

# The Nexus Between ESG and Disaster Risk Resilience: Strengthening Financial Stability and Sustainable Development

ESG and  
Disaster Risk  
Resilience

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## ABSTRACT

Natural disasters pose significant economic and social challenges, particularly in vulnerable regions, necessitating strategies to enhance resilience. This study explores the relationship between Environmental, Social, and Governance practices and disaster risk resilience in financial institutions. The objective is to understand how these practices strengthen financial stability and sustainable development in high-risk environments. A systematic literature review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews model, analyzing relevant articles from the Scopus database. Findings reveal that integrating Environmental, Social, and Governance practices enables financial institutions to conduct comprehensive risk assessments, leading to informed lending and investment decisions. These practices enhance resilience by mitigating financial shocks from disasters, fostering stakeholder relationships, and promoting sustainable investments. The study concludes that adopting Environmental, Social, and Governance principles significantly bolsters financial institutions' capacity to manage disaster risks, ensuring long-term stability and supporting sustainable development. However, challenges such as regional regulatory differences and data limitations highlight the need for further research to optimize these practices globally. This underscores the critical role of Environmental, Social, and Governance frameworks in building resilient financial systems.

**Keywords:** Climate Risk, ESG, Lending, Natural Disasters, Policy.

## ABSTRAK

Bencana alam menimbulkan tantangan ekonomi dan sosial yang signifikan, terutama di wilayah rentan, sehingga memerlukan strategi untuk meningkatkan ketahanan. Studi ini mengeksplorasi hubungan antara praktik Lingkungan, Sosial, dan Tata Kelola dengan ketahanan risiko bencana di lembaga keuangan. Tujuannya adalah untuk memahami bagaimana praktik-

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*praktik ini memperkuat stabilitas keuangan dan pembangunan berkelanjutan di lingkungan berisiko tinggi. Tinjauan pustaka sistematis dilakukan menggunakan Preferred Reporting Items for Systematic Reviews dan perluasan Meta-Analyses untuk model Scoping Reviews, dengan menganalisis artikel-artikel relevan dari basis data Scopus. Temuan penelitian menunjukkan bahwa integrasi praktik Lingkungan, Sosial, dan Tata Kelola memungkinkan lembaga keuangan untuk melakukan penilaian risiko yang komprehensif, yang mengarah pada keputusan pinjaman dan investasi yang terinformasi. Praktik-praktik ini meningkatkan ketahanan dengan memitigasi guncangan keuangan akibat bencana, membina hubungan dengan pemangku kepentingan, dan mendorong investasi berkelanjutan. Studi ini menyimpulkan bahwa penerapan prinsip-prinsip Lingkungan, Sosial, dan Tata Kelola secara signifikan memperkuat kapasitas lembaga keuangan untuk mengelola risiko bencana, memastikan stabilitas jangka panjang, dan mendukung pembangunan berkelanjutan. Namun, tantangan seperti perbedaan peraturan regional dan keterbatasan data menyoroti perlunya penelitian lebih lanjut untuk mengoptimalkan praktik-praktik ini secara global. Hal ini menggarisbawahi peran penting kerangka kerja Lingkungan, Sosial, dan Tata Kelola dalam membangun sistem keuangan yang tangguh.*

**Kata kunci:** Risiko Iklim, ESG, Pinjaman, Bencana Alam, Kebijakan.

## INTRODUCTION

Natural disasters, including hurricanes, floods, and droughts, cause extensive damage to infrastructure and property, leading to severe economic and social impacts, particularly in vulnerable developing countries (Noy, 2009; Benali & Saidi, 2017). The United Nations International Strategy for Disaster Reduction (UNISDR) defines these events as destructive phenomena that result in casualties, property damage, and social disruption (Chaudhary & Piracha, 2021). In Southeast Asia, climate-related damages are significant, with the 2021 Climate Risk Index reporting losses of approximately US\$12.41 million in Myanmar, the Philippines, and Thailand from extreme weather between 2000 and 2019 (Lam & Delina, 2024). Data from the ASEAN Disaster Information Network (ADINet) highlight that these impacts threaten regional development goals, emphasizing the need to integrate climate risk into financial planning.

Beyond physical destruction, natural disasters disrupt economic activity, increase recovery costs, and reduce regional revenues (Panwar & Sen, 2018). To address these challenges, Environmental, Social, and Governance (ESG) principles are critical. ESG evaluates the sustainability and ethical implications of business practices, enabling financial institutions to mitigate risks and enhance disaster resilience through risk assessments, transparent reporting, and sustainability-focused policies (Krueger et al., 2020; Fuady et al., 2021). By promoting responsible investment, ESG strengthens the financial sector's capacity to withstand disaster-related challenges (Kaban et al., 2019).

