtiar* (active effort). The understanding of *tawakkal* among students and teachers in Pidie Jaya is not a passive fatalism that surrenders to fate (*jabariyah*), but rather a surrender placed at the end after all limits of human ability have been maximally exerted (Abubakar, 2025). Preparedness for floods, self-evacuation, and the construction of adaptive infrastructure are forms of tangible effort, while prayer and remembrance of God serve as mental fortifications that reinforce the belief that the final outcome lies in Divine decree. This balance fosters a resilient attitude, where they do not blame fate when struck by disaster, yet also do not act recklessly by neglecting safety.

The results of interviews with residents of *Dayah Darul Muta'allimin* regarding post-disaster psychosocial support are as follows:

In responding to disasters, the *Teungku* emphasized the importance of patience, trust in God, mutual aid, and increasing care for nature and fellow human beings.

This theological synergy manifested concretely in a very high level of social solidarity (*takaful ijtima'i*) throughout the crisis. The values of *ukhuwah Islamiyah* (brotherhood among Muslims) and Acehese local wisdom, such as *meusapat* (gathering together to reach consensus), spurred the emergence of spontaneous philanthropic actions. Residents of the *dayah* voluntarily shared their living spaces, distributed food, and helped clean the homes of other residents who were more severely affected (Jamal, 2025). This social solidarity acted as the primary social capital that bypassed the often-slow bureaucratic channels of disaster response, allowing recovery at the grassroots level to proceed more quickly through community self-reliance.

Based on observations, the *Dayah* community in Pidie Jaya integrates local wisdom—passed down orally by their ancestors with religious understanding and modern disaster science. One example of this integration is the use of natural signs to interpret weather cycles and the potential for hydrological disasters. Traditional knowledge regarding animal behavior, wind direction, cloud formations, and fluctuations in river flow (Batoro et al., 2022) is validated through informal discussions at the *dayah* and correlated with official advisories from the Meteorology, Climatology, and Geophysics Agency (BMKG) accessed via smart devices.

This integration is also evident in the recognition of customary law, such as the existence of *Keujruen Blang* (a customary institution governing rice field irrigation) and *Panglima Laot* (a customary maritime institution), whose values are highly respected within the *dayah* community

(Mahmuddin et al., 2024; Rudina & Syarifuddin, 2022; Suparmin & Lubis, 2025). Customary values prohibiting the unregulated clearing of land in river headwaters or the destruction of protected forests are aligned with the texts of ecological fiqh taught in the *dayah* (Yus et al., 2025). Through this integration, modern disaster science is no longer viewed as a foreign theory from outside, but rather as a reinforcement of the local wisdom and religious values that have long been practiced by *dayah* residents in maintaining the hydrological balance of their region.

Constraints and Challenges in Coping with Disasters

One of the most critical challenges faced by Islamic boarding schools in Pidie Jaya Regency in responding to hydrometeorological disasters is the lack of adequate safety facilities and infrastructure. Most boarding schools are located in rural areas near riverbanks, with semi-permanent dormitory structures that are vulnerable to damage from floods or strong winds. Furthermore, Islamic boarding schools generally lack standard self-sufficient emergency response equipment, such as rubber boats for evacuation during rising water, life jackets, emergency megaphones, and two-way radios (HT), which are critically needed when cellular networks are disrupted by storms.

The condition of sanitation infrastructure within the Islamic boarding school complex is also a critical vulnerability when floods strike. Clean water sources that rely on dug wells or shallow boreholes are immediately contaminated by floodwater, causing an immediate clean water crisis for hundreds of students trapped in the school's internal evacuation shelters. The absence of an integrated macro-drainage system around the Islamic boarding school complex exacerbates the situation, causing floodwaters to take longer to recede. The lack of adequate accommodation space also forces evacuees to crowd into classrooms or mosques with very minimal sanitation facilities, thereby increasing the risk of disease spread in the aftermath of the disaster.

