NUSANTARA
RESILIENCE CAPITAL

A dual-layer financing solution enabling immediate disaster response and rapid economic resiliency

Kellogg-Morgan Stanley Sustainable Investing Challenge

April 2026

Behind Sumatra’s growing economy, public infrastructure is the backbone

Sumatra is the 6th largest island in the world and sits at the geographic center of Southeast Asia’s most important maritime trade route

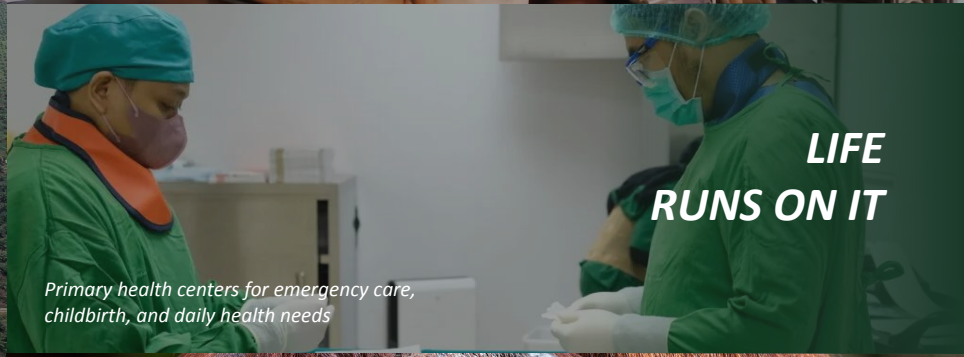
Trans-Sumatra Highway — 2,800km connecting the island's commodity backbone

58M people — schools, public services, and daily life depend on stable infrastructure

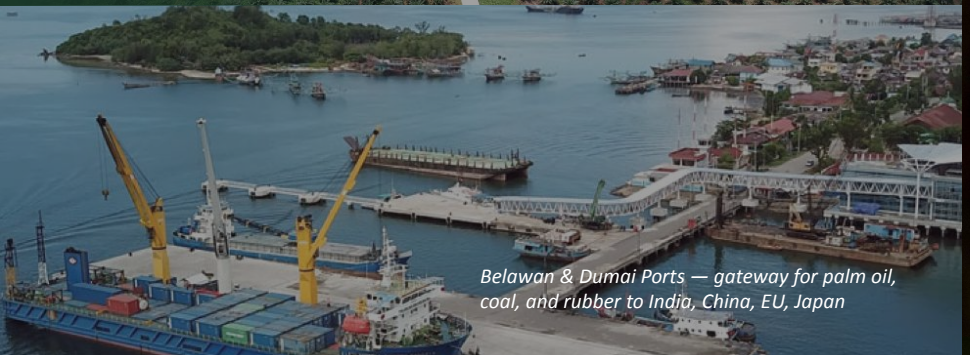
ECONOMY RUNS ON IT

54% of global palm oil supply — grown and exported through Sumatra's roads and ports

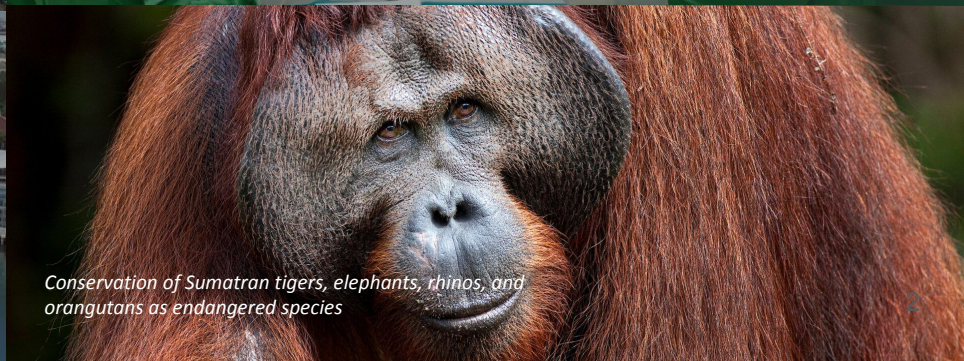
LIFE RUNS ON IT



Primary health centers for emergency care, childbirth, and daily health needs



Belawan & Dumai Ports — gateway for palm oil, coal, and rubber to India, China, EU, Japan

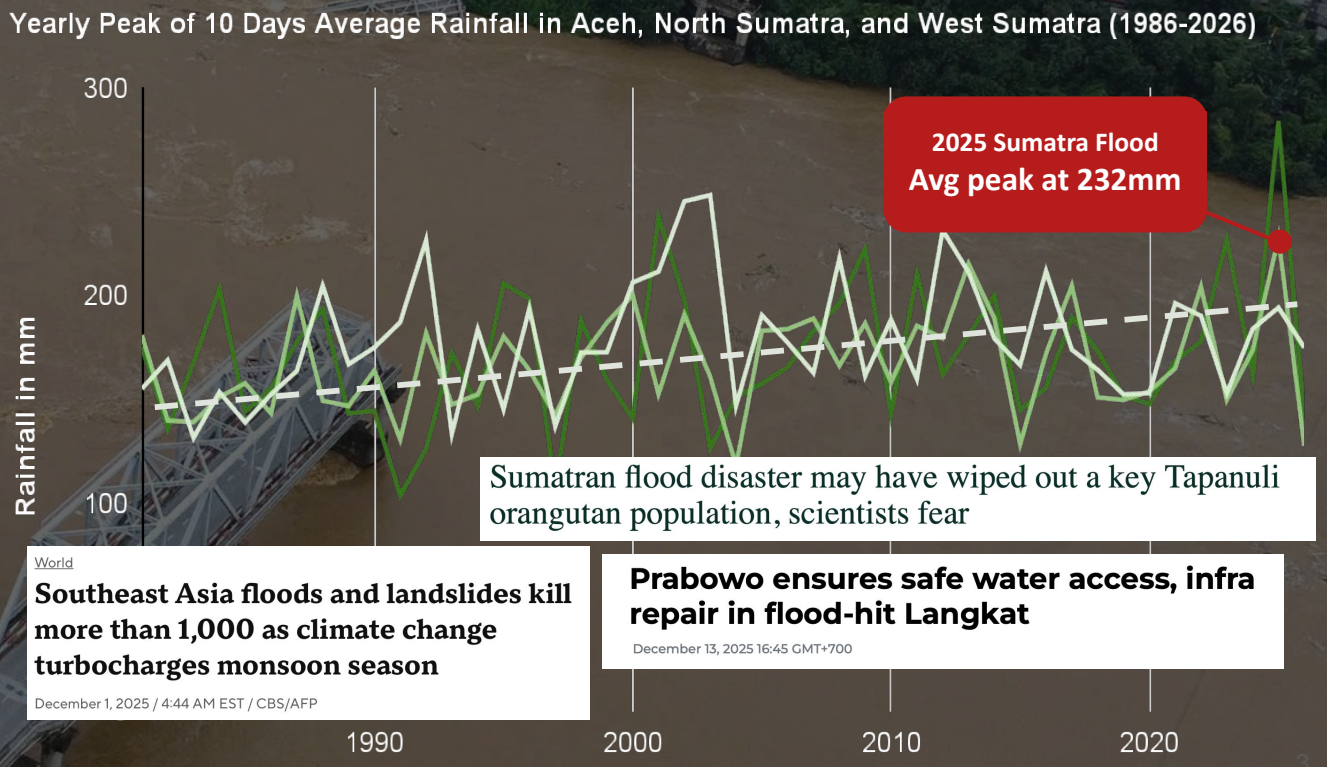


Conservation of Sumatran tigers, elephants, rhinos, and orangutans as endangered species

However, Sumatra also lies within Southeast Asia's most hydrologically volatile and destructive monsoon systems

"Our teams were completely cut off—no signal, roads blocked by debris up to five stories high—and communities struggled to survive as basic infrastructure took time to be restored."

Field researcher, Aceh & West Sumatra
April, 2026



Sumatran flood disaster may have wiped out a key Tapanuli orangutan population, scientists fear

World

Southeast Asia floods and landslides kill more than 1,000 as climate change turbocharges monsoon season

December 1, 2025 / 4:44 AM EST / CBS/AFP

Prabowo ensures safe water access, infra repair in flood-hit Langkat

December 13, 2025 16:45 GMT+700

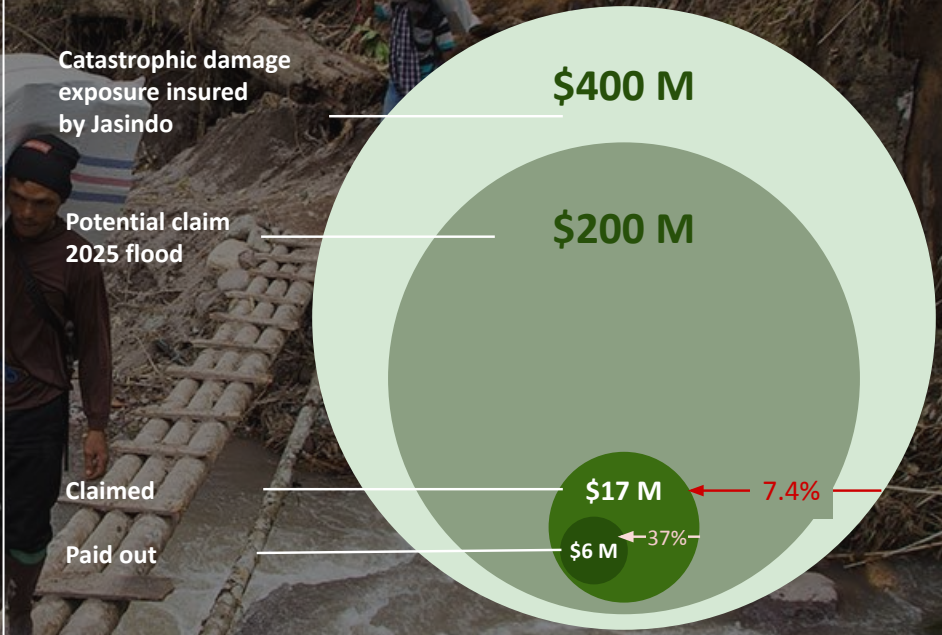
BMKG and CHIRPS Database, 2026

Delayed reconstruction due to the current state-owned insurer

Jasindo, as a state-owned insurer, covers $398M public infrastructure across Sumatra

