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THE ROLE OF DISASTER INSURANCE IN MITIGATING THE RISK OF NON-PERFORMING LOANS IN INDONESIAN BANKING

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Abstract

Indonesia is highly vulnerable to natural disasters, which affect banking sector stability through increased credit risk, reflected in rising Non-Performing Loans (NPLs). Natural disasters disrupt borrowers' cash flows, damage productive assets and loan collateral, and heighten default risk, particularly among micro, small, and medium enterprises and in disaster-prone regions. This study aims to analyze the role of disaster insurance in mitigating NPL dan NPF risk in Indonesia's banking sector. Using a qualitative descriptive-analytical approach, the study relies on documentary analysis of reports from financial authorities, disaster management agencies, banking institutions, and relevant literature from 2017–2025. Content analysis is applied to examine disaster risk transmission and the effectiveness of disaster insurance as a risk transfer mechanism. The findings indicate that disaster insurance helps reduce NPL and NPF volatility by protecting collateral values and supporting post disaster cash flow recovery, although its effectiveness remains constrained by low insurance penetration. The study highlights the importance of strengthening disaster insurance to enhance financial system resilience.
Keywords: *Disaster Insurance, Credit Risk, NPL, Financial Stability*

Abstrak

Indonesia adalah negara dengan tingkat kerentanan bencana alam yang tinggi yang berdampak pada stabilitas sektor perbankan melalui peningkatan risiko kredit bermasalah. Bencana alam mengganggu arus kas debitur, merusak aset produktif dan jaminan kredit, serta meningkatkan risiko gagal bayar, terutama pada sektor UMKM dan wilayah rawan bencana. Penelitian ini bertujuan menganalisis peran asuransi bencana dalam mitigasi risiko NPL dan NPF perbankan di Indonesia. Penelitian menggunakan pendekatan kualitatif deskriptif melalui studi dokumentasi pada laporan OJK, Bank Indonesia, BNPB, AAUI, laporan tahunan perbankan, dan literatur ilmiah periode 2017–2025. Analisis data dilakukan dengan analisis isi data dokumentasi untuk mengkaji transmisi risiko bencana dan efektivitas asuransi sebagai instrumen transfer risiko. Hasil penelitian menunjukkan bahwa asuransi bencana berperan menekan volatilitas NPL dan NPF melalui perlindungan agunan dan pemulihan arus kas debitur, meskipun masih dibatasi oleh rendahnya penetrasi asuransi. Penelitian ini menegaskan pentingnya penguatan asuransi bencana bagi ketahanan sistem keuangan nasional.
Kata kunci: Asuransi Bencana, Risiko Kredit, NPL, Stabilitas Keuangan.

I. INTRODUCTION

Indonesia is a country vulnerable to natural disasters. Located at the intersection of three moving earth plates and in the center of the Pacific Ring of Fire, Indonesia is expected to experience more than 3,000 disasters throughout 2024, including earthquakes, tsunamis, and volcanoes (BNPB, 2025). These disasters claim many lives, destroy buildings, and severely disrupt the economy and finances. Natural disaster risk can lead to higher non-performing loans (NPLs) in banks. When disasters strike, small business owners, farmers, and fishermen often lose productive assets and sources of income, making it difficult to repay loans.

Credit risk in banking stems not only from internal factors within the borrower but also from other external factors, such as natural disasters (Sukmadilaga et al., 2025). Disaster economics (Pundit & Noy, 2024) explains that disasters can disrupt household and business cash flows, which, if unprotected, can impact the financial system through increased defaults. Disaster insurance serves as a risk transfer tool, helping to maintain borrower income stability and minimize potential credit losses for banks (Cummin & Mahul, 2009). Disaster insurance is not merely personal protection, but rather a reinforcing system to maintain financial stability.

