



Seminario sobre Modelos de Gestión Financiera del Riesgo de  
Desastres para las Entidades Federativas en México  
Mexico, D.F. 1 de diciembre de 2011

# Catastrophe Risk Insurance Pools: Opportunities and Challenges for the Mexican States

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**GFDRR**  
Global Facility for Disaster Reduction and Recovery



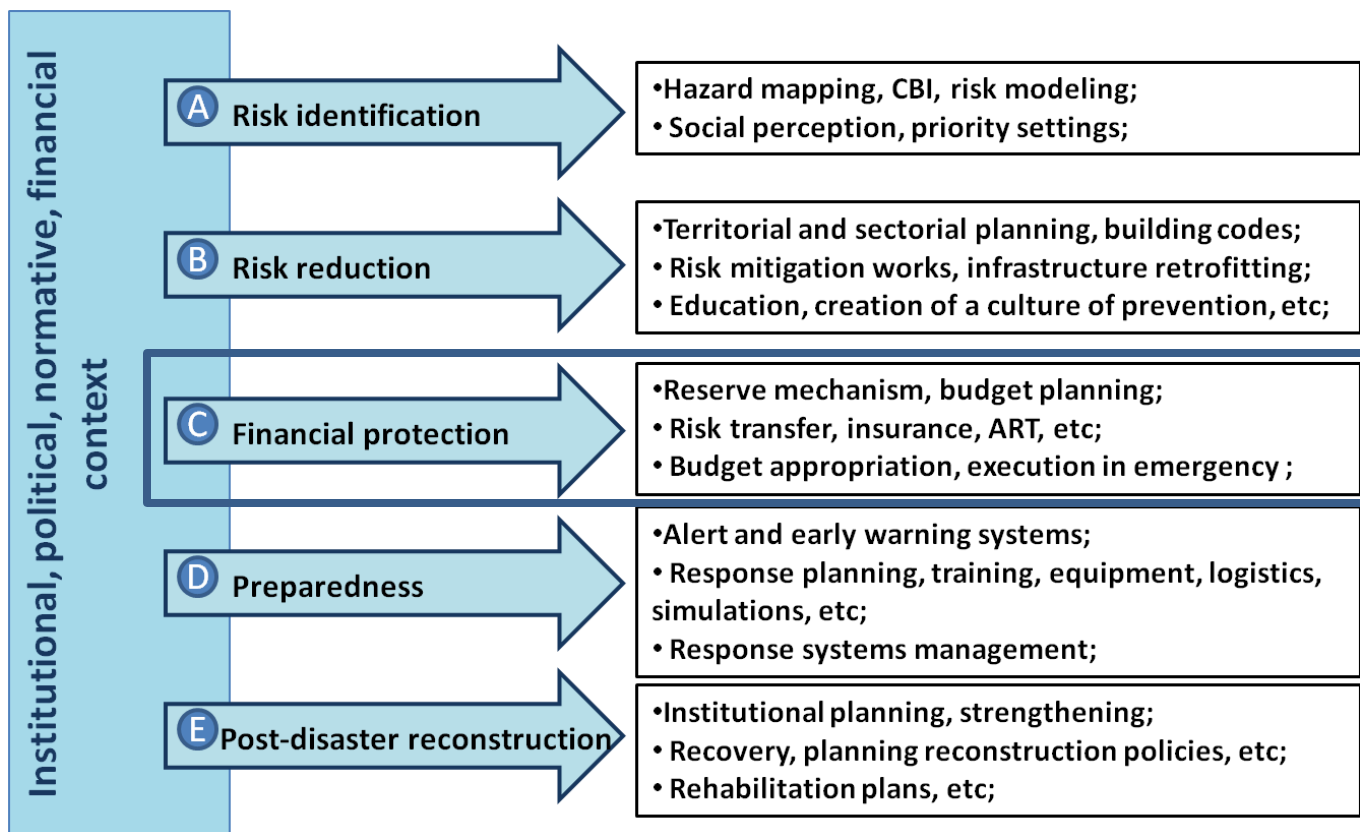
## The DRM equation

$$\text{Hazard} \times \text{Exposure (Vulnerability)} = \text{Risk}$$

- Earthquakes
- Cyclones
- Monsoon Rains
- Landslides
- Draughts
- Tsunami...
- Population (particularly the poor, living in risk area, and with little capacity to cope, etc.)
- Infrastructure (in flood plains or seismic zone, coastal area, with poor standards, etc.)
- Economic activity (agriculture zone, tourism area, key infrastructure, etc.)



# Disaster risk management framework





# Disaster risk reduction and disaster risk financing are complements



Disaster Risk Financing reduces the **opportunity cost of disasters** (cost of securing funds to sustain a natural disaster)

Disaster Risk Reduction reduces the **expected disaster losses**

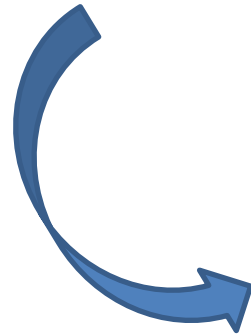
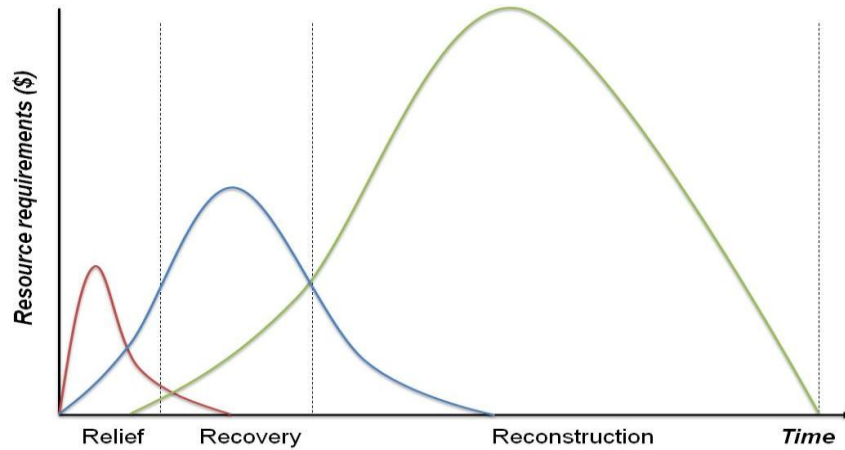