Cycle of cascade

Liquidation on Jasindo's response of 2025 Sumatra flood



Timing is everything in disaster recovery, one more day Jasindo takes to settle pushes the community into a poverty trap

Cost to the Communities

Month 0.5

Emergency needs unmet

Schools closed, hospitals dark — damaged buildings can't reopen
Roads cut off — no bridge repairs mobilized, supply chains severed from day one

manageable

Month 2

Public services collapse

Children out of school for months – no reconstruction begins
Healthcare access lost

serious

Month 4

Economic severance deepens

Government offices non-functional — coordination capacity collapses without restored facilities
323 public facilities idle

critical

Month 12

Permanent damage sets in

Public services fail, economic activity slows
Poverty trap — 100K+ households fall below $1.25/day

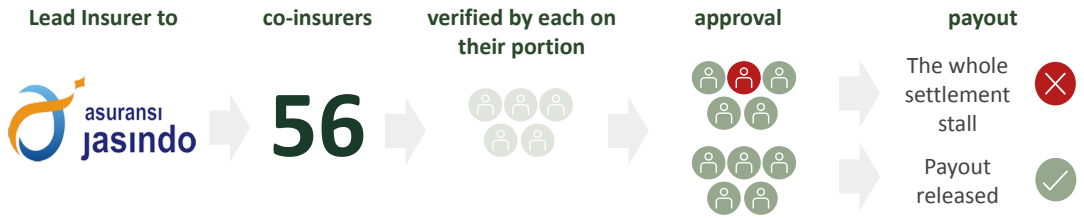
irreversible

Why the problem has not yet been resolved?

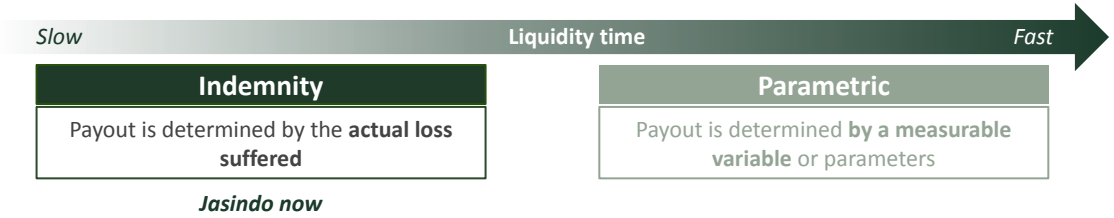
Because Jasindo is a traditional insurer who prioritizes claim verification over speed

How the system works?

Payouts require coordination across 56 co-insurers



Funds are only released after losses are verified



Why they can't just switch?

System Constraint

- Switching = system-wide
- Government redesign
- Built for precision and accountability (indemnity)

On the other hand…..

Emergency relief funding is delayed due to bureaucratic processes, slowing critical response when time matters most

Indonesians raise white flags as anger grows over slow flood aid

People in Indonesia's Aceh province are raising white flags as a call for international solidarity

21 Days

Disaster Response Agency

BNPB

"The state budget cannot bear disaster risks alone — alternative financing mechanisms are necessary"

Sri Mulyani
Indonesia's Minister of Finance 2016-2025
World Bank Managing Director 2010-2016

Why now is the right timing?

Climate risk is intensifying while capital and infrastructure are finally in place to respond

WHY URGENT

Deforestation by extractive industries are intensifying flood risk

Sumatra lost 4.4M ha since 2001 · forest loss tripled in 2024 to 91K ha · palm oil, mining, pulpwood the main drivers

National budget can't be the only backstop

2025 deficit: $41B — widest in 20 years · approaching 3% legal cap · disaster competes with debt, meals, infra

NOW

WHY INDONESIA NOW

Government has built the system and is asking for capital market solutions

PFB launched 2025 · $500M World Bank DRFI loan · Jasindo + NDA all operational · SWF as anchor

WHY POSSIBLE

Parametric proven — Mexico

Mexico FONDEN cat bond since 2006 · Philippines DRFI pilot validated rapid payout · Indonesia is next frontier

Catastrophe bond as portfolio diversification

$25.6B cat bond issuance in 2025 (+45% YoY) · 93% tied to North America · Indonesia structurally underserved

Nusantara Resilience Capital solves two timing failures simultaneously

Our structure uniquely addresses two separate bottlenecks that no existing instrument covers

~12 months → 14 days *(~26x faster)*

LAYER 1

Parametric Reinsurance

DAY 14 After trigger verification

Eliminates: Jasindo indemnity settlement delay **(~12 months)**

Recipient: Jasindo

Covers: Insured public infrastructure such as hospitals, schools, buildings, infrastructure, etc.

&

~21 days → 1 days *(~21x faster)*

LAYER 2

Community Pool

DAY 1 Immediate activation

Eliminates: State budget bureaucracy cycle **(2–3 weeks)**

Recipient: Disaster Response Agency (DRA)

Covers: Immediate relief needs such as **temporary** bridges, roads, telecoms, clean water, medical and evacuation centre

[1] Community pool ring-fenced — unavailable to investors, activated by disaster declaration not rainfall trigger. [2] 14-day window required for cross-validation of BMKG + CHIRPS data by Verisk (AIR Worldwide) before disbursement.

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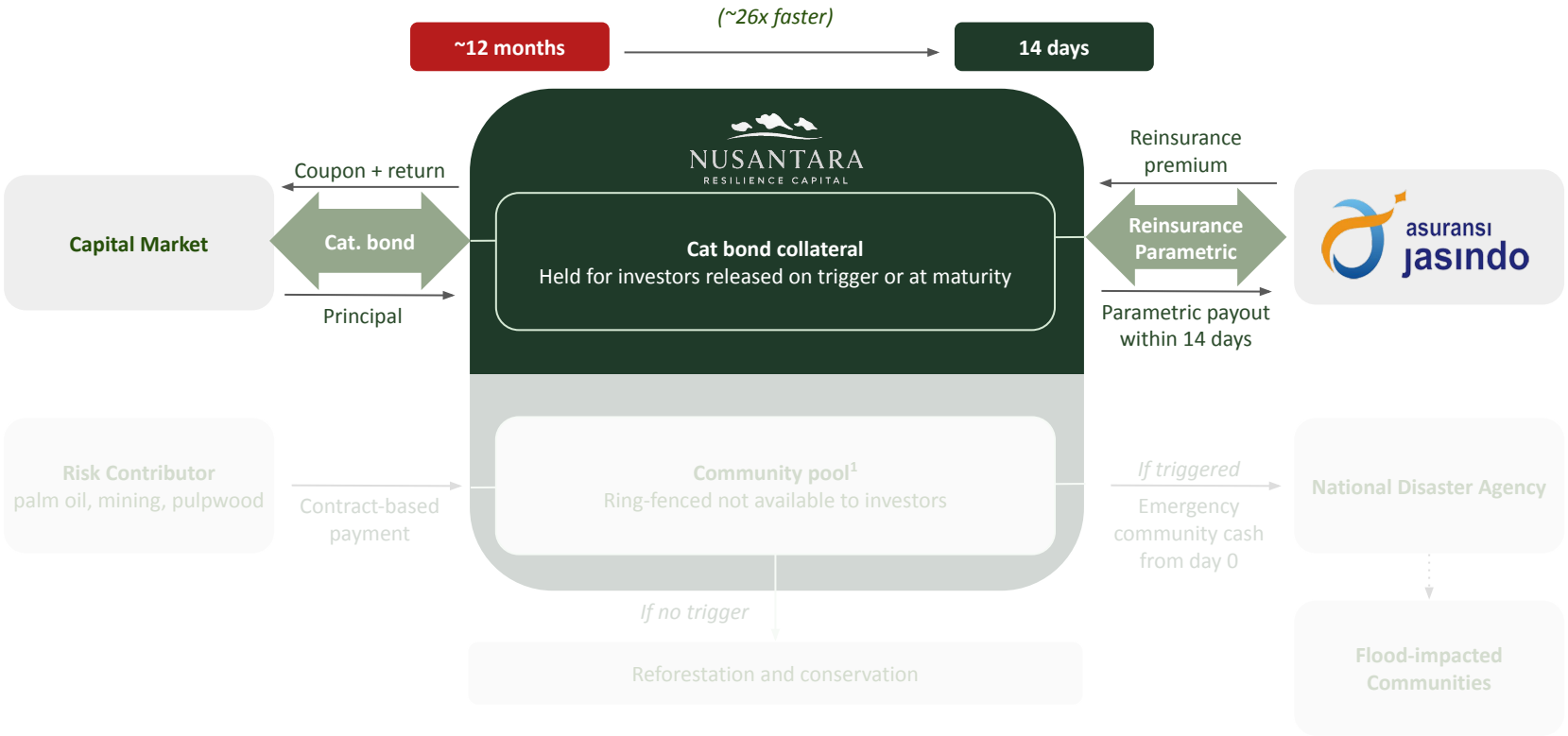
Parametric Reinsurance

We issue a catastrophe bond from capital markets and channel it into parametric reinsurance to enable 14-day payouts



Parametric Reinsurance

We size the fund at $200M, representing 50% of the $400M maximum catastrophic damage exposure, complementing existing indemnity insurance

