

INNOVATIVE INSURANCE TO MANAGE CLIMATE RISKS

Severe storms, record heat waves, intense droughts, and floods—the impact of climate change rises every year and economic and financial losses rise with it. Insurance plays a major role in helping businesses in advanced economies mitigate the consequences of the changing climate and prepare for policy changes ahead. But insurance in emerging markets isn't yet able to make the same contribution, despite the fact that natural disasters disproportionately affect people and firms in these countries. Recently, however, a number of new business and donor initiatives have begun to create innovative approaches to using insurance to address climate change.

New research from the National Academy of Sciences shows that the warming planet makes weather patterns more volatile and the likelihood of extreme events greater.¹ Climate change will affect weather in a number of ways, only some of which can be predicted. Already global temperatures and precipitation levels are becoming more extreme. For example, in 2016, temperatures climbed to an unprecedented 54 degrees Celsius in Kuwait.²

The impact of heavy floods and extreme temperatures is obvious, but climate change poses subtler risks too. Hotter temperatures can accelerate evaporation, pulling more moisture from crops and creating longer periods of drought. Dry soil is also less able to absorb extreme rainfall, increasing mudslides and land erosion.

Gradual changes in climate can affect business operations in ways that often seem individually minor, but can collectively cause significant damage. Just a few examples include subway doors that don't close properly when temperatures reach a certain level, diseases such as malaria that reduce workforce participation, and changes to wind patterns that decrease the output of wind power systems. There are countless other ways that gradual climate changes can have an economic or financial impact on businesses.

In both the short and long term, the increasingly unpredictable nature of weather patterns also heightens the challenge of adapting to environmental changes and building what's known as resilience—or the capacity of a system to absorb stresses brought on by climate change.

That's where insurance can be a tool to help mitigate some aspects of climate change. Long used to offset risks from hazards such as fire and flood, to protect investments and assets, and to provide peace-of-mind, insurance is one of the world's largest industries.

In 2012, guarantees and disaster relief products, along with traditional life insurance and property and casualty products, generated \$4.6 trillion in premiums.

Insurance can play a critical role in offsetting climate change risk in emerging-market economies, and a number of factors are driving its use. Cellular and digital technologies now make it possible to deliver insurance to a wider range of customers in these countries at much lower cost. And investors are demanding that companies identify and disclose climate risks, especially in industries more sensitive to climate change. Coffee retailer Starbucks, for example, has already expressed concerns about how climate change could affect crops crucial to its supply chain.

In addition, the business model of insurers depends not only on the efficient management of the risks they underwrite, but also on their investment funds. These include trillions of dollars in long-term assets that can be affected by climate change.

Countries that are part of the United Nations Framework Convention on Climate Change are also interested in fostering new tools to manage climate risks within emerging markets. These include insurance. As part of the commitment to provide financing for climate change adaptation in emerging economies, donor governments have announced a range of commitments to insurance mechanisms. Often these governments work with commercial insurance providers to create new products.