The results of an interview with the head of *Dayah Darul Mudil Hasani Al-Aziziyah* regarding the challenges of disaster prevention are as follows:

The greatest challenge lies in encouraging students and the community to care for the surrounding environment. In particular, the habit of littering is still frequently observed. This challenge should not exist in the lives of educated Islamic generations. This is because Islam itself upholds the values of cleanliness as a manifestation of faith itself.

Also, the results of an interview with the head of *Dayah Darul Mudil Hasani Al-Aziziyah* regarding the challenges of disaster prevention are as follows;

The main challenge lies in changing the mindset of the students and the broader community to encourage them to play a role in protecting the environment. The habit of littering remains a major obstacle to raising awareness about caring for the environment among the students and the community.

The main challenge for Islamic boarding school leaders in Pidie Jaya is to foster a habit of taking full responsibility for protecting the surrounding environment. Littering, in fact, remains a habit that continues to be passed down by Indonesian society in general, and the residents of Islamic boarding schools in Pidie Jaya are no exception. Strong, long-term policies are needed to eliminate this bad habit.

This behavior is known in Arabic as *fasad fil ardh*. *Fasad fil ardh* refers to physical, moral, and ecological damage to the earth caused by human greed and misconduct (as indicated in Surah Ar-Rum: 41) (Agita & Harun, 2025). Natural disasters are often a tangible manifestation of this facade. Hydrometeorological disasters can also be viewed as manifestations of the "facade of the earth," as well as a test from God.

However, although *dayah* residents possess extraordinary spiritual resilience, their technical capacity in disaster management remains very limited due to a lack of formal disaster education and training (disaster drills) (Ataupah et al., 2024; Nahri, 2021). So far, the disaster management knowledge possessed by the students and teachers has been acquired through self-learning based on past empirical experience, rather than through structured training. Consequently, understanding of disaster risk management, first aid for drowning victims, safe medical evacuation techniques, and effective evacuation route mapping remains very limited among *dayah* residents.

Local disaster management agencies such as the BPBD (Regional Disaster Management Agency) have not yet intensively engaged the *dayah* community as the target of the “Disaster-Resilient *Dayah*” program. Periodic emergency drills involving all students are rarely conducted within *dayah* compounds. The absence of a standardized and independent disaster management curriculum integrated into the *dayah* education system means that understanding of hydrometeorological disaster mitigation resulting from global climate change is often not fully grasped through the lens of modern science, leading to responses that are sometimes still slow during the critical initial moments of a crisis (Kurniawan, 2025).

Another challenge that has emerged is the communication gap and coordination barriers between *dayah* management and government agencies as well as external humanitarian organizations. The *dayah*'s structure, which tends to be autonomous and self-reliant, sometimes makes them reluctant or hesitant to take the initiative to establish formal communication networks with the main regional disaster management command centers before a crisis actually reaches its peak. On the other hand, local governments and vertical agencies often view *dayahs* merely as purely religious educational institutions, thus failing to structurally involve them in disaster management coordination forums at the subdistrict and district levels.

When hydrometeorological disasters struck simultaneously at several locations in Pidie Jaya, the lack of dedicated communication channels meant that emergency reports from the Islamic boarding schools often reached the BPBD or SAR command centers too late. The distribution of logistical aid, medicines, and evacuation vehicles from external sources was consequently delayed due to conflicting information regarding the number of evacuees and urgent needs within the boarding schools. These coordination challenges persisted into the post-disaster phase, where rehabilitation and reconstruction programs for educational infrastructure funded by the local government were often out of sync with the urgent physical recovery priorities within the *dayah* communities.

Strengthening Efforts and Recommendations

To enhance the resilience of the *dayah* community in Pidie Jaya Regency moving from the cultural-spiritual level to the technical-procedural level it is necessary to formulate a comprehensive preparedness strategy. An urgent first step is the formation of “*Santri Siaga Bencana*” (SANA), or the *Dayah* Internal Disaster Management Task Force, within each pesantren complex. This task force consists of young religious teachers and senior students who are specially trained to take operational control when an emergency occurs, ranging from the division of tasks for the evacuation team, the public kitchen team, to the first aid team.