A strong financial system can withstand external risk factors such as natural disasters. Ideally, banks in disaster-prone areas would require customers to take out disaster insurance when applying for loans (Alalmaee, 2024). Regulations on how banks manage risk should also encourage banks to incorporate disaster risk into creditworthiness calculations (OJK, 2017). The number of insured properties in disaster-prone zones is less than 0.1 percent (Antara, 2025b), and there are no regulations requiring disaster insurance to be incorporated into the credit review process. Banks tend to prefer reacting after a disaster by restructuring debt, which only delays the problem of bad debt, not preventing it.

Previous research has examined the impact of disasters on stability and at the national level. Taher & Zuhroh (2022) analyzed the improvement in consumer credit performance after the disaster in Palu (Taher & Zuhroh, 2022), while Sugiarto et al. (2023) identified the sensitivity of NPLs to external shocks (Sugiarto et al., 2023). However, no research has linked disaster insurance to NPL mitigation within the context of regulations, banking practices, and insurance market readiness in Indonesia. Existing studies tend to be

quantitative or macroeconomic in nature. This study uses a descriptive qualitative analysis approach to explore the gap between the theoretical potential of disaster insurance and its practical implementation in the Indonesian banking system, focusing on regulatory, structural, and policy dimensions. Thus, this study provides a novel contribution to the literature on banking risk management in disaster-prone developing countries.

This study aims to analyze the mechanisms of disaster insurance in mitigating NPL and NPF risks, identify the inhibiting and enabling factors for its integration into bank credit risk management, and evaluate the regulatory responses of the Financial Services Authority (OJK) and Bank Indonesia to the use of disaster insurance as an NPL control instrument.

II. THEORETICAL STUDIES

1. Banking Risk Management

Credit risk refers to the potential loss that arises when a borrower is unable to meet loan repayment obligations, typically measured by the Non-Performing Loan (NPL) ratio (Mishkin & Eakins, 2019). Banking risk management encompasses the process of identifying, measuring, monitoring, and controlling the risks faced by banks in their operations. According to a report from the Basel Committee on Banking Supervision, banking risks are divided into credit, market, operational, and liquidity risks (Basel, 2024). Of these risks, credit risk dominates bank portfolios, particularly in developing countries, as it refers to losses resulting from the failure of borrowers or counterparties to meet their obligations.

Banks need to have a comprehensive risk management framework, including identifying external risks such as natural disasters or climate risks that could impact a borrower's ability to meet loan repayment obligations. OJK Regulation No. OJK Regulation No. 18/POJK.03/2016 requires banks to implement effective risk management for all material risks in their business activities, and climate risk management guidelines direct banks to consider the impact of climate-related risks in their strategies and governance (OJK, 2024).

2. Non-Performing Loans (NPLs) and Non-Performing Financing (NPFs)

Non-Performing Loans (NPLs), or non-performing loans, are loans for which borrowers have not repaid either principal or interest within a specified period, usually more than 90 days. According to the World Bank (2019), NPLs are an important indicator for assessing the health of the banking sector. A high NPL ratio indicates poor asset quality,

which can reduce bank capital and disrupt the financial intermediation function (World Bank, 2019).

Meanwhile, Non-Performing Financing (NPF) refers to non-performing loans experienced by Islamic banks. Both NPLs and NPFs are loans or financing categorized as substandard, doubtful, and loss. The NPL (conventional banks) and NPF (Islamic banks) levels indicate the extent to which banks experience non-performing financing relative to total financing (Syakur Novianto et al., 2023).

3. Disaster Economics

Disaster economics is a branch of economics that studies the economic impact of natural disasters and how policies respond to them. Natural disasters negatively impact income, assets, and cash flows for both households and businesses (Noy, 2009). This in turn disrupts consumption, investment, and the ability to meet financial obligations. Furthermore, the losses incurred are not uniform; developing countries often experience greater impacts than developed countries due to limitations in mitigation and recovery. Disasters cause not only direct losses, such as physical damage, but also indirect losses, such as supply chain disruptions, reduced productivity, and increased financial risk (Noy, 2009). In the banking sector, these impacts manifest through increased credit defaults and soaring NPLs and NPFs.