According to The ASEAN Magazine Financing Loss and Damage from Climate Change: Challenges and Opportunities (2023), floods dominate disaster events in Southeast Asia, accounting for 71.58% of cases (3,430 incidents), followed by tornadoes (11.98%, 574 events) and severe local storms (6.24%, 299 events). Other hazards, including landslides (3.71%, 178 events), earthquakes (2.40%, 115 events), tropical cyclones (1.90%, 91 events), droughts (1.19%, 57 events), volcanic eruptions (0.83%, 40 events), wildfires (0.10%, 5 events), storm surges (0.04%, 2 events), and tsunamis (0.02%, 1 event), are less frequent. These figures underscore the critical need for robust flood risk management while addressing the varied impacts of other hazards.

The 2019 Global Platform for Disaster Risk Reduction, organized by the United Nations Office for Disaster Risk Reduction (UNDRR), emphasized that managing disaster risks and promoting risk-aware investments yield benefits across economic, social, and environmental sectors. Research indicates that natural disasters heighten risk awareness, prompting firms to enhance ESG disclosure transparency, which can reduce debt costs (Shi et al., 2020). Companies with strong ESG profiles also exhibit greater resilience during financial crises (Broadstock et al., 2021). The banking sector plays a

pivotal role in sustainable development by directing credit to environmentally responsible firms while limiting support for carbon-intensive industries. However, banks face physical climate risks, requiring a balance between emission reduction and financial stability. Despite ESG adoption, clear incentives and oversight for measurable sustainability outcomes remain limited (Setyowati, 2023).

Firms near disaster-affected areas often increase ESG disclosure transparency in response to changing investor perceptions (Huang et al., 2022). Similarly, applying ESG principles to urban planning enhances resilience against climate change and flooding, though challenges include limited geographic scope and difficulties in measuring social and governance outcomes (Srirangam & Sheng, 2024). Panjaitan et al. (2025) found that green banking practices improve profitability, particularly when integrated with ESG principles, suggesting that combining green banking with ESG enhances financial performance through comprehensive risk management and sustainability strategies.

This study highlights the role of financial institutions in embedding ESG into lending and investment frameworks to address rising disaster risks. With climate change intensifying these threats, the financial sector is crucial for risk mitigation and sustainable development. The research systematically reviews how ESG adoption enhances disaster risk resilience, focusing on lending policies that account for climate risks and their implications for financial stability in vulnerable regions. It addresses emerging trends in ESG and lending policies, how financial institutions integrate ESG into decision-making, and specific ESG practices that enhance resilience to disaster risks.

## **LITERATURE REVIEW**

### **ESG Framework and Disaster Risk Resilience**

Environmental, Social, and Governance (ESG) criteria evaluate the sustainability and societal impact of investments. The environmental dimension covers climate policies, carbon emissions, and resource management (Singhania & Saini, 2022). The social dimension focuses on relationships with employees, suppliers, customers, and communities (Yu, 2023). Governance involves corporate leadership, executive compensation, audits, and shareholder rights (Li et al., 2021). Globally, ESG adoption is growing due to stricter regulations and stakeholder demand for transparency. In Europe, mandatory non-financial disclosures have driven ESG integration, particularly in countries like Norway, Sweden, and the UK (Singhania & Saini, 2022). In contrast, Southeast Asia, including Indonesia and Thailand, is still developing ESG frameworks (Singhania & Saini, 2022). The trend is shifting toward mandatory ESG reporting, highlighting the importance of sustainable practices in both developed and emerging markets. ESG practices enhance financial stability by reducing risks and improving long-term performance. Banks with higher ESG scores experience fewer non-performing loans (Tóth et al., 2021). Additionally, integrating ESG into risk management boosts resilience during financial crises, as ESG-focused investments are better equipped to handle economic downturns (Chiaramonte et al., 2022).

Disaster risk resilience refers to the capacity of systems, communities, and societies to withstand, adapt, and recover from disasters (Graveline & Germain, 2022). Evolving from a reactive focus on vulnerability, disaster risk management (DRM) now emphasizes proactive resilience strategies. Frameworks like the Flood Resilience System (FloReS) integrate physical, social, economic, and governance dimensions for holistic disaster risk management (Magnuszewski et al., 2019). The Workforce/Population, Economy, Infrastructure, Geography, Hierarchy, and Time (WEIGHT) framework further identifies key resilience factors influencing post-disaster recovery (Santos et al., 2020). These multidimensional approaches underscore the need for comprehensive resilience planning to support sustainable development amid rising disaster risks. Financial institutions are vital in DRM by providing resources and mechanisms for recovery and resilience. Integrating Disaster Risk Financing (DRF) into their operations ensures post-disaster funding, strengthening community and economic resilience (Liyanage & Villalba-Romero, 2021). Instruments like catastrophe bonds and insurance help transfer risk and

fund rebuilding efforts (Lee & Fraser, 2019). Public-private partnerships also enhance long-term resilience by fostering innovative solutions and financial stability post-disaster.

