

# Weathering climate change: Insurance solutions for more resilient communities



More than 3.4 billion people worldwide are already threatened by natural hazards, most of them in the developing world. Climate change could make matters even worse. Innovative insurance solutions offer these large populations more adequate financial tools to help them cope with the growing risks in a changing climate.

# Weathering climate change: Insurance solutions for more resilient communities

**Climate change will continue to expose local communities to the mounting challenges – and costs – of protecting lives and assets against extreme weather and other climate-related risks. These range from more frequent and severe storms, floods, droughts and other natural disasters to sea level rise, crop failures, and water shortages. Science can give some clues about the changes in climate which will force societies to adapt. But national and local decision-makers will still have to make policy and investment choices under a large degree of uncertainty and cater for a variety of future climate impacts.**

**One of the biggest challenges they face is mobilising the requisite financing for adaptation. Since funds are limited and budgets are tight, efficient allocation of financial resources is essential to manage the growing threats of climate change. Insurance is a powerful tool in this endeavour. By putting a price tag on risks, it promotes the right incentives to move societies towards more resiliency. At the same time, investments in physical adaptation measures are important to keep risk transfer premiums affordable and ensure the long-term insurability of climate risks. Innovative insurance solutions often present the most cost-effective way to deal with low-probability, high-severity weather events, providing a mechanism to finance a disaster before it strikes.**

## A case for action: adapting to a changing climate

Over half of the world's population lives in regions highly exposed to natural disasters. Across these communities, economic losses from climate change are already substantial – and on the rise. But only a part of them are insured. Worldwide, insured losses alone from weather-related disasters have jumped from USD 5.1 billion per year in the period between 1970 and 1989 to USD 27 billion annually over the last two decades.<sup>1</sup> Events such as Hurricane Katrina in 2005 pushed the annual cost of catastrophes to over USD 100 billion in that same year.<sup>2</sup>

Global warming, which could see the Earth's surface temperatures rise by 1.1 to 6.4 degrees Celsius before the end of the century, could further heighten this vulnerability.<sup>3</sup> With global temperatures changing, storms and floods would likely become more severe and more frequent, and sea levels could rise up to one-and-a-half metres by the end of the century. The most vulnerable regions are in the developing world. According to the Economics of Climate Adaptation (ECA) Working Group, current climate risks could cost emerging economies anywhere between 1 and 12 percent of annual gross domestic product by 2030. Under a high climate change scenario, this figure could rise up to 19 percent.<sup>4</sup>

As climate change puts more lives and properties at risk, adaptation is rapidly becoming a priority requiring urgent action at both national and local levels. The United Nations estimates that by 2030 the world should be spending an additional USD 36 to 135 billion each year to address the effects of climate change. To support these efforts, the organisation has set up a separate Adaptation Fund to make available financing for adaptation projects in the developing world. It is one of numerous international funds designed to channel money to communities threatened by climate risks.

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<sup>1</sup> Source: [http://www.swissre.com/media/media\\_information/Global\\_insurance\\_review\\_2009.html](http://www.swissre.com/media/media_information/Global_insurance_review_2009.html)

<sup>2</sup> Swiss Re sigma report 01/2010: Natural catastrophes and man-made disasters in 2009.

<sup>3</sup> IPCC Fourth Assessment Report 2007.

<sup>4</sup> Report of the Economics of Climate Adaptation Working Group 2009. Shaping climate-resilient development – a framework for decision-making.



Destruction left by Hurricane Charley in Punta Gorda, Florida in August 2004.



The resources committed to such global initiatives, however, fall far short of what is actually needed for adaptation worldwide, particularly in the poorest countries. And much uncertainty remains over the long-term impacts that future climate trends will have on local communities. Such ambiguity leaves decision-makers with a series of unanswered questions when considering how to prepare for the projected change in climate. These questions include: What is the potential loss that their societies will face in the coming years due to climate change? How much of that loss can they avert and how? How much investment do they need to fund adaptation measures? And, will the benefits of this investment outweigh the costs?

