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Impelementation of Flood Disaster Control Regulations with a Multisectoral Approach

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Abstract
This study was conducted to examine the implementation of flood-control regulations in Sumatra through a multisectoral approach encompassing the perspectives of land administration, public works and water resources, transmigration, environment and peatland management, energy, public financing, legal governance, and inter-institutional coordination. A normative juridical framework, enriched with institutional process mapping, was employed to assess how cross-sectoral policies have shaped hydrological vulnerability and influenced the effectiveness of flood-mitigation efforts. The analysis indicates that the effectiveness of licensing regimes, spatial planning, and field-level monitoring has been constrained by tenure uncertainty, inconsistencies in spatial datasets, weak geospatial verification, and deficits in upstream infrastructure maintenance. Granular violations including land clearing, peat canalization, and incomplete mine reclamation were also found to remain insufficiently addressed by conventional enforcement mechanisms, as reflected in numerous field findings circulating in the public domain. From the land-administration perspective, tenure certainty and risk-layer consolidation are required to be strengthened; from the water-resources perspective, synchronization of planning and infrastructure maintenance must be ensured; from the transmigration perspective, population placement is mandated to be based on hazard mapping and rights protections; from the environmental and peatland perspective, ecological restoration and rewetting are viewed as essential prerequisites; from the energy sector, logistical preparedness and mitigation-budget protection are required to be enhanced; and from the legal perspective, regulatory harmonization and tiered sanctions are required to ensure effective ecological recovery. At the institutional level, strengthened coordination across ministries is deemed necessary to enable consistent implementation of these recommendations. Accordingly, it is concluded that flood management in Sumatra can only be achieved through an integrated and binding governance framework grounded in a unified risk map, systematic licence auditing, and measurable ecological rehabilitation.

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1. INTRODUCTION

Flooding on Sumatra Island in late 2025 demonstrated new dynamics, shifting from a periodic hydrometeorological event to one with greater intensity and recurring frequency, bringing significant socio-economic impacts. This shift in patterns highlights the need to understand flooding not solely from the perspective of extreme rainfall, but also through a more comprehensive perspective of spatial governance and land use. Several field findings

demonstrate that land use, water resource infrastructure, transmigration policies, and environmental management play a significant role in shaping the vulnerability of watersheds (DAS). Therefore, strengthening intersectoral coordination is key to mitigating future flood risk. As an illustration, the case of Tesso Nilo National Park (TNTN) shows the characteristics of multi-sectoral failure: the initial area of TNTN was recorded as 81,793 hectares, but natural forest cover has shrunk drastically so that only around 12,561 hectares (15% of the original area) remain, while more than half of the area has been converted into illegal palm oil plantations, a condition that weakens the upstream absorption function and accelerates surface runoff.

Administrative data combined with remote sensing data suggests that upstream changes occur gradually and often go unnoticed as factors impacting downstream flood patterns. In Tesso Nilo National Park, the presence of approximately 5,600 families living and managing land on a large scale demonstrates socio-economic dynamics that develop organically in line with the community's need for living space and economic activities. In this context, changes in land cover and upstream land use appear to coincide with increased flooding in downstream areas, a phenomenon that becomes clearer when spatial and chronological data are combined. In July 2025, for example, hotspot monitoring in Riau recorded approximately 790 hotspots with fire activity estimated at peak levels of up to 1,000 hectares per day, indicating that degraded peatlands tend to be less than optimal in storing water for the following rainy season. These findings provide a shared learning opportunity that gradual landscape changes can impact hydrological systems, making collaborative efforts relevant to strengthening upstream areas and reducing future flood risk.. In addition, the results of hydrological monitoring and field studies show an increase in river sedimentation after land conversion by tens of percent, so that flow capacity is reduced and the risk of overflow increases. Existing flood control infrastructure has also eroded its effectiveness. Several reservoirs and irrigation channels have experienced a decrease in capacity due to sedimentation and lack of maintenance. A decrease in capacity of >30% has been reported in several watersheds, which weakens the technical ability to withstand peak discharge.

Regulatory and institutional dynamics also exacerbate conditions on the ground. Overlapping issuance of HGU/business permits in areas that are later proven to overlap with protected areas indicates map verification issues and uncertainty over land status (Ministry of ATR/BPN, 2024). Meanwhile, there is a gap in implementation between the peat protection policy (PP No. 71/2014 and its amendments), which requires rewetting and restoration, and the reality on the ground: more than 50% of critical peatlands in several areas of Sumatra have not been adequately restored, thus reducing the spongiosa function of peat as a hydrological buffer. In the realm of enforcement, evaluations by law enforcement indicate a tendency to resolve large-scale encroachment cases administratively without long-term ecological restoration, which opens up the possibility of reversal of land use and the risk of recurrence. Normative conflicts also arise between the regional regulation instrument (Presidential Regulation No. 5/2025) and the administrative sanction mechanism in the environmental sector (PP No. 24/2021), which in practice creates uncertainty regarding remedial action and land restoration (Presidential Regulation No. 5/2025; Government of the Republic of Indonesia, 2021). Funding is a crucial factor that is still considered a constraint in implementation.