### **Climate Risk-Informed Lending**

The concept of climate risk-informed lending is rooted in the recognition that climate, physical, and transition risks can significantly impact the financial stability of both lenders and borrowers (Ginglinger & Moreau, 2023). With climate risk assessments, financial institutions can manage and mitigate potential losses and align their portfolios with global climate goals (Hirzel et al., 2014). Climate Risk-Informed Lending is a proactive approach to addressing the financial implications of climate change in the lending sector, promoting sustainability and resilience in financial markets (Monasterolo & Volz, 2020). According to Bhattacharyay (2021), financial risks posed by extreme weather events and the transition to a low-carbon economy can significantly impact borrowers' creditworthiness, leading to higher default rates and increased financial instability. (Bhattacharyya et al., 2021). Financial institutions that incorporate climate risk into their lending strategies can manage risk by ensuring that their portfolios are resilient to the impacts of climate change and aligned with global sustainability goals (González & Núñez, 2021). Furthermore, understanding and integrating climate risk into financial decisions allows institutions to identify new opportunities, such as financing projects that contribute to climate resilience and the transition to a sustainable economy (Monasterolo & Volz, 2020).

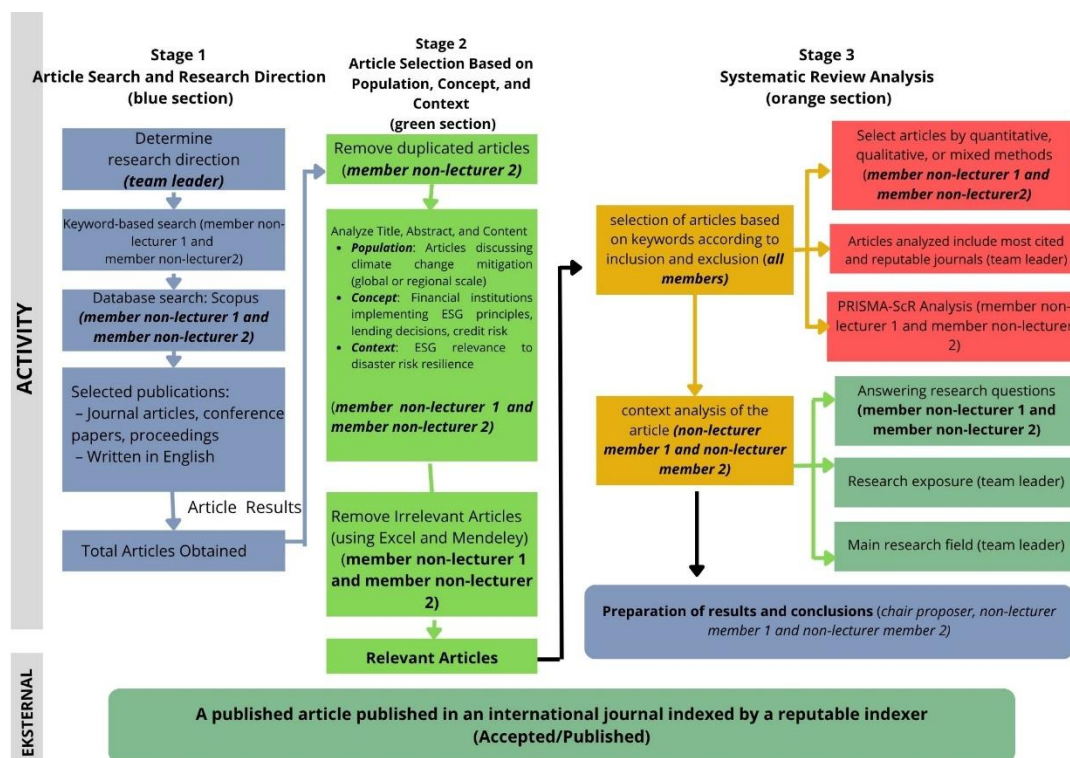
By integrating climate risk into lending decisions, financial institutions can mitigate risks associated with climate change, such as the physical risks of extreme weather events and the transition risks of a low-carbon economy (Lane et al., 2019). However, the challenges are likely significant. These include the difficulty in accurately assessing and pricing climate risk due to its complex and long-term nature, and the need for substantial data and expertise to integrate this risk into traditional lending models (Javadi & Masum, 2021). Furthermore, effectively managing climate risk requires aligning short-term financial objectives with long-term sustainability goals, which may require changes in financial institutions' risk appetites and investment strategies (Schütze, 2020).