Fund Sizing Logic

Reference: Jasindo Public Asset Exposure

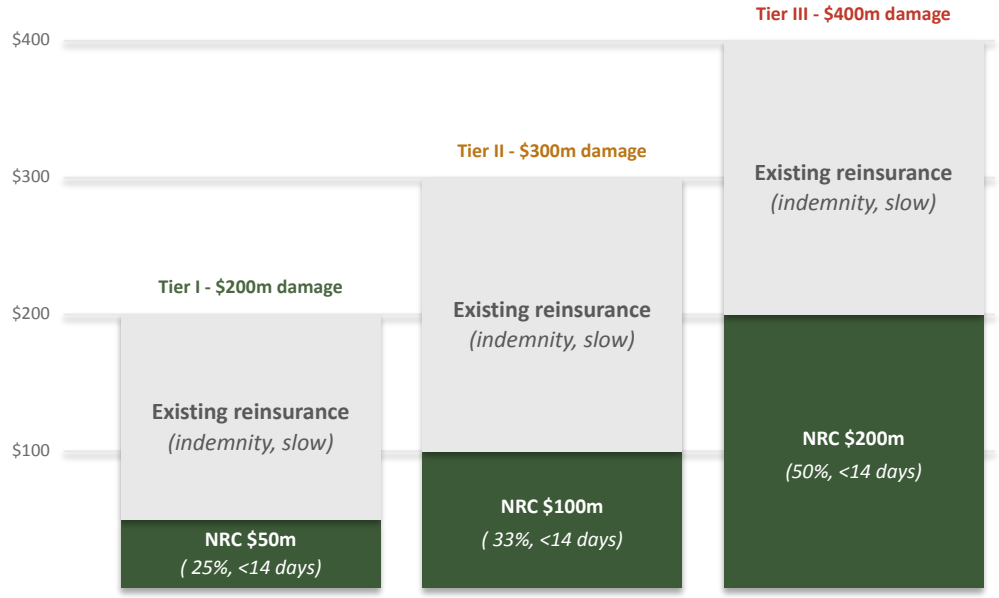
Structured to cover catastrophic tail — Tier III payout of $200m covers 50% of catastrophic damage; existing indemnity handles the remaining 50% over months.

Tier	Rainfall threshold	Write-down	Payout	Est. Damage (upper bound)
I	>200 mm/24h	25%	$ 50m	$200m
II	>250 mm/24h	50%	$ 100m	$300m
III	>300 mm/24h	100%	$ 200m	$400m

Sized for meaningful Tier I impact — At Tier I ($200m damage, like Nov 2025 severity), NRC pays Jasindo $50m in 14 days

Affordability — Annual premium fits within Jasindo budget allocation. A larger bond would exceed premium affordability threshold

Tier-by-Tier Damage vs. NRC Coverage



Damage estimates scale progressively with tier severity ($200m → $300m → $400m), reflecting how catastrophic damage accelerates non-linearly above extreme thresholds due to cascading infrastructure failures. Actual damages-severity curves would be calibrated via Verisk AIR data during actual issuance.

Parametric Reinsurance

NRC unlocks high-yield, uncorrelated returns through catastrophe risk transfer, with downside protection from a 25% MDB first-loss tranche

SENIOR TRANCHE

Investor Notes

US$ 150m

FIRST-LOSS

MDB Tranche

US$ 50m

MDB absorbs losses - Investor Losses ≠ Bond Write-Downs

Tier	Payout	MDB Absorbs	Investor Loss
No Trigger	**$0**	**$0**	**$0**
Tier I (>200mm)	**$50m** (25%)	**$50m** (100%)	**$0**
Tier II (>250mm)	**$100m** (50%)	**$50m** (100%)	**$50m** (33.3%)
Tier III (>300mm)	**$200m** (100%)	**$50m** (100%)	**$150m** (100%)

MDB absorbs $50m in every trigger. Tier I produces zero investor loss.

Fund structure and pricing

Fund Size (Total Bond)	**US$ 200m**
Investor Notes	US$ 150m
Tenor	**3 years**
Reference Rate (SOFR)	3.67%
Risk Spread	7.33%
Gross Coupon	**11.00%**
(-) Expected Loss	(2.0%)
Net Expected Return	**9.00%**
Reinsurance Premium (Jasindo)	8.0% / $16m p.a.
Risk-Return Multiple	**3.67x**
*SPV Management Fees	1%

Investor return and cash flow (no trigger and Tier I in any year)

3-YEAR ROI	ANNUALIZED IRR	NET P&L
+33.0%	**+11%**	**+$49.5m**
Total return	*Per year*	*On $150m invested*

**Investor cash flow, ROI, and IRR are identical in No-Trigger and Tier I scenarios | Upon trigger, principal is written down by the applicable % (standard cat bond mechanic) | MDB coupon paid only in no-trigger years.*

Premium rate steps down as coverage declines post-trigger

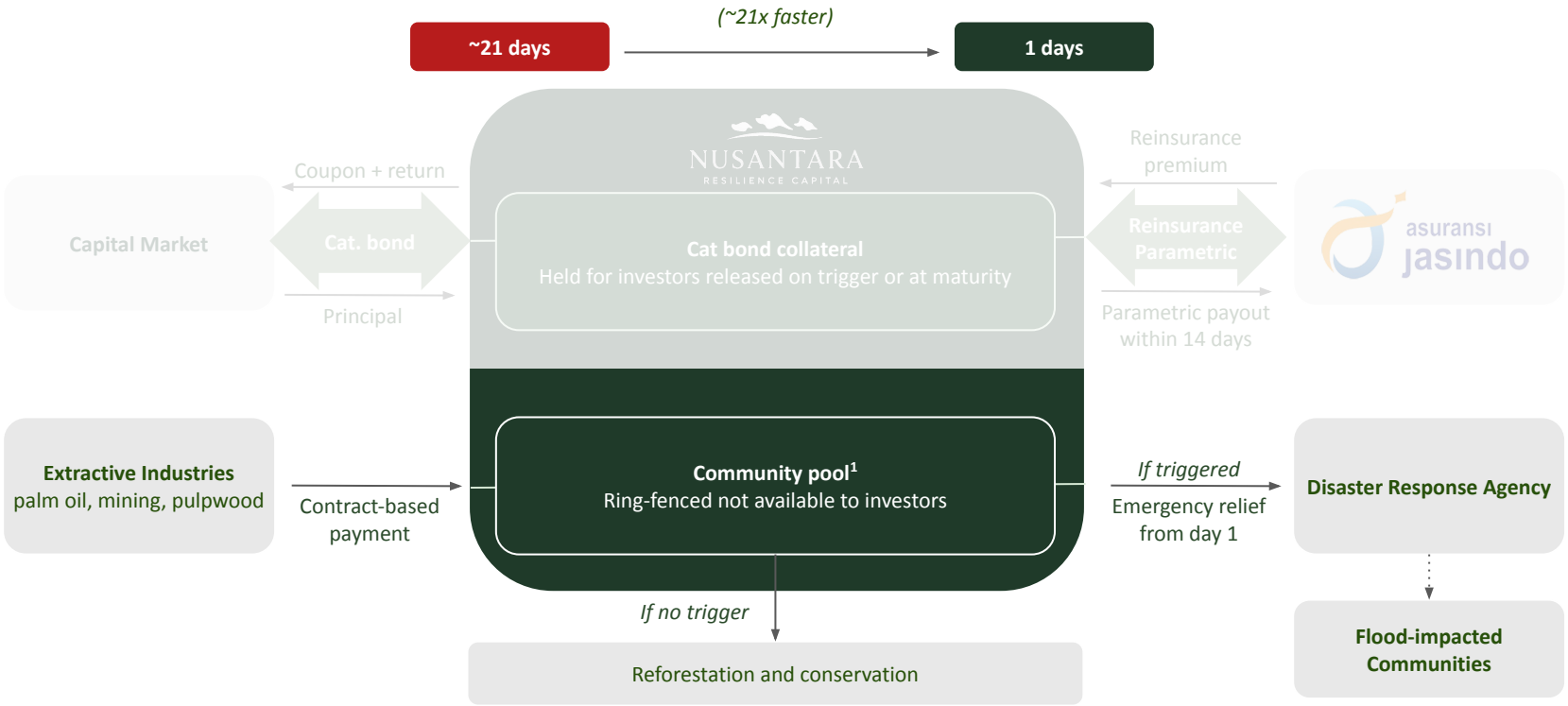
Coverage	$200m	$150m	$100m	$50m
Reinsurance Premium	8%	6%	4%	2%
Trigger State	Full	Post-Tier 1	Post-Tier II	Post-Tier III

***Reins. Premium** = $200m × 8% = **$ 16m/yr,** aligned with Jasindo premium revenue & state budget allocation*
***EL 2.00% -** Probability-weighted annual investor loss after MDB buffer.*
***RR Multiple 3.67x -** Spread per unit of expected loss. Cat bond market typical range: 2–4x.*

MDB 25% ($50m) | ILS Funds 50% ($100m) | Pension 25% ($50m)

Community Pool

Mobilizing contribution from extractive industries to unlock emergency funding for immediate relief needs from Day 1



Implementation Plan

Structured execution with key public, private, and capital market partners

Layer 1

Action Items		Key Stakeholders	Y0	Y1	Y2
1	SPV Incorporation & Registration	MAS			
2	Risk modeling & parametric trigger design	BMKG, Verisk, adpc Asian Disaster Preparedness Center			
3	Pre-agreed reinsurance scheme	asuransi jasindo, BNPB, WORLD BANK GROUP, Swiss Re			
4	Capital market preparation	S&P Global, MOODY'S, Fitch Ratings, pwc			
5	Cat bond issuance	SGX			

Implementation Plan

Structured execution with key public, private, and capital market partners

Layer 2

Action Items	Key Stakeholders	Y0	Y1	Y2
1 SPV Incorporation & Registration	MAS			
2 Contract for offtake conservation projects	WWF; GOOD FOREST INDONESIA; Taman Nasional Tesso Nilo			
3 Contributive scheme pilot	smart agribusiness and food; Toba Pulp Lestari; AGINCOURT RESOURCES; BNPB			

Impact through targeted resiliency measures for community, climate, and biodiversity