The results of interviews with residents of the Darul Mudil Hasani Al-Aziziyah Islamic boarding school regarding post-disaster spiritual strengthening are as follows;

Dayah is also actively involved in providing spiritual support to the surrounding community. This spiritual support is provided through communal prayers, zikr, and advice to remain patient, steadfast, and trust in Allah SWT when facing His trials. The head of Darul Mudil Hasanil Al-Aziziyah Islamic Boarding School also emphasized that this disaster should not be viewed merely as a trial, but rather as an incentive to draw closer to Allah SWT.

The results of interviews with residents of *Dayah* Darul Muta'allimin regarding post-disaster spiritual support are as follows:

When the disaster struck, the *Dayah* actively assisted the community through fundraising, providing temporary shelters, and offering spiritual support through zikir and religious sermons.

Furthermore, improvements in physical infrastructure must be accompanied by the creation of an internal disaster-prone area map and the designation of clear evacuation routes within the *dayah* complex through the installation of easily visible signs (Wasil & Muizudin, 2023). The *dayah* must also begin allocating its own budget or applying for urgent emergency equipment assistance, such as the procurement of small fiberglass boats, life jackets, emergency generators, and the construction of elevated clean water storage tanks that are out of reach of floodwaters. Self-directed

evacuation drills for floods and tornadoes must be scheduled regularly, at least twice a year, to train students' kinesthetic memory and mental preparedness so they do not panic when a real disaster strikes.

Breaking down communication barriers between Islamic boarding schools and external parties requires an inclusive multi-stakeholder collaboration model (pentahelix collaboration) (Nuzir et al., 2025). The Pidie Jaya Regency Government, through the Regional Disaster Management Agency (BPBD) in collaboration with the *Dayah* Education Office, must initiate a formal Memorandum of Understanding (MoU) regarding a pesantren-based disaster resilience capacity-building program. Pesantren must be positioned as strategic partners and incorporated into the regional disaster management command structure (Ginarsih, 2026), thereby entitling them to direct and rapid access to early warning system information from the BPBD operations control center via digital applications or community radio networks.

The results of interviews with residents of *Dayah* Ribatul Muta'allimin Al-Aziziyah regarding the strengthening of disaster mitigation collaboration are as follows;

We hope that the local government will further strengthen the capacity of Islamic boarding schools in the area of disaster mitigation. These schools need to be provided with disaster response training, emergency supplies, and specialized education for students and the community so that when a disaster strikes, people will not panic and will be able to respond promptly. Because Islamic boarding schools in Aceh are integrated with the surrounding communities, they can serve as both a foundation for strengthening religious values and a center for disaster education.

This collaboration should also address both academic and practical aspects by involving local universities (such as UIN Ar-Raniry or Syiah Kuala University) and disaster-related NGOs to organize community service programs at Islamic boarding schools. Activities could include training on developing contingency plans for Islamic boarding schools, assistance in establishing emergency water purification systems, and the active involvement of religious scholars/*Teungku* in formulating disaster mitigation policies at the district level. Through this close collaboration, Islamic boarding schools will no longer operate independently but will be fully integrated into a robust regional disaster resilience ecosystem.

The best educational model recommended for implementation in Pidie Jaya Regency is the enrichment of curriculum content through the "Ecotheology-Science Integration" method. This approach combines classical religious texts (turats) that discuss environmental sustainability and humanity with modern meteorology and disaster science. For example, teaching materials on the prohibition against polluting water in fiqh texts are enriched with scientific material on the impact of watershed degradation that triggers flash floods, so that students gain a holistic understanding from both the dimensions of Sharia law and the laws of nature (sunnatullah).