Since resources for climate adaptation are finite, trade-offs are inevitable. Decision-makers must have the facts to allocate resources more efficiently and make informed choices about those investments that promise to yield the highest economic benefits to their constituents. This includes using location-specific information to systematically assess climate risks, quantify their potential impact and identify the most cost-effective adaptation measures.

## Insurance can make communities more resilient to climate risks by protecting them against damage from the most rare and severe weather events.

Insurers and reinsurers have much to contribute towards such an approach through their risk management expertise. They can do so in at least three ways:

- The industry has extensive experience in modelling, pricing and managing risk. These capabilities are indispensable to understand and respond to the total climate risk faced by a local community.
- Insurance is itself a valuable component of a comprehensive climate adaptation portfolio. It is an effective way to make societies more resilient by protecting them against the residual risk from low-frequency, high-severity weather events. In addition, it reinforces risk prevention measures by incentivising investments in activities with net economic benefits and helps free up resources for other capital-intensive investments. Insurance can also support the construction of climate adaptation infrastructure, such as with engineering covers and surety bonds.
- The insurance industry can work with governments to design and deploy new and innovative risk transfer solutions that can play their part in helping the most vulnerable societies cope with large natural disasters, especially in the developing world.

### Modelling, pricing and managing risk: a basis for understanding and responding to total climate risk

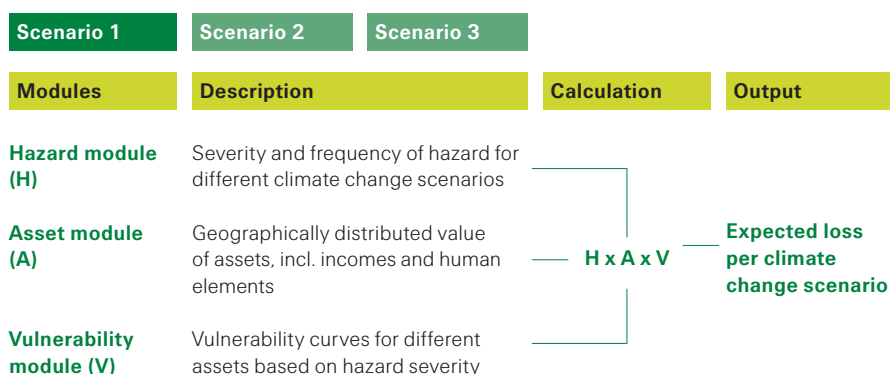
Climate change is likely to significantly increase losses over the next 20 years, as warmer temperatures lead to more severe and frequent weather disasters, rising sea levels, and shifts in rainfall patterns and climate zones. But climate is only one factor driving this increase. Economic growth around the world since the 1970s has led to higher costs associated with natural catastrophes, as has the concentration of economic value in certain regions of the world that are prone to natural hazards. The state of Florida, for example, has seen its population nearly triple and its economy expand rapidly over the last four decades.<sup>5</sup> And yet, today as then, the Sunshine State is regularly affected by hurricanes moving up along the south-eastern seaboard of the United States.

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<sup>5</sup> US Census Bureau.

**Figure 1: Quantifying annual expected losses**

3 climate change scenarios



Source: Swiss Re

To understand the local nature of climate risk and quantify the potential damage to a local economy, it is therefore important not only to assess the frequency and severity of climate hazards, but also to identify the value and vulnerabilities of assets they put most at risk. This method is common in the insurance and reinsurance industry, which uses probabilistic models to determine expected losses. By analysing hazard frequency and severity in conjunction with the concentration of assets, such an approach provides the basis for determining a location's total climate risk (Figure 1).<sup>6</sup>

The magnitude of total climate risk is calculated by combining existing climate risks, the value at risk driven by economic growth and the impact of future climate change. For example, hurricanes pose the greatest hazard to communities in southern Florida over the next twenty years. Climate change could worsen this risk significantly by increasing the intensity of future hurricanes and the damage they cause. An assessment of total climate risk in this region reveals that losses from hurricane winds, storm surge and floods could double over the next two decades, from an average annual loss of USD 17 billion in 2008 to USD 33 billion in 2030. While actual future losses can vary substantially from these projections, a substantial part of the increase is driven by further economic growth in areas exposed to hurricane risk.

