

Special Report: Climate Risk in the Asia Pacific

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Executive Summary

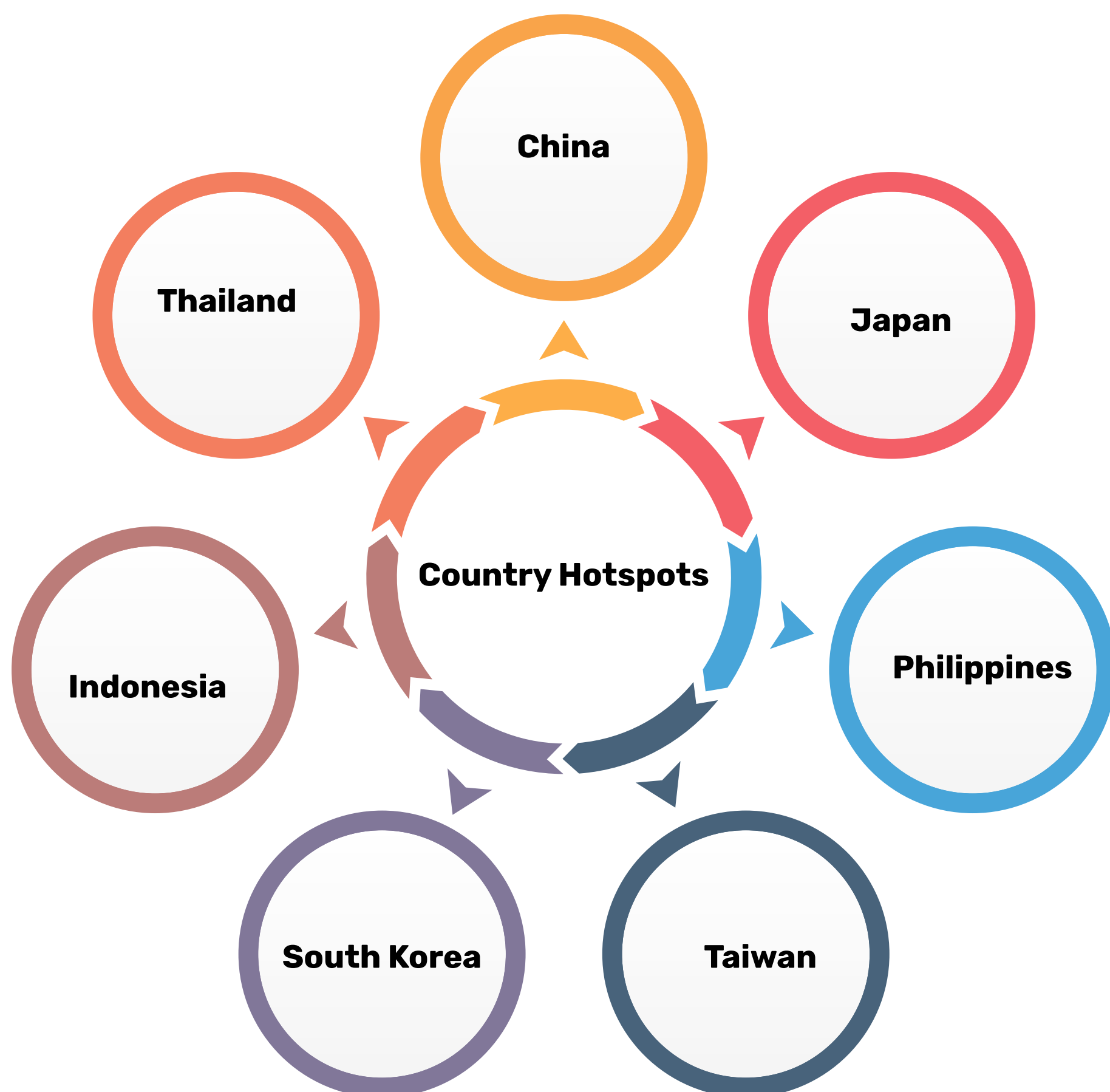
Climate disasters are among the top phenomenon in the Asia Pacific. From floods to typhoons, cyclones, droughts and heatwaves, adverse weather conditions continue to result in significant disruptions across the region. Over the years, there has been a surge in the number of disaster-related casualties and has affected people in the region to a greater extent. In Asia, flooding remained a recurring threat and alone inflicted losses more than USD 30 billion every year since 2010. Southern China and South Korea in particular experienced record rain and significant flooding in 2022.