Post-disaster transmigration and relocation policies add a socio-legal dimension to the hydrological crisis. Transmigration without adequate hazard mapping and secure land rights increases the risk of repatriation of settlements in flood-prone areas; field evidence suggests that many resettlement sites are being built on riverbanks because the alternative housing options provided are slow or ecologically unsafe. Furthermore, the loss of

biodiversity and ecosystem function, as evidenced by the reduction of large animal habitats in the National Park (TNTN), indicates systemic damage that impacts the landscape's resilience to hydrometeorological disturbances.

With the above background, this paper aims to analyze the dynamics of the causes of flooding in Sumatra in a multi-sectoral manner through the perspectives of land, public works (SDA), transmigration, and the environment; examine policy and institutional gaps (including regulatory conflicts and issues with single-data maps); and formulate an integrated policy direction based on land use improvement, upstream ecosystem restoration, strengthening land verification, and green-blue infrastructure integration.

2. RESEARCH METHODS

This research essentially uses a normative juridical approach supported by limited empirical evidence (empirically informed normative research). The normative juridical approach is positioned as the primary framework for analyzing how positive legal norms in the fields of agrarian affairs, forestry, the environment, water resources, energy, and transmigration work (or fail to work) in the context of flood control in Sumatra, particularly in the case of Tesso Nilo National Park. Normatively, this research conducts a doctrinal analysis of relevant laws and regulations, including Laws (UU), Government Regulations (PP), Presidential Regulations (Perpres), and Ministerial Regulations (Permen).

The doctrinal analysis was conducted using textual interpretation techniques (interpreting the wording of articles as formulated by lawmakers) and purposive/teleological interpretation (interpreting articles based on the objectives of environmental protection, disaster mitigation, and tenure security). This stage was complemented by doctrinal mapping, namely a systematic mapping of hierarchical and functional relationships between instruments (for example, the relationship between Presidential Regulation No. 5/2025, Government Regulation No. 24/2021, Government Regulation No. 71/2014, the Environmental Law, the Water Resources Law, and transmigration regulations) to identify inconsistencies, overlapping authorities, and normative gaps within the flood control framework. Furthermore, a comparative law approach was used to compare ecological restoration models, restoration financing instruments (escrow, performance bonds, restoration guarantees), and ecosystem-based flood prevention regulations in several other jurisdictions that have integrated land use, upstream conservation, and hydrometeorological risk management. The results of this comparison serve as the basis for a gap analysis between prevailing norms in Indonesia and international best practices, particularly regarding: (i) the design of administrative sanctions directly linked to restoration obligations; (ii) protection of community tenure rights in flood-prone areas; and (iii) integration of risk maps into the licensing process. This normative-juridical approach is strengthened by institutional process mapping, which involves tracing the flow of authority and decision-making procedures in relevant institutions (KLH, ATR/BPN, PU, BNPB/BPBD, Ministry of Home Affairs, Ministry of Finance, Ministry of Energy and Mineral Resources, Regional Governments) based on regulations and administrative documents. This technique is used to identify vulnerable points of accountability leakage (for example, during map verification, permit issuance, emergency status declaration, or emergency response funding activation), and to assess the extent to which written norms are actually implemented in practice.

Empirical and technical data were used selectively as triangulation material to test the applicability of norms in the field, rather than as the primary focus of the research design. This empirical evidence served as a normative verification tool to determine whether existing regulatory designs align with identified flood risk patterns and whether law enforcement practices are consistent to protect the carrying capacity of upstream areas.

Within a normative-juridical framework, doctrinal and empirical findings were then used to formulate legal drafting recommendations in the form of proposed normative clauses (e.g., strengthening ecological recovery requirements after permit revocation, establishing a binding One-Map risk layer in permits, and securing fiscal space for disaster management). Each proposed clause was tested for implement ability (bureaucratic and budgetary feasibility) and human rights impacts (securing community tenure, replacement cost compensation standards, and complaint mechanisms). Ethical and participatory dimensions were maintained through the application of the principle of informed consent, protecting the confidentiality of informants, and disseminating key findings in a format accessible to local stakeholders. This ensured that the research remained rooted in the normative mandate of the legal system while being sensitive to social realities on the ground.

3. RESEARCH RESULTS AND DISCUSSION

Land Perspective

The land aspect focuses on the distribution and legality of land ownership. In many Sumatran watersheds, upstream land has been converted to oil palm, rubber, or mining plantations through HGU (Cultivation Rights) permits by large corporations. This process often ignores the existence of red zones and river buffer zones due to weak spatial planning implementation. The case of TNTN (National Park) illustrates this, as conflicts over land ownership between villagers and plantation companies have persisted since the 1990s.

Legally, land conflicts arise from overlapping regulations. For example, many forest areas (Forestry Law) are still being appropriated as plantation HGUs, while agricultural certificates (UUPA 1960) occupy river basins. This dual legal ownership weakens control over catchment areas. There are issues of delays in map data verification by the ATR/BPN regarding permit issuance, which in some cases allows for overlap with permits from other sectors. While agricultural and transmigrant land use rights are regulated in the ATR/BPN Ministerial Regulation on land preparation and release (Ministerial Regulation No. 4/2018, for example), their implementation is less stringent. As a result, many community settlements along riverbanks are de facto illegal (residential structures without permits), violating the No Build Zone principle in spatial planning. This is why floods in Sumatra mostly affect slum settlements in watersheds.