4. Disaster Insurance

Disaster insurance is a type of insurance that provides financial compensation for losses caused by natural disasters such as earthquakes, tsunamis, floods, or hurricanes. Disaster insurance serves as financial protection that helps individuals and businesses maintain their financial stability after a disaster (Cummin & Mahul, 2009). In developed countries, disaster insurance is often a requirement for obtaining property loans, providing protection for both borrowers and lenders. Meanwhile, in developing countries like Indonesia, disaster insurance coverage remains very low; less than 10% of properties in disaster-risk areas are insured. As a result, many people remain vulnerable to the financial impact of disasters (World Bank, 2025).

Insurance plays a crucial role in protecting the value of bank collateral. When collateralized assets are insured, insurance claims replace the lost value of the assets. The proceeds from these claims help maintain the value of the loan collateral, thereby minimizing bank losses (Silvia & Isnaini, 2025).

5. Disaster Risk Transfer through Insurance

Natural disaster risk is an exogenous risk that can trigger systemic risk in the banking sector (Wu et al., 2024). Risk transfer through insurance is based on the principle of pooling and spreading risk, where individual risks are transferred to a larger risk pool through premium payments. Disaster insurance not only protects physical assets but also prevents disaster-induced poverty and supports faster economic recovery (Cummin & Mahul, 2009).

Disaster insurance embedded in bank loans serves as a credit safety net that reduces banks' exposure to losses, thereby suppressing the occurrence of non-performing loans. Integrating disaster insurance into the financial system can enhance macroprudential resilience, especially in countries with high disaster risk levels like Indonesia (Bayer & Stigler, 2015). Operationally, the effectiveness of insurance in mitigating NPLs is guaranteed through the Banker's Clause in collateral insurance policies. This clause designates the bank as the primary beneficiary of claim funds. Thus, if collateral assets are damaged, claim payments must be allocated first to pay off or restructure the debtor's debt, to prevent a spike in NPLs (Dorfman, 2018).

III. RESEARCH METHODS

This qualitative study aims to understand the role of disaster insurance in mitigating the risk of non-performing loans in Indonesian banking. The research method used is descriptive analytical research, relying on secondary data, both qualitative and quantitative. The research approach is qualitative, focusing on the interpretation of relevant texts, policies, reports, and official documents.

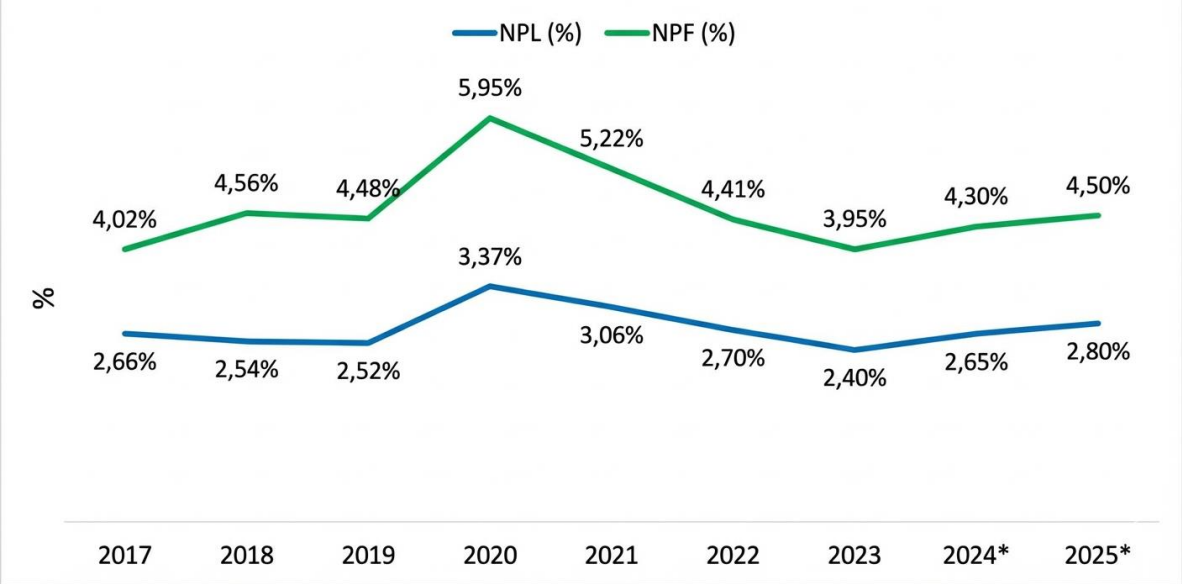
Data collection was conducted through documentation studies, namely by collecting, selecting, and reviewing documents from reliable sources, including reports from the Financial Services Authority (OJK), Bank Indonesia, the National Disaster Management Agency (BNPB), the Indonesian General Insurance Association (AAUI), financial reports of commercial banks listed on the Indonesia Stock Exchange (IDX), indexed scientific journals, and verified national media coverage for the period 2017–2025. The data analysis method used is content analysis, with data categorized according to research themes, including: the transmission of disaster risk to non-performing loans (NPLs), the effectiveness of disaster insurance, structural barriers, and policy responses. These data are then interpreted within the theoretical and regulatory frameworks applied in Indonesia to answer the research questions.

