

Climate risks in insurance: risk mapping, pooling, and national schemes in several EU countries

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With you today !



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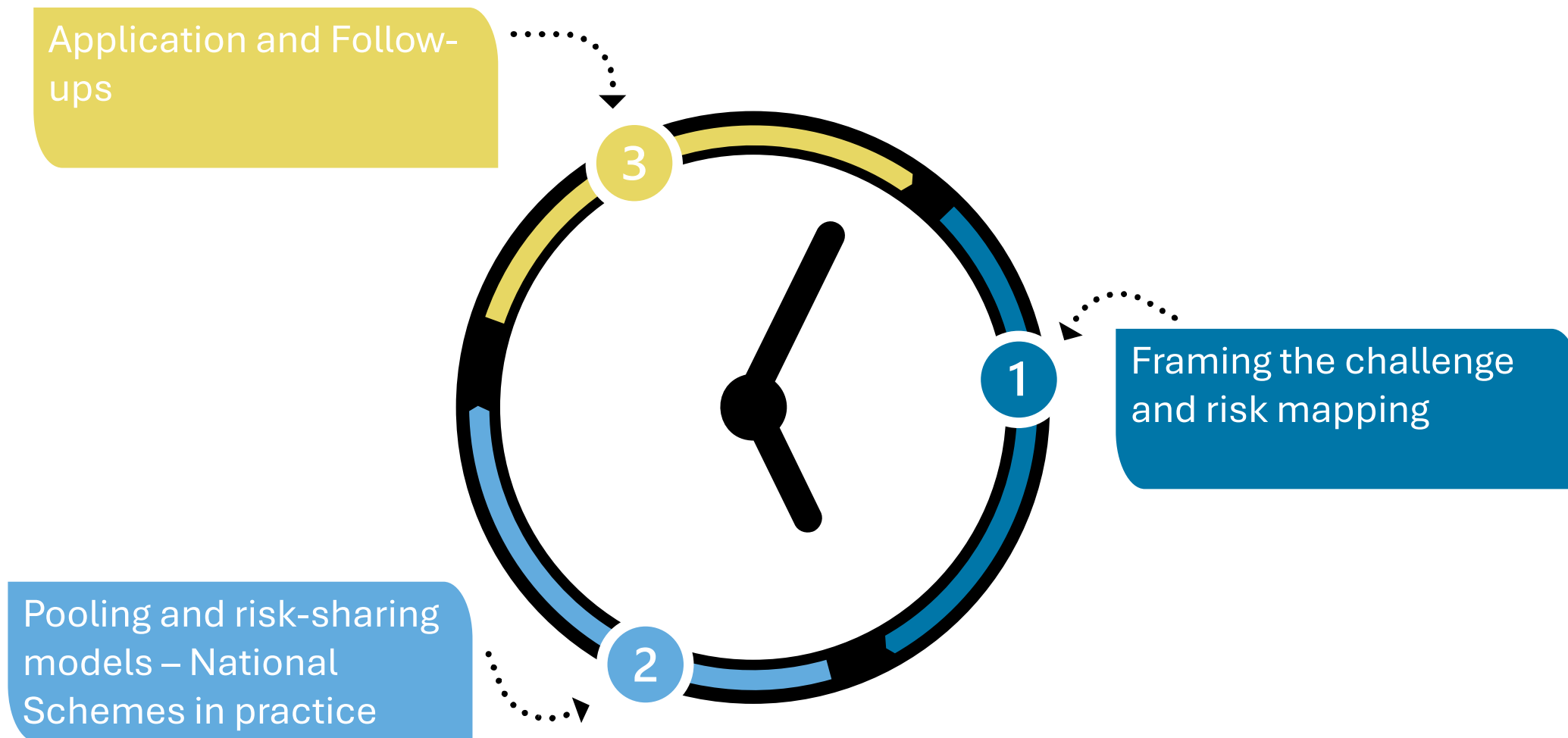
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Why are we here ?