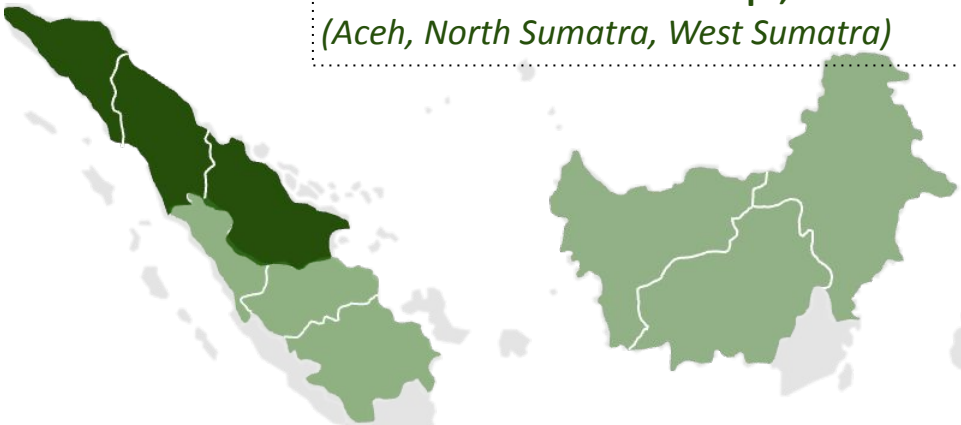
Categories	Impact target	Key Metrics	SDG-alignment
Physical infrastructure	**Bridges and roads**	Average days to restore road connectivity to affected villages	**11.5.2** — Direct economic loss to critical infrastructure and disruption to basic services
	Telecommunication	% of affected population with restored mobile coverage within 14 days	**9.c.1** — Proportion of population covered by a mobile network, by technology
Public facilities	**Medical center**	% of flood-affected medical centers remaining operational during disaster	**3.8.1** — Coverage of essential health services
	Evacuation center	% of designated shelters activated and functional within 48 hrs of trigger	**11.5.1** — No of deaths, missing persons and persons affected by disaster per 100k people
	Government building	Days to resume full government service delivery post-flood event	**16.6.2** — Proportion of population satisfied with their last experience of public services
Utilities	**Electricity access**	% of households with electricity restored within 14 days of trigger payout	**7.1.1** — Proportion of population with access to electricity
	Clean water access	• % of affected households with safe water access restored within 7 days • % reduction in waterborne disease incidence in covered areas year-on-yer	**6.1.1** — Proportion of population using safely managed drinking water services **3.3.3** — Malaria incidence per 1,000 population
Climate & Biodiversity	**Forest conservation**	• Hectares of forest restored or avoided deforestation annually (reforestation rate) • tCO_2e sequestered per year from restored forest area	**15.2.1** — Progress towards sustainable forest management **13.2.2** — Total GHG per year, applied here as a carbon sequestration proxy
	Critically endangered species	Population trend index of supported megafauna species (Sumatran Tiger, Elephant, Rhino, Orangutan)	**15.5.1** — Red List Index: trends in extinction risk of species

Structural risk assessment and mitigation strategy to achieve investment-grade profile

Risk Category	Risk	Mitigation	Impact	Likelihood
Market	Limited investor demand	Tranche diversification, MDB anchor investor, targeted ILS placement	Moderate	Moderate
	Sub-investment-grade rating	MDB subordinated tranche, early rating agency engagement	Moderate	Moderate
	FX mismatch (USD & EUR to IDR)	Currency matching, hedging, reserve buffer	Moderate	High
Political	Political interest in operational-related stakeholders	MDB as an anchor; Capacity building for regulatory reform	High	High
	Political turnover affecting enforcement	Multi-year binding contract	Moderate	High
Operation	Extractive industries willingness to involve	SOEs as first mover	Moderate	High
	Parametric trigger basis risk	BMKG and CHIRPS-validated data, independent calculation agent	High	Moderate
Use-of-Proceed	Issuance delays caused by multi-layered stakeholder coordination	Stakeholder mapping, identification, and engagement strategy	High	Low
	Ineffective conservation offtake project	Pre-agreed contract with concrete monitoring, evaluation , and earning mechanism	Moderate	Moderate

High *Moderate* *Low*

Short to Medium Term expansion plan across Indonesia's flood-prone geographies, enabling broader replicability



Short Term - Proof of Concept, First Issuance
(Aceh, North Sumatra, West Sumatra)

Medium Term - Island-Level Expansion
(Jambi, South Sumatra, Riau)

Medium Term - National-Level Expansion
(East, Central, and West Borneo)

Consolidating locally-rooted experiences in finance, sustainability, and policy

Arliza Nathania

WORLD RESOURCES INSTITUTE

THE WORLD BANK

Indonesia

Hans Sutikno

Columbia Center on Sustainable Investment
A JOINT CENTER OF COLUMBIA LAW SCHOOL AND COLUMBIA CLIMATE SCHOOL

BCA

Indonesia

Haryo Pangestu

Bloomberg

BNP PARIBAS

Singapore

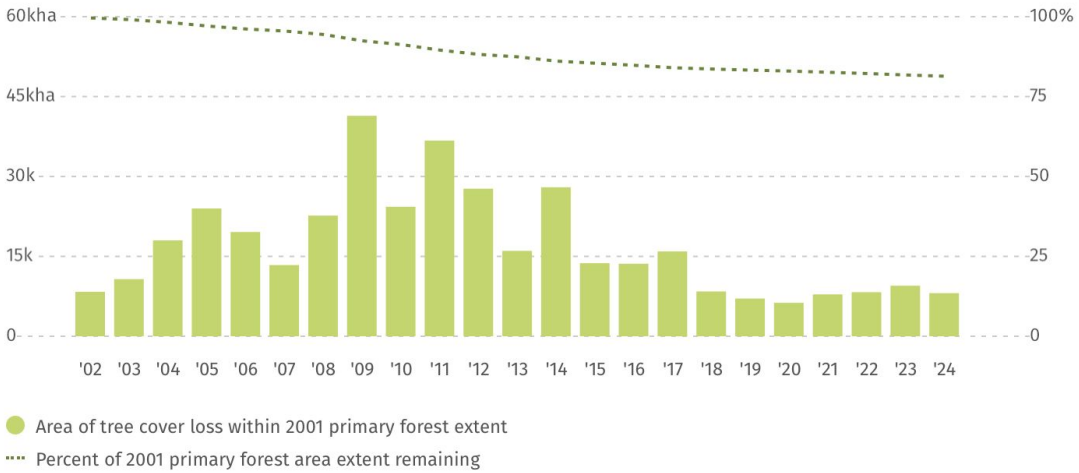
COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK


"rebuilding not just homes, but the futures that were put on hold"
NUSANTARA
RESILIENCE CAPITAL

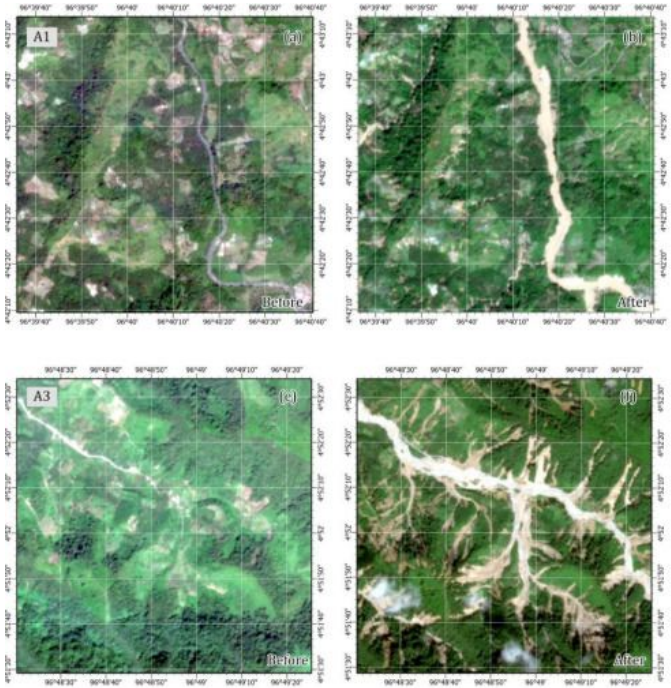
APPENDIX

Deforestation in Sumatra

From **2002** to **2024**, **Sumatera Utara lost 390 kha of humid primary forest**, making up **25%** of its total tree cover loss in the same time period. **Total area of humid primary forest in Sumatera Utara decreased by 19%** in this time period.



https://www.sciencedirect.com/science/article/pii/S2666592126000168



Huiwen Wu et al, “Analysis of the Compound Disaster Caused by Extreme Rainfall and Landslides in Sumatra, Indonesia in 2025 and Its Implications for Disaster Prevention and Mitigation,” Natural Hazards Research, 2026, https://doi.org/10.1016/j.nhres.2026.03.003