IV. RESEARCH RESULTS

1. Disaster Risk Transmission to Increased NPL and NPF

Data analysis shows that natural disasters in Indonesia have a clear risk transmission pathway that increases the non-performing loan (NPL) ratio. When disasters strike, such as the Lombok earthquake (2018), the Palu tsunami (2018), the South Kalimantan floods and tropical cyclone Seroja in East Nusa Tenggara (2021), and the Aceh Singkil floods (2025), borrowers lose productive assets and sources of income, drastically reducing their ability to repay loans.

According to the theory of external risk transmission, such as disasters (Pundit & Noy, 2024), non-financial risks can degrade the quality of a credit portfolio if there are no adequate risk absorption mechanisms. Figure 1 shows fluctuations in NPL and NPF, with the highest levels occurring in 2020, with the COVID-19 disaster (mass layoffs and business closures), the Jakarta floods, and the Maluku earthquake. In 2021, NPL and NPF remained high due to the ongoing impact of the COVID-19 disaster, the Semeru eruption, and the floods in South Kalimantan.



Source: processed data (OJK Annual Report 2017-2025)

Figure 1. Graph of Fluctuations in NPL and NPF of Indonesian National Banks 2017-2025

Collateral losses due to earthquakes, tsunamis, and liquefaction result in a cycle of losses that occurs when natural disasters strike a region, leading to widespread loan defaults. Repeated earthquakes damage homes used as collateral for mortgages and tourism

infrastructure, damaging MSME assets. Major floods in Kalimantan, or Greater Jakarta (Jabodetabek), Indonesia's largest economic center, resulted in significant operational losses, disrupting debtors' cash flow, and damaging productive assets in industrial zones. Tropical Cyclone Seroja (flash floods) in East Nusa Tenggara (NTT) in 2021 resulted in losses to agricultural and fisheries assets, resulting in economic losses in the micro-sector. Major floods in Aceh and North Sumatra in November 2025 caused loss of life and material damage. The disaster disrupted the supply chain due to disrupted access, impacting borrowers' repayment capacity.

The large gap between NPL and NPF (Figure 1 and Table 1) occurs because Islamic banking has significant exposure to the MSME and agricultural sectors. Islamic banking (including Islamic Regional Development Banks) has a very strong market share in provinces with high Indonesian Disaster Risk Index (IRBI) scores, such as Aceh (IRBI 221.86) and East Nusa Tenggara (IRBI 234.00). Because the customer base is concentrated in disaster-prone areas, a single disaster will significantly impact the NPF (BNPB, 2024).