### **RESEARCH METHODS**

This study employed a qualitative paradigm using the scoping review method. A scoping review is a method used to map the available literature on a broad topic, identify research gaps, and determine the scope of existing evidence (Peters et al., 2020). This tool was chosen because it aligns with the research objective of reviewing how financial institutions integrate ESG factors into lending policies that consider climate risk. The procedures in the scoping review method include identifying research questions, identifying relevant studies, selecting research data, processing research data, and collecting, summarizing, and reporting results (Arksey & O'Malley, 2005). This study was conducted using the latest reporting tool used in scoping reviews, namely PRISMA-ScR (Tricco et al., 2018; McGowan et al., 2020; Peters et al., 2020). Furthermore, this study utilizes the PCC (Population, Concepts, and Context) framework developed by the Joanna Briggs Institute (JBI) to define research boundaries in a scoping review by identifying relevant populations, key concepts, and specific contexts related to the research questions (Jordan et al., 2021).

Articles were searched using the Scopus database with the keywords “ESG,” “lending,” “credit risk management,” “loan decision,” “disaster risk resilience,” and “sustainability.” Combined using Boolean operators into (TITLE-ABS-KEY (“ESG” OR “ESG integration” OR “ESG risk” OR “ESG investment” OR “ESG performance”) AND (“Banking” OR “Finance” OR “Lending policy” OR “Credit risk” OR “Investment decision” OR “investment” OR “loans” OR “loan” OR “credit” OR “lending”) AND (“policy” OR “regulation”) AND (“disaster risk” OR “Climate risk” OR “resilience” OR “Risk mitigation”)). This combination aims to identify relevant literature in the context of ESG, credit risk management, lending decisions, and disaster risk resilience, with a particular focus on ESG and sustainability trends.

The data obtained from the database is then subjected to data cleansing. Data cleansing is carried out with the aim of ensuring that only valid information is included in the final dataset, thereby improving the accuracy, feasibility, efficiency, and quality of research results. All selected literature is transferred to Mendeley and Excel software to eliminate duplication and facilitate the final screening and selection process. The criteria in this research database have several limitations, such as the range of publication years and document types applied to obtain more specific data. In this study, the publication year is limited to studies published between 2019 and 2025. The language of the selected studies is English. The relevance of the study topics is to discuss the adoption and integration of ESG in lending policies that consider climate risks, and also those that cover the context of developing countries with similar situations. The included study methodologies use relevant methodologies, including qualitative, quantitative, or mixed-methods. Furthermore, this study limits the types of documents, selecting only journal articles, papers, conference proceedings, and proceedings.



Source: Debrah et al. (2023)