From an agrarian law perspective, the Basic Agrarian Law (UUPA) authorizes the state to regulate land use for public purposes. However, its derivative regulations often overlap: for example, Presidential Regulation 5/2025 concerning forest areas presents a conflict with Government Regulation 24/2021 (environment). The Presidential Regulation shifts land control authority from administrative fines to asset recovery (corporate criminal sanctions), contradicting Government Regulation 24/2021, which focuses sanctions on administrative matters. A re-audit of HGU permits on critical land is deemed necessary to prevent disasters. Essentially, the unclear land status in the upstream watershed (watershed) (between agricultural, forestry, and residential uses) and weak enforcement of sanctions have resulted in the massive conversion of catchment areas, triggering extreme runoff.

Public Works Perspective (Water Resources)

Currently, the Ministry of Public Works (PU) manages watershed infrastructure such as dams, canals, and irrigation channels. Technically, flood management has focused on river normalization and embankment construction. However, numerous problems arise from an infrastructure approach lacking comprehensive planning. River Basin Agencies (BWS) in Sumatra frequently report that solely physical solutions (embankments or dams) are insufficient without spatial planning and community participation. For example, in

Southeast Aceh, the BWS Sumatra I emphasized the need for synergy between physical development and infiltration zones within the RTRW (Regional Spatial Plan).[1].

Non-physical infrastructure is also weak. Hydrological data show that watershed capacity has significantly decreased due to sedimentation and the loss of upstream watersheds (Ridwan and Sarjito, 2024). This improvement program should be supported by Government Regulations on irrigation network systems and watershed boundaries (such as PP 121/2008 and Ministerial Regulation No. 27/2015), but in reality, village drainage canals are not integrated into the Public Works master plan. For example, the Water Resources Development Master Plan (RIPSD) does not include all existing small dams in Sumatra, while the Water Resources Law No. 17/2019 mandates regional integration (integrated management), which is not yet optimal. The disconnect between spatial planning policies (ATR) and the Water Resources Master Plan (PU) has resulted in several new dams actually spurring the conversion of new land downstream (e.g., the Kayan Dam in Kalimantan was mis implemented, although a similar example in Sumatra, the Karianho Reservoir, has not yet been fully utilized).

Another problem is maintenance performance. Many dams and irrigation channels are often clogged with sediment or debris due to low budget support. This situation is exacerbated by weak technical oversight (many Public Works Ministerial Regulations on building standards are not followed up). Watershed infrastructure should, in fact, mitigate flow fluctuations, especially during heavy rainfall. However, field surveys in several watersheds indicate high hydrological levels (two daily flood peaks) due to inadequate reservoir management. In short, the Public Works sector focuses on engineering solutions, while non-mechanical approaches (such as forest restoration) are neglected.

Natural disaster management regulations (Law No. 24/2007 in conjunction with Presidential Decree 93/2019) assign a role to the National Disaster Management Agency (BNPB), but coordination with the Public Works Agency (PU) at the regional level is often disrupted. This was evident during the recent floods in Sumatra, where many emergencies normalization plans still resulted in the removal of upstream vegetation. This crisis underscores experts' recommendations for the immediate implementation of integrated, cross-sectoral river flow management.[2]Without it, the development of irrigation infrastructure or canals will be futile in the face of the ever-decreasing rate of land infiltration.

Transmigration Perspective

The transmigration program was once considered a solution to reduce population density and spur development outside Java. However, its implementation in Sumatra often exacerbated environmental problems. In many old transmigration areas, rice paddies were converted into temporary fields by leveling them, eliminating secondary forests. Furthermore, the uncertainty of transmigrant land ownership fueled disputes: non-transparent land allocations led to individuals holding public land certificates. Transmigration also led to overlapping settlements with local indigenous communities, leading to increased agrarian conflicts in upstream areas.

After major floods, the government often utilizes the concept of permanent housing (huntap) in transmigration areas. However, the mismatch between transmigration locations and the need for safe land has become an issue. For example, the Disaster Awareness

[1]River Basin Center (BWS) Sumatra I, "Synergy in Flood Management and Spatial Planning in Southeast Aceh," sda.pu.go.id.

[2]Study of the Impact of Land Cover Changes on Flooding in River Basins, Muhammad Ridwan[1] * , Joko Sarjito ENVIRO: Journal of Tropical Environmental Research (2024) 26 (1): 38–45 30 September 2024

Transmigration initiative outside Java was late in providing safe, flat land for flood victims. Related regulations, such as Transmigration Law No. 2/2023, which regulates Completed Transmigration (legalization of transmigration land and certainty of rights), were only enacted after the disaster. Furthermore, the Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency (BPN) on Transmigration Acceleration (Permen ATR 7/2018), which ideally maps transmigration areas according to watershed patterns, has been weakly implemented.