Table 1. NPL and NPF Gap

Tahun	NPL (%)	NPF (%)	Gap (%)	Peristiwa
2018	2.54	4.56	2.02	Gempa Lombok dan Tsunami
2020	3.37	5.95	2.58	Covid-19 dan Banjir Jakarta
2025*	2.80	4.50	1.70	Bencana Sumatera

Source: processed data (OJK annual report 2017-2025)

2. The Role of Disaster Insurance in NPL Mitigation

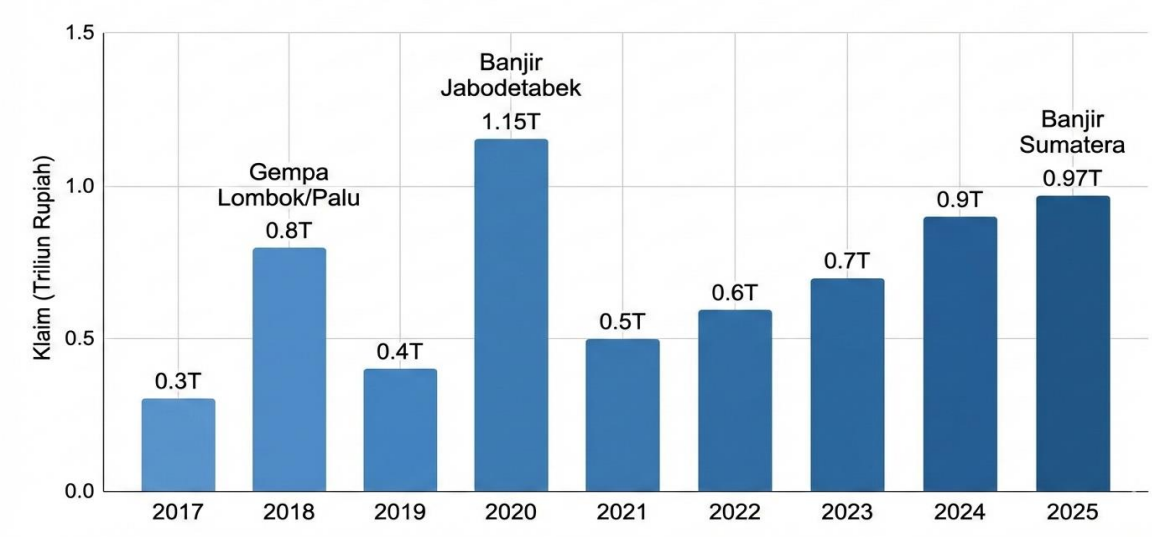
Disaster insurance has the potential to break the chain of transmission of these losses. With claim compensation, debtors can maintain cash flow, thus ensuring their ability to pay installments. The AAUI (2020) report noted that insurance claims due to the January 2020 floods reached IDR 1.1 trillion, helping thousands of debtors in Greater Jakarta (Antara, 2020). However, insurance coverage remains very low: less than 10% of properties in disaster-prone areas are insured (World Bank, 2019). According to the AAUI (2025) report, following the disaster in Sumatra, the provisional claim estimate by mid-December 2025 was IDR 567.02 billion, consisting of IDR 492.52 billion in property assets and IDR 74.49 billion in motor vehicle assets. Combined with state assets, the estimated claims reached IDR 970 billion (voi.id, 2025).

Without insurance claim payments, these significant losses would be a burden on debtors, potentially increasing the risk of default. Although insurance coverage remains low,

preliminary evidence demonstrates the effectiveness of insurance in reducing non-performing loans (NPLs). Integrating disaster risk mitigation through insurance has been empirically proven to reduce credit quality volatility in Indonesia. Industry studies indicate that credit insurance helps banks transfer some credit risk to insurers, thereby mitigating the risk of losses due to default and making the overall credit risk of the portfolio more manageable (Siregar et al., 2022).

The primary role of disaster insurance is to protect the value of collateral held by banks. If the physical assets (houses or factories) used as collateral are destroyed, their value decreases dramatically. Insurance claim funds serve as a replacement for the value of lost assets, allowing the collateral to be restored or, at the very least, providing financial compensation that offsets the bank's losses.

Insurance serves as an emergency liquidity injection for debtors, particularly MSMEs, who lose their source of income or business premises. The disbursement of claim funds allows debtors to quickly repair or replace damaged assets and restart economic activities. A stable and quickly restored cash flow is a key prerequisite for debtors to resume their loan payments, thus preventing delays and defaults that could trigger an increase in NPLs.