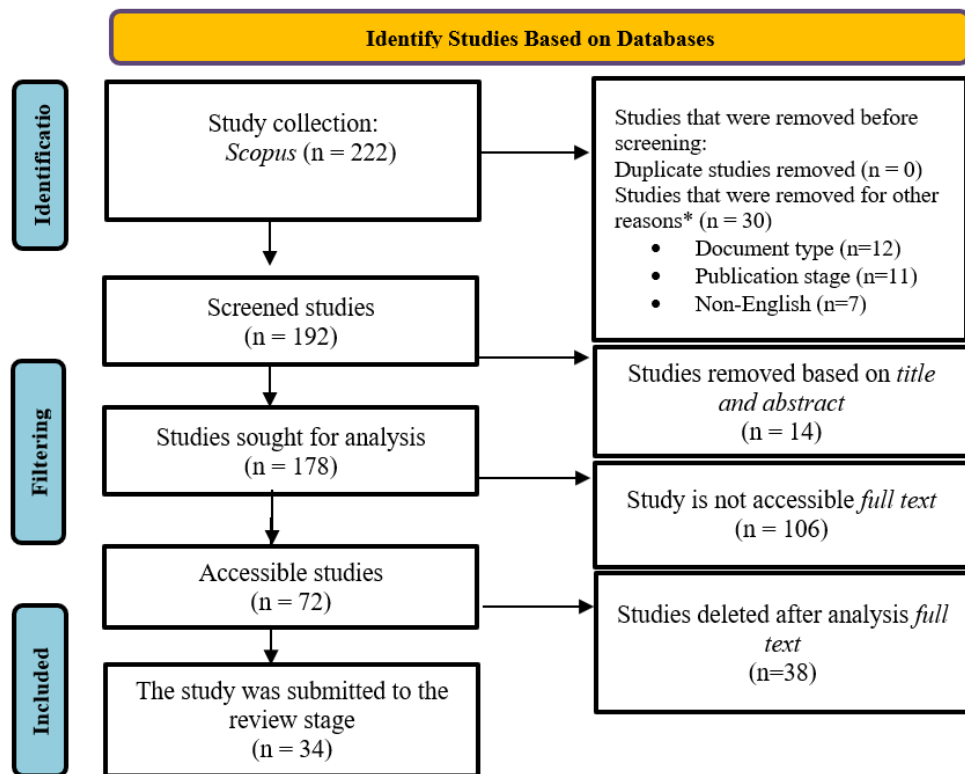
Figure 1. Research Process

The systematic review process undertaken in this study is structured into three stages, as presented in Figure 1. The first stage involves defining the research direction and identifying relevant literature through keyword searches and database exploration, with the inclusion criteria limited to English-language journal articles, conference papers, and proceedings. The second stage focuses on the selection of articles based on the Population, Concept, and Context (PCC) framework, which includes removing duplicates, screening abstracts and content, and excluding irrelevant studies, thereby yielding a set of relevant articles. The final stage consists of systematic analysis, applying the PRISMA-ScR approach, emphasizing highly cited and reputable works. This stage also involves answering research questions, synthesizing findings, and identifying the main thematic areas. The process concludes with the preparation of results and conclusions, leading to the publication of an article in a reputable indexed journal.

## RESULTS

### Article Selection and Trends in ESG and Disaster Risk Resilience Research

Based on the PRISMA diagram above in Figure 2, the article selection process began with 222 documents identified from the Scopus database. Of these, 30 articles were excluded because they did not meet the initial criteria, of which 12 types of article documents were irrelevant to the existing criteria, 11 articles did not meet the publication stage, and 7 articles were not in English. This left 192 articles to be screened through titles and abstracts. At this stage, 14 articles were removed again, leaving 178 articles for full-text review. However, 106 of these were not accessible in full-text due to limited journal access. After further review, 38 articles read did not meet the inclusion criteria. A total of 34 final studies met all criteria and were included in the final review.



Source: Page et al. (2021) and processed by the author (2025)

Figure 2. PRISMA Diagram

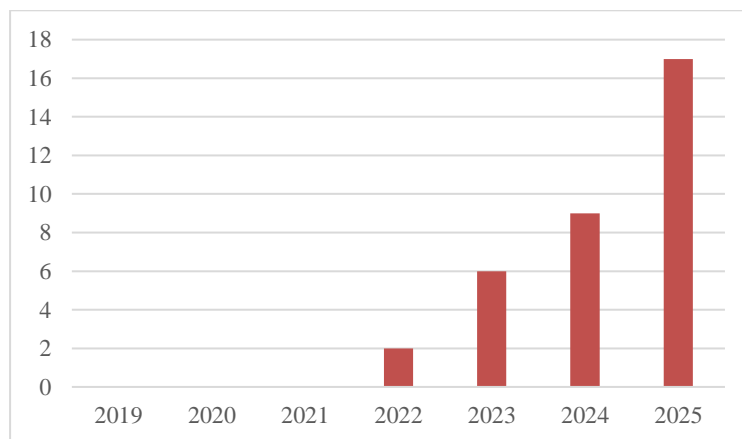


Figure 3. Number of Articles per Year

Based on Figure 3, the graph above shows a significant upward trend in the number of scientific publications discussing the relationship between Environmental, Social, and Governance (ESG) and disaster risk resilience between 2022 and 2025. From 2019 to 2021, no articles met the inclusion criteria. However, starting in 2022, two articles began to address this issue. This trend then continued to increase to six articles in 2023, nine articles in 2024, and peaked at 17 articles in 2025. This surge indicates that ESG issues are increasingly relevant and a primary focus in scientific research, particularly in the context of disaster risk management and financial sustainability.