This report aims to highlight the significant disruptions and damages that the adverse weather conditions have been inflicting in the region. With major threat to life and property, these form a part of not just environmental concerns but also impact the regional, economic and political spheres. This report also highlights how businesses operating in the Asia Pacific can get hampered due to such weather phenomena. Hence, this report focuses on the growing concerns over the vulnerability and threat to life and property as well as its regional, political and economic impact that follows.



Country Hotspots

China, Japan, the Philippines, Taiwan, South Korea, Indonesia and Thailand are among the most exposed APAC countries. Each area is repeatedly hit by major calamities including catastrophic floods, typhoons, cyclones and so on thereby causing direct threat to life and property. In these countries, densely populated coastal and river basin regions concentrate high-value assets and are extremely vulnerable to storm surge, sea-level rise and extreme rainfall.



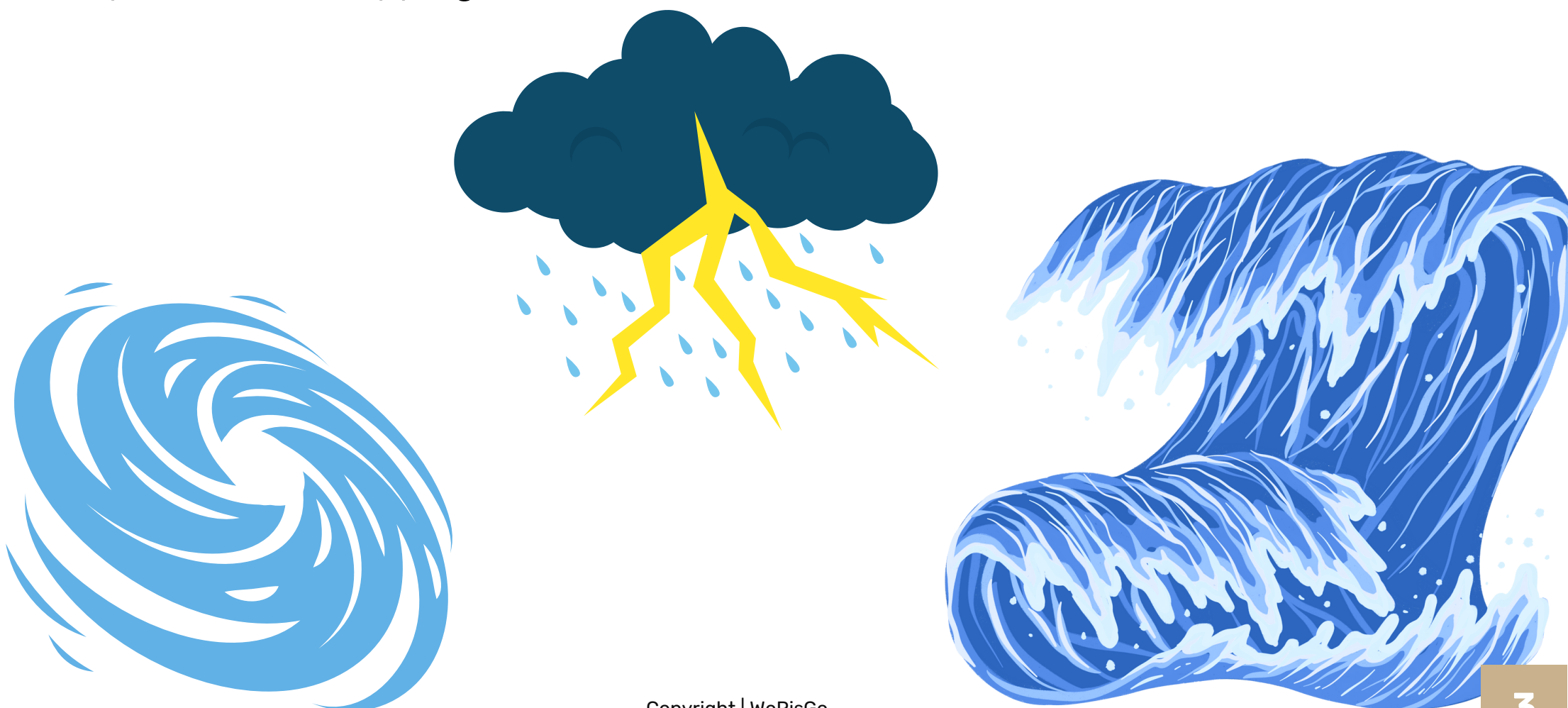


Overview of Climate Vulnerabilities in APAC

As per reports, APAC is most likely to be impacted by heavy precipitation, followed by agricultural drought, hot temperatures/heatwaves, and warming winds with intensifying tropical cyclones. Each subregion also has its own variation of risks to which it will have to adapt to under the warming scenarios, in an overall basis. Already, torrential rains, monsoon floods and typhoons inflict massive damage each year. Asia's agricultural drylands (northeast China, inland Southeast Asia, etc.) are also experiencing deeper droughts, crop failures and water stress.