# Integrated disaster risk financing strategy for sovereign and sub-sovereign entities

- Fiscal assessment of natural disasters
  - Inclusion natural disaster risks in the overall fiscal risk assessment
  - Catastrophe risk models and historical (fiscal) losses
- Management of the budget volatility associated with natural disasters
  - Risk retention and risk transfer
- Insurance of public assets
  - Group insurance of public assets
  - Catastrophe insurance pool of public assets
- Promotion of property catastrophe risk insurance markets
  - Residential dwellings
  - Small and medium enterprises
  - Farmers and herders



# Matching the funding needs



	Relief phase (1-3 months)	Recovery phase (3 to 9 months)	Reconstruction phase (over 9 months)
<b>Post-disaster financing</b>			
Donor assistance (relief)	█	█	█
Budget reallocation	█	█	█
Domestic credit	█	█	█
External credit	█	█	█
Donor ass. (reconstruction)	█	█	█
Tax increase	█	█	█
<b>Ex-ante financing</b>			
Budget contingencies	█	█	█
Reserve fund	█	█	█
Contingent debt facility	█	█	█
Parametric insurance	█	█	█
Catastrophe Bonds	█	█	█
Traditional insurance	█	█	█

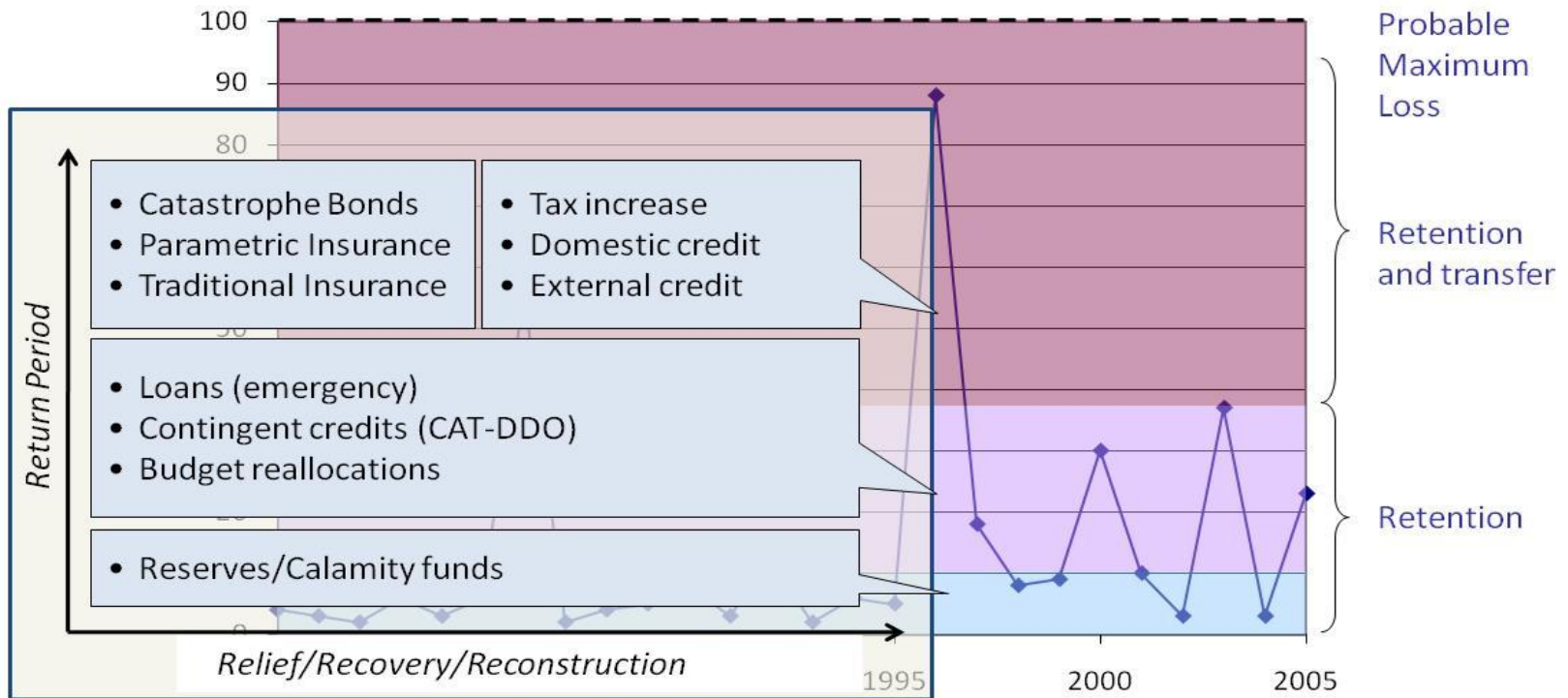


# Costs and benefits of financial instruments

Instruments	Indicative Cost (multiplier)	Disbursement (months)	Amount of funds available
Donor support (relief)	0-1	1-6	Uncertain
Donor support (recovery & reconstruction)	0-2	4-9	Uncertain
Budget contingencies	1-2	0-9	Small
Reserves	1-2	0-1	Small
Budget reallocations	1-2	0-1	Small
Contingent debt facility (e.g., CAT DDO)	1-2	0-1	Medium
Domestic credit (bond issue)	1-2	3-9	Medium
External credit (e.g. emergency loans, bond issue)	1-2	3-6	Large
Parametric insurance	2 & up	1-2	Large
ART (e.g., CAT bonds, weather derivatives)	2 & up	1-2	Large