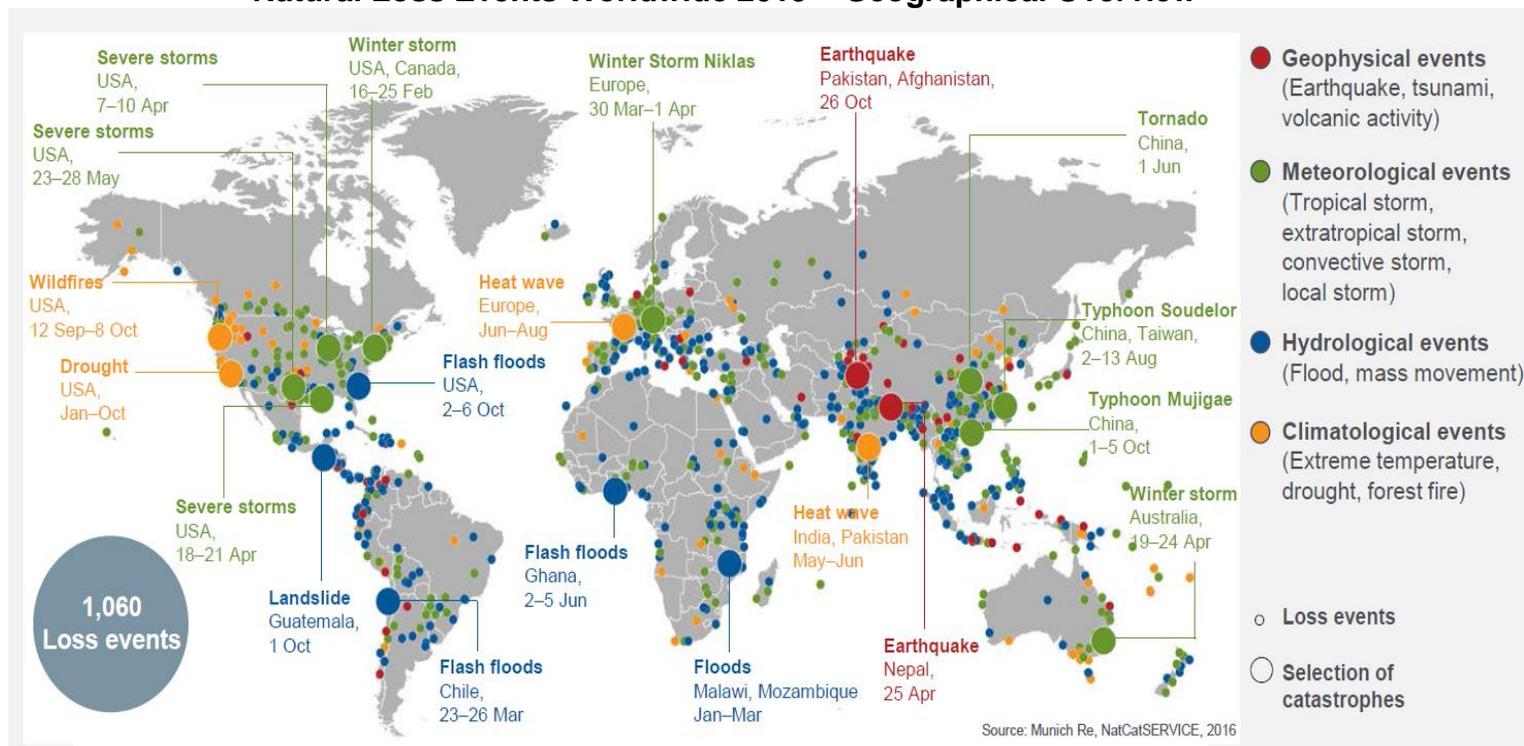
INSURANCE AND NATURAL HAZARD TRENDS

In 2015, re-insurer MunichRe estimated that more than one thousand natural hazard events resulted in losses of \$90 billion around the world. While the number of such events increased, the total costs of associated losses was slightly lower than previous

years, due in part to the El Niño effect, which suppressed the Atlantic hurricane season. More than 90 percent of natural catastrophes in 2015 were linked to weather-related events, yet only about a third of resulting losses were insured, which is in line with historical coverage trends. From 2004 to 2014, insurance covered 30 percent of global catastrophe losses, according to insurer SwissRe. Governments, companies, and people bore the brunt of losses, an estimated \$1.3 trillion.

Empirical evidence from the insurance sector shows that damage costs from weather related disasters have been rising over the past 30 years and will likely continue to grow as climate change increases the intensity of storms, droughts, and floods. These figures only detail economic losses and financial damages, and don't capture the devastating human costs of natural disasters.

Natural Loss Events Worldwide 2015 – Geographical Overview



Source: Munich Re, NatCat Service 2016.

INSURANCE IN EMERGING ECONOMIES

In order to stem the increased potential for losses, build-in resilience, and promote economic growth, companies and investors in emerging markets will need to proactively address climate risks, create new tools to mitigate damages from climate change, and find ways to adapt to a warmer world.

Insurance is still a nascent risk management tool in emerging economies. These markets account for only about 16 percent of the global insurance market, although they are growing rapidly. While some of these countries have a more mature insurance market, in general their consumers, businesses, corporations, and government regulators have less experience with insurance products than those in advanced economies.

Public entities typically form the bulk of insurance customers in emerging markets. As a country's wealth level rises, however,

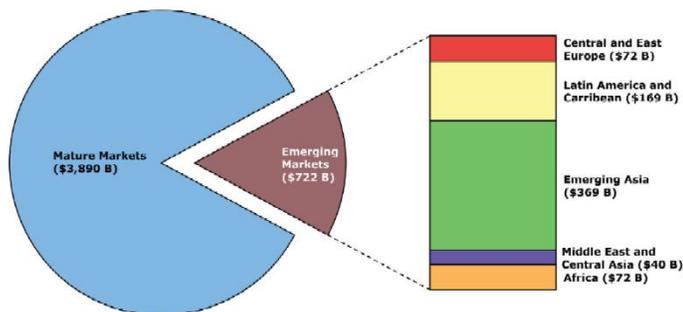
private companies and people tend to buy more insurance, primarily for motor vehicle usage.³

In many cases, prospects for developing insurance in emerging markets will depend on multiple factors, including how to understand risks, the capacity of insurance customers to bear product costs, regulatory infrastructure and transparency, and the reliability and ease with which claims can be processed and funding deployed. More fundamentally, in many emerging markets insurance is still seen largely as a luxury good, with lower priority than food, shelter, and savings. Governments have made great strides in supporting financial literacy and promoting private insurance, but in many countries few people consider buying it.