As a result, many flood victims continue to rebuild their homes in high-risk areas (riverbanks). Although Presidential Decree No. 45/2021 (the National Disaster Management Agency's (BNPP) working group) tasked the BNPB with coordinating the placement of temporary housing units (hinterland), the process has been slow and influenced by local politics. Meanwhile, relocation-based mitigation approaches fail without cross-sector synergy: the old paradigm that linked transmigration solely to agricultural land preparation fails to address hydrological and ecological aspects. Transformational policies, however, recognize that transmigration area planning must take flood hazard maps into account (transmigration that minimizes risk).

Environmental Perspective

Environmental damage is the most important root cause in the context of the Sumatran floods. Deforestation of Sumatra's tropical rainforests has reached tens of percent; for example, in the upper Tesso Nilo River, more than 70% of primary forest has been lost in the past two decades. The loss of tree cover accelerates runoff and increases sediment entering rivers. The expansion of plantations (rubber and oil palm) increases soil compaction and reduces infiltration, triggering a rise in river water levels. The results are in line with the predictions of the watershed ecosystem, namely that changes in land cover result in an increase in flooding events.

Peatland degradation is an additional factor. Peat functions not only as a carbon store but also as a hydrological buffer. The conversion of peat into degraded land and canalization disrupts its spongy function. Peatlands, which should absorb excess rainfall, have now become sources of flooding due to the drastic drop in water levels. Peat scrub populations are unable to absorb water quickly, making coastal peat areas in South Sumatra, Central Kalimantan, and Jambi among the most vulnerable to flooding. Degraded peatlands have experienced permanent hydrological collapse, losing their historical water retention function. This damage has a negative feedback loop, such as dry land triggering peat fires (karhutla) during the dry season, followed by massive flooding during the rainy season.

Sumatra's biodiversity has also declined drastically. Tesso Nilo National Park is an example of a priority zone for flora and fauna conservation, but its natural forest is now limited to small fragments. Deforestation is eroding the habitat of endangered species such as the Asiatic tapir (Tapirus indicus) and many other large mammals. The loss of top predators (tigers, elephants) can indirectly exacerbate flooding, as food chains are disrupted and catchment ecosystems are weakened. National environmental policies already prohibit the conversion of protected forests and peat swamps (Law 32/2009 in conjunction with Law 11/2020, and Government Regulation 71/2014 concerning peat), but implementation often remains on paper. Regulations such as Government Regulation 24/2021 actually permit the release of forest areas only if the government demonstrates a need, but without incentives for post-violation restoration, the long-term impacts remain unaddressed.

Several stakeholders believe that Presidential Regulation No. 5/2025 does not explicitly regulate a binding mechanism for land function restoration after permit revocation. Agrarian policies that encourage land redistribution do not prioritize infiltration areas, resulting in land acquisition for plantations and transmigration often clashing with protected zones.

Similarly, the Job Creation Law permits the conversion of forest functions for public facilities, raising concerns about weakening conservation. In general, there is no legal framework that explicitly regulates flood prevention through integrated land management. While the Ecosystem-Based Disaster Risk Reduction concept has been adopted globally and should be integrated into the Sumatra (Papua) provincial spatial plan (RTRW), its scope is still absent from the National Spatial Plan.

Energy Perspective

Fuel availability and energy supply reliability during disasters: The December 2025 flood experience shows that disruptions to distribution, blocked roads, submerged fuel depots, and broken transmission lines immediately reduce the operational capacity of local generators, refugee pumps, and emergency response facilities, so that technical responses (pumps, hospital generators, clean water distribution) are slowed or stopped; the central government then issues orders for service restoration and distribution of emergency energy logistics. This practice requires existing policy and organizational sanctions: the procedures for determining an Energy Crisis/Energy Emergency (Presidential Decree No. 41/2016 and Ministerial Regulation No. 12/2022) provide a framework for identifying crisis criteria, establishing cross-agency coordination actions, and activating operational reserve allocation flows; while technical-implementation authority (fuel distribution assignments, wholesale/retail arrangements, and allocation transfers) rests with the oil and gas regulatory regime and downstream regulator (BPH Migas/implementing regulations). In operational practice, state operators (PLN) and oil and gas companies are required to have operational preparedness and reserve plans as required by electricity legislation and national energy policy; but the real weak points during disasters are: (1) bureaucratic procedures for disbursing and reallocating stocks; (2) limited regional logistics capacity for moving fuel/oil/generators; and (3) the lack of synchronization between the energy emergency status and the mechanism for accelerating procurement/field assignments.

Policy consequences and brief operational recommendations. Regularly, national energy policy (RUEN Perpres No.22/2017; PP No.79/2014) and transition roadmap (Perpres No.10/2025) set targets for renewable energy supply and mix, but lack binding resilience-by-design requirements for emergency logistics (e.g., regional fuel reserve requirements, fast-track assignment by BPH Migas, and PLN/BAU emergency procurement protocols) so that legal maneuvering space during floods is limited; therefore, operational recommendations that can be immediately adopted are: (1) establishing minimum reserves of special emergency fuel for disasters regulated in Ministerial Regulations/Perpres so that there is no need for a revision process of the Regional Budget for release; (2) activating the fast-track assignment mechanism for fuel distribution by BPH Migas and the assignment of strategic generators (based on Perpres 41/2016 and Permen ESDM 12/2022) for affected areas; (3) requiring operators (PLN and fuel distributors) to certify continuity and mutual plans integrated with BNPB/BPBD plans so that the activation of energy support is aligned with the disaster response status; and (4) including escrow/logistics contingency funding clauses and reporting obligations in regional implementing regulations so that the disbursement of funds and procurement are quickly not trapped in administrative procedures. The implementation of these clauses can be directly based on a combination of Presidential Decree 41/2016, ESDM Ministerial Decree 12/2022, RUEN (Presidential Decree 22/2017), the Oil and Gas/Electricity Law, and the authority of BPH Migas/PLN as a technical legal instrument to strengthen energy logistics readiness in flood-prone areas.