Climate impacts also include gradual trends: sea-level rise is already eroding many coastlines and enabling more destructive storm surges. Nearly one-fifth of China's population and over a third of its GDP lie in low-lying coastal areas. Small states and delta rank among the world's top "at risk" zones for sea inundation. Hence floods, cyclones, droughts and heatwaves are becoming the "new normal" for APAC, increasingly threatening lives and livelihoods.

In 2022 Asia Pacific faced losses of at least \$80 billion. Flood-related losses dominated 61% of 2022 losses and billions are spent annually coping with recurring typhoons and monsoons. Flood-prone cities like Manila or Hong Kong host millions in precarious zones. Meanwhile, heatwaves and drought are raising agricultural and infrastructure risks (e.g. power outages during heat, water shortages for industry). In short, APAC stands out globally as the region most exposed to overlapping climate hazards.





Country-Level Analysis



China: Vulnerabilities: 280+ million people and one-third of GDP concentrated in low-lying coastal and river-delta areas. Major risks include floods, droughts, landslides, and saltwater intrusion.

- Recent Events:
 - 2022 floods in Pearl River Basin & Jiangxi: affected 6.49m, economic losses CNY 27.82 bn.
 - Yangtze drought: worst on record, 52m impacted, agricultural losses of CNY 51.3 billion (US\$7bn.)
 - Total 2022 climate-related losses: CNY 238.7bn (US\$34bn).
- Business Implications: GDP losses projected at 0.5–2.3% by 2030. Extreme weather poses risks to agriculture, industrial output, and social stability. Despite adaptation measures (reservoir management, reforestation, green investment), exposure remains high.

- **Japan:** Vulnerabilities: Typhoons, torrential rains, storm surges, heatwaves, and tsunami exposure. Coastal megacities (Tokyo, Osaka, Nagoya) at risk.
- Notable Event: Typhoon Hagibis (2019) – insured damages of ~US\$10bn.
- Trends: Intensifying heatwaves, shifting rainfall patterns, agricultural stress, and saltwater intrusion.
- Business Implications: Rising “cost of inaction” for key industries (autos, electronics). Infrastructure at risk of flooding and heat stress. Ongoing resilience investments (flood controls, heat action plans) are critical, but systemic risk persists.



- **Philippines:** Vulnerabilities: Among the world’s most disaster-prone countries. 74% of population and 60% of land area exposed. Faces ~20 cyclones annually, plus sea-level rise and subsidence.
- Historical Impact: Typhoon Haiyan (2013) killed 6,000, destroyed 1.1m homes, caused ~US\$800m in damages.
- Trends: Increasing cyclone intensity, coastal flooding, and agricultural disruption.
- Business Implications: Ranked among the top globally for disaster risk. Frequent typhoons disrupt supply chains, drive urban migration, and create persistent operational interruptions. The government’s adaptation measures (seawalls, reforestation, “Build Back Better” initiatives) demand high fiscal resources.



Country-Level Analysis

Taiwan: Vulnerabilities: Typhoons, floods, landslides, droughts, and sea-level rise. Critical tech infrastructure (semiconductors) exposed.

- Notable Event: Typhoon Morakot (2009) caused record floods, 600+ deaths, major infrastructure damage.
- Risks: Sea-level rise of 3–4mm/year; urban heat islands (Taipei); farmland salinization.
- Business Implications: Disruption risk to global semiconductor and electronics supply chains. Investments in flood control, renewable energy, and drought preparedness continue, but systemic risks to property, ports, and power assets remain.



South Korea: Vulnerabilities: Monsoon floods, typhoons, winter snowstorms, and severe summer heatwaves.

- Recent Events:
 - 2023 floods killed 50, displaced 10,000, major infrastructure damage.
 - 2022 heatwave hit 39°C, causing more deaths (34 fatalities) than floods that year.
- Risks: Shifts in rainfall extremes, sea-level rise, and risks to ports/industrial areas.
- Business Implications: Korea's export-driven industries risk downtime and logistic bottlenecks. Strong disaster management, but limited global supply chain insurance coverage (only 25% adequate).

Indonesia: Vulnerabilities: Sea-level rise and recurrent floods; Jakarta is among the fastest-sinking megacities globally.

- Risks: Urban flooding in Jakarta, Surabaya, Bandung; coastal erosion of smaller islands; drought-driven wildfires in Sumatra and Kalimantan.
- Business Implications: Key disruptions likely in transport, commerce, and agriculture. Long-term coastal investments face rising exposure.