In more specific fiqh terminology, this is known as *fiqh bi'ah*. *Fiqh bi'ah* is an extension of classical fiqh that specifically outlines the laws, ethics, and practical guidelines for Muslims in interacting with the environment, ranging from water conservation and waste management to the protection of animals and plants (Haq et al., 2025). As traditional Islamic educational institutions rooted in classical Islamic texts, *dayah* communities are very familiar with fiqh reasoning. This term is crucial for understanding the application of contextual fiqh in *dayah*.

The results of interviews with residents of *Dayah* Darul Muta'allimin regarding the *dayah's* curriculum and its relationship to disaster events are as follows:

The leader stated that the books on ethics and monotheism studied at the Islamic boarding school often emphasize the importance of people caring for the environment, not cutting down trees indiscriminately, and not littering, as these actions can lead to disasters such as floods. According to him, Islamic teachings do not only govern the relationship between humans and God, but also the relationship between humans and nature and other creatures.

The results of interviews with residents of the Ribatul Muta'allimin Al-Aziziyah Islamic boarding school regarding the school's curriculum and its connection to natural disasters are as follows:

In the texts studied at the Islamic boarding school, Islam not only teaches or commands worship of Allah, but also explains humanity's responsibility toward the

natural world. This natural world is Allah's creation and must be well preserved. If we fail to protect the forests, river waters, and the environment, disasters like this flood can easily occur. In Islam, this concept is called balance or "al-mīzān," which humans must uphold as a trust and as part of their role as stewards on this earth.

The interview results indicate that, in essence, eco-theological values have been taught in the educational programs of several Islamic boarding schools in Pidie Jaya. Unfortunately, these eco-theological values are currently limited to classroom settings or the pulpit. Practical implementation is needed to bring these Islamic eco-theological values to life in the daily lives of the boarding school communities in Pidie Jaya Regency.

In practical terms, this educational model can be translated into innovative and context-specific learning materials. Instructional material developers at Islamic boarding schools can create a pocket guide titled "Disaster Fiqh and Flood Mitigation," written in accessible language and accompanied by illustrations that appeal to students. Additionally, disaster awareness can be promoted through Friday sermons on the theme of Islamic eco-theology in all mosques affiliated with Islamic boarding schools in Pidie Jaya. By positioning Islamic boarding schools as the driving force behind education rooted in faith-based values, environmental awareness will grow into a character trait and way of life deeply ingrained in the hearts of boarding school students and the broader Acehese community.

CONCLUSION

This study demonstrates that the responses of dayah communities to hydrometeorological disasters in Pidie Jaya Regency are shaped by the integration of spiritual values, social solidarity, and adaptive practices. Dayah residents perceive disasters not only as environmental events but also as moral and religious challenges that require a balance between human effort (ikhtiar) and trust in God (tawakkal). The findings reveal that Islamic ecotheological principles, particularly khalifah (stewardship), mizan (balance), and environmental responsibility, play a crucial role in strengthening disaster preparedness, emergency response, and post-disaster recovery. In addition, dayahs function as important centers of community resilience by providing leadership, social support, environmental education, and psychosocial assistance during disaster situations.

This study contributes to the growing literature on religion and disaster resilience by extending Islamic ecotheology beyond environmental ethics into the practical domain of disaster management. The findings support the development of an Islamic Ecotheological Disaster Resilience framework, which highlights the interaction between spiritual resilience, environmental stewardship, social cohesion, and adaptive action. From a practical perspective, the study underscores the importance of strengthening collaboration between dayahs, government agencies, and disaster management institutions through the establishment of a Disaster-Resilient Dayah model. Future research is encouraged to examine the applicability of this framework in different socio-cultural settings and disaster contexts to further advance faith-based approaches to community resilience.

AUTHOR CONTRIBUTIONS STATEMENT

ASA contributed to the conceptualization of the study, research design, data collection, data analysis, and preparation of the original manuscript draft. **SM** contributed to the development and validation of research instruments, data interpretation, and manuscript review. **Z** contributed to data verification, theoretical framework development, and critical revision of the manuscript. **MM** supervised the research process, provided methodological guidance, reviewed the final manuscript, and approved the article for publication. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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