

Closing the Nat Cat protection gap: Jakarta, Indonesia

Jakarta is at the centre of Indonesia's economic growth. But the city is highly exposed to earthquake and flood risk, and only a small part of its economy is insured against natural disasters. This means that individuals, businesses and the government would have to shoulder most of the financial burden. The Nat Cat protection gap between economic and insured losses would amount to about USD 10 billion if a major earthquake or flood hit Jakarta today. By 2023, it could nearly triple unless the city improves its disaster preparedness.

Jakarta is exposed to various natural hazards, including earthquakes, tsunamis, floods and volcanoes. As the city and its surrounds grow and develop, more people, properties and infrastructure concentrate in this disaster-prone area. But a large part of the local economy remains uninsured, even as the process of urbanisation continues. As highlighted in *sigma* No. 2/2013, the ratio of the potential insured to economic loss therefore remains very low in the region when compared to events in North America, Europe, Australia and New Zealand. Closing the "Nat Cat protection gap" is a challenge for both Jakarta's authorities and the insurance industry to strengthen the city's resilience.

Natural hazards

Jakarta is a coastal city located in the Pacific "Ring of Fire," a zone of volcanoes and fault lines encircling the Pacific tectonic plate. The nearby mountains make it a catchment area for 13 rivers flowing into the Java Sea. Flooding is one of the greatest risks to Jakarta. The city is situated in the tropics and surrounded by warm waters. Besides frequent torrential rain, the factors that make Jakarta particularly vulnerable to flooding are sea level rise, land subsidence and rapid urbanisation.

Fortunately, Jakarta has not witnessed a big earthquake with a notable impact on its residents. However, according to the US Geological Survey, the Australian plate is moving under the Eurasian plate at the rate of 6.5 cm per year in the south of the Sunda (Java) trench, 5.5 cm per year around the islands of Sumatra and Java, and 4.5 cm a year in the Sumatra region. This rate of convergence suggests that a large amount of energy is accumulating in the region and could be released in the form of a strong earthquake, exposing Jakarta to significant seismic risk.

Volcanoes are spread across various Indonesian islands. Many of them have erupted in recent years and devastated communities nearby, such as Mt. Merapi

in 2010. The closest active volcanoes to Jakarta are Kiaraberres-Gagak (~62km), Salak (~59km) and Gede (~64km). Depending on the eruption style of the volcano and prevailing local weather conditions, Jakarta might well be impacted.

Swiss Re's recent study "Mind the Risk – cities under threat from natural disasters" – a comprehensive analysis of natural hazard risk in over 600 cities around the world – showed that the Greater Jakarta area ranks no. 4 globally in terms of people affected by earthquake and river flood combined. It estimates that on an aggregate basis about 27.7 million people could potentially be affected by these perils (Table 1).

Table 1: Natural hazards in Jakarta

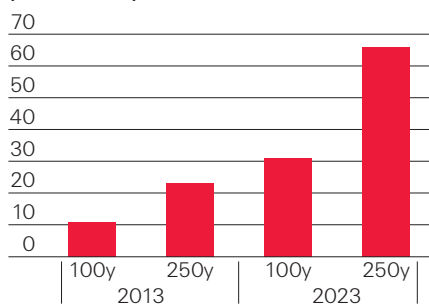
Natural hazard	Causes	Damage history	Loss potential
Flooding	Torrential rain, sea level rise, high tide, land subsidence	Experienced many damaging events in recent past	Very high
Earthquake	Existence of subduction zone and fault lines	Earthquakes were felt in recent past; no damage causing event	High
Volcanoes	Existence of active/dormant volcanoes in adjacent provinces	No damage causing event	Moderate
Extreme temperature	Rapid urbanization and changing climate	No damage causing incident	Low

Estimated Nat Cat protection gap

We define the Nat Cat protection gap as the difference between losses for insured property assets and potentially insurable property assets from a particular peril, such as an earthquake or flood (using 100 and 250 year return periods). Insurable property assets include all physical assets which could potentially be fully covered by insurance policies: buildings, contents, infrastructure, and vehicles. Our definition, however, excludes any Business Interruption/Contingent Business Interruption losses as well as loss and injury to people or emergency relief costs. Therefore, the insurable loss may slightly differ from the potential economic loss.