Thailand: Vulnerabilities: Floods, droughts, rising seas, and monsoon storms.

- Notable Event: 2011 Chao Phraya flood – 700+ deaths, 10m affected, US\$48bn in damages (double-digit % of GDP).
- Business Implications: Despite flood walls and reservoirs, vulnerabilities persist. Key risk sectors: agriculture, tourism, real estate, and manufacturing. Coastal and riverine infrastructure increasingly exposed.

Climate Disaster	Most Affected Countries	Business / Economic Fallout
Cyclones / Typhoons	Philippines, Japan, Taiwan, China	Infrastructure damage, port and airport shutdowns, supply chain delays, higher insurance premiums
Flooding & Sea-Level Rise	Indonesia (Jakarta), Thailand, China (Shanghai, Pearl River Delta), Vietnam, Pacific Islands	Capital relocation (Jakarta), manufacturing disruption, port closures, displacement of workforce
Heatwaves & Drought	South Korea, China (northern provinces), Thailand	Energy blackouts, reduced industrial productivity, crop failures, water rationing
Wildfires & Haze	Indonesia (Sumatra, Kalimantan), Australia	Air quality crisis, public health costs, tourism losses, aviation disruption
Tsunamis & Coastal Risks	Japan, Indonesia, Pacific Islands	Energy grid shutdowns, port damage, reconstruction burden, reputational risks for investors



Regional Political and Economic Implications

Climate impacts are of utmost concern and increase the regional tensions. Climate extremes in APAC are not only environmental challenges but also have regional and economic implications. In the densely-populated Asia-Pacific, climate-driven impacts can destabilize societies and escalate regional disputes. For example, Bangkok, Jakarta, Ho Chi Minh City, Manila lie in the top global vulnerability hotspots. Significant internal migration from these cities may be unavoidable if repeated flooding undermines livelihoods. It will come with significant costs and could lead to internal political instability if not handled effectively. Such large-scale displacements could further strain the already tense regional relations. It could easily trigger cross-border migration, which would only intensify regional security problems. Meanwhile, loss of fisheries or arable land could intensify competition in contested waters (e.g. South China Sea) or spark further migration pressures.

Politically, climate events also force new security postures. APAC navies and relief agencies must plan joint disaster responses (tsunami/typhoon rescue, humanitarian aid), since it becomes difficult to single-handedly deal with mega-disasters. Weak or slow government response to recurring disasters can fuel domestic unrest (anti-government protests, etc.)

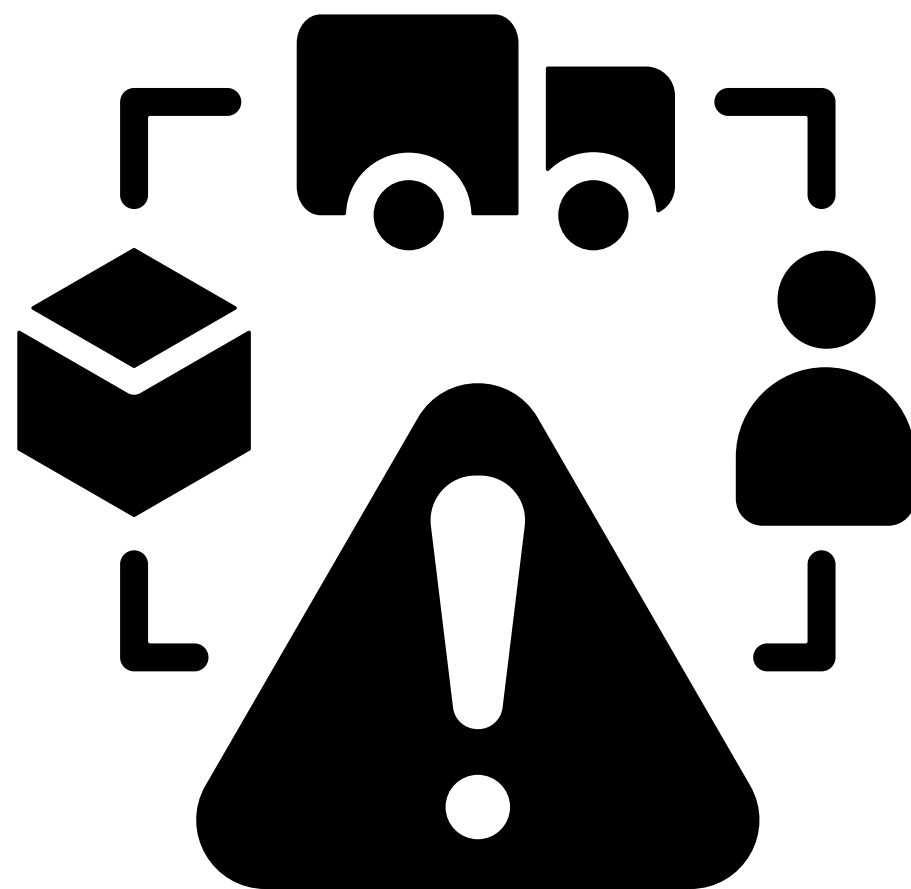
Economically, trade patterns may shift: investors might avoid geopolitically unstable areas prone to climate risk, altering regional supply chains. In 2022 APAC's economic losses due to natural disasters cost an estimated \$80 billion. Flood damages have dominated over 61% of losses. In Asia-Pacific, since 1980, weather-related natural disasters have caused losses of US\$ 1,800 billion killing more than 630,000 people. Yet less than 6% of those losses have been insured outside Japan/Australia.