Financial and Funding Perspectives

From a financial perspective, the flood crisis in Sumatra was exacerbated by a combination of (1) limited regional fiscal capacity, with the Unexpected Expenditure (BTT) item in many regional budgets (APBD) accounting for only a small proportion, resulting in a lack of funding for rapid response and initial recovery; and (2) pressure from central government budget efficiency policies (Presidential Instruction No. 1/2025), which led to cuts or delays in several transfers and special allocations (DAK/TKD), resulting in procedurally blocked funding flows for emergency response and recovery. Emergency fund utilization procedures at the central level (BNPB Ready-to-Use Funds) are available as a quick channel for the response phase, but these funds are limited by emergency status criteria, strict accountability channels, and the capacity of BNPB/BPBD to absorb and distribute aid. Consequently, when many regions are affected, rapid availability becomes an operational issue. At the regional level, the BTT disbursement mechanism and APBD reallocation require formal decrees, accountability documents, and often involve APBD revision processes (which require time and local politics). Emergency actions requiring rapid procurement and technical restoration are often "stalled" even though legally sourced funds exist.

Furthermore, the 2025 Presidential Instruction on Efficiency demands significant efficiency targets that effectively force cuts in transfer items (including allocations typically used for mitigation/reconstruction), leading the House of Representatives (DPR) and regional governments to report pressure on the disaster management budget and to request additional central government allocations. Regarding non-governmental aid: raising and receiving domestic donations must comply with regulations (Law No. 9/1961, implementing regulations, and related Ministerial Regulations), which require permits, account transparency, and reporting. Without proper regulation, public-donor funds are at risk of misuse or difficulty integrating into formal recovery programs; while international aid can only be officially received after the government declares it necessary and is then coordinated through the National Disaster Management Agency (BNPB)/Ministry of Foreign Affairs according to international aid acceptance guidelines, thus restricting the speed of foreign aid entry without eliminating state control. The problem is not simply a lack of money, but a rigid allocation structure.**,** bureaucratic disbursement procedures**,** And The pressure of fiscal efficiency in 2025 which is reducing the fiscal maneuvering space of the regions so that practical funding solutions must combine (a) minimal protection of BTT/DAK for emergency response which should not be cut when the Presidential Instruction on efficiency is implemented, (b) an escrow mechanism/restoration guarantee to ensure the recovery budget is tied to ecological output, (c) technical support for accelerated disbursement (SPO/fast-track procurement) in emergency scenarios, and (d) a legal-accountable framework for managing public donations and international aid receipts so that they can be immediately channeled to recovery without sacrificing accountability.

The 2025 budget efficiency is not essentially synonymous with reducing disaster management funding capacity, as efficiency normatively aims to close unproductive spending and shift fiscal space to higher priorities. However, in practice in Sumatra, these efficiency instruments are translated linearly as cuts or delays in allocations, rather than as a refocusing of spending on critical functions such as hydrometeorological mitigation and post-disaster recovery. Thus, the core problem lies not in efficiency as a fiscal policy, but in the absence of a shielding mechanism for strategic disaster items (BTT, physical DAK for mitigation, operational support for BPBD), the lack of minimum earmarking for emergency response functions, and the weak design of procedural flexibility when disaster status escalates. As a result, efficiency policies create an implementation gap: theoretically sufficient allocations remain unable to be mobilized quickly because they are treated the

same as routine items that must be cut, restricted, or delayed. In other words, the funding crisis is not caused by efficiency itself, but rather by the failure to organize the fiscal architecture so that disaster management functions become a priority that is immune from efficiency pressures, while remaining accountable and quickly disbursed when disasters occur.

Legal Perspective

Legally, the described institutional patterns and field practices open up a spectrum of real legal risks for various actors, from business actors, regional and central public officials, to program management institutions, which should be analyzed in a measured manner. At the administrative level, actors issuing or facilitating permits risk facing administrative sanctions and permit revocation if map verification and permit procedures fail to meet requirements (e.g., Government Regulation No. 24/2021; Presidential Regulation No. 5/2025), while permit holders may be subject to administrative fines and environmental restoration obligations if their activities damage watershed or peatland functions (Government Regulation No. 71/2014; Environmental Law). In the civil realm, economic losses and loss of property rights arising from flooding open up the possibility of lawsuits for damages and restitution against business actors or public bodies that fail to comply with the *duty of care in* water resource management (Water Resources Law No. 17/2019; related Civil Law). From a criminal perspective, actions that fulfill the elements of environmental destruction, forest burning, or the removal of evidence/map manipulation can trigger environmental or corporate criminal investigations and prosecutions, including corporate criminal liability if evidence points to company policies that violate the provisions.