Evidences of Cat Bond Worldwide

Year	SPV Name	Region	Amount (USD)	Significance / Importance	Social & Environmental Impact
1992	Hurricane Andrew (catalyst)	USA	$26B losses	Hurricane Andrew caused $26B+ in damages, bankrupting 11 insurers. Catalyzed the creation of the cat bond market as traditional reinsurance proved insufficient.	Exposed systemic gaps in disaster financing that disproportionately hurt low-income coastal communities. Triggered 11 insurer bankruptcies, delaying claims for hundreds of thousands of households.
1997	First formal USAA cat bond (Residential Re)	USA	~$477m	First broadly marketed modern-structure cat bond. Official launch of the cat bond market, giving insurers access to broader capital markets.	Enabled USAA to maintain solvency and honor claims for U.S. military members and families. Reduced risk of insurer failure, protecting household financial recovery.
2006	FONDEN / MultiCat Mexico I	Mexico	~$160m	World's first sovereign government-issued catastrophe bond. Landmark precedent for emerging-market sovereign risk transfer.	Provided Mexican government with fast-disbursing liquidity for disaster recovery of public infrastructure and housing, reducing reliance on budget reallocation that historically cut social spending.
2007	CCRIF (Caribbean Catastrophe Risk Insurance Facility)	Caribbean (16+ countries)	Multi-donor	World's first regional multi-government parametric risk pool. Paid out to Haiti and Barbados within 14 days after Hurricane Matthew (2016).	Paid over $32M to 7 Caribbean governments in early years, all within 2 weeks of triggering events. Recent Jamaica payout of ~$150M after Hurricane Melissa enabled immediate relief and infrastructure repair.
2009	MultiCat Mexico II	Mexico	~$290m	First ever multi-peril sovereign catastrophe bond, covering both earthquake and hurricane risk in a single instrument.	Multi-peril design reduced overall cost of coverage, freeing fiscal resources for social programs.
2014	IBRD Caribbean Cat Bond	Caribbean (16 countries)	~$30m	World Bank's first natural hazard catastrophe bond, for 16 Caribbean nations under the Capital at Risk Notes program.	Expanded fiscal resilience tools to some of the world's smallest and most climate-vulnerable economies.
2017	IBRD Pandemic Bond (PEF)	Global (IDA countries)	$320m	World's first pandemic catastrophe bond. Triggered by COVID-19 in 2020. Later shelved due to complex trigger design that delayed payouts.	Intended to protect world's poorest countries from pandemic shock. In practice, complex trigger thresholds delayed COVID-19 payouts at the height of the 2020 crisis.
2019	Philippines sovereign cat bond	Philippines / SE Asia	$225m	First Asian sovereign-sponsored cat bond. First cat bond listed on an Asian exchange (SGX). Pioneered the World Bank model in Southeast Asia.	Philippines faces $3B+ in expected annual disaster losses. Bond provided flexible rapid-disbursement capital after qualifying events, protecting fiscal space of a government responding to multiple typhoons per year.
2020	FONDEN Mexico V (hybrid sustainable)	Mexico	$485m	Largest and longest-tenor sovereign cat bond at time of issue. First hybrid catastrophe + sustainable development bond.	Breakthrough in linking disaster risk finance to sustainable development: when not triggered, investor funds can be deployed toward World Bank sustainable development projects in Mexico.
2024	Jamaica sovereign cat bond II (Hurricane Melissa)	Caribbean	~$150m	Paid out ~$150M after Hurricane Melissa. High-profile demonstration of cat bond utility for small island states.	The $150M payout funded immediate humanitarian relief, critical infrastructure repair, and future resilience investment in Jamaica

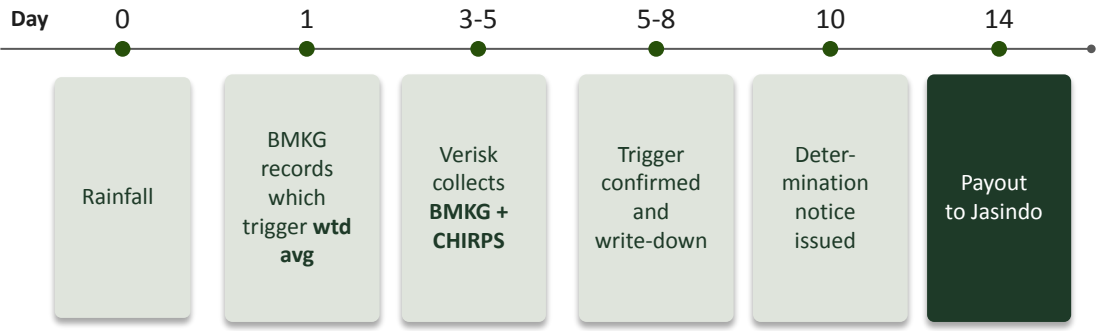
Parametric, Indemnity, and Forecast-based Insurance

	Indemnity-based	Parametric-based	Forecast-based financing
	Traditional insurance / reinsurance	*Rainfall-triggered cat bond — Guardian Leuser SPV*	*Anticipatory action / contingent credit*
Trigger mechanism	**Actual verified losses** — requires post-event damage assessment and claims adjustment by insurer	**Objective physical index**: rainfall threshold (mm/24h or mm/6d) verified by independent calculation agent using BMKG station data	**Probabilistic forecast model** — payout released when disaster likelihood exceeds pre-agreed threshold before event occurs
Payout speed	**6–12 months** after event	**<14 days** after trigger verification	**Days before event** — but only if forecast threshold is met
Transparency & certainty	**Low** — payout depends on insurer loss assessment; high dispute and delay risk	**High** — predefined thresholds, no discretion, publicly verifiable data from BMKG	**Medium** — model-dependent; forecast uncertainty can be contested or missed
Basis risk	**None** — payout matches actual verified loss exactly	**Moderate** — rainfall proxy may not perfectly match economic loss	**High** — forecast may not materialise; funds may be deployed for non-events or withheld for severe unforecast events
Operational complexity	**High** — requires field adjusters, claims documentation, legal review, and insurer solvency	**Low** — automated trigger verification; trustee-controlled escrow release; no claims process	**High** — requires real-time forecast integration, pre-agreed disbursement protocol, and model governance
Capital structure	**Not fully collateralized** — subject to insurer balance sheet and counterparty risk	**Fully collateralized** — principal held in SOFR-linked instruments in SPV; no counterparty risk	**Varies** — contingent credit lines depend on lender capacity; not pre-funded
Investor suitability	**Insurance market only**	**ILS funds, asset managers, pension/impact funds, MDBs**	**Predominantly MDB / bilateral donor funded**
Fitness conclusion	**Poor** — fiscal delay amplifies disaster impact and fatality risk	**Optimal** — speed, certainty, and full collateralization protect sovereign liquidity at the moment of crisis	**Complementary** — best paired with parametric as an early-action preparedness layer

Parametric Trigger Design

Rainfall trigger with multi-station and multi-source validation ensures credibility and timely payouts

How parametric trigger work?



Tier	Rainfall threshold	Write-down	Payout	Est. Damage (upper bound)
I	>200 mm/24h	25%	$ 50m	$200m
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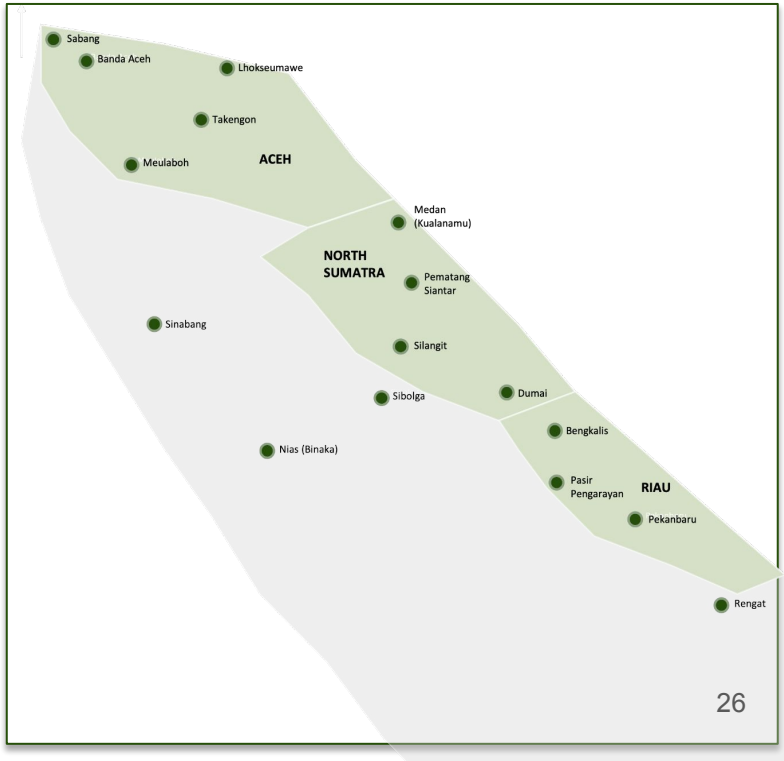
Data: BMKG stations · CHIRPS v2.0 satellite · NASA GPM · Verisk (AIR Worldwide) as calculation agent

BMKG Station Map



Parametric Catastrophe Bond

How does Jasindo benefit from reinsurance?

"We need to be more cautious and find opportunity whether we can improve the current RBC level"

Andy Samuel Panggabean
Director of Jasindo

asuransi jasindo Portfolio

2,000+
Public infra insured

$200M
Catastrophic exposure

⬇ 60-65%
RBC below peers as per 2025

Why reinsurance matters for Jasindo:

- Balance sheet relief & protection
- Risk-based capital (RBC) improvement
- Avoid Financial Service Authority (FSA) regulatory penalty

Peer Assessment of Disaster Risk Financing Instruments

NRC integrates speed, pre-funded liquidity, and infrastructure coverage

Instrument	Payout speed	Pre-funded liquidity	Covers public infrastructure	Capital markets-backed	Incorporate risk externality
Swiss Re–Jasindo ABMN Reinsurance Incumbent indemnity reinsurer — 12 mo	✗	✗	✓	✗	✗
World Bank Philippines DRFI Parametric sovereign precedent — ~29 days	~	✓	~	✗	✗
CCRIF / Jamaica Cat Bond Caribbean parametric sovereign — ~14 days	✓	✓	~	✓	✗
Mexico FONDEN Cat Bond First sovereign cat bond (2006) — ~14 days	✓	✓	~	✓	✗
NRC SPV Our structure — <14 days	✓	✓	✓	✓	✓

Case Study: Sumatra 2025 flood

Back-test: 232mm weighted avg rainfall → Tier I trigger → $40m to Jasindo in 14 days → zero investor loss

Rainfall Measurement & Trigger Determination

DAY 0

Nov 25, 2025

Cyclone Senyar lands. BMKG extreme rainfall event

DAY 1

232 mm

BMKG records which trigger **wtd avg** in Aceh, North Sumatra and Riau

DAY 3-5

Verisk collects **BMKG + CHIRPS**

DAY 5-8

Trigger confirmed and write-down

DAY 10

Determination notice issued

Cash Flow Timeline (Tier I Scenario)

DAY 14

$50m

Parametric payout to Jasindo (from MDB tranche)

YEAR 1

$16.5m

Full coupon to investors ($150m × 11%)