By these measures, and based on various growth assumptions for Jakarta's local economy, the estimated 100 year flood protection gap in the metropolitan area of Jakarta (difference between insurable and insured loss) would increase from USD 9bn in 2013 to USD 25bn in 2023. Similarly, for earthquake the gap widens from USD 11bn in 2013 to USD 31bn in 2023. When we look at more extreme events contributing to return period 250 year loss, the protection gap is much wider. For earthquake, the 250 year protection gap widens from USD 23bn to USD 66bn in 2023. Similarly, the flood protection gap increases from USD 14bn today to USD 37 bn in 2023 (Table 2).

Nat Cat Protection Gap Earthquake (USD billions)



A call for collective action

For earthquake and flood perils, the return period losses highlight the huge insurance protection gap in the Jakarta market. By the year 2023, despite the increase in insurance penetration we would expect a growing gap due to an even larger concentration of property assets as the rate of insurance growth is surpassed by the rate of asset growth.

To avoid this impending risk, partners from both the private and public sectors are called upon to work together to create better prepared communities through various risk mitigation and risk transfer solutions. The following steps may support government and insurance industry to effectively close the protection gap from the impact of natural disasters:

- Hazard-related land use planning
- Implementation and maintenance of flood protection measures like, concrete wall, levee, retention areas etc.
- Early warning systems for effective disaster response
- Upgrading to adequate seismic building code provisions and its implementation
- Improvement of hazard maps (flood zones, soil quality) using latest risk assessment knowledge and technology; raising risk awareness
- Improving data quality of insurance

Nat Cat Protection Gap Flood (USD billions)

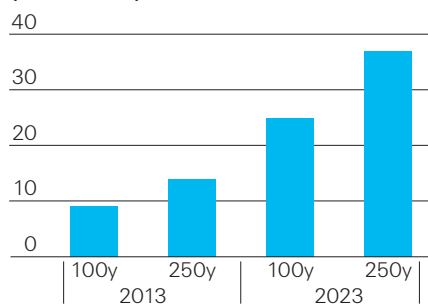


Table 2: Estimated losses for earthquake and flood (USD billions).

Year	Return Period (years)	Earthquake			Flood		
		Insured	Insurable	Gap	Insured	Insurable	Gap
2013	100	1	12	11	2	11	9
	250	2	25	23	2	16	14
2023	100	5	36	31	7	32	25
	250	10	76	66	11	48	37

exposures and building inventory of public assets and infrastructure

- Making insurance accessible and affordable to larger part of population and businesses
- Innovation in terms of risk transfer solutions and diversification to other regions and products

Resources

- Web stories on flood on swissre.com (www.swissre.com/rethinking, publication "Flood an underestimated risk", <http://media.swissre.com/documents/Flood.pdf>)
- SwissReFloodApp (www.swissre.com/library/Apps/The_Flood_App_for_iPad.html)
- CatNet® access (<http://www.swissre.com/catnet>)
- Publication "Mind the risk-cities under threat from natural disasters" (www.swissre.com/rethinking/climate_and_natural_disaster_risk/Mind_the_risk.html)
- Urban resilience web pages (www.swissre.com/urbanresilience)

Return period loss

A 1-in-a-100 (or -250) year loss indicates how often a certain loss level may be exceeded on average over an infinite time period, based on probabilistic modelling and on a constant risk exposure. It neither considers any portfolio growth over the modelled time horizon nor does it predict when the next large event will take place. The time of occurrence remains completely random and can be several days, years, decades or centuries in the future.