For public officials, there is a risk of state administrative and financial liability, including Supreme Audit Agency (BPK) audit findings, disciplinary sanctions, or administrative lawsuits if policies or budget management narrow the fiscal space for emergency response without adequate shielding mechanisms. Furthermore, failure to provide recursive access and protection of the rights of affected communities (tenure, compensation, and proper relocation) increases exposure to human rights claims and collective litigation. Non-transparent emergency procurement practices or rapid assignments without compliance with public procurement regulations also pose a risk of corruption and administrative/criminal sanctions for implementers. At the institutional level, the accumulation of granular violations has the potential to create long-term costly liabilities such as expensive ecological restoration obligations, investment freezes, and licensing uncertainty, which actually reduce the effectiveness of mitigation policies. To minimize this exposure, mitigation analysis and measures must prioritize integrated compliance audits, the consolidation of binding One-Map maps in licensing decisions, recovery guarantee instruments (escrow/performance bonds), and transparent and accountable emergency procurement procedures—steps that will reduce the probability of sanctions while strengthening the legitimacy of public policies.

4. CONCLUSION

Flash floods in Sumatra are a manifestation of structural failures accumulated from weak spatial planning, tenure security, and consistent public policy. From a land perspective, rights uncertainty and overlapping permits, including HGU (Utan Usaha Pertimbangan Guna (HGU), forestry concessions, and mining permits, have reduced the watershed's function as a catchment area and opened up opportunities for uncontrolled upstream land conversion. A public works perspective emphasizes that flood control infrastructure cannot function optimally if upstream spatial planning is damaged, sedimentation is high, and hydrological functions are disrupted. Post-disaster transmigration and relocation policies that are not supported by land security and hazard

maps exacerbate vulnerability, while environmental damage such as deforestation, peat degradation, and the loss of natural buffers accelerate runoff and increase peak discharges downstream. Regulatory disharmony, for example, conflicting Presidential Regulations (Perpres) and Government Regulations (PP), as well as weak oversight of the Environmental Law, the Water Resources Law, and the Peatland PP, indicates that the existing legal framework has not been effectively implemented. Administrative practices and institutional relationship patterns, including the potential for abuse of authority and strategic litigation by interested parties, can hinder the implementation of regional reconstruction policies; further empirical studies are needed to quantify this phenomenon.

In this context, the post-flood disaster permit revocation policy in Sumatra actually has a strong legal basis through a risk-based business licensing framework, environmental administrative sanctions, and sectoral authority in forestry, plantations, mining, and water resources. However, its effectiveness remains limited because implementation in the field is not always supported by rapid, consistent, and geospatial data-based factual verification. Findings that went viral on social media, such as allegations of unauthorized plantation expansion, incomplete mine reclamation, disruption of water management by micro- and medium-sized enterprises, and unsupervised illegal logging practices, illustrate that the source of flood risk actually stems from the accumulation of granular violations that have not been covered by conventional enforcement approaches. Therefore, permit revocation remains a crucial enforcement instrument, but it will only be effective if accompanied by cross-sectoral field audits, consolidation of permit and land cover maps, correction of overlapping permits, and the implementation of tiered sanctions that ensure that perpetrators directly impacting hydrological damage actually face administrative consequences and remedial action.

Within the national institutional framework, responsibility for flood control and post-disaster recovery is distributed in a coordinated manner among several ministries and institutions, whose duties and functions have been clarified in the cabinet restructuring and the latest development planning documents. The Ministry of Environment (KLH) plays a central role in environmental management and ensures scientific environmental impact assessments. The Minister of Forestry has a strategic mandate to maintain primary forest cover, oversee the utilization of production/protected forest areas, and ensure peatland restoration and watershed rehabilitation comply with environmental protection standards, including the issuance of IPPKH (Land Use Permits). The Ministry of Agrarian Affairs and Spatial Planning/BPN (ATR/BPN) plays a role in ensuring tenure certainty and accurate base maps for all spatial planning and land permitting. The Ministry of Public Works, through the River Basin Office, manages river infrastructure, dams, and irrigation networks, which are then integrated with the mandate of the National Disaster Management Agency (BNPB) and the Regional Disaster Management Agency (BPBD) in the regions for emergency response, risk reduction, and critical infrastructure recovery. At the same time, the Ministry of National Development Planning/Bappenas is directing policy integration through planning documents, where the 2025 RKP carries the theme "Accelerating Inclusive and Sustainable Economic Growth" and the 2025–2029 RPJMN places strengthening disaster resilience, environmental management, and poverty reduction as part of the structural transformation agenda; the Ministry of Finance and local governments ensure fiscal support, while the Ministry of Energy and Mineral Resources, together with BPH Migas and PLN, guarantee the reliability of energy supply during the emergency response phase. With this configuration, strengthening synergy across sectors and levels of government is a prerequisite for legal, planning, financing, and technical instruments to be truly integrated within a consistent and sustainable flood control implementation framework.