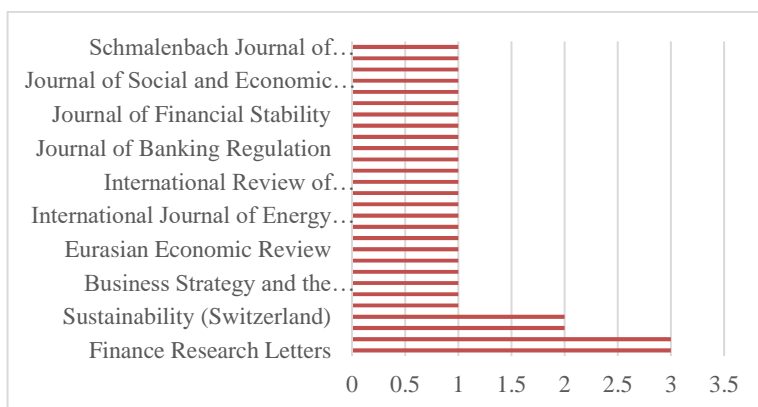


Figure 4. Publication Journal

Meanwhile, based on the journal article distribution in Figure 4, it can be seen that topics on ESG and disaster risk resilience are widely published in various interdisciplinary scientific journals. Finance Research Letters and the Journal of Environmental Management are the journals with the most articles, each publishing three articles on this focus. This indicates that this topic receives equal attention from both financial and environmental perspectives.

In addition, two other journals, Resources Policy and Sustainability (Switzerland), each contributed two articles, indicating that sustainability and resource policy issues are also important components of the ESG and disaster risk discourse. Meanwhile, the remaining articles are mostly spread evenly across 24 different journals, each contributing one article. These journals cover a wide range of fields, such as economics, law, public finance, climate change, financial stability, and radiation safety, demonstrating the multidisciplinary nature of ESG and disaster resilience studies.

### Research Methods and Quality of ESG-Disaster Resilience Studies

The results also show in Figure 5 that the research approaches used in the existing articles are dominated by quantitative methods. A percentage of 62% indicates that the majority of studies addressing ESG and disaster risk resilience tend to use numerical data, statistics, or empirical models to explain the phenomena under study. Meanwhile, mixed methods contributed 26%, indicating a trend toward combining qualitative and quantitative approaches. This method is generally used to explore context or gain a deeper understanding while also being supported by robust quantitative data.

Qualitative methods were used in only 12% of articles. This indicates that while narrative and interpretive approaches are still used, their share is much smaller than that of quantitative methods. This suggests researchers rely more heavily on data-based analysis and numbers to support their arguments, particularly in the economic and financial fields, which require precise measurements. This study used the Mixed-Method Appraisal Tool (MMAT) to evaluate the quality of the articles. The table lists the research methods with the following codes: QL stands for Qualitative, QN(NR) stands for Quantitative non-randomized, and MX stands for mixed-method.