YEAR 2

$16.5m

Full coupon continues — no write-down

YEAR 3 — MATURITY

$166.5m

Final coupon + $150m principal returned

Investor Outcome

33% ROI, full coupon, zero principal loss

Reforestation and Conservation Project

Examples of projects if there's no trigger during the first issuance of the bond

Category	Tropical Forest	Mangrove Coastal Zone	Peatland Forest
Location/ Off-taker	Taman Nasional Tesso Nilo	Taman Nasional Sembilang	Taman Nasional Sebangau
Cause of Degradation	Illegal logging and palm oil expansion leading to degraded land and habitat fragmentation	Mangrove loss due to aquaculture and coastal development, increasing flood and erosion risk	Drainage for agriculture/logging causing fire-prone peatlands and high emissions
Restoration Approach	Native reforestation and wildlife corridor restoration	Mangrove replanting and coastal ecosystem rehabilitation	Rewetting (canal blocking) and peatland reforestation
Cost ($/ha)	~$1,600	~$1,200	~$1,700
Budget Allocation	$3.6M	$3.6M	$3.6M
Area Restored (ha)	~2,250	~3,000	~2,100
Trees Planted	~2.5M	~15M	~1.8–2.1M
Key Impact	Biodiversity recovery, ecosystem stabilization, ~6–8 tCO_2/ha/year	Flood protection, coastal resilience, ~10–15 tCO_2/ha/year	Fire risk reduction, carbon abatement (~20–40 tCO_2/ha/year), habitat protection

Assumption of Tier Payout

$50M is the minimum fast-liquidity amount needed to prevent infrastructure cascade in the first 14 days, validated by two independent approaches

APPROACH 1

Top-down: Actual Nov 2025 claim pace

Projecting real disbursement data to full 12-month settlement cycle

① **$17.2M claimed in 5 months**
Actual figure from Nov 2025 Sumatra flood — public infrastructure owners filed claims with Jasindo

② **Pace: $3.44M/month**
Linear claim pace over 5 months = $3.44M per month of eligible claims entering the system

③ **12-month projection → ~$41M**
Extrapolated to full indemnity settlement cycle: $3.44M × 12 = $41.3M in total filed claims

④ **+ unclaimed buffer → ~$50M**
Documentation lag, bureaucratic delay, and unreported damage add ~20% — bringing total to ~$50M

Result: ~$50M needed to cover full 12-month claim cycle in fast-liquidity form

=

APPROACH 2

Bottom-up: Philippines emergency loss precedent

World Bank methodology: emergency loss = % of direct loss for immediate relief

① **Philippines methodology**
World Bank defines emergency loss = ~25% of direct public asset loss — the minimum needed for immediate government relief response

② **Nov 2025 direct public asset loss: ~$200M**
Jasindo's insured public infrastructure exposure triggered by the Nov 2025 flood event in Phase 1 provinces

③ **25% emergency component → $50M**
$200M × 25% = $50M. This is the portion the government needs immediately — before any indemnity assessment begins

④ **Consistency check ✓**
Philippines pilot used same ratio: ₱1B premium covered $225M bond with ~25% emergency tranche — directly comparable structure

Result: ~$50M = 25% of $200M direct exposure — the standard emergency liquidity ratio

Sources: BNPB / Jasindo Nov 2025 claim data · World Bank Philippines Parametric Catastrophe Risk Insurance Program Pilot Lessons Learned (2023) · AIR Worldwide emergency loss methodology

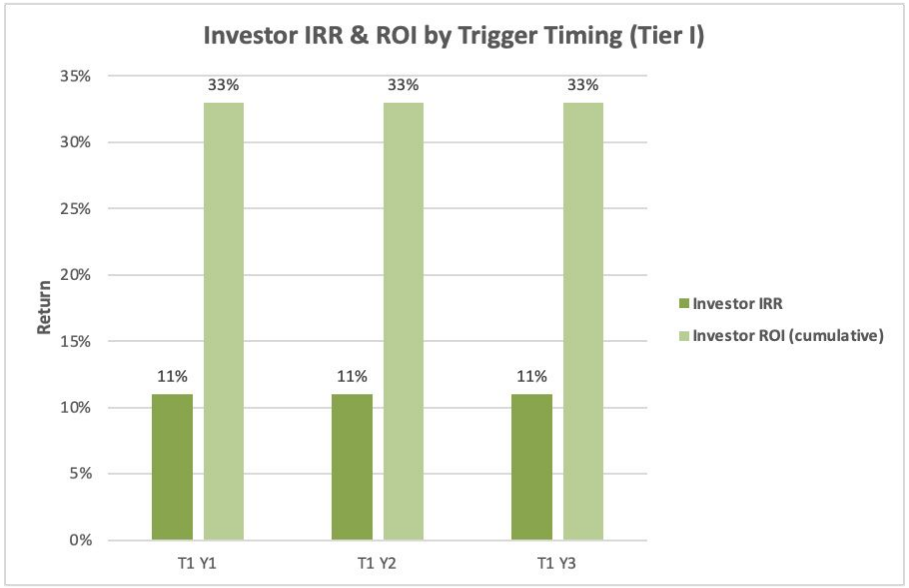
LAYER 1 | LAYER 2

Parametric Catastrophe Bond

Scenario: Tier I — MDB Absorbs Entire Write-Down, Investors Retain Full Principal

Tier I trigger in any year (Y1, Y2, or Y3) produces identical investor outcome to the no-trigger scenario — payout to Jasindo fully absorbed by MDB first-loss tranche.

TRIGGER THRESHOLD	PARAMETRIC PAYOUT	BACK-TEST EXAMPLE	EST. DAMAGE (upper bound)
>200mm / 24hr (1-in-25 yr)	$50 million (14 days)	Sumatra 2025 (232mm)	Up to $200m



Investor's Perspective: Cash Flows & Returns

3-YEAR ROI	ANNUALIZED IRR	NET P&L
+33.0%	+11%	+$49.5m
Total return	*Per year*	*On $150m invested*

Investor Year-by-YearCash Flows

	Year 1	Year 2	Year 3	Total
Cash flow	$16.50m (coupon)	$16.50m (coupon)	$166.50m (coupon+principal)	$199.5m

MDB Tranche Impact: How the First-Loss Buffer Works

Key Insight

MDB absorbs 100% of Tier I write-down. Investors experience **zero principal loss** and continue collecting full coupon.

note: Tier I events have zero investor impact — MDB absorbs entire $50m write-down | ROI & IRR calculated on $150m investor notes | All scenarios assume single-trigger events

Parametric Catastrophe Bond

Scenario: Tier II Severe Event — Partial Investor Loss

Tier II trigger in any year (Y1, Y2, or Y3) delivers $100m payout to Jasindo in 14 days; MDB absorbs $50m first-loss, investors absorb remaining $50m (33% of principal)

TRIGGER THRESHOLD	PARAMETRIC PAYOUT	PROBABILITY	EST. DAMAGE (upper bound)
>250mm / 24hr	$100 million (14 days)	1-in-50 yr	Up to $300m (33% covered)

Tier II - Investor Cash Flow ($m)

Year	Tier II in Year I	Tier II in Year II	Tier II in Year III
Year I - Coupon	**11.0**	**16.5**	**16.5**
Year II - Coupon	**22.0**	**27.5**	**33.0**
Year III - Coupon	**33.0**	**38.5**	**44.0**
Principal	**100**	**100**	**100**
IRR	(4.3%)	(2.9%)	(1.5%)
ROI	(11.3%)	(7.7%)	(-4%)

Tier II - Jasindo's Economics if trigger II happens ($m)

Year	Tier II in Year I	Tier II in Year II	Tier II in Year III
Payout Received	100m	100m	100m
Premium Paid	24m	36m	48m
Net Position	**76**	**64**	**52**

$100m payout delivered in 14 days regardless of trigger year. Premium paid declines after trigger due to coverage-based step-down (8% → 4% on remaining $100m).

MDB Tranche Impact: First-Loss Buffer Partially Exhausted

BEFORE EVENT: Inv $150m | MDB $50m → AFTER: Inv **$100m** | MDB **$0** *(wiped out)*

Investor loses **$50m (33%)** after MDB absorbs $50m

Note: Tier II events split loss 50/50 — MDB absorbs first $50m, investors absorb remaining $50m (33% of principal) | ROI & IRR calculated on $150m investor notes | Earlier trigger, less coupon collected before write-down

Parametric Catastrophe Bond

Scenario: Tier III Catastrophic Event — Full Write-Down Across Capital Stack

Tier III trigger in any year (Y1, Y2, or Y3) delivers $200m payout to Jasindo in 14 days; MDB absorbs $50m first-loss, investors absorb remaining $150m (100% of principal)

TRIGGER THRESHOLD	PARAMETRIC PAYOUT	PROBABILITY	EST. DAMAGE (upper bound)
>300mm / 24hr	$200 million (14 days)	1-in-100 yr	Up to $400m (50% covered)

Tier III - Investor Cash Flow ($m)

Year	Tier III in Year I	Tier III in Year II	Tier III in Year III
Year I - Coupon	**0.0**	**16.5**	**16.5**
Year II - Coupon	**22.0**	**16.5**	**33.0**
Year III - Coupon	**33.0**	**16.5**	**33.0**
Principal	**0.0**	**0.0**	**100**
IRR	(N/A)	(N/A)	(N/A)
ROI	(100%)	(89%)	(78%)

Tier III - Jasindo's Economics if trigger III happens ($m)

Year	Tier III in Year I	Tier III in Year II	Tier III in Year III
Payout Received	200m	200m	200m
Premium Paid	16m	32m	48m
Net Position	**+184**	**+168**	**+152**

$200m payout delivered in 14 days regardless of trigger year. Premium paid declines to zero after trigger due to coverage-based step-down (8% → 0% on $0m remaining coverage — bond fully exhausted).