5. BIBLIOGRAPHY

Balai Wilayah Sungai (BWS) Sumatera I. (n.d.). *Sinergi penanganan banjir dan tata ruang Aceh Tenggara*. Kementerian PUPR. https://sda.pu.go.id

Choy, Y. K., & Onuma, A. (2025). Peatland degradation and hydrological collapse in Southeast Asia. *Land, 14*(2), 125. https://www.mdpi.com/2073-445X/14/2/125

Gaveau, D. L. A., et al. (2019). Deforestation dynamics in the Tesso Nilo forest landscape, Sumatra. https://www.researchgate.net/publication/336000514_Deforestation_dynamics_in_the_Tesso_Nilo_forest_landscape_Sumatra

Hooijer, A., & Page, S. (2012). Subsidence and carbon loss in drained tropical peatlands. *Biogeosciences, 9*,

Instruksi Presiden Nomor 1 Tahun 2025 tentang Efisiensi Belanja dalam Pelaksanaan APBN dan APBD Tahun Anggaran

Kaoem Telapak – Pantau Gambut. (2025). *Melacak jejak pengelolaan gambut: Ancaman, konflik, dan masa depan berkelanjutan*. Februari 2025.

Kementerian Agraria dan Tata Ruang / Badan Pertanahan Nasional, Peraturan Menteri ATR/BPN Nomor 4 Tahun 2018 tentang Persiapan dan Pelepasan Lahan untuk Kepentingan Transmigrasi / Pelepasan Lahan (Permen ATR/BPN No.4/2018)

Kementerian Agraria dan Tata Ruang / Badan Pertanahan Nasional, Peraturan Menteri ATR/BPN Nomor 7 Tahun 2018 tentang Percepatan Pelaksanaan Transmigrasi (Permen ATR/BPN No.7/2018)

Kementerian Pekerjaan Umum dan Perumahan Rakyat ,Peraturan Menteri PUPR Nomor 27/PRT/M/2015 Tahun 2015 tentang Bendungan

Kumparan News. (2025). *Satgas PKH: Ada hampir 5 ribu warga dan mereka punya KTP di Tesso Nilo*. https://kumparan.com/kumparannews/satgas-pkh-ada-hampir-5-ribu-warga-dan-mereka-punya-ktp-di-tesso-nilo-25NcvAzGXfM

Maulana Jakfar, R., & Arief, H. (2024). *Analisis konflik tenurial di Taman Nasional Tesso Nilo oleh Masyarakat Desa Air Hitam* [Skripsi, Institut Pertanian Bogor]. IPB Repository. https://repository.ipb.ac.id/handle/123456789/159431

Merten, J., et al. (2020). Impacts of land-use change on runoff generation in a tropical catchment (Sumatra, Indonesia). *Journal of Hydrology*. https://www.researchgate.net/publication/338381632_Impacts_of_land-use_change_on_runoff_generation_in_a_tropical_catchment_Sumatra_Indonesia

Mongabay Indonesia. (2025, June 30). *Mencermati penyelamatan Tesso Nilo setelah tergerus 85 persen*. https://mongabay.co.id/2025/06/30/mencermati-penyelamatan-tesso-nilo-setelah-tergerus-85

Peraturan Mahkamah Agung (Perma) Nomor 1 Tahun 2021 tentang Perkara Kehutanan. Berita Negara Republik Indonesia Tahun 2021 Nomor 683.

Peraturan Menteri ESDM Nomor 12 Tahun 2022 tentang Pedoman Penanganan Darurat Energi / Pelaksanaan Ketentuan Perpres No.41/2016

Peraturan Pemerintah Republik Indonesia Nomor 121 Tahun 2015 tentang Pengusahaan Sumber Daya Air , Lembaran Negara Republik Indonesia Tahun 2015 Nomor 344; Tambahan Lembaran Negara Nomor 5801.

Peraturan Pemerintah Republik Indonesia Nomor 21 Tahun 2021 tentang Penyelenggaraan Penataan Ruang. Lembaran Negara Republik Indonesia Tahun 2021 Nomor 31; Tambahan Lembaran Negara Republik Indonesia Nomor 6633.

Peraturan Pemerintah Republik Indonesia Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup. Lembaran Negara Republik

Indonesia Tahun 2021 Nomor 32; Tambahan Lembaran Negara Republik Indonesia Nomor 6634.

Peraturan Pemerintah Republik Indonesia Nomor 24 Tahun 2021 tentang Tata Cara Pengenaan Sanksi Administratif dan Tata Cara Penerimaan Negara Bukan Pajak yang Berasal dari Denda Administratif di Bidang Kehutanan, Lembaran Negara Republik Indonesia Tahun 2021 Nomor 34.

Peraturan Pemerintah Republik Indonesia Nomor 28 Tahun 2011 tentang Pengelolaan Kawasan Suaka Alam dan Kawasan Pelestarian Alam (KSA–KPA). Lembaran Negara Republik Indonesia Tahun 2011 Nomor 67; Tambahan Lembaran Negara Republik Indonesia Nomor 5217.

Peraturan Pemerintah Republik Indonesia Nomor 37 Tahun 2012 tentang Pengelolaan Daerah Aliran Sungai. Lembaran Negara Republik Indonesia Tahun 2012 Nomor 62; Tambahan Lembaran Negara Republik Indonesia Nomor 5292.