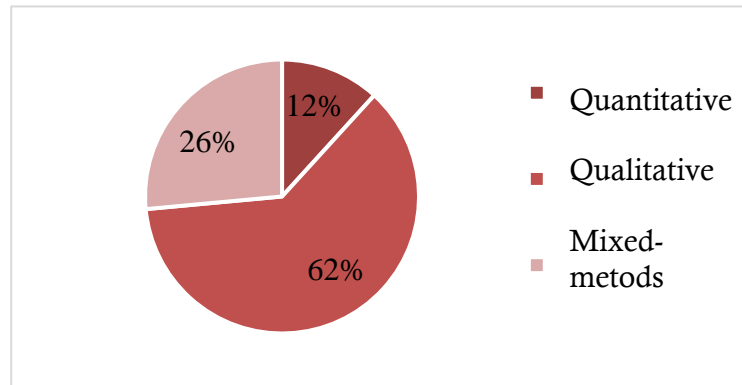


Figure 5. Article Method

Table 1. Article Data Quality According to MMAT

Num	Author/Year	S1	S2	Research methods	P1	P2	P3	P4	P5	Score
1	Shah et al. (2023)	Y	Y	QL	Y	Y	Y	Y	Y	100%
2	Prazian (2024)	Y	Y	QN(NR)	Y	Y	N	Y	Y	80%
3	Mishra et al. (2023)	Y	Y	MX	Y	Y	Y	N	Y	80%
4	Ding et al. (2025)	Y	Y	MX	Y	Y	Y	Y	Y	100%
5	Bassen et al. (2025)	Y	Y	MX	Y	Y	Y	Y	Y	100%
6	Li et al. (2023)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
7	Yébenes (2024)	Y	Y	QN(NR)	N	Y	Y	Y	N	60%
8	Liu et al. (2024)	Y	Y	QN(NR)	Y	N	Y	N	Y	60%
9	Naifar (2024)	Y	Y	MX	Y	Y	Y	Y	Y	100%
10	Greenwood & Warren (2022)	Y	Y	QN(NR)	Y	Y	N	Y	Y	80%
11	Ren et al. (2025)	Y	Y	QN(NR)	Y	N	N	Y	Y	60%
12	Peng et al. (2025)	Y	Y	QN(NR)	Y	Y	Y	Y	N	80%
13	Wu & Liu (2023)	Y	Y	QL	Y	Y	Y	N	N	80%
14	Shu & Tan (2023)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
15	Qing et al. (2024)	Y	Y	QL	Y	Y	Y	N	N	60%
16	Fahmy (2023)	Y	Y	QN(NR)	Y	Y	N	Y	Y	80%
17	Han et al. (2024)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
18	Alnafrh (2024)	Y	Y	QN(NR)	Y	Y	N	Y	N	60%
19	Nieto & Papathanassiou (2024)	Y	Y	QN(NR)	Y	Y	N	Y	Y	80%
20	Zhang & Xi (2024)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
21	Alhowaish (2025)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
22	Kumari et al. (2024)	Y	Y	MX	Y	Y	Y	Y	Y	100%
23	Nefzi (2025)	Y	Y	MX	Y	Y	Y	Y	Y	100%
24	Duan et al. (2025)	Y	Y	QN(NR)	Y	Y	Y	N	Y	80%
25	Zhang (2025)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
26	Gaies (2025)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
27	Yfanti et al. (2025)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%
28	Cicirko (2025)	Y	Y	MX	Y	Y	Y	Y	Y	100%
29	D'Arcangelo et al. (2025)	Y	Y	QL	Y	Y	Y	Y	Y	100%
30	Bansah et al. (2025)	Y	Y	MX	Y	Y	Y	Y	Y	100%
31	Kirschenmann (2022)	Y	Y	MX	Y	Y	Y	Y	Y	100%
32	Schult et al. (2023)	Y	Y	QN(NR)	Y	Y	Y	Y	N	80%
33	Yadav & Asongu (2025)	Y	Y	QN(NR)	Y	N	N	Y	Y	60%
34	Liu et al. (2023)	Y	Y	QN(NR)	Y	Y	Y	Y	Y	100%

Table 1 shows that all scientific publications are of good quality. This is based on the recommendation of Hong et al. (2018) that a good article meets at least three criteria for inclusion in the review, a score of 100% indicates meeting all five criteria, 80% indicates meeting all four criteria, and 60% indicates meeting all three criteria.

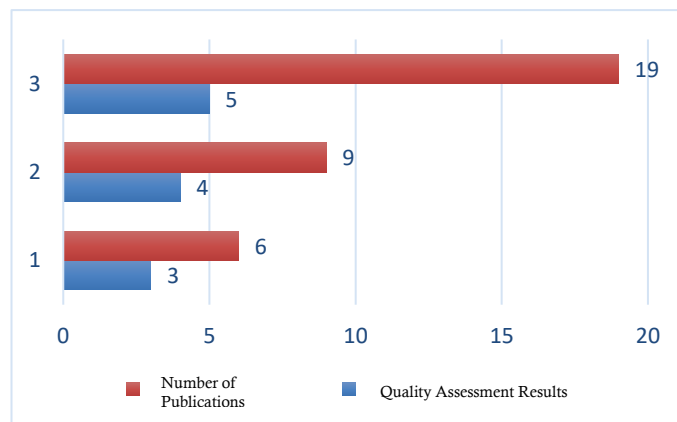


Figure 6. Overall Quality Comparison

Figure 6 presents a comparison of overall quality based on the number of publications and quality assessments, processed by the author. The chart indicates that for quality level 1, there are 3 publications and 6 quality assessments; for level 2, 5 publications and 9 assessments; and for level 3, 19 publications and 4 assessments. This suggests a significant increase in publication volume at higher quality levels, with level 3 showing the highest number of publications, despite a lower quality assessment count.

## DISCUSSION

Financial institutions initiate the integration of Environmental, Social, and Governance (ESG) factors by developing clear internal policies that define and measure environmental risks, social risks, and governance risks, often aligning with global frameworks for consistency (Nieto & Papathanassiou, 2024). New EU regulations, such as the Capital Requirements Regulation (CRR3) and Capital Requirements Directive (CRD6), embed climate and ESG risks into law, with Pillar 3 disclosures fully integrated into the EU Taxonomy, while Pillar 2's long-term climate risk management, combining bank transition plans, climate scenario analysis for physical and transition risks, and dynamic balance sheets remains in development (Nieto & Papathanassiou, 2024). Within the EU, policies encourage private sector adoption of sustainability factors in funding, guided by the EU Taxonomy, which classifies environmentally sustainable activities, and supported by the Non-Financial Reporting Directive (NFRD) and the upcoming Corporate Sustainability Reporting Directive (CSRD), requiring sustainability data from borrowers (Kirschenmann, 2022). The Green Asset Ratio (GAR) measures the proportion of taxonomy-aligned assets to total assets, while the Sustainable Finance Disclosure Regulation (SFDR) mandates transparency on sustainable investment proportions, ensuring informed investor decisions (Kirschenmann, 2022).