MDB Tranche Impact: First-Loss Buffer Partially Exhausted

BEFORE EVENT: Inv $150m | MDB $50m → AFTER: Inv **$0** | MDB **$0** *(wiped out)*

Investor loses **$150m (100%)** after MDB absorbs $50m

Note: Tier III events fully write down capital stack — MDB absorbs first $50m, investors absorb remaining $150m (100% of principal) | ROI calculated on $150m, IRR undefined at –100%) | Earlier trigger, less coupon collected before write-down

Scenario I Financials — Key Metrics, SPV, Investor, Jasindo Cashflow

Detailed cash flow breakdown across Tier I trigger timing scenarios (Y1/Y2/Y3) alongside No-Trigger baseline

LAYER 1 | LAYER 2

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Key Metrics by Trigger Timing

Metric	T1 Y1	T1 Y2	T1 Y3	No Trigger
Investor IRR	+11.0%	+11.0%	+11.0%	+11.0%
Investor ROI (cumulative)	+33.0%	+33.0%	+33.0%	+33.0%
Investor Net Cash Flow	$49.50	$49.50	$49.50	$49.50
SPV Operating P&L 3-yr	$0.52	$5.68	$10.85	$9.01

Investor Cash Flow Detail ($m)

Year	T1 Y1	T1 Y2	T1 Y3	No Trigger
Year 0 — Investment	($150.00)	($150.00)	($150.00)	($150.00)
Year 1 — Net Coupon	$16.50	$16.50	$16.50	$16.50
Year 2 — Net Coupon	$16.50	$16.50	$16.50	$16.50
Year 3 — Net Coupon	$16.50	$16.50	$16.50	$16.50
Year 3 — Principal Return	$150.00	$150.00	$150.00	$150.00

SPV 3-Year P&L Detail ($m)

Item	T1 Y1	T1 Y2	T1 Y3	No Trigger
Reinsurance Premium	$34.00	$41.00	$48.00	$48.00
Investment Income	$22.02	$22.02	$22.02	$22.02
Investor Coupon Paid	($49.50)	($49.50)	($49.50)	($49.50)
MDB Coupon Paid	$0	($1.84)	($3.67)	($5.51)
SPV Fees	($6.00)	($6.00)	($6.00)	($6.00)

Jasindo Cash Flow Detail ($m)

Item	T1 Y1	T1 Y2	T1 Y3	No Trigger
Premium Paid Y1	($16.00)	($16.00)	($16.00)	($16.00)
Premium Paid Y2	($9.00)	($16.00)	($16.00)	($16.00)
Premium Paid Y3	($9.00)	($9.00)	($16.00)	($16.00)
Payout Received Y1	$50.00	$0	$0	$0
Payout Received Y2	$0	$50.00	$0	$0
Payout Received Y3	$0	$0	$50.00	$0
Net Jasindo Cash Flow	$16.00	$9.00	$2.00	($48.00)

Scenario II Financials — Key Metrics, SPV, Investor, Jasindo Cashflow

Detailed cash flow breakdown across Tier II trigger timing scenarios (Y1/Y2/Y3) alongside No-Trigger baseline

Key Metrics by Trigger Timing

Metric	T2 Y1	T2 Y2	T2 Y3
Investor IRR	-4.3%	-2.9%	-1.5%
Investor ROI (cumulative)	-11.3%	-7.7%	-4.0%
Investor Net Cash Flow	($17.00)	($11.50)	($6.00)
SPV Operating P&L 3-yr	$7.02	$11.68	$16.35

SPV 3-Year P&L Detail ($m)

Item	T2 Y1	T2 Y2	T2 Y3
Reinsurance Premium	$24.00	$36.00	$48.00
Investment Income	$22.02	$22.02	$22.02
Investor Coupon Paid	($33.00)	($38.50)	($44.00)
MDB Coupon Paid	$0	($1.84)	($3.67)
SPV Fees	($6.00)	($6.00)	($6.00)

Investor Cash Flow Detail ($m)

Year	T2 Y1	T2 Y2	T2 Y3
Year 0 — Investment	($150.00)	($150.00)	($150.00)
Year 1 — Net Coupon	$11.00	$16.50	$16.50
Year 2 — Net Coupon	$11.00	$11.00	$16.50
Year 3 — Net Coupon	$11.00	$11.00	$11.00
Year 3 — Principal Return	$100.00	$100.00	$100.00

Jasindo Cash Flow Detail ($m)

Item	T2 Y1	T2 Y2	T2 Y3
Premium Paid Y1	($16.00)	($16.00)	($16.00)
Premium Paid Y2	($4.00)	($16.00)	($16.00)
Premium Paid Y3	($4.00)	($4.00)	($16.00)
Payout Received Y1	$100.00	$0	$0
Payout Received Y2	$0	$100.00	$0
Payout Received Y3	$0	$0	$100.00
Net Jasindo Cash Flow	$76.00	$64.00	$52.00

Scenario III Financials — Key Metrics, SPV, Investor, Jasindo Cashflow

LAYER 1 | LAYER 2

Detailed cash flow breakdown across Tier III trigger timing scenarios (Y1/Y2/Y3) alongside No-Trigger baseline

Key Metrics by Trigger Timing

Metric	T3 Y1	T3 Y2	T3 Y3
Investor IRR	n/a	n/a	n/a
Investor ROI (cumulative)	-100.0%	-89.0%	-78.0%
Investor Net Cash Flow	($150.00)	($133.50)	($117.00)
SPV Operating P&L 3-yr	$21.34	$24.34	$27.35

SPV 3-Year P&L Detail ($m)

Item	T3 Y1	T3 Y2	T3 Y3
Reinsurance Premium	$16.00	$32.00	$48.00
Investment Income	$7.34	$14.68	$22.02
Investor Coupon Paid	$0	($16.50)	($33.00)
MDB Coupon Paid	$0	($1.84)	($3.67)
SPV Fees	($2.00)	($4.00)	($6.00)

Investor Cash Flow Detail ($m)

Year	T3 Y1	T3 Y2	T3 Y3
Year 0 — Investment	($150.00)	($150.00)	($150.00)
Year 1 — Net Coupon	$0	$16.50	$16.50
Year 2 — Net Coupon	$0	$0	$16.50
Year 3 — Net Coupon	$0	$0	$0
Year 3 — Principal Return	$0	$0	$0

Jasindo Cash Flow Detail ($m)

Item	T3 Y1	T3 Y2	T3 Y3
Premium Paid Y1	($16.00)	($16.00)	($16.00)
Premium Paid Y2	$0	($16.00)	($16.00)
Premium Paid Y3	$0	$0	($16.00)
Payout Received Y1	$200.00	$0	$0
Payout Received Y2	$0	$200.00	$0
Payout Received Y3	$0	$0	$200.00
Net Jasindo Cash Flow	$184.00	$168.00	$152.00

FX Sensitivity — IDR/USD Impact on Jasindo

Exchange Rate Scenarios

Scenario	Base (current)	IDR –15%	IDR –30% (stress)	IDR +10%
IDR per USD	17,000	19,550	22,100	15,300

Annual Premium Cost to Jasindo

Metric	Base	–15%	–30%	+10%
Premium in USD	$16m	$16m	$16m	$16m
Premium in IDR (bn)	272	313	354	245

Payout Value to Jasindo (IDR trillion)

Tier	Base	–15%	–30%	+10%
Tier I ($50m)	0.85	0.98	1.10	0.77
Tier II ($100m)	1.70	1.96	2.21	1.53
Tier III ($200m)	3.40	3.91	4.42	3.06

① Asymmetric Impact

When IDR weakens by 30%, Jasindo's premium cost in IDR rises by **30%** (Rp272bn → Rp354bn). But payout value in IDR rises by the **same 30%** — Tier III goes from Rp3.4T to Rp4.4T. Effective cost-to-payout ratio is unchanged.

② Currency Mismatch = Natural Hedge

USD-denominated bond is counterintuitively **protective**. If IDR weakens during a disaster (common pattern), the USD payout translates into MORE IDR at precisely the moment Jasindo needs reconstruction funding.

③ Flight-to-Quality Timing

Major Indonesian disasters historically coincide with IDR weakness (2004 tsunami, 2018 earthquakes). The bond pays out MORE IDR when reconstruction costs (imports of materials, equipment) are MOST sensitive to FX.

Pricing & IRR Sensitivity Analysis

SOFR Rate Sensitivity

Metric	Low 2.0%	Base 3.67%	High 5.0%
SOFR	2.00%	3.67%	5.00%
Spread	7.33%	7.33%	7.33%
Gross Coupon	9.33%	11.00%	12.33%
Net Exp. Return	3.83%	5.50%	6.83%

Spread Sensitivity

Metric	Tight 8.0%	Base 9.5%	Wide 11.0%
Spread	8.00%	9.50%	11.00%
SOFR	3.67%	3.67%	3.67%
Gross Coupon	11.67%	13.17%	14.67%
Net Exp. Return	6.17%	7.67%	9.17%
Risk-Return Mult.	1.37x	1.70x	2.04x

IRR — Trigger Tier I

Coupon ↓ / Payout →	10%	15%	20%	25%	30%	35%	40%
7%	7.00%	7.00%	7.00%	7.00%	4.41%	1.70%	(1.14%)
8%	8.00%	8.00%	8.00%	8.00%	5.36%	2.60%	(0.29%)
9%	9.00%	9.00%	9.00%	9.00%	6.31%	3.51%	0.57%
10%	10.00%	10.00%	10.00%	10.00%	7.27%	4.41%	1.43%
11%	11.00%	11.00%	11.00%	11.00%	8.22%	5.32%	2.28%
12%	12.00%	12.00%	12.00%	12.00%	9.17%	6.22%	3.14%
13%	13.00%	13.00%	13.00%	13.00%	10.12%	7.12%	3.99%
14%	14.00%	14.00%	14.00%	14.00%	11.07%	8.03%	4.85%
15%	15.00%	15.00%	15.00%	15.00%	12.02%	8.93%	5.70%

Target Investor Base

Blended finance structure leveraging MDB first-loss to unlock institutional and ILS capital