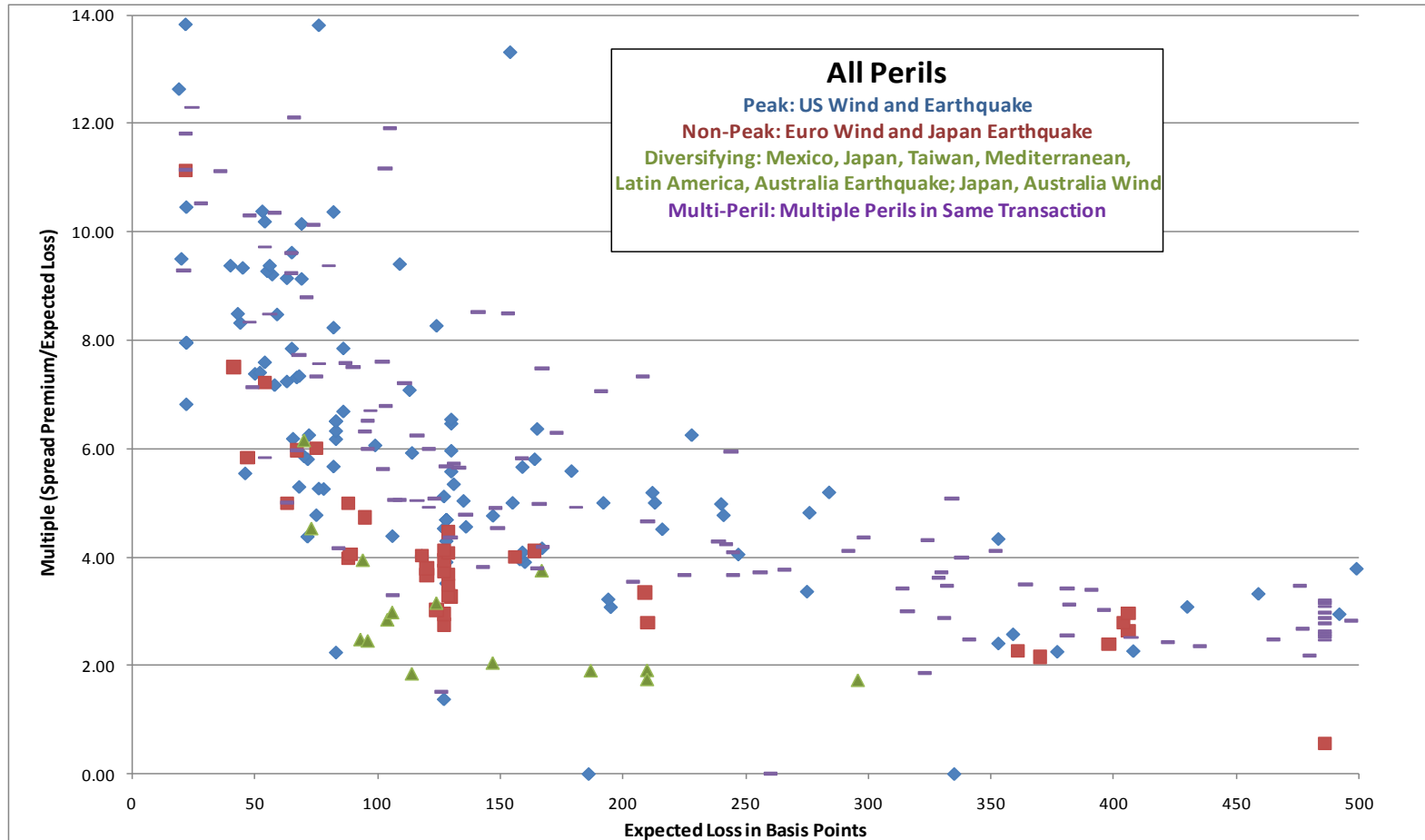
# Three-tiers risk layering approach







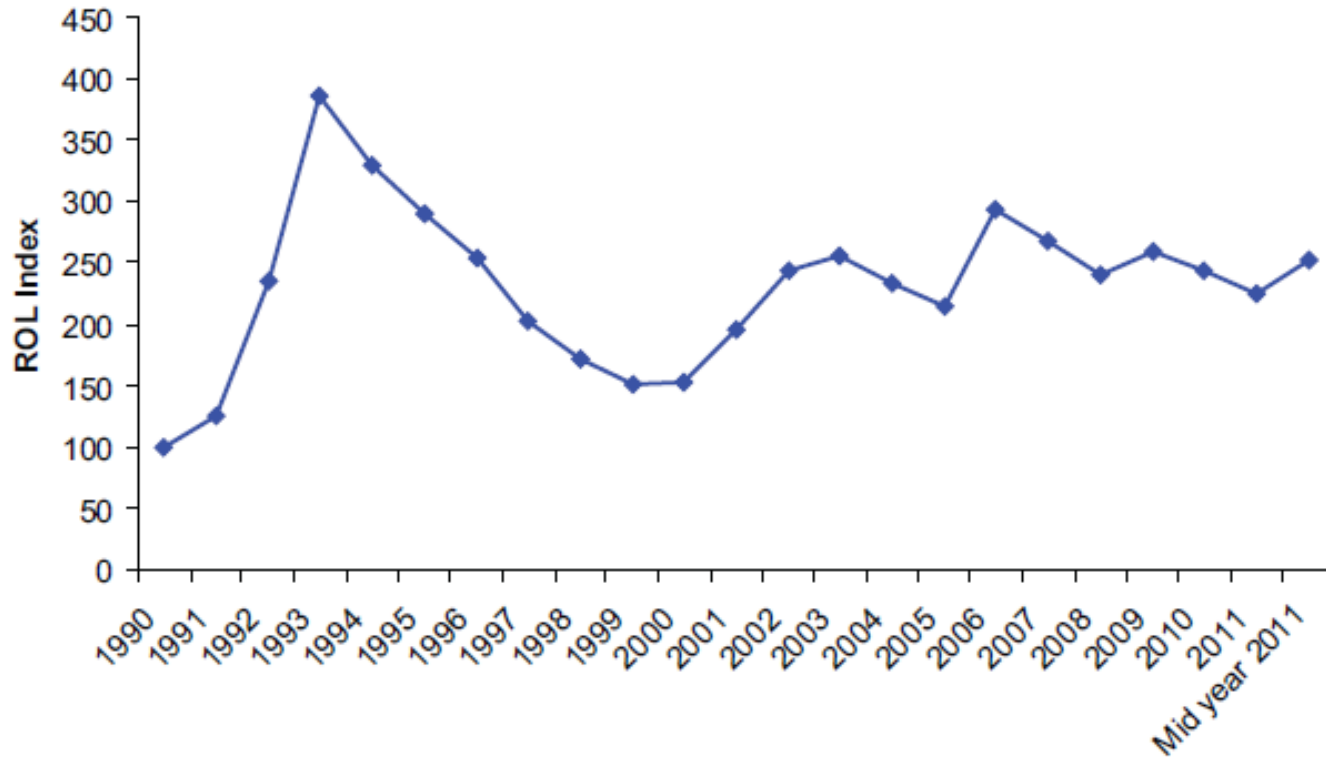
# Catastrophe risk transfer instruments are expensive...