International cooperation on climate change mitigation is of utmost importance not only because of its adverse effects on economic outcomes, but also because of the way it affects security issues in the region.



Business and Investment Risk Outlook

Industries and investors in the APAC region need to contend with mounting physical risk. Several key assets and supply chains (manufacturing, agriculture, ports, real estate) lie in hazard-prone zone. From a business perspective, APAC's climate risks translate directly into financial risks. Companies and investors face potential stranded assets (coastal infrastructure), supply-chain disruptions (flooded factories or farmlands), and higher operating costs (insurance, mitigation).



'In Asia-Pacific, weather-related natural disasters have caused losses of US\$ 1,800bn since 1980 and killed more than 630,000 people. The insurance gap is alarming: excluding the figures for Japan and Australia, less than 6% of the overall losses were borne by insurers.'

This means much of the burden falls on governments, businesses and households. Indeed, a recent industry survey found only 25% of firms feel confident that they have adequate insurance for supply-chain interruptions from extreme weather.



Assessment

High concentration of production in climate-exposed hubs raises the risk of systemic disruption. Rising claims from reoccurring disasters lead to higher premiums, potentially increasing operational costs in high-risk sectors. Governments are enacting stricter climate policies and resilience plans. Businesses must anticipate new compliance burdens, especially around carbon and infrastructure standards.

The adverse weather conditions can also lead to significant transit disruptions, thereby making it difficult for people to commute. The disruptions to rail, ferry and air travel can also incur losses and hamper businesses and the economy. The adverse weather conditions have raised concerns over citizen safety as well. It can lead to significant humanitarian, economic, and environmental impacts, calling out a need for extensive responses from the government.

The infrastructure also gets adversely affected with damage to roads, bridges, and public utilities hindering transportation and communication. Disruptions to local transit and business operations in and around the affected areas remain. Power outages are also likely due to adverse weather conditions. Although authorities actively issue alerts, the increasing frequency and intensity of the weather also highlights the need for better disaster management and climate resilience strategies.

Hence, climate risks in the Asia Pacific can be seen as a challenge that will shape trade, investment, and political stability the years to come. For businesses, proactive adaptation and diversification are essential to sustain growth and protect assets.



Recommendations

Strengthen Resilience Infrastructure:

Businesses ought to prioritize investment in flood defenses, drought-resistant water systems, and heatwave adaptation. For example, accelerating city floodwall projects and river basin management can prevent multi-percent GDP losses. Similarly, countries should expand seawalls and green spaces to buffer and counter storm surges.

Enhance Early Warning and Response:

Expanding meteorological monitoring and community-based early warning in vulnerable countries can be beneficial as early warnings lead to advanced preparedness. APAC governments should cooperate on cross-border early-warning for cyclones and floods, and hold joint disaster exercises.

Diversify and Climate-Proof Economies:

Businesses should diversify supply chains away from single high-risk locations. Manufacturers may use regional risk maps (e.g. disaster hotspots) to shift critical facilities. Investors should require climate-risk disclosure from companies in line with global ESG standards

International Cooperation:

Countries must regard climate impacts as shared security issues. Regional forums (ASEAN, APEC) should make climate resilience a core agenda, including coordinated migration and refugee planning if needed.

ABOUT THE AUTHOR

Bhairavi Pradhan hails from Darjeeling, West Bengal. She completed her schooling from Loreto Convent, Darjeeling and graduated from St. Joseph's University, Bangalore. She holds a Master's degree in International Relations from Amity University, Noida. She has keen interest in geopolitics and diplomacy and has honed her skills in the field of Risk Analysis.



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