India, for example, is among those countries most vulnerable to climate change, with annual losses of between \$9 billion and \$10 billion, because of extreme weather incidents. Nearly 80 percent

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Out of a Global Insurance Market of \$4.6 trillion per year, developing countries and economies in transition accounted for 16% (2012).



Source: Swiss Re Economic Research & Consulting, 2103.
 Note: 16% of the \$4.6 trillion insurance revenues are in what insurers deem “emerging markets”, as of 2012, with the share projected to roughly double by 2023.

of those costs are uninsured. While the penetration and density of insurance products in India today stands at 1 percent of gross domestic product, losses from extreme weather conditions are boosting awareness about the ability of insurance to offset risk.

CLIMATE CHALLENGES FOR INSURABILITY

Because climate scientists are still trying to understand the physical and ecological processes affected by climate change, estimates about the magnitude and timing of expected damages vary widely, with some regions better understood than others. Uncertainties remain as to how sensitive climate and biological systems will be because of increased greenhouse gas concentrations and the timing of major changes. Even as predictive models rapidly advance, unpredictability could be a major hurdle in developing an approach to insurance that addresses climate risk.⁴

A number of additional factors further complicate the ability to develop and price climate change insurance products, including the rising frequency and severity of natural disasters, rapidly expanding populations, and higher concentrations of assets in hazard prone areas. Existing infrastructure, built without consideration of climate risks, may also become harder to insure. These factors are important for policy makers and the insurance industry to consider when developing insurance markets and other measures to manage climate change.

Still, given the very early stage of insurance markets in emerging economies, significant opportunities exist in the short and medium term to develop tools and financial products that can help manage and mitigate climate-related risks and help those exposed to these risks absorb economic and financial shocks.

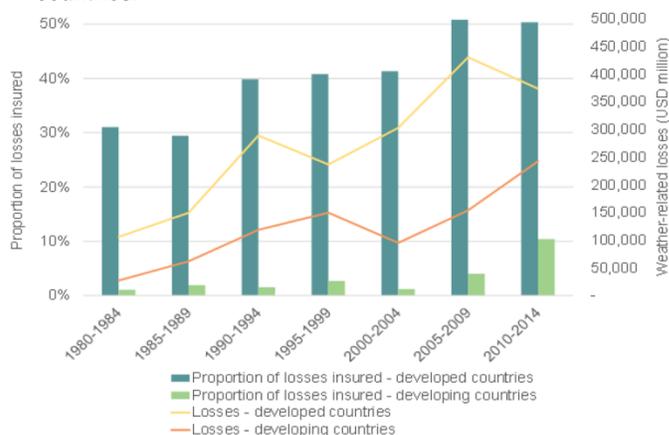
INNOVATIVE INSURANCE PRODUCTS IN RESPONSE TO CLIMATE CHANGE

The World Bank and IFC are taking part in a broad effort to create innovative insurance products that will be crucial to economic growth in emerging markets. They also participate in the Global Innovation Lab for Climate Finance, which supports the identification and piloting of cutting-edge climate finance instruments, including programs to develop new insurance mechanisms. Though many of these initiatives are at an early stage, they could soon offer insights and strategies to use insurance to promote climate risk management.

Index insurance for small farmers

By paying benefits on the basis of a pre-determined index, index insurance can help stabilize the income of the world’s 2.5 billion small farmers. The index used for this insurance tracks objectively determined indicators such as rainfall or livestock mortality rates in order to estimate assets and investment losses resulting from weather or other catastrophic events. Eliminating the need for traditional claims assessment makes the settlement process simpler, quicker, and more objective. Index insurance initiatives are being tried around the world. The largest effort is the Global Index Insurance Facility, a multi-donor trust fund managed IFC

Despite Growth, the proportion of insured weather-related losses in developing countries is lower than in developed countries.

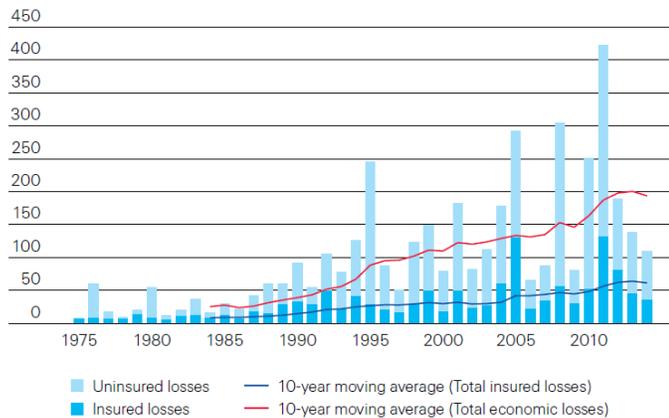


Source: Vivid Economics based on data from Munich Re, NatCat Service.