# ...and volatile

Guy Carpenter World CAT Rate-on-Line Index

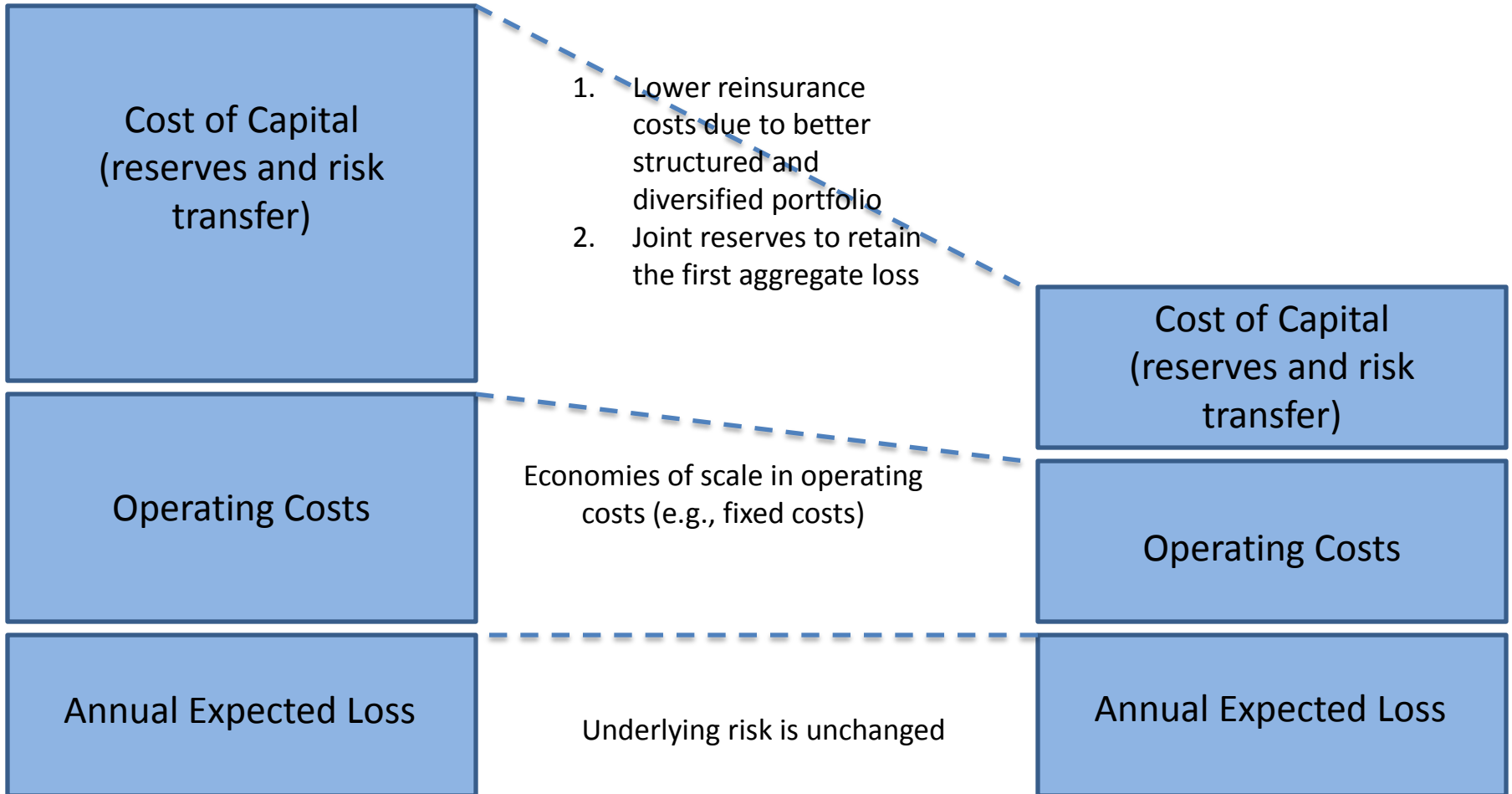




# Insurance pricing and risk pooling - Concepts

Technical insurance premium  
(BEFORE risk pooling)

Technical insurance premium  
(AFTER risk pooling)





## Cat Pools – Value Proposition

- Pooling risks across a wide area provides better spread and more efficient use of capital
- Pools create the spread of risk and critical mass to make catastrophe risk insurance affordable and effective
  - Compulsion as a key requirement to overcome lack of risk awareness and anti selection?
- Provide a more efficient platform to transfer catastrophe risk to international reinsurance or capital markets
- Provides a mechanism to encourage risk mitigation and safer construction practices
- Provides the platform to increase risk awareness
- Facilitates the build up of catastrophe reserves
- Facilitates research and investment in the modelling of catastrophe risk