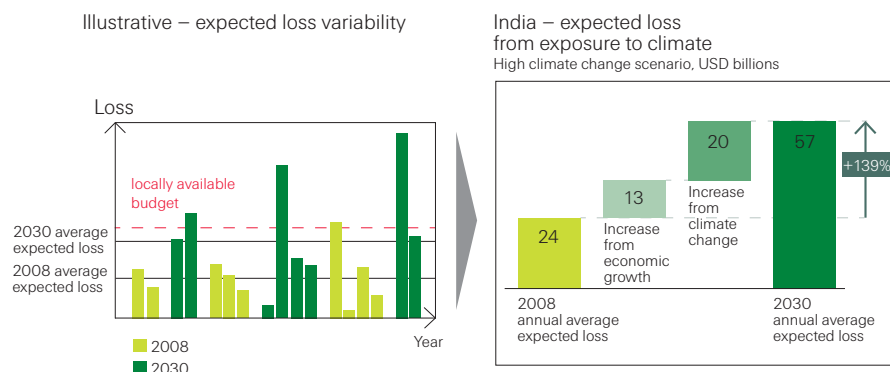
#### Drought risk to agriculture in Maharashtra, India

The state of Maharashtra has the largest area of drought-prone agricultural land in India. Three years of crippling drought between 2000 and 2004 caused terrible hardship for the two-thirds of inhabitants who depend on agriculture for their livelihoods. As a result of the drought, crops failed, quality of harvests declined, livestock died, available employment decreased and household debt increased. Scores of families fell below the poverty line, some starved and several farmer suicides were reported. Many other parts of India also face the risk of drought from erratic rainfall patterns, which affect agricultural production and economic development. Climate change could make matters worse. The Economics of Climate Adaptation (ECA) Working Group estimates that in Maharashtra, a specific extreme event such as a 1-in-25 years drought may affect up to 30 million people or 30 percent of the region's population. Among them are 15 million small and marginal farmers. The same event would reduce 14 percent of agricultural output and 30 percent of food grain production, increasing farmers' debts by 26 percent and 96 percent, respectively. Although the region's adaptation challenges are considerable, decision-makers have the opportunity to put together an effective portfolio of climate resilience measures, at limited cost and with insurance a key part of the solution.

<sup>6</sup> For a more detailed discussion, see Swiss Re report 2003: Natural catastrophes and reinsurance.



**Figure 2: Drivers of total climate risk**



Source: Swiss Re

### Drought losses on the rise in Maharashtra, India

In the Indian state of Maharashtra, today's expected annual loss from drought stands at almost USD 24 billion, equal to 2.5 percent of the region's agricultural output. Under a high climate change scenario, potential annual losses could rise to USD 57 billion by 2030, an increase of 139 percent that could affect over 4 percent of agriculture production. While much of this is attributable to reduced rainfall and more frequent heat waves, a shift towards higher value horticultural crops and sugar cane is also responsible for putting greater agricultural asset values at risk.

Yet predictions about future climate are frayed with uncertainties. To account for these, decision-makers have to plan for different climate change scenarios and factor in varying degrees of losses. A total climate risk approach can provide important guidance by assessing the total losses that a community is likely to face today and in the future under various climate change scenarios. It considers a continuation of today's weather patterns, projected asset values at risk and additional climate change (Figure 2).

The ECA Working Group first applied and tested this methodology in eight different regions of the globe representing various climate hazards and stages of development. The findings from these test cases confirm that significant economic value is at risk. Today, the locations studied already stand to lose between 1 and 12 percent of GDP annually as a result of existing climate patterns. When adding the effects of economic growth and climate change, the total potential loss by 2030 rises to as much as 19 percent of annual GDP.<sup>7</sup>

But assessments of total climate risk do not provide any clues on the most suitable response to climate-related impacts. For that, decision-makers need to know the costs and benefits of adaptation measures available to them. These may include infrastructural, technological, behavioural or financial solutions. Only when combining a total climate risk approach with a cost-benefit analysis of location-specific adaptation measures is it possible to determine how to adapt to climate change in the most efficient way.