MDB / DFI — First-Loss Tranche | 25% | US$ 50m

Institution	Type	Precedent	Rationale for NRC
World Bank (IBRD)	MDB	Issued Jamaica, Philippines, Mexico cat bonds	AAA-rated issuer platform; GRiF grant can fund first-loss
Asian Development Bank	MDB	OECD-ADB 2024 report on Asia cat bonds	Indonesia = 2nd largest borrower; ASEAN climate mandate
IFC	DFI	Blended finance for climate adaptation	Catalyze $160m private capital with $40m first-loss
KfW / USAID	Bilateral	Funded Jamaica cat bond transaction costs	InsuResilience partner; US/EU strategic interest in SE Asia

ILS Dedicated Funds | 50% | US$ 100m

Fund	AUM	Note
Fermat Capital	~$10bn	Largest dedicated ILS manager
Nephila Capital	$7.6bn	Markel-owned; pioneer in ILS
Twelve Capital	~$6bn	Zurich-based; active in sovereign
Elementum Advisors	~$5bn	Chicago; diversified cat bond
LGT ILS Partners	~$3bn	Swiss institutional channel
Plenum Investments	~$2bn	Multi-strategy ILS platform

Pension / Impact & Asset Managers | 25% | US$ 50m

Institution	Type	Why NRC fits
Danantara Indonesia	SWF	Indonesia-specific mandate
PGGM (Netherlands)	Pension	SDG-aligned; active ILS allocator
Swiss Re Foundation	Impact	Climate resilience mandate
Calvert Impact	Impact	Developing-market insurance gap
PIMCO	Asset Mgr	Alt credit; $2tn+ AUM
Schroders Capital	Asset Mgr	Dedicated ILS strategy
BlackRock	Asset Mgr	Climate adaptation allocation

MDB 25% ($50m) | ILS Funds 50% ($100m) | Pension 25% ($50m)

Note: Target allocation indicative — final placement subject to bookbuilding. Institutions listed are illustrative based on known ILS market participants and sovereign cat bond precedent.

Stakeholder Analysis

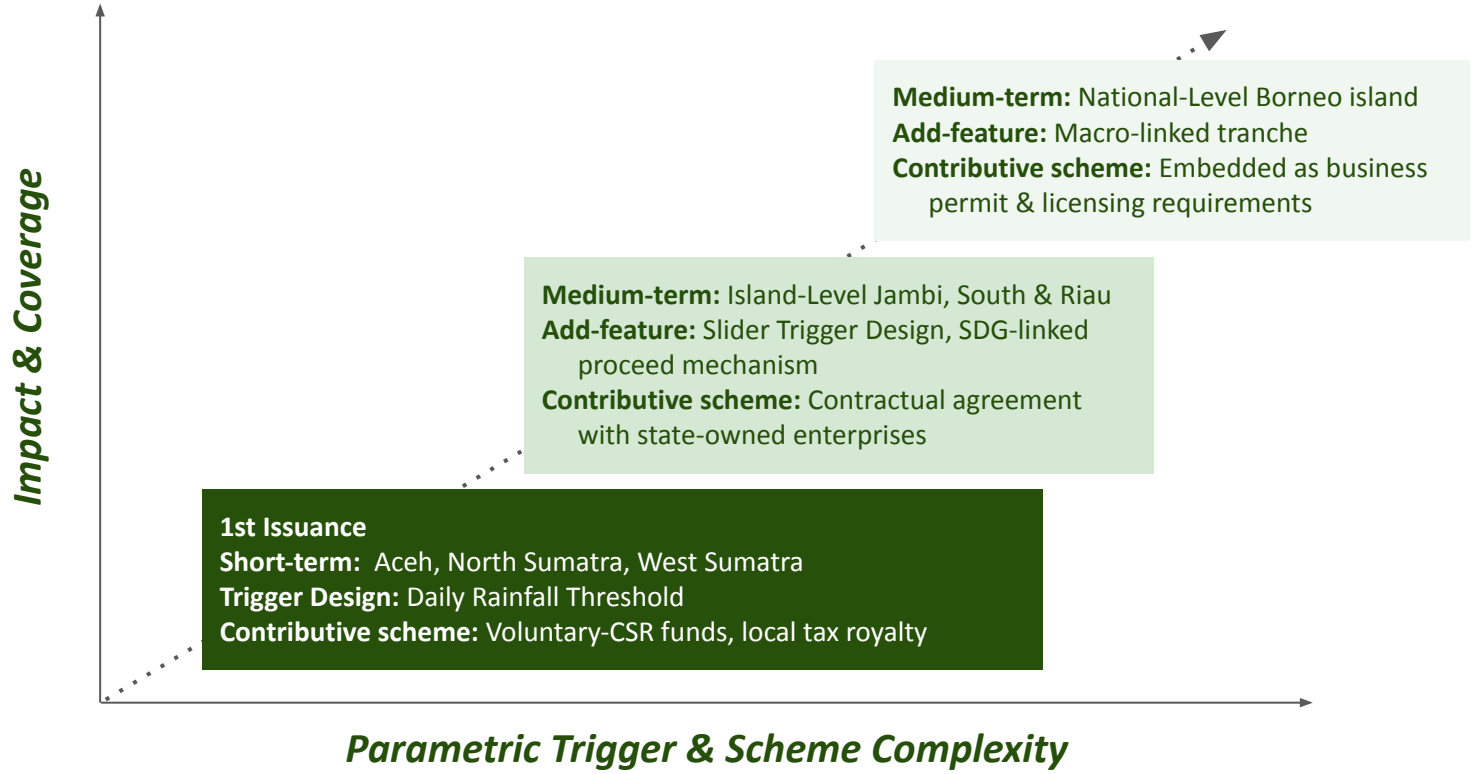
Institution	Type	Engagement Output	Evidences
Monetary Authority of Singapore	Regulatory Body	SPV business permit	Established Singapore's SPRV regulatory regime and ILS Grant Scheme (2018), enabling 25+ cat bond issuances. Subsidized and co-facilitated the first Asian sovereign cat bond (Philippines, $225m, 2019) listed on SGX.
Agency for Meteorology, Climatology, and Geophysics	Weather Data Provider	Methodology alignment on rainfall data and collection mechanism	Operates Indonesia's official rainfall and SPI monitoring network, providing 50+ years of historical precipitation data.
Verisk	Risk Consultant	Trigger design for catastrophic flood disaster and economic loss	Provides natural peril models across 110+ countries, with dedicated flood, storm surge, and rainfall modeling capabilities directly applicable to parametric trigger design.
ADPC	Risk Consultant	Trigger design for catastrophic flood disaster and economic loss	Southeast Asia's leading intergovernmental disaster risk center (est. 1986), with active flood hazard modeling and early warning system
Jasindo	Public Insurance	Pre-agreed reinsurance scheme	Serves as the institutional anchor of Indonesia's sovereign disaster risk financing framework (PFB/DRFI).
National Disaster Agency	Disaster Relief	Pre-agreed disaster relief funds	Central implementing body for Indonesia's 2018 DRFI Strategy and the national Pooling Fund for Disaster (PFB).
World Bank Group	Development Institution	Catalytic capital investment	Issued the first Asian sovereign cat bond for the Philippines ($225m, 2019) and facilitated $4.5bn+ in sovereign disaster risk coverage globally.
Swiss Re	Reinsurance Provider	Pre-agreed reinsurance scheme	World's top cat bond arranger and sponsor since market inception; co-arranged the Philippines sovereign cat bond alongside the World Bank.

Stakeholder Analysis

Institution	Type	Engagement Output	Evidences
S&P Global, Moody's, Fitch Rating	Rating Agency	Bond rating	All three agencies maintain established methodologies for rating ILS/cat bonds based on expected loss probability.
PWC	Public Auditor	SPV financial audit, ESG assurance	Auditors with a dedicated sustainability and ESG assurance practice, and a track record auditing Indonesian state-owned enterprises and financial institutions including Jasindo.
Singapore Exchange	Exchange Platform	Bond listing, prospectus documentation & secondary market access for ILS investors	Hosted the first-ever Asian sovereign cat bond (Philippines, $225m, 2019) — the first cat bond listed on any Asian exchange.
World Wide Fund for Nature	NGO	Offtaker for excess margin reforestation projects	Active in Sumatra since the 1990s with 60-year ecosystem restoration concession license for 100,000 acres of Sumatran lowland rainforest (Thirty Hills / Bukit Tigapuluh)
Good Forest Indonesia	NGO	Offtaker for community-based forest restoration and verified deforestation avoidance projects	Operates in Sumatra's key deforestation corridors, providing on-the-ground project implementation capacity for excess margin deployment.
Sumatran Orangutan Conservation Program	NGO	Offtaker for habitat restoration funding; biodiversity impact reporting for the SPV	Indonesia's primary in-situ conservation program for the critically endangered Sumatran orangutan, operating across Aceh and North Sumatra
SMART Agribusiness	Palm Oil Company	Contract-based resilience payment embedded in municipal land & business permit renewal	One of Indonesia's largest integrated palm oil producers (part of Sinar Mas Group), with significant concession footprint in Riau and Sumatra
Toba Pulp Lestari	Agroforestry Company	Contract-based resilience payment embedded in municipal land & business permit renewal	Formal zero-deforestation sustainability policy (2014 cut-off date) and holds PEFC forest management certification,

Stakeholder Mapping

Expansion Plan Rationale



Impact

NRC aims to deliver sustained public impact across local economy, community, climate & biodiversity

Public Finance Protection & Market Efficiency

$11.6

Mobilized for each $ of public expenditure in responding to flood-related risks

30%

Transferred flood losses from public balance sheets to capital markets

Business Continuity & Regional Economic Stability

0.5%

Regional annual GDP losses mitigated

<14 days

Disaster liquidity disbursement

Community Resilience & Poverty Alleviation

175,050

Flood-affected households stabilized against asset depletion

>100,000

Vulnerable households protected from falling deeper into poverty

Climate & Biodiversity Preservation

±9,000 ha

Avoided or restored deforestation area

1.5m tCO2e

Retained carbon emission per year

±4,000

Critically endangered megafauna supported (Sumatran Tigers, Elephants, Rhinos, and Orangutans)