



NatCat MODEL EXTENSION TO INSURANCE SECTOR IN PAKISTAN

**TECHNICALLY ENHANCING INTEROPERABILITY
AMONG SYSTEMS**

Organized by

**National Disaster Risk Management Fund (NDRMF) In Collaboration
with Space & Upper Atmosphere Research Commission (SUPARCO)**



NatCat Model Extension to Insurance Sector in Pakistan

Technically Enhancing Interoperability Among Systems

Strengthening Pakistan's financial resilience against disasters by linking risk data with smart financing solutions – from risk to resilience!

Pakistan's Insurance Landscape

Pakistan's insurance market is growing but still small compared to other countries. Insurance protection gap is wide and deep in Pakistan because of low awareness, high costs, and limited access to the right tools for understanding risks.

Natural disasters like floods, earthquakes, and droughts are common in Pakistan, and the need for disaster insurance is increasing. **NatCat Models** (Natural Catastrophe Models) provides technical support to insurance companies to better understand the risks, offer fair premiums, and help protect communities and businesses from future losses.

Challenges Faced by Pakistan's Insurance Sector

Pakistan faces rising financial risks from frequent natural disasters, **yet insurance coverage for such risks remains below 1% of GDP**. The major roadblocks?

1. Lack of **reliable, disaggregated catastrophe risk data**.
2. Limited hazard data affects accurate risk pricing.
3. High uncertainty makes **reinsurance costly and inaccessible**.
4. **Absence of advanced risk quantification tools** for insurers.
5. Difficulty in **developing inclusive and affordable disaster insurance products**.
6. Minimal use of technology and modeling in risk underwriting.
7. International reinsurers are reluctant due to **lack of local catastrophe models**.

These barriers not only restrict the growth of local insurers but also deter global reinsurers from entering the Pakistani market. The **NatCat Model** developed by NDRMF in collaboration with SUPARCO offers a solution designed to overcome these challenges.

Transforming Pakistan's Insurance Landscape

The Need for NatCat Integration

Disaster Risk Financing (DRF) Strategy

NDRMF & NatCat Models

NDRMF is supporting Pakistan's shift from reactive disaster response to proactive financial preparedness through its **Disaster Risk Financing (DRF) strategy**. It has developed Pakistan's first-ever DRF Strategy, integrating risk financing with the national financial management framework to address the critical need for financial preparedness against natural disasters.

National DRF strategy emphasizes to accelerate extension of Natural Catastrophe (NatCat) Model to Pakistan's insurance sector. NDRMF aims to expose the NatCat data capabilities for the insurance sector and further possibilities of linking the NatCat Model to Insurance systems by enhancing interoperability between these systems. By integrating **NatCat Models**, this strategy helps quantify potential losses from floods, earthquakes, droughts, and other hazards, enabling smart financial planning and faster recovery.

Key Components:

Risk Assessment & Modeling

Risk Layering

Data-Driven Decision Support

Market Engagement

The NatCat Model

The NatCat Model is an advanced risk assessment tool that utilizes probabilistic modeling to predict the potential impacts of natural disasters. It combines extensive data on natural hazards, exposed assets, structural vulnerabilities, and historical loss records to generate precise loss estimates. The model can provide valuable information on the frequency, severity, and volatility of disaster losses over time. By evaluating exposure and vulnerability at the sub-district level, the model helps predict where future events are likely to occur and their potential intensity, quantifies risks and their financial impacts. This predictive capability is crucial for strategic planning developing targeted DRR and ensuring efficient deployment of resources before, during, and after disaster events.

Developed by NDRMF and SUPARCO, the NatCat Model is Pakistan's first advanced catastrophe modeling system – designed to quantify and predict losses from:

- ✔ **Hydro-meteorological Hazards:**
(Riverine Floods, Urban Floods, Flash Floods, droughts, tropical cyclones, Heat Waves)
- ✔ **Geophysical Hazards:**
Earthquakes, Landslides, Tsunamis

- Provides precise risk quantification and loss estimation
- Supports evidence-based decision-making for DRF

NatCat Model Extension to Insurance Sector in Pakistan

Redefining Risk — Empowering Resilience

Ministry of Finance's Office Memorandum dated Wednesday, March 19th, 2025, highlighted the extension of the NatCat Model to the insurance sector. Moreover, the Asian Development Bank's Climate and Disaster Resilience Enhancement Program (CDREP) actions under RA – 3 require operationalizing of risk-layered Disaster Risk Financing (DRF) framework.

NDRMF integrating NatCat Model with Pakistan's insurance sector with a strong focus on interoperability to enable smart, data-driven disaster risk financing. From real-time risk analytics to interoperable platforms, this step empowers insurers to offer better coverage, faster claims, and climate-resilient products.

By integrating the NatCat Model, insurers can:

- Access accurate, location-specific risk assessments.
- Calculate Average Annual Loss (AAL), Net Loss, and Gross Loss to shape underwriting and product design.
- Generate Exceedance Probability (EP) curves to predict financial losses.
- Apply Tail Value at Risk (TVaR) for extreme event preparedness.
- Access risk insights by event type, asset class, and location – enabling precise, data-driven decisions.
- Make informed decisions on reinsurance and risk retention.
- Design innovative insurance products tailored for Pakistan's risk landscape.

Accurate, disaggregated risk data, the model helps insurers:

- Data-driven risk profiles for fair premium pricing.
- Develop new catastrophe-related insurance products
- Optimize reinsurance coverage
- Strengthen fiscal risk management and disaster preparedness
- Meet global reinsurance standards and attract international partners.
- Post-disaster loss estimates streamline claims and payouts
- Improves market credibility for attracting reinsurers.

National Leap Toward Resilience

For Pakistan:

- Strengthen disaster preparedness and financial resilience at the national and local level
- Align with international DRF best practices
- Protect communities and businesses from financial loss
- Open doors for affordable and accessible disaster insurance for vulnerable communities.
- Help meet international reinsurance standards and improve global market integration.

About NDRMF

National Disaster Risk Management Fund (NDRMF), a government owned, non-profit company incorporated with Securities & Exchange Commission of Pakistan (SECP), under Section 42 of the companies Act 2017, is working for reducing the socio-economic and fiscal vulnerability of the country and its population to natural hazards by prioritizing and financing investments in disaster risk reduction and preparedness that have high economic benefits, through climate change adaptability, as well as disaster resilient communities and infrastructure. The Fund is an apex financing institution for Disaster Risk Reduction (DRR) and Disaster Risk Financing (DRF), and functions in line with existing policies and plans of Government of Pakistan in DRR and Preparedness.

Let's Build a Resilient Future, Together

**Transform Pakistan's
insurance landscape**

**Bridge gaps between
technology, risk financing,
and resilience**

**Turn data into action
for safer communities**



National Disaster Risk Management Fund (NDRMF)

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