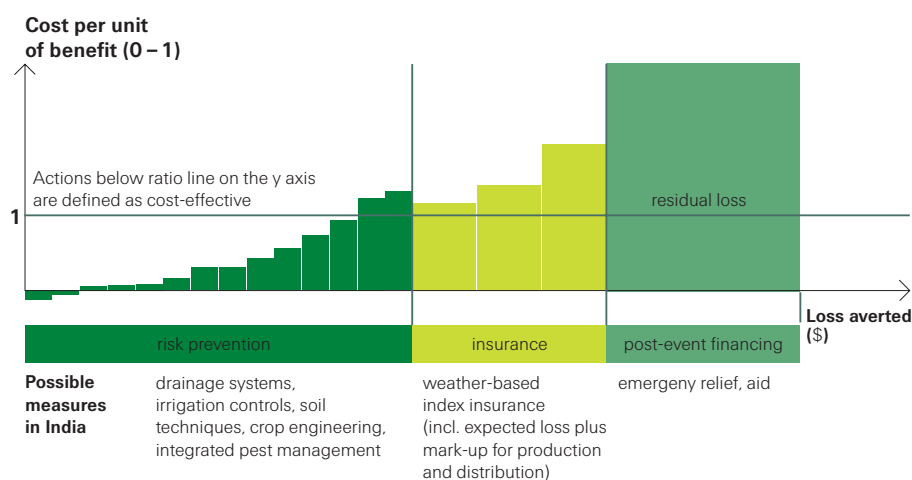
The output of this step is a prioritised ranking of the most cost-effective measures, depicted in an "adaptation cost curve" around which a society can build its climate adaptation strategy. Risk transfer generally offers an attractive option to protect against high-severity, low-frequency events. But residual risks can remain that may be only partially covered by insurance (Figure 3).

<sup>7</sup> For additional ECA findings see [www.swissre.com/climatechange](http://www.swissre.com/climatechange).

### Cost-effective adaptation in Maharashtra, India

A cost-benefit analysis of adaptation measures shows that Maharashtra can cost-effectively avert almost half of its expected drought loss to 2030. Measures include drip and sprinkler irrigation, drainage, watershed management, better soil techniques, pest management and crop engineering. Risk transfer is an important complement to protect against severe drought. Together, insurance and risk prevention form a cost-effective adaptation portfolio that addresses up to 80 percent of potential losses. Yet, some residual loss of around 20 percent remains that cannot be averted through known measures.

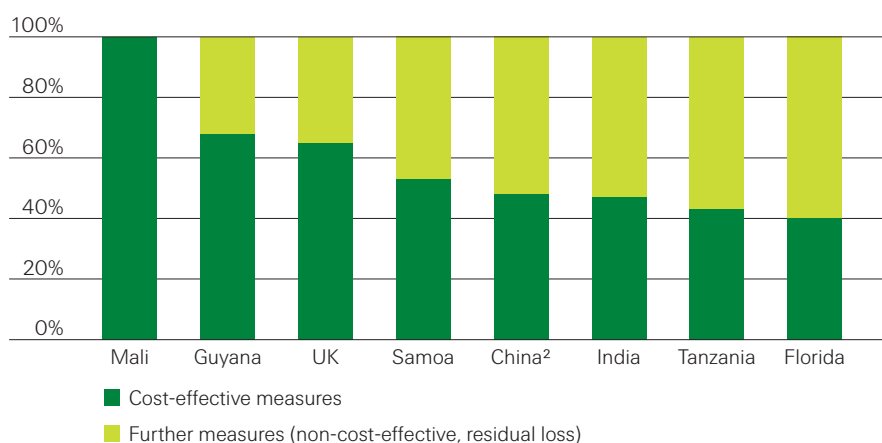
Figure 3: Cost curve of climate adaptation measures