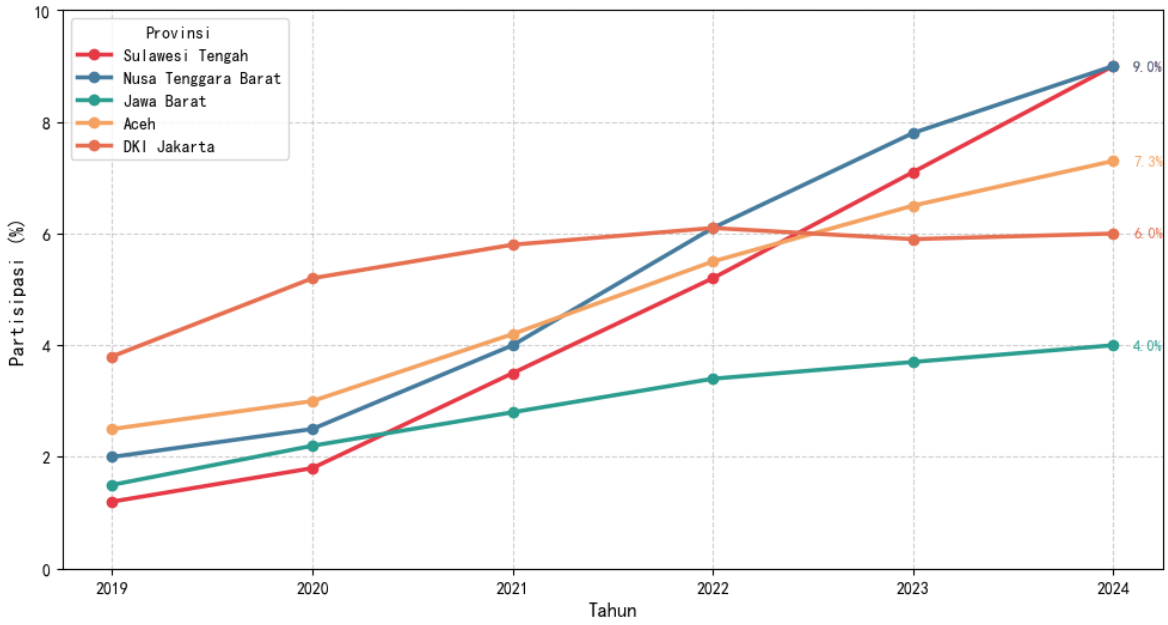
Source: processed data (AAUI, BNPB (IRBI), OJK, BRI & Mandiri Annual Report 2018-2025)

Figure 2. Graph of Trends in Disaster Insurance Claims in Indonesia 2017-2025

This disaster insurance mechanism ensures that banks are the primary beneficiaries of submitted claims. This ensures that some or all of the claim funds will be used to repay the debtor's remaining principal, thereby preventing the bank's credit risk (NPL) from total loss.

3. Barriers and Opportunities Affecting the Effectiveness of Disaster Insurance

The main obstacle hindering the integration of disaster insurance is the low level of public participation in disaster insurance in Indonesia. Only around 2.96% of MSMEs in Indonesia had disaster insurance by 2024 (Antara, 2025a). This is caused by a combination of economic, psychological, and systemic barriers. In several developing countries in the Asia Pacific region, protection against natural disaster risks is generally not automatically included in property insurance policies but is offered as an optional additional benefit. This scheme tends to discourage public interest in taking out such coverage. In Indonesia, for example, only a small percentage of households have property insurance, with less than 5% opting to add flood risk coverage to their policies (The Asian Business, 2025). Psychologically, distrust of the claims process (perceived as complicated, slow, or frequently rejected) and a preference for mutual assistance (gotong royong) and government assistance erode interest. The 2024 National Survey on Financial Literacy and Inclusion (SNLIK) showed that public understanding of financial services still needs to be improved, while insurance product literacy, in particular, is also relatively low according to industry reports. Negative perceptions of the claims process and product inconsistencies with actual needs can hinder public interest in disaster insurance (OJK & BPS, 2024). Various studies on the development of disaster risk financing instruments, such as those promoted by the World Bank, emphasize the need to strengthen insurance mechanisms to meet the needs of vulnerable and informal groups. Breakthroughs in weather index-based insurance, integration with social assistance programs, and the use of village leaders have yielded significant results. As seen in Figure 3 below, participation in West Nusa Tenggara (NTB) and West Sulawesi (Sulbar) has increased by more than 9%. This increase in participation is not due to coercion to purchase policies, but rather to building a protection system that is trustworthy, affordable, and relevant to the realities of community life (Friawan, 2022).