Peraturan Pemerintah Republik Indonesia Nomor 45 Tahun 2004 tentang Tata Cara Perlindungan Hutan. Lembaran Negara Republik Indonesia Tahun 2004 Nomor 147; Tambahan Lembaran Negara Republik Indonesia Nomor 4453.

Peraturan Pemerintah Republik Indonesia Nomor 57 Tahun 2016 tentang Perubahan atas Peraturan Pemerintah Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut. Lembaran Negara Republik Indonesia Tahun 2016 Nomor 260; Tambahan Lembaran Negara Republik Indonesia Nomor 5957.

Peraturan Pemerintah Republik Indonesia Nomor 60 Tahun 2009 (Perubahan atas PP Nomor 45/2004 tentang Perlindungan Hutan). Lembaran Negara Republik Indonesia Tahun 2009 Nomor 137; Tambahan Lembaran Negara Republik Indonesia Nomor 5056.

Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut , Lembaran Negara Republik Indonesia Tahun 2014 Nomor 209; Tambahan Lembaran Negara Nomor 5580.

Peraturan Pemerintah Republik Indonesia Nomor 79 Tahun 2014 tentang Kebijakan Energi Nasional , Lembaran Negara Republik Indonesia Tahun 2014 Nomor 300; Tambahan Lembaran Negara Nomor 5609.

Peraturan Pemerintah Republik Indonesia Nomor 82 Tahun 2001 tentang Pengelolaan Kualitas Air dan Pengendalian Pencemaran Air , Lembaran Negara Republik Indonesia Tahun 2001 Nomor 153.

Peraturan Presiden Republik Indonesia Nomor 22 Tahun 2017 tentang Rencana Umum Energi Nasional (RUEN) , Lembaran Negara Republik Indonesia Tahun 2017 Nomor 43.

Peraturan Presiden Republik Indonesia Nomor 41 Tahun 2016 tentang Penetapan dan Penanggulangan Krisis Energi dan/atau Darurat Energi ,Lembaran Negara Republik Indonesia Tahun 2016 Nomor 96; Tambahan Lembaran Negara Nomor 4776.

Peraturan Presiden Republik Indonesia Nomor 5 Tahun 2025 tentang Penertiban Kawasan Hutan Lembaran Negara Republik Indonesia Tahun 2025 Nomor 8.

Peraturan Presiden Republik Indonesia Nomor 9 Tahun 2016 tentang Percepatan Pelaksanaan Kebijakan Satu Peta (One-Map Policy) ,Lembaran Negara Republik Indonesia Tahun 2016 Nomor 28.

Peraturan Presiden Republik Indonesia Nomor 93 Tahun 2019 tentang Penguatan dan Pengembangan Sistem Informasi Gempa Bumi dan Peringatan Dini Tsunami, Lembaran Negara Republik Indonesia Tahun 2019

Ridwan, M., & Sarjito, J. (2024). Studi kajian dampak perubahan tutupan lahan terhadap kejadian banjir di daerah aliran sungai. *ENVIRO: Journal of Tropical Environmental Research, 26*(1),

Undang-Undang Republik Indonesia Nomor 11 Tahun 2020 tentang Cipta Kerja — Lembaran Negara Republik Indonesia Tahun 2020 Nomor 245; Tambahan Lembaran Negara Nomor 6573.

Undang-Undang Republik Indonesia Nomor 17 Tahun 2019 tentang Sumber Daya Air , Lembaran Negara Republik Indonesia Tahun 2019 Nomor 190; Tambahan Lembaran Negara Nomor 6405.

Undang-Undang Republik Indonesia Nomor 24 Tahun 2007 tentang Penanggulangan Bencana , Lembaran Negara Republik Indonesia Tahun 2007 Nomor 66.

Undang-Undang Republik Indonesia Nomor 26 Tahun 2007 tentang Penataan Ruang. Lembaran Negara Republik Indonesia Tahun 2007 Nomor 68; Tambahan Lembaran Negara Republik Indonesia Nomor 4725.

Undang-Undang Republik Indonesia Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup ,Lembaran Negara Republik Indonesia Tahun 2009 Nomor 140; Tambahan Lembaran Negara Nomor 5059.

Undang-Undang Republik Indonesia Nomor 41 Tahun 1999 tentang Kehutanan. Lembaran Negara Republik Indonesia Tahun 1999 Nomor 167; Tambahan Lembaran Negara Republik Indonesia Nomor 3888.

Undang-Undang Republik Indonesia Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya. Lembaran Negara Republik Indonesia Tahun 1990 Nomor 49; Tambahan Lembaran Negara Republik Indonesia Nomor 3419.

Undang-Undang Republik Indonesia Nomor 9 Tahun 1961 tentang Pengumpulan Uang atau Barang , Lembaran Negara Republik Indonesia Tahun 1961 Nomor 214; Tambahan Lembaran Negara Nomor 2273.

Walhi Riau. (2025, June 25). *Penertiban TNTN harus menyasar pebisnis besar terlebih dahulu dan perhatikan aspek pemulihan*. https://www.walhiriau.or.id