Source: Report of the Economics of Climate Adaptation Working Group 2009

This analysis tells another, more encouraging story about the challenges of climate adaptation. In the countries studied by the ECA Working Group, anywhere between 40 and 68 percent – and in one instance close to all – of the average annual expected losses can be prevented cost-effectively through known and readily available adaptation measures. These include improved drainage and irrigation systems, sea barriers and enhanced building codes, vegetation buffers and disaster awareness campaigns, among many others. In the case of Florida, for example, around 40 percent of total expected losses under the high climate change scenario could be averted cost-effectively, with measures such as levees, vegetation management and changes to the way that houses and apartments are built (Figure 4).

Figure 4: Average annual expected losses



Source: Report of the Economics of Climate Adaptation Working Group 2009



## Climate risks threaten local communities around the world



Indian villagers hold onto their household items as a makeshift vessel is pulled through the flood waters after heavy rains in East Midnapore in June 2008 (top).

Drought resulting in crop failures and water shortages can threaten food supplies and contribute to the spread of infectious diseases. According to WMO estimates, between 1 and 2.4 billion people will be living in water-scarce regions by 2025 (left).



Storm surge and high winds caused by Hurricane Isabel overtake and destroy the North Carolina State Highway in September 2003 (right).

### Securing climate-resilient development in the Caribbean

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is an innovative, multi-country risk transfer solution that forms an integral part of the region's overall climate adaptation strategy. The CCRIF launched a study in February 2010 on the Economics of Climate Adaptation (ECA) in the Caribbean region. Its findings reinforce the importance of building a balanced portfolio of risk prevention and risk transfer measures to cost-effectively address the impacts of climate change.

#### About the Caribbean Catastrophe Risk Insurance Facility (CCRIF)

The Caribbean Catastrophe Risk Insurance Facility provides 16 Caribbean governments with short-term liquidity in the event of hurricanes and earthquakes, which pose a significant threat to communities in the region. Climate change is likely to exacerbate hurricane risks even more.

The CCRIF was launched in 2007 following the passage of Hurricane Ivan, which swept across the Caribbean in September 2004. Ivan was the tenth most intense Atlantic hurricane ever recorded, killing

over 100 people and causing billions of dollars in losses. In both Grenada and the Cayman Islands, losses reached close to 200 percent of annual national GDP. But Hurricane Ivan also laid bare the obvious limitations of post-disaster financing. While funding from the international community eventually poured into the region, relief aid was slow to materialise and could only support a limited number of infrastructure projects.

In response, the Caribbean Community (CARICOM) decided to seek a more viable alternative and promote catastrophe risk insurance to mitigate the cash flow problems faced by its members after a major disaster. This marked the beginning of what would eventually become the CCRIF. By putting contingent funding in place before catastrophes occur, this facility represents a real shift in the way that governments treat risks and the economic costs associated with them. It gives participating governments the unique opportunity to purchase earthquake and hurricane catastrophe coverage with the most attractive pricing.

The first insurance scheme of its kind worldwide, the CCRIF also innovates in its combined use of traditional insurance

and capital market instruments. To date, it is the only regional fund to successfully develop and offer parametric insurance policies to participating members. In its first year of operation, the facility made two payouts totalling around USD 1 million after a magnitude 7.4 earthquake shook the eastern Caribbean in November 2007. CCRIF made a further payout of over USD 6 million to the Turks & Caicos Islands after that island nation was severely impacted by Hurricane Ike. The sums of money went towards post-disaster recovery efforts. For 2010 – 2011, CCRIF's aggregate exposure for policies written was just over USD 600 million. Some USD 20 million were retained by the CCRIF, while an additional USD 110 million were purchased from the international reinsurance and capital markets – including Swiss Re – to increase the claims-paying capacity of the facility.