Source: BNPB, OJK, AAUI (2024)

Figure 3. Disaster Insurance Participation Trend Graph for 5 Priority Provinces (2019-2024)

Figure 3 shows the trend in disaster insurance participation. Central Sulawesi and West Nusa Tenggara had the highest participation among the five provinces, each reaching 9.0% of registered households in 2024. This is due to post-disaster trauma, which has made people in these two provinces more open to financial protection. This openness is also due to the success of the PRIMA (Indonesia Tangguh Bencana Program) program by BNPB, PT Asuransi Jasindo, and OJK) and the AUT (Asuransi Usaha Tani) program by Jasindo, along with their fast claims processing. West Java had the lowest participation rate at 4% in 2024, due to low financial literacy (insurance) among farmers and informal workers, and the perception that disaster insurance is not a priority.

Low financial literacy related to disaster insurance can be addressed through a systemic approach that combines education, product design, and policy incentives. Insurance literacy needs to be integrated into public programs and financing already well-known to the public, such as People's Business Credit (KUR), agricultural insurance, and social assistance, so that education is contextual and relevant. Simplifying products and using simple language that is easy for the layperson to understand, particularly through parametric insurance schemes, can increase public understanding and trust. The role of banks and trusted local figures, such as

extension workers and village officials, is also crucial as literacy agents in the education process.

Based on these obstacles, regulations requiring disaster insurance for certain collateral in disaster-prone areas should be implemented. Regulators must ensure the Banker's Clause is applied uniformly and effectively across the banking and insurance industries. Synergy between banks and insurance companies is needed to simplify post-disaster verification processes. The Disaster Pooling Fund (Presidential Regulation No. 75 of 2021) is urged to be strengthened as a national fiscal and reinsurance backstop to cover uninsured risks (DJKN, 2025).

The application of parametric insurance in the disaster insurance system is also more effective than the indemnity scheme in Indonesia because claim payments are triggered by objective and measurable parameters without the need for loss audits. Claim payments under this scheme are automatic and very fast because they do not require physical damage surveys. Funds are disbursed once an agreed-upon threshold is exceeded (Chafid, 2022). Its main advantage is not only speed, but also transparency and trust. Because the targets are objective and public, the public is no longer suspicious of claim rejections.

V. CONCLUSION

Disaster insurance plays a strategic role in mitigating the risk of non-performing loans (NPLs) in Indonesia. Natural disasters have been shown to significantly increase non-performing loans (NPLs), particularly in disaster-prone areas with low insurance penetration, such as Aceh, North Sumatra, West Sumatra, and Central Sulawesi. Therefore, progressive government policies are needed to mandate disaster insurance coverage for loans in disaster-prone areas, encourage national insurance product penetration to increase disaster insurance literacy, and strengthen multi-sector collaboration between banks, insurance companies, and local governments.

Disaster insurance is not only an individual protection tool but also a crucial pillar of national financial system resilience amidst the increasing threat of disasters. Amid low participation in independent insurance (5.1%), collectively managed parametric insurance is the most efficient systemic solution. This scheme not only protects physical assets but also safeguards regional economic cash flow, ensuring that natural shocks do not escalate into financial crises that cripple regional banking. Parametric insurance serves as a

complementary "first aid" to maintain the collectibility of non-performing loans (NPLs/NPFs) in the post-disaster period.

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