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and the World Bank which operates in 31 countries and insures a total of 1.3 million farmers.

Natural Catastrophes Losses: Insured vs Uninsured losses, 1975–2014 (in 2014 dollars, \$ billions)



Source: Swiss Re, *Underinsurance of Property Risks: Closing the Gap*, 2015.

In India, a favorable regulatory environment and effective outreach have led to a dramatic increase in small farmers using index insurance. As of 2012, 22 million farms were covered by a yield-based index and three million by weather index insurance. The Syngenta Foundation in India offers farmers a product that combines weather index insurance with high value hybrid corn seeds. Seeds sown by farmers are insured for failure of monsoon through a replanting guarantee.⁵ Syngenta has a similar program in Kenya. The expanded reach of mobile phone banking is also making it possible to bundle crop insurance with phone services to reduce transaction costs and reach more farmers.

Establishing a successful, commercially sustainable index insurance program still faces many challenges, including the need for reliable local weather information, which is a resource many poor countries lack. Without it, payouts may be inaccurate and farmers unwilling to participate.⁶ Another challenge is the reluctance of smaller farmers to pay premiums, which results in the need for public subsidies for a program even when it is economically viable and attractive.

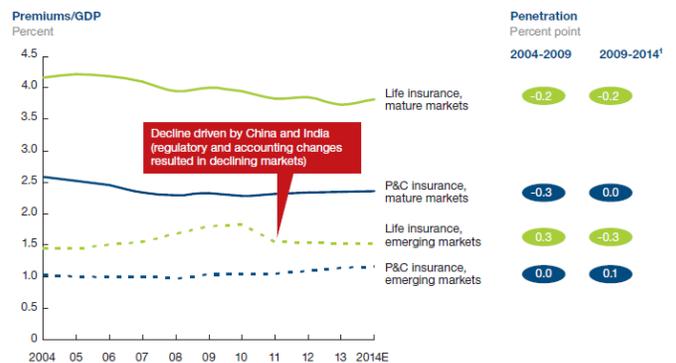
Sovereign risk programs for disaster response

Disaster relief programs are primarily a government responsibility, with donor help often provided after major weather events such as hurricanes and floods. However, the insurance industry also has an important role to play in designing and administering publicly supported post-disaster relief programs.

Africa Risk Capacity, for example, is a program that supports pre-approved disaster relief programs for participating African countries, and is based on risk pooling and risk transfer. Payments are made when a pre-agreed threshold event occurs, such as a

sufficiently severe deviation from normal rainfall levels. This approach gives countries quick access to capital when most needed, without lengthy processing. In its first year, Africa Risk Capacity made \$30 million in payments in response to severe drought events. The World Bank Group, along with private insurers, supports similar programs in the Caribbean and Pacific regions. Private insurers benefit from participating in these programs. While they remain mostly oriented for governments, these programs benefit the local private sector by reducing losses to the national economy and speeding recovery.

Penetration Rates Vary by Product Line and Region



FN 1 2014 based on available 1H or 3Q reporting; at fixed exchange rates 2013. Source: McKinsey Global Insurance Pools, Oxford Economics.

Uruguay insurance for power, drought, and oil imports

Because Uruguay generates a substantial amount of energy through hydroelectric plants that rely on rainfall, lower than usual rain levels have decreased energy production in the country. In 2012 hydropower production slumped because of a prolonged drought, forcing the government to buy costly fossil fuel electricity. Another drought in 2008 caused \$900 million in crop losses and threatened the availability of power.

In 2013 Uruguay adopted climate insurance, facilitated by the World Bank and administered by Swiss Re, to insure against drought. Throughout the country’s main water basins, 39 stations measure precipitation and generate a daily index. When rainfall drops below a minimum index level, which is re-established every few months, the insurance contract goes into effect. The amount of money disbursed depends on the severity of the drought, as well as on the price of oil on the date the insurance is activated.

CONCLUSION

Insurance products are one approach among many that offer innovative methods to manage and mitigate growing risks of climate change to economic development, particularly in emerging markets. Insurance may also help businesses and consumers withstand financial shocks brought about by climate-related events and may be an important component to managing the impact of climate change on growth. Still, challenges remain

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to building insurance markets in these economies and to developing products that manage climate change risks. ■

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¹ The National Academy of Sciences, Engineering, Medicine, "Attribution of Extreme Weather Events in the Context of Climate Change," 2016.

² James Tapper, "Think you're hot?" *The Guardian*, July 23, 2016.

³ SwissRe Global Insurance Review and Outlook 2015, 2016.

⁴ William Gail, "A New Dark Age Looms," *New York Times*, April 19, 2016.

⁵ Earth Security Group, "Indian Insurance and Sustainable Development," 2016.

⁶ Allianz, Microinsurance, "Effective protection against poverty?" March 16, 2015.