When a massive 7.0-magnitude earthquake hit Haiti in January 2010, the CCRIF's parametric earthquake insurance policy paid its full limit of just under USD 8 million, providing the nation rapid access to insurance proceeds after the quake. Measured against the loss of life and devastation on the island, the USD 8 million payout was not a major sum of money. It did, however, provide much-needed liquidity to get the wheels of government turning again. In addition, the Haitian catastrophe has highlighted the potential of parametric insurance to help countries plan for and pre-finance natural disasters as part of a comprehensive disaster risk management strategy.

#### The CCRIF's Economics of Climate Adaptation (ECA) initiative

Recognising that decision-makers need a quantitative fact base to draw up sound and cost-effective adaptation strategies, the CCRIF launched a study in February 2010 on the economics of climate adaptation in the Caribbean region. The findings reinforce the importance of building a balanced portfolio of risk prevention and risk transfer measures to cost-effectively address the impacts of climate change.



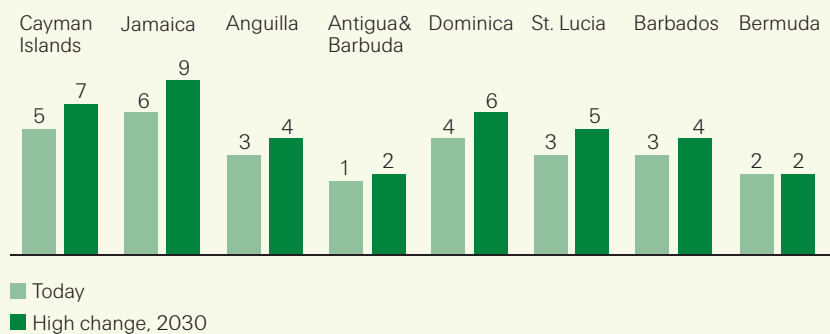
Time-lapse satellite imagery of Hurricane Andrew sweeping across the Caribbean region and making landfall in the United States in August 1992.



## Climate impact on the national GDP of eight Caribbean island states

### Expected loss from climate risk today and in 2030

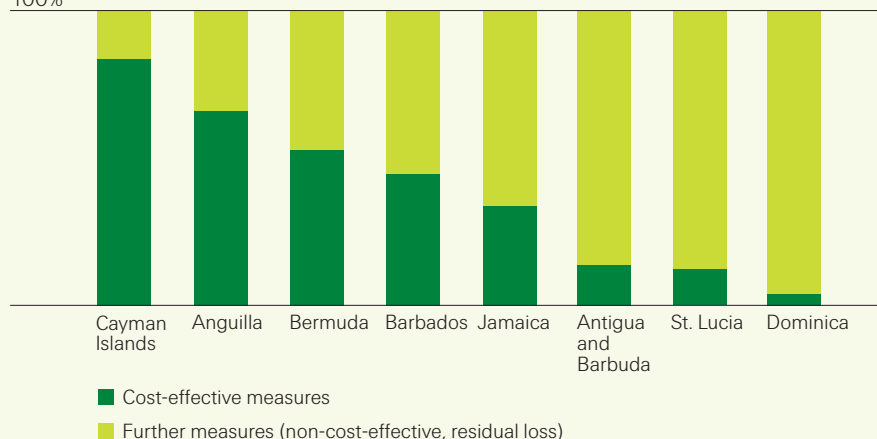
% of GDP



Source: Caribbean Catastrophe Risk Insurance Facility.

## Cost-effective prevention of annual expected losses in the Caribbean

100%



Source: Caribbean Catastrophe Risk Insurance Facility

Using a total climate risk approach, the CCRIF's ECA project initially assessed the potential economic impact of climate change in eight Caribbean countries, including Anguilla, Antigua and Barbuda, Barbados, Bermuda, the Cayman Islands, Dominica, Jamaica and St. Lucia. Findings from these studies indicate that the potential damage from hurricane-induced wind, storm surge and flooding is already high in the region, with today's annual expected losses ranging anywhere between 1 percent of GDP in Antigua and Barbuda and 6 percent of GDP in Jamaica.