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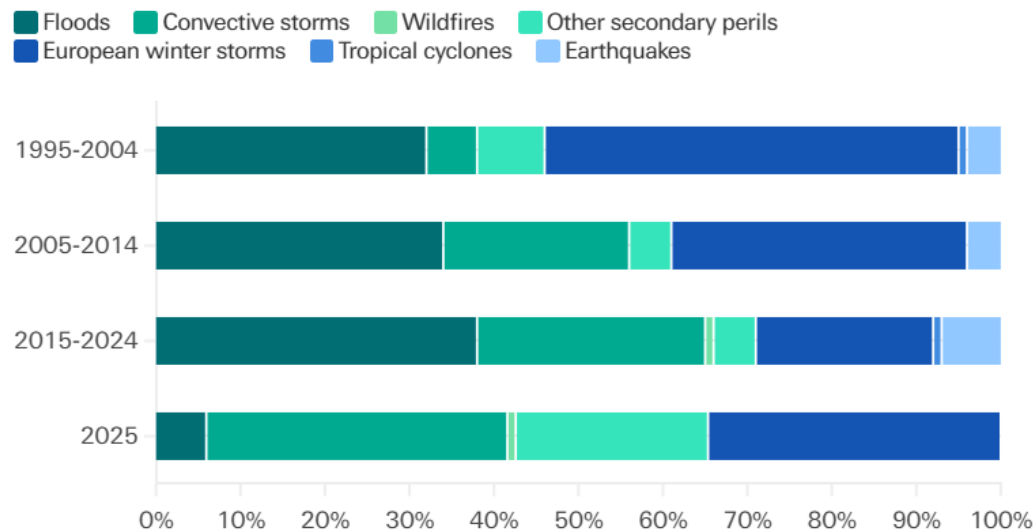
Framing the challenge

Europe economic losses in 2025

\$9.9bn total
\$6.9bn nat cat
\$2.9bn man-made

Europe insured losses in 2025

\$6.5bn total insured
\$4.0bn nat cat
\$2.4bn man-made



Source: Swiss Re Institute

Note: Green = Secondary perils, Blue = Primary perils

36 events >2 514 victims

The natcat Europe protection gap



Source : Swiss Re



Climate risks data sources

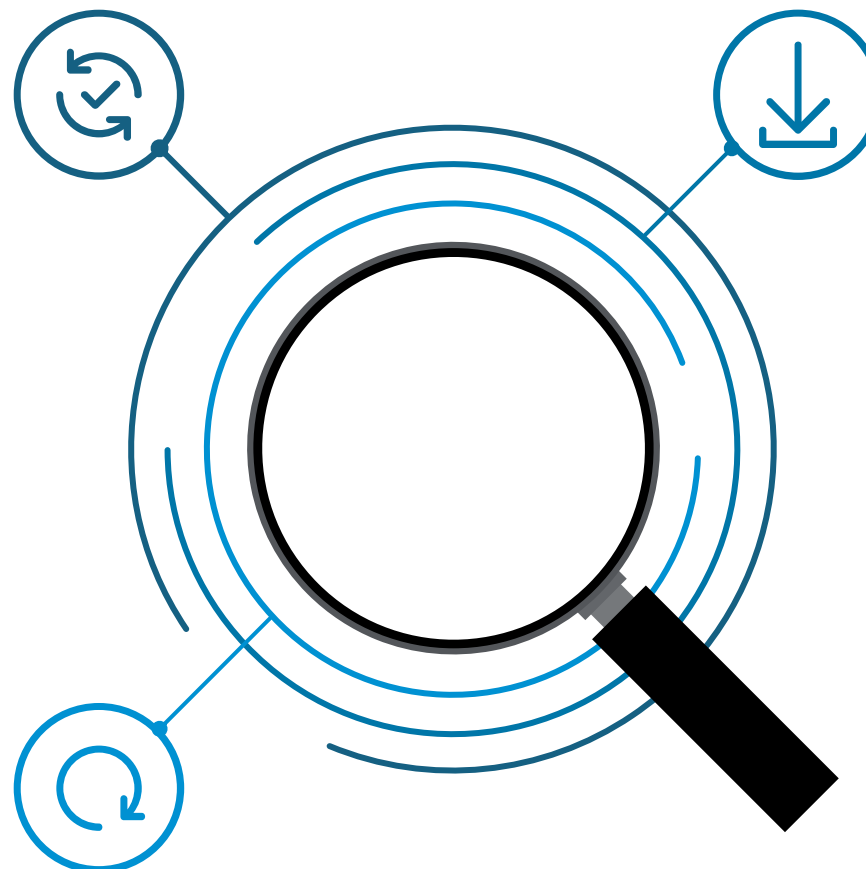
(Re)Insurer internal data

- Internal exposure and loss records with key details on location and attributes
- Often require additional data on the construction details