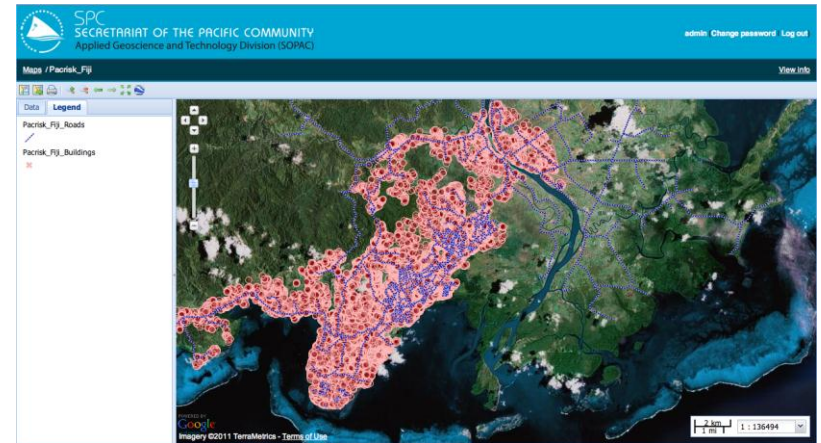
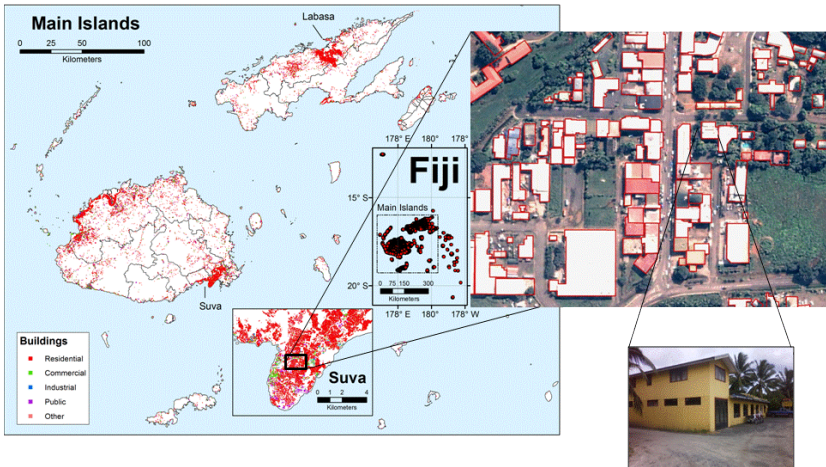
## Examples of catastrophe risk insurance pools

- Regional sovereign catastrophe risk insurance pools
  - Caribbean Catastrophe Risk Insurance Facility
  - Pacific Disaster Risk Insurance Program (under development)
- Regional property catastrophe risk insurance pool
  - Catastrophe Risk Insurance Facility for Southeastern countries
- National property catastrophe risk insurance pools
  - Turkish Catastrophe Insurance Pool
  - California Earthquake Authority
  - Taiwan Residential Earthquake Insurance Pool
  - Algeria Catastrophe Risk Insurance Pool
- National agricultural insurance pools
  - Turkish agricultural insurance pool
  - Mongolia index based livestock insurance pool
  - Thailand agricultural co-insurance pool
  - Spanish agricultural insurance pool (Agroseguro)

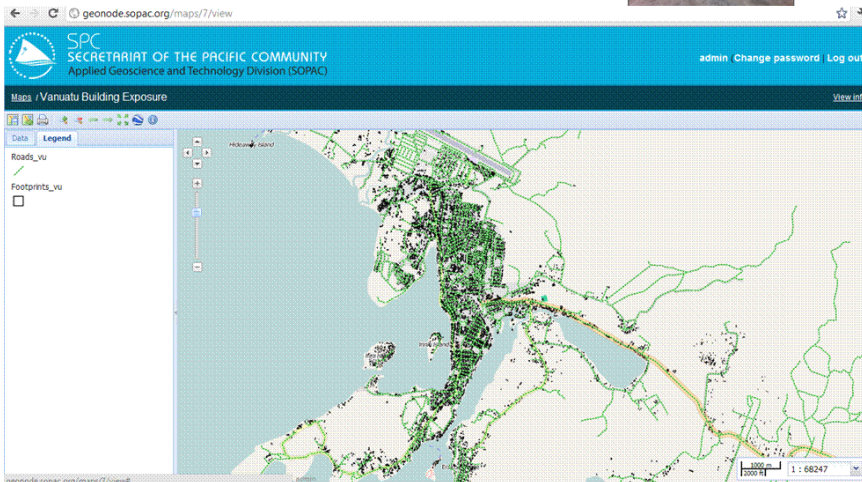


# Pacific Catastrophe Risk Assessment and Financing Initiative

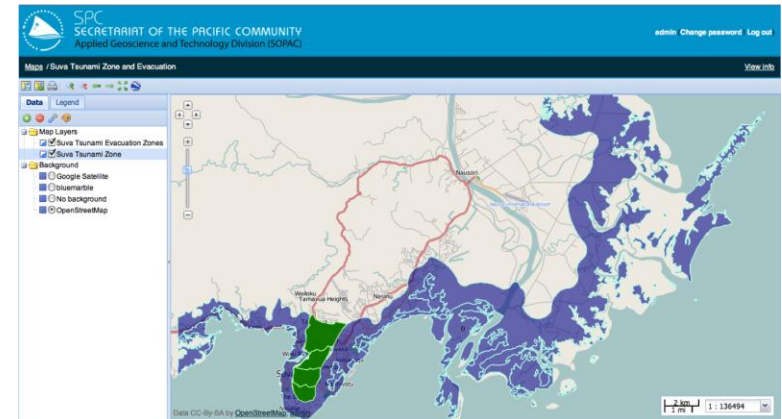
## Open-source, web-mapping technology to share risk assessment results for more effective Disaster Risk Management in the Pacific



Building and Road Exposure in Fiji



Building and road exposure, Port Vila, Vanuatu



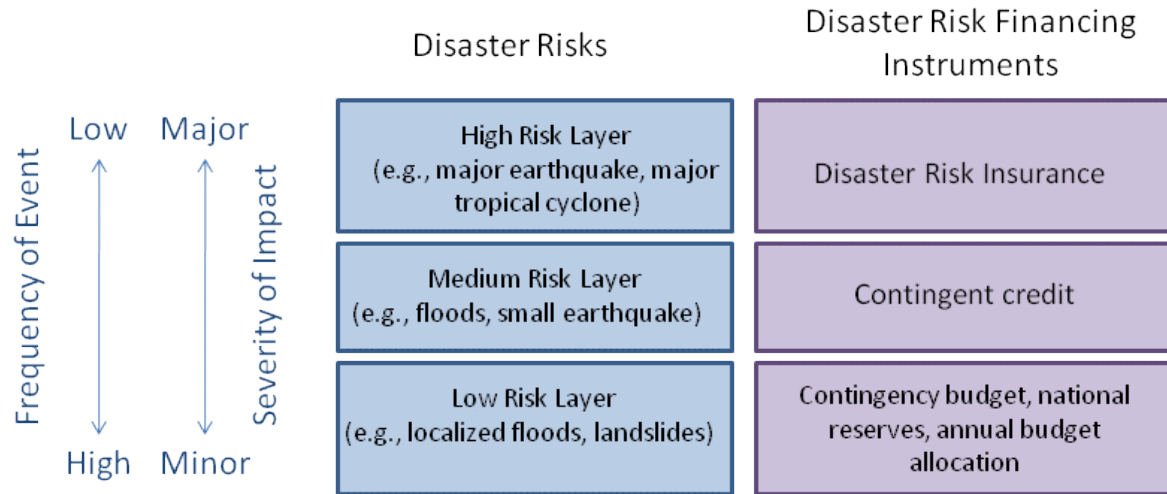
Tsunami Hazard and Evacuation Zones in Fiji