Climate change could significantly increase these risks over the next 20 years and threaten the region's development prospects if countries take no further adaptation measures. The study finds that under a high climate change scenario, expected losses as a proportion of GDP could rise by another 1 to 3 percentage points, costing some Caribbean countries up to 9 percent of national income by 2030. In absolute terms, this means that losses could more than double between now and 2030.

But the CCRIF's ECA study also shows that many affordable adaptation measures are available to address the total climate risk in the region. In fact, under a high climate change scenario, Caribbean countries can cost-effectively avert anywhere between 2 and 90 percent of expected losses in 2030, depending on their level of development and topographic characteristics. Measures include constructing sea walls, enforcing building codes and other risk prevention initiatives. But to protect local communities against the financial consequences of low-frequency, high-severity events, risk transfer – or insurance – generally proves to be more cost-effective than additional prevention measures.

**Additional information on the ECA methodology, first published in the ECA Working Group report "Shaping Climate-Resilient Development" and findings from other country case studies are available at [www.swissre.com/climatechange](http://www.swissre.com/climatechange)**

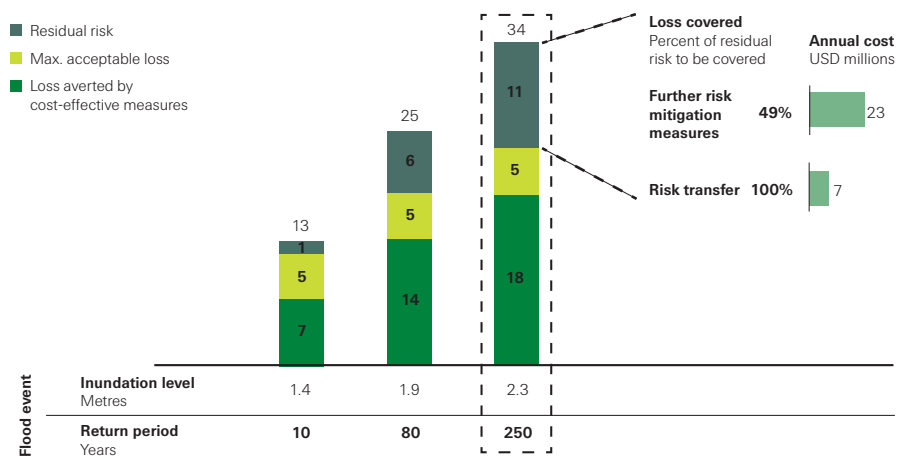
## Insurance: a valuable component of a comprehensive climate adaptation portfolio

As the ECA case studies show, climate puts substantial economic value at risk – across different geographies, development stages and climate hazards. Therefore, decision-makers have much to gain from strengthening their economies’ resilience to climate change. This makes a strong case for preventive action. Yet, disasters are unforeseeable in their timing and unpredictable in their severity. While a community can prevent much of the average annual expected loss, no community can afford to prevent damage from every imaginable risk event, especially from those hazards that are least likely to occur and can only be averted at a prohibitively high cost – if at all.

In such instances, insurance usually proves to be the most cost-effective adaptation measure. To prepare for rare but high-severity events, transferring risk to the insurance and capital markets is generally more economical than trying to shore up limited resources and directly prevent possible losses. By offloading residual risks to a broader community, risk transfer not only caps losses suffered by individuals and firms, but it also reduces the burden on public budgets. In so doing, it makes local communities more resourceful when a disaster strikes and protects livelihoods from potentially catastrophic damage.

**Figure 5: The business case for risk transfer**

Samoa – further measures are required to cover residual risk  
Losses incurred by flood events in 2030, in percent of GDP



Source: Report of the Economics of Climate Adaptation Working Group 2009

The case of Samoa poignantly illustrates the value of risk transfer to climate adaptation efforts. This island state of the South Pacific is highly vulnerable to flooding from tropical cyclones and salinisation. Some 70 percent of Samoa’s villages lie along the coast, and one in three buildings is located below four metres elevation. Sea level rise caused by climate change may significantly magnify the threat to its local population.