At loan origination, ESG integration begins with materiality assessments to identify sector-specific environmental, social, and governance risks, enhancing due diligence alongside traditional financial analysis to assess long-term losses from stranded assets (D'Arcangelo et al., 2025). ESG scorecards or adjusted credit scorecards reflect these risks, leading to stricter terms like higher interest rates or collateral for poor performers, incentivizing sustainability improvements, while strong environmental performance lowers debt costs, reflecting investor focus on transition risks (D'Arcangelo et al., 2025). Local government support through carbon pricing, renewable energy subsidies, and simplified clean investment processes, alongside green financial innovations like bonds,

loans, insurance, and ESG ratings, drives this ecosystem (Shah et al., 2023). The green, social, and sustainable bond market surged from US\$596 billion in 2020 to US\$1.1 trillion in 2021, adhering to International Capital Market Association (ICMA) Green Bond Principles and the EU Green Bond Standard, with green loans offering lower rates for renewable energy and efficiency projects (Mishra et al., 2023; Zhang & Xi, 2024). Standardized ESG reporting is vital for investor decision-making (Zhang & Xi, 2024).

Credit rating agencies increasingly translate ESG risks into financial risk weights, projecting impacts of management failures on credit risk, though varying methodologies highlight the need for refinement (Oliver Yébenes, 2024). Amid climate policy uncertainty, enhanced disclosure on green innovation and sustainable investments reduces systemic bank risk, with ESG and environmental innovation scores serving as economic stabilizers during regulatory shifts (Liu et al., 2024). Regulatory frameworks encourage governance and climate risk disclosure, though gradual implementation is needed to avoid overburdening smaller institutions (Kumari et al., 2024). Collectively, these efforts position green finance as a strategic tool for a low-carbon transition.

Environmental, Social, and Governance (ESG) principles have emerged as a strategic tool in sustainable development and risk management, enhancing disaster resilience while addressing sustainability and climate change adaptation (Alnafrah, 2024). Consistent ESG implementation mitigates disaster impacts and speeds up recovery. ESG investments tackle climate risks, boosting resilience by managing environmental threats, as seen with UK asset managers, and are linked to lower risk and better credit ratings, especially in renewable energy, though standardization is needed (Chodnicka-Jaworska, 2022; Greenwood & Warren, 2022; Kirschenmann, 2022; Pangalos, 2023; Kashi & Shah, 2023; Cepni et al., 2023; Qing et al., 2024; Bassen et al., 2025; Duan et al., 2025). Good governance, supported by transparent ESG reporting, is crucial (Zhang & Xi, 2024). Building retrofit strategies focus on energy efficiency and CO<sub>2</sub> reduction, enhancing resilience by cutting fossil fuel use and mitigating carbon policy risks, though they require careful planning (Erol et al., 2023; Shu & Tan, 2023; Aquino et al., 2024). ESG-based climate scenario analysis, a newer tool, improves sustainability and resilience by exploring climate change impacts for strategic planning beyond disclosure (Ding et al., 2025). Integrating ESG into risk assessment influences green finance lending terms, with EU regulations like NFRD and CSRD promoting transparency, necessitating robust disclosure rules (Kirschenmann, 2022; Wu & Liu, 2023; Oliver Yébenes, 2024). Lastly, Green Municipal Bonds (GMBs), pioneered by Saudi Arabia, finance low-carbon projects, enhancing resilience through climate-resilient infrastructure and social equity, supported by sustainable governance (Mishra et al., 2023; Alhowaish, 2025).

## **CONCLUSION**

This study explores the connection between Environmental, Social, and Governance practices and disaster risk resilience within financial institutions. It highlights how these practices improve risk assessments, lending decisions, and overall financial stability in areas prone to natural disasters. Key findings show a growing body of research on this topic, with a focus on quantitative methods that demonstrate benefits such as reduced costs for sustainable borrowers, enhanced transparency, and better adaptation through tools like scenario analysis and green bonds. Overall, integrating these practices strengthens institutions' ability to withstand and recover from disaster-related shocks, promoting sustainable development.

These findings imply that financial institutions should treat Environmental, Social, and Governance principles as essential strategies rather than mere regulatory requirements, investing in training and technology to implement them effectively. However, limitations include the heavy reliance on quantitative data, which overlooks socio-cultural and regional variations, potentially reducing the applicability of results across diverse contexts. Future research should incorporate qualitative approaches, case studies from various regions, and long-term analyses to provide deeper insights into how these practices evolve and impact resilience over time.

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