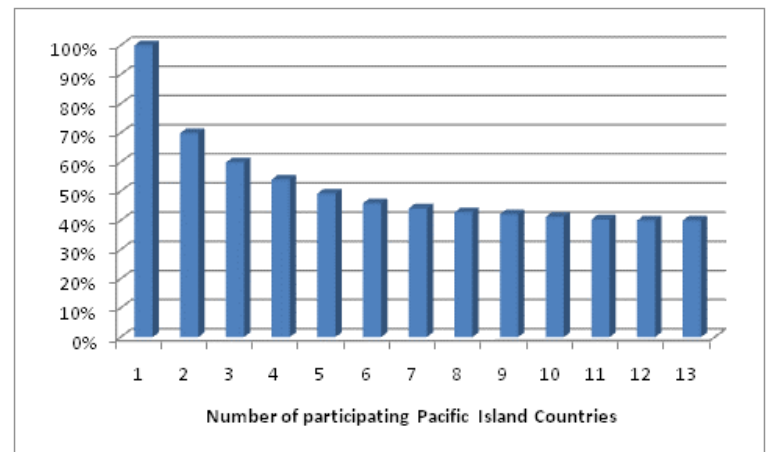
# Pacific Disaster Risk Financing and Insurance

## Increasing the financial resilience of the PICs against natural disasters



Developing an integrated disaster risk financing strategy

- (i) Capacity building on macro-economic planning of natural disasters and integrated disaster risk financing and insurance;
- (ii) Development of private disaster risk insurance markets;
- (iii) Piloting of Pacific disaster risk insurance program for governments
- (iv) Establishment of Pacific cat pool





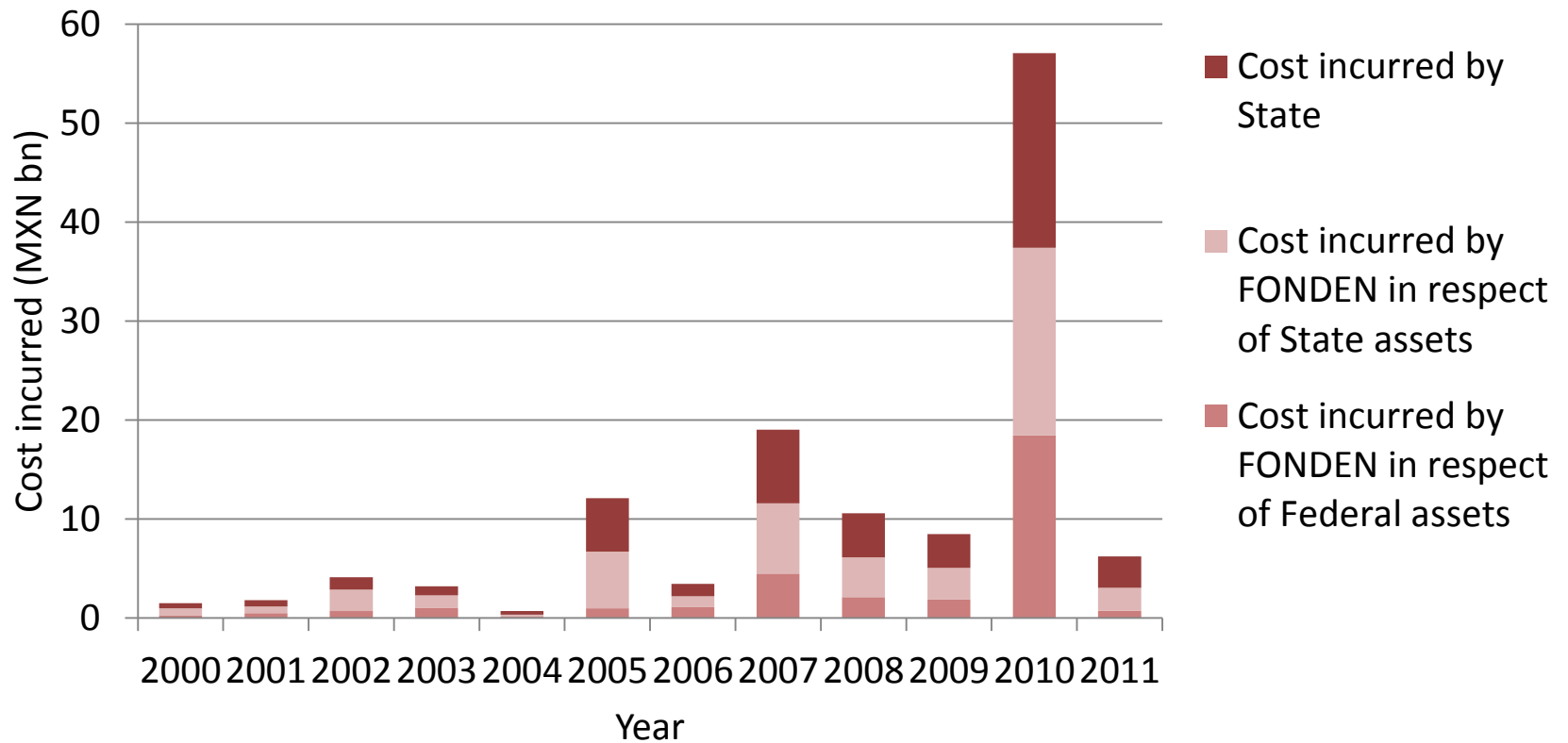
## Some important lessons from international experience