Proprietary cat data

- Hazard/extreme event or exposure datasets from reinsurers, brokers and vendor models
- Vulnerability / damage curves
- Catastrophic loss and Event Database

Advantage : detailed hazard footprints and vulnerability functions



Open-Source climate data

- Copernicus/EU data
- Historic weather observations (ERA 5)
- Forward looking NGFS or IPCC climate scenarios from GCM (e.g. CMIP5/6) and RCM (EURO-CORDEX RCMs)
- Exposure data (Corine Land Cover)
- Open-source vulnerability / damage curves (JRC)

Climate risks data categories

	Public Sources	Commercial / Proprietary sources
 Observation and reanalysis		No proprietary equivalent
 Climate Model Projections and scenarios		Projections available in most vendor models
 Hazard Footprint Data		Vendor model catalogs
 Exposure and Loss data		Industry property databases (property locations/attributes) and modelled losses from vendors
 Vulnerability Functions		Cat model functions refined using claims; in-house insurer claims analysis for bespoke curves

Pooling and risk sharing models



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Lloyd's solution

Full natural-hazard coverage requires more than the private sector alone



Public backstop or guarantee

Ex : France & Spain



Public risk-sharing frameworks

National disaster fund payment scheme

Ex : France

Supra-national disaster fund payment

Ex : EU project



Collaborative reinsurance solutions

Reinsurance partnership

Ex : The UK

Supra-national private reinsurance public-backed scheme

Ex : The UK

Presentation of potential pooling structures



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Upper Layer 2

Additional capacity through EU wide catastrophe bonds

Upper Layer 1

Private Reinsurance (low-frequency, high-severity) for extreme tail events

Middle layer

EU parametric PPP pool

Bottom Layer

National retention & traditional indemnity insurance (high-frequency, low-severity)

Presentation of potential pooling structures **AAE** | ACTUARIAL ASSOCIATION OF EUROPE

EU-level PPP with blended public-private capital to pool risks, cover extreme events, and stabilize volatility;
governance model still to be defined

EU parametric PPP pool (similar to CCRIF in the Caribbean)

- 1 Premiums aligned to each country's exposure, pooled and globally reinsured
- 2 Parametric, weather-based triggers for fast, transparent payouts
- 3 Basic risk reduced via EU-level calibration and layered trigger design

- 1 Adds multi-year investor capital for peak catastrophe risk
- 2 Enhances diversification and smooths reinsurance cycles
- 3 Higher basis risk exposure – requires robust, multi-metric calibration

EU wide Cat Bonds (similar to UK Terrorism Cat Bond)

Application and follow-ups

Layered architecture (€M)	Payers
EU Public backstop ILL XS 500	State/EU
ILS/Cat bond 150 XS 350	Capital market investors
Parametric insurance 150 XS 200	Parametric trigger payout
Private capital 200	Insurers + pool

Before public backstop

- **Total private capacity (Layers 1-3): 500M€**
- **Diversification benefit from pooling private + parametric + ILS: 85M€ (17% impact)**
- **EU public backstop on top**



In practice, the key issue is how layers 1-3 are structured and priced.

Premiums (€M)		100		90		95
Losses (€M)		250		200		150

Risk-based pricing without solidarity elements

- **Premium = base premium x (1 + loss ratio)**
- **France : $100 \times (1 + 250/100) = 350$**
- **Spain : $90 \times (1 + 200/90) = 290$**
- **Germany : $95 \times (1 + 150/95) = 245$**



High-risk countries see large premium spikes

Risk-based pricing with 85% solidarity elements

- **Premium = (1 – solidarity) x risk based + solidarity x base**
- **France : $0.15 \times 350 + 0.85 \times 100 = 137.5$**
- **Spain : $0.15 \times 290 + 0.85 \times 90 = 120$**
- **Germany : $0.15 \times 245 + 0.85 \times 95 = 117.5$**



Premiums are much more stable and affordable, but cross-subsidized

Thank you for your attention!