CatNet® – Swiss Re's online natural hazard atlas

Natural hazards are violent manifestations of nature and the whole world faces it in one way or the other. With increasing population and economic activity, it is very important to prepare the communities and economies to cope with adverse impact of natural hazards. Swiss Re, with its 150 years of expertise in understanding various natural hazards and developing tailored solutions for governments and re/insurance clients across the world, has developed CatNet® tool which helps to visualize risk profile of any concerned region.

CatNet® provides hazard maps for various perils - earthquake, windstorm, river flood, storm surge, volcanoes, tsunami, wildfires etc. It also provides information on historical events, for example, epicenters of earthquakes, storm tracks,

and observed tsunami heights. CatNet® also helps to visualize major plate boundaries present across the world to get indication on potential seismic risk. It also helps to see the extent of previous major natural catastrophes, for example, 2011 Thailand floods and 2011 Tohoku earthquake.

The major advantages of CatNet® are as follows:

- Easy access to maps and satellite images
- Extensive information on natural hazard risks
- Option to upload one's own exposure data and view it together with various natural hazard risks
- Online sigma loss database
- Easy access to geographic information and search functionalities to zoom into desired location/region

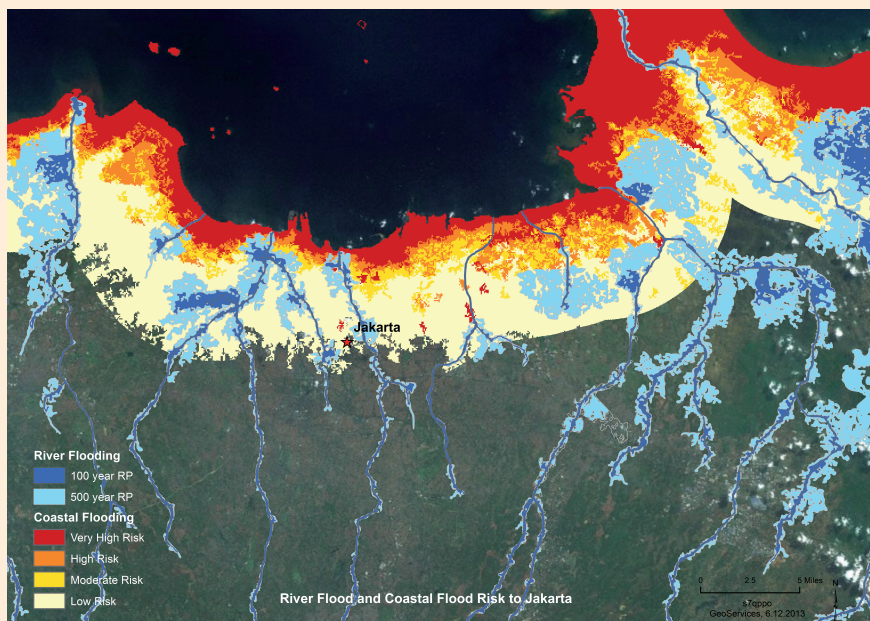
- Provides overview of natural catastrophes as they are occurring with integrated GDACS global alerts for recent events

CatNet® provides a unique advantage to our clients. The key benefits are as follows:

- Raises awareness of natural hazard risk across the globe, including non-modeled perils like volcanoes and tsunami
- Enables client for informed underwriting decisions (risk selection, risk adequate pricing, accumulation control and facultative buying)
- Highlights importance of detail exposure data and helps to check existing location data

The figure below shows Jakarta's exposure to coastal and river flood hazards. Visit CatNet® homepage at www.swissre.com/catnet to get more information about it. Contact your Swiss Re representative to get access to CatNet®. Use of CatNet® is free of charge to Swiss Re clients. For any questions, please write to: catnet@swissre.com.

River flood and Coastal flood risk to Jakarta Swiss Re Global Flood Zones™ are calculated based on Swiss Re's proprietary and patented multiple regression approach. These are indicative flood zones and cannot replace detailed, location information and assignments. The effect of flood protection measures is not taken into account.





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