- Identify the specific needs of the countries
- Design an integrated disaster risk financing and insurance strategy
- Design simple insurance instruments
- Link with DRM and CCA agenda
- Create positive externalities beyond DRFI
- Political Economy
  - No cross subsidization
  - Peer pressure among countries
  - Local ownership
  - Value proposition for all the parties (client/donor/industry)
- Strong and continuous political commitment is essential





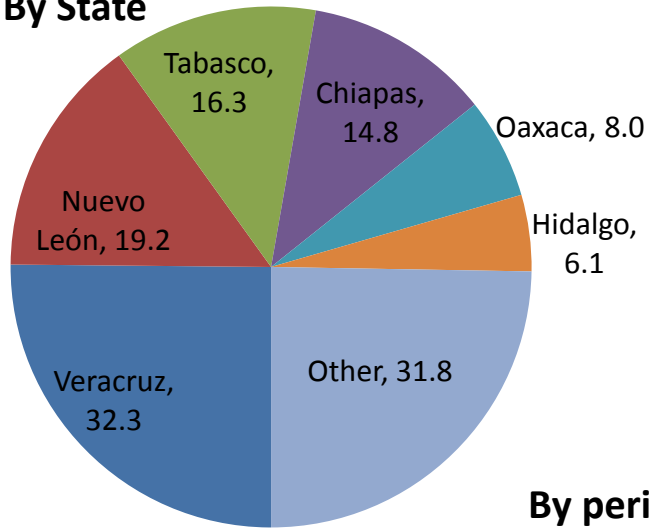
## Mexico : Historical cost profile recorded by FONDEN