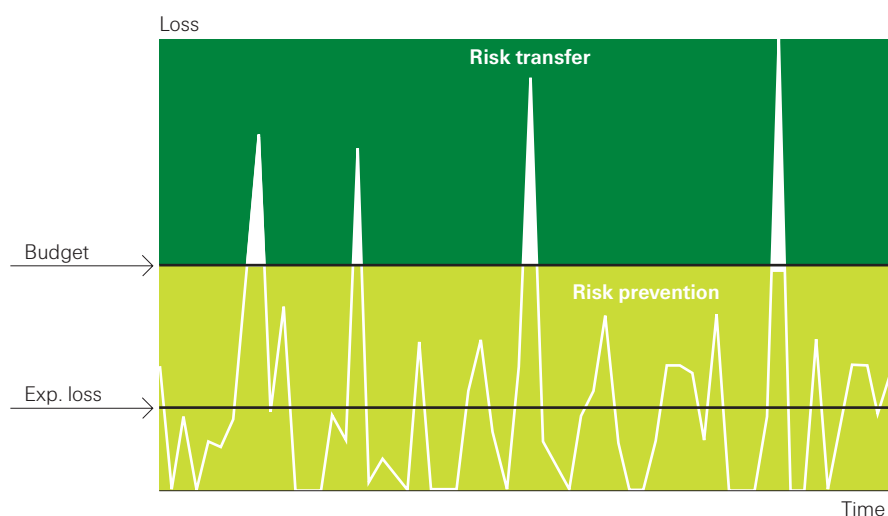
Since losses can vary substantially from year to year, loss probabilities must necessarily inform decisions to strengthen disaster preparedness and determine the optimal level of protection. Under such circumstances, insuring damage from extreme weather events with lower probabilities is usually more economical than trying to avert such losses altogether. For example, if Samoa decided to defend its economy against a one-in-250-years storm surge, risk transfer would be much cheaper than introducing additional technical risk mitigation measures (Figure 5).

## Risk transfer and risk prevention play complementary roles in building a location's climate resilience.

Risk transfer and risk prevention are mutually reinforcing. Insurance can help to hedge against unacceptable losses from weather events, but keeping insurance prices in check through prevention is equally important. In the Samoa case, for example, improving defences against storm-surge waves has the dual benefit of reducing exposure to storm perils while at the same time ensuring that risk transfer options continue to be affordable for less frequent, more severe storm events. Properly set insurance premiums, in turn, provide a strong incentive to invest in those types of prevention activities that promise to yield net economic rewards.

But as decision-makers look across the broad range of adaptation measures available, they must find the right balance between risk prevention and risk transfer options to ensure the most optimal use of funds. Generally, it makes more economic sense to build defences against severe climate impacts and transfer the risk of the most extreme events rather than to design an infrastructure that can withstand the largest disasters. Yet, the extent to which a community should insure risk also depends on location-specific circumstances and other subjective considerations, such as decision-makers' willingness to accept a certain level of risk, local policy priorities and budget limitations (Figure 6).

**Figure 6: Drivers of demand for risk transfer**



Source: Swiss Re

Besides reinforcing preventive action, insurance against climate risks has wider economic benefits, too. It provides appropriate incentives for attracting private-sector financing, which is indispensable to drive innovation and create sustainable adaptation solutions. And by allocating adaptation funds more efficiently to measures that promise to yield net benefits, risk transfer frees up resources for other investments needed to stimulate economic growth and achieve broader development goals.

Extending insurance cover would therefore have particularly far-reaching benefits in the most vulnerable regions of the developing world, where resources are scarce and the potential impact of climate change fierce. Yet, a significant percentage of assets in emerging markets remains uninsured. Measured in premiums as a percent of GDP, average insurance penetration rates of 2.9 percent in developing countries are far below those in industrialised countries at 8.6 percent.<sup>8</sup>

<sup>8</sup> Swiss Re sigma report 02/2010: World insurance in 2009.



## Public-private partnerships: deploying innovative risk transfer solutions

Risk transfer benefits climate-affected communities by helping households, businