

The anatomy of a windstorm

Mr Amer Ahmed of **Allianz Reinsurance** looks into the make-up of a windstorm, and notes how very vulnerable Asia is to its devastation, mostly as a result of increasing built up in coastal areas. Under-insurance is also prevalent and he urges for investment in resilience as well as the closing of the insurance gap.



It's a familiar image: a satellite shot of a white mass swirling out from the dark "eye" at its centre. A typhoon – called a hurricane when it occurs in the Atlantic or Northeast Pacific, and a cyclone in the South Pacific or Indian Ocean – edging towards landfall. But how and why did it develop? Why is Asia particularly at risk, both physically and economically, from these storms? And what can be done about it?

More tropical storms develop in the Pacific Ocean than in the Atlantic

On average, around 26 tropical storms develop out of the warm waters of the Pacific each year, compared with 11 in the Atlantic. Triggered by high sea-surface temperatures of at least 26.5°C, which supply its energy source, the storm begins to develop over the "heating plate" of the water surface, and low wind shear allows it to circulate into its familiar upright conical shape. Humidity in the surrounding atmosphere further promotes development, and as peak wind speeds reach 120km per hour, the tropical storm officially becomes a typhoon.

The most active base for the storms is the western north Pacific, affecting the large coastal areas of Southeast Asia which front its warm seas. The Philippines alone is buffeted by around 20 tropical storms each year, and such storms were responsible for 42% of hazard-related deaths in the Asia and Pacific region between 1970 and 2010. They also

caused 23% of direct physical losses during the same period, according to the 2013 Asia Development Bank (ADB) report *Investing in Resilience: Ensuring a Disaster-Resistant Future*.

Storm surges and flooding threaten coastal areas

While typhoon winds are responsible for great destruction, particularly along exposed coastlines, once the storm makes landfall, it loses the energy source of the warm ocean waters. It must also interact with the topography; high mountainous landscapes such as those in Taiwan disturb the system and cause it to dissipate much more quickly than, for instance, the flat warm-watered areas of the Mekong Delta.

But in Asia, the typhoon's secondary perils of storm surges and flooding can often bring greater danger than winds. These factors are particularly devastating to coastal or low-lying areas in Asia such as the Bay of Bengal. Many coastal areas are also suffering land subsidence and this, coupled with rising sea levels and the increase in assets and populations along those areas means exposure to flood – and storm surge – risk is sharply increasing. Investing in Resilience reported that disaster losses across the whole region are rising more rapidly than regional GDP as a result of increased exposure and vulnerability.

Early warning systems a life saver

So what can be done to mitigate the human and economic costs of these increasing exposures?

Up to seven days before a tropical storm makes landfall, meteorological bureaus can approximate its track. From three days out they can predict with relative accuracy where landfall will occur. The resulting toll on human life can be greatly reduced when early warning systems leverage this information.



In December 2012, Typhoon Bopha struck the southern Philippine island of Mindanao. The Category 5 “super typhoon” was the strongest ever to hit the island and left a damage bill of US\$1.04 billion. While the death toll was still significant – around 1,000 perished in Bopha’s wake – it was still lower than that caused by the weaker and less economically destructive Tropical Storm Washi the previous year.

The Philippine government had recently upgraded its warning systems as part of Project NOAH (Nationwide Operational Assessment of Hazards) and pushed out television and internet alerts as Bopha approached. The UN credited the warnings with saving untold lives as tens of thousands fled to shelter. Earlier this year Taiwan signed up to Google’s natural disaster information platform which shares critical information such as a typhoon’s path and the closest places of refuge. A similar system exists in Japan.

Not every country at risk has invested in such systems. In 2008 experts said Myanmar’s failure to act on warnings from the Indian Meteorological Department contributed to the deaths of an estimated 140,000 who perished in Cyclone Nargis.

GDP losses and under-insurance

Aside from the risk to human life, countries regularly struck by Nat CATs such as tropical storms face crippling long-term recovery costs. The Philippines loses 0.8% of its GDP each year to Nat CATs, while Bangladesh loses 1.26% – the highest of any country, according to the 2012 Lloyd’s Global Underinsurance Report. The report named the 10 countries with the highest expected percentage of GDP losses per annum from Nat CATs and seven of those are in Asia.

These losses are exacerbated by the critical rate of under-insurance in the region, which the report also highlighted. Hong Kong, Thailand, China, Bangladesh, Philippines, Vietnam, Indonesia and India are among the most under-insured countries in the world according to the study. The global insurance shortfall totalled \$168.11 billion, with the majority of this gap in Asia.

The magnitude 7.9 earthquake which struck China’s Sichuan province in May 2008 caused \$125 billion in damages. A tiny 0.3% of this was insured loss, with the state and taxpayer ultimately footing the bill. In total, between 2004 and 2011, China experienced an average uninsured loss of \$18.91 billion per Nat CAT event, well over 90% of the total loss per event, indicating the country’s low non-life insurance penetration levels.

“The difference between total damage and the total insured damage, or the ‘insurance gap’, has a strong effect on the cost which ultimately falls upon the taxpayer,” the Lloyd’s report warned.

Recovery costs are much lower in countries with high insurance levels, and the report suggested that if a country’s insurance penetration level increased by even one percentage point, the financial recovery burden on the state – and ultimately the taxpayer – could be up to 22% lower. The same increase would also reduce the insurance gap by around 13%.

Investment in resilience

When high-growth economies are geographically and environmentally over-exposed to such risks and under-insured for its impacts, the implications are vast and global. As well



as seeking to increase non-life insurance penetration, heavy investment in disaster resilience is needed in the region. Investing in Resilience reported that by 2050, Asia’s urban population will have almost doubled in size and, in many areas, this growth will occur in hazard-prone areas. Six of the 10 countries with the highest tropical storm mortality rate are in Asia.

Investment in resilience can take many forms and will often pay for itself quickly. An analysis of two typhoon resilience projects revealed that a five to seven day forecast system in Thailand, allowing the early harvest of crops, has a benefit-to-cost ratio of almost 2. And in Vietnam, if dike management costs were reduced through mangrove planting in several provinces, the ratio would be a huge 55.

Advances are definitely being made. Since 2009 in India, after in-principle financing has been secured for large-scale public projects, a report detailing the project’s disaster risk concerns and vulnerability to Nat CATs such as storms and floods must be submitted before final approval is granted. However obstacles to resilience investment are many and varied in the region, from limited political support to inadequate risk information to insufficient funding.

ADB President Haruhiko Kuroda spoke at the Delhi Sustainable Development Summit earlier this year and outlined why change is imperative: “Each year, our region typically experiences about one-third of the world’s disasters and is home to 80% of its disaster-affected people. Moreover, the annual economic cost of disasters averages \$54 billion, a price we simply cannot afford to pay.”

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