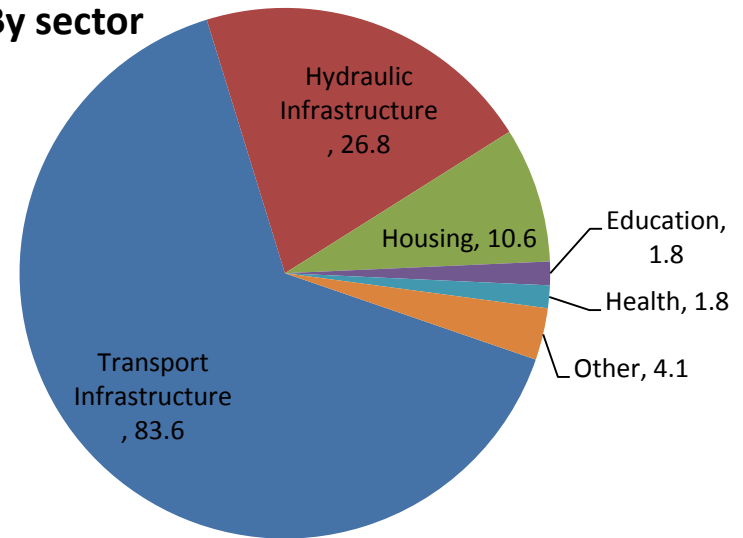


# Split of total losses 2000-2011, MXN bn

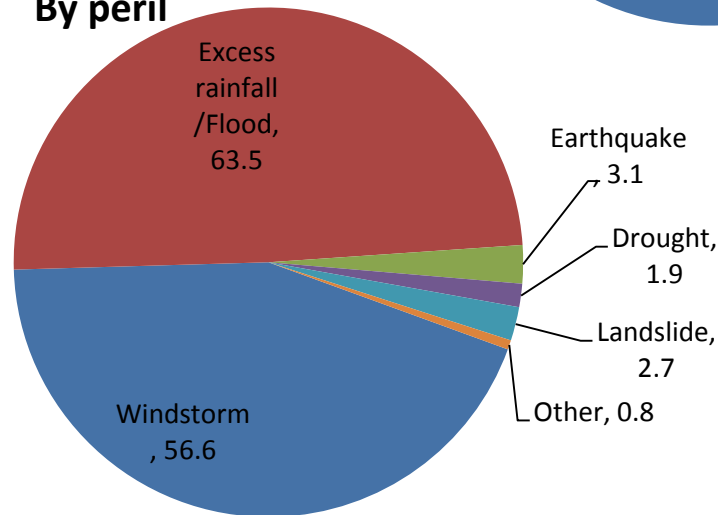
By State



By sector



By peril





# Catastrophe risk profile of Mexican States

## 100 Year PML for state as percentage of exposure

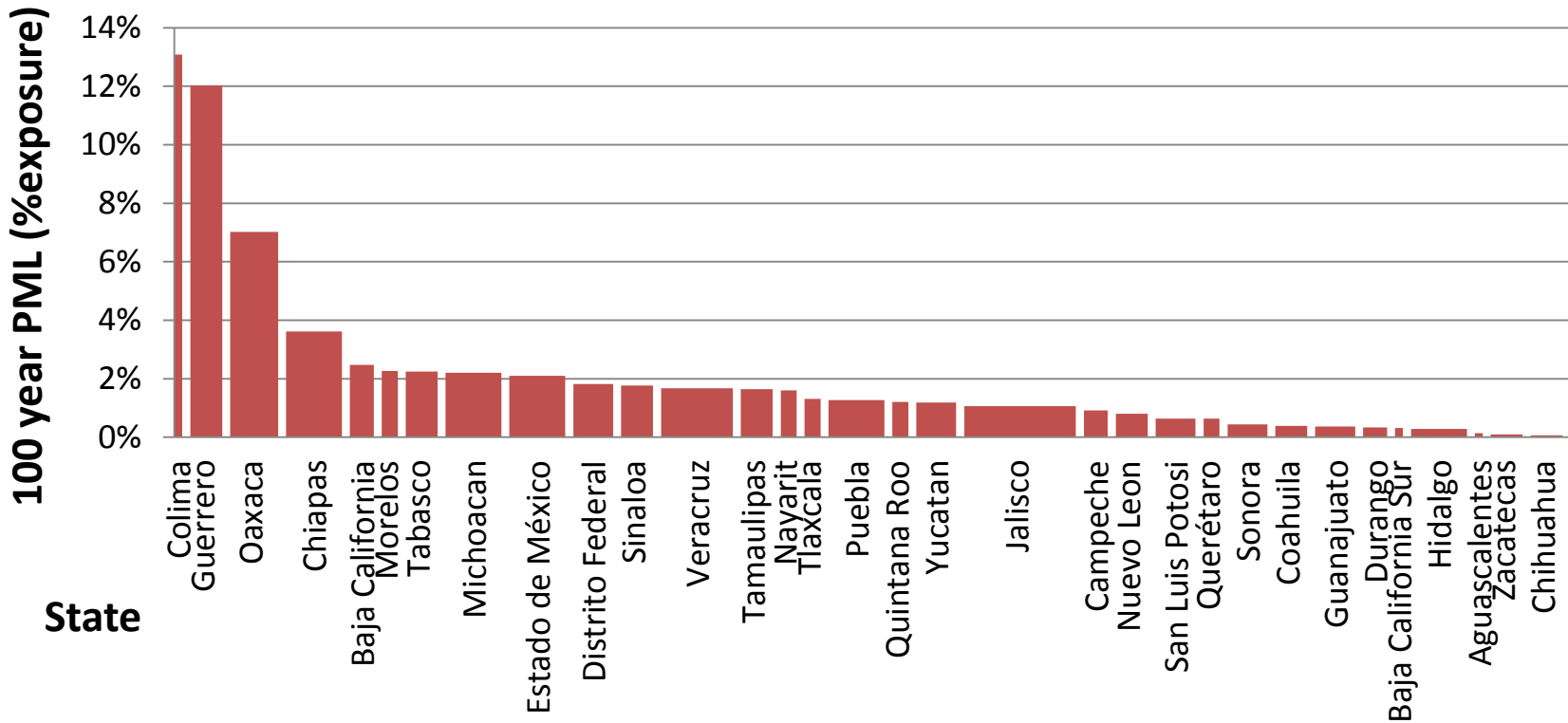


Illustration based on R-FONDEN version 1.

The width of each rectangle is proportional to the exposure. The volume of each rectangle is therefore proportional to the 100 year Probable Maximum Loss (PML).



# Risk pooling among states would reduce 100 year PML of state contributions by more than half

## 100 Year PML by state and for all-state, all peril risk pool

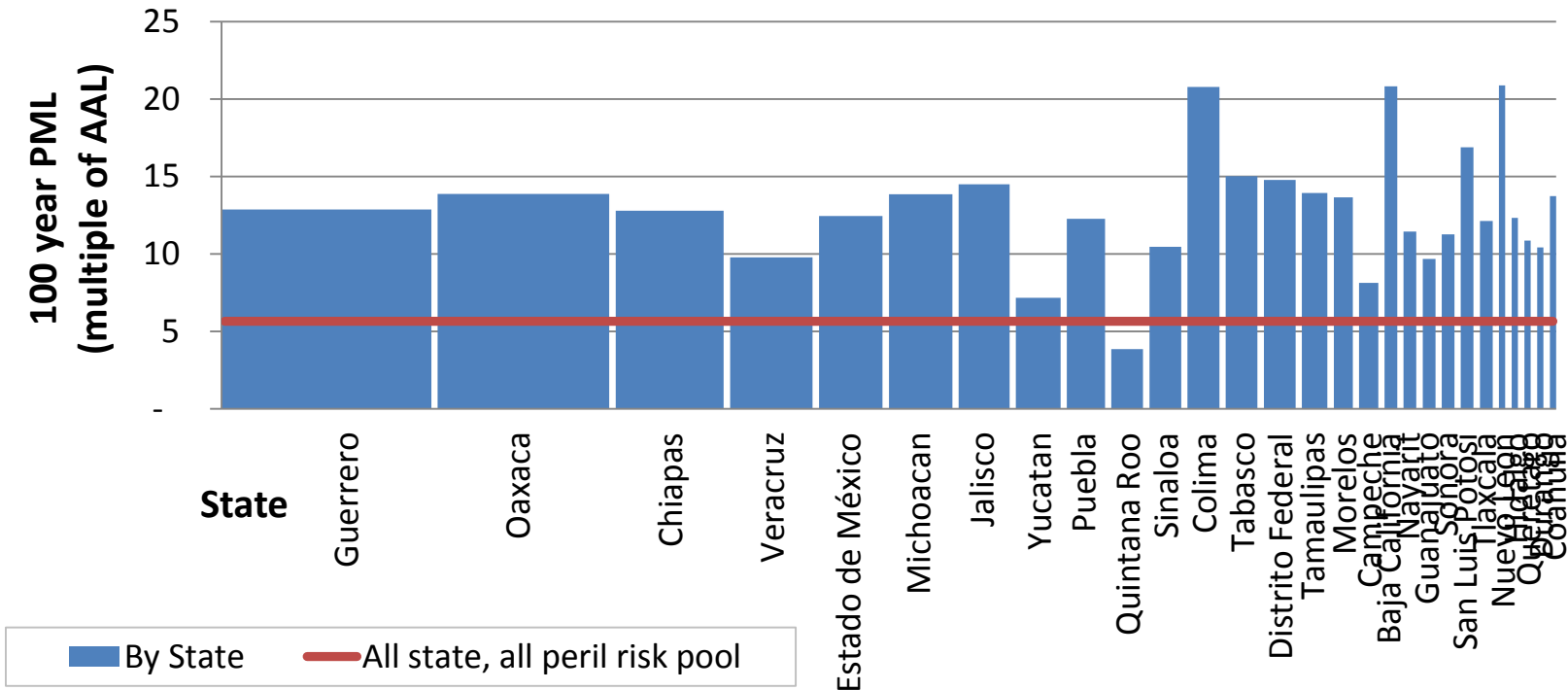


Illustration based on R-FONDEN version 1.



## Moving forward

- What are the financial needs of the Mexican states post disaster?
  - Budget support for post-disaster response/relief?
  - Financing for post-disaster rehabilitation and/or reconstruction of state assets?
- What type of catastrophe risk financing vehicle?
  - Individual cat insurance
  - Group cat insurance
  - Cat risk pool (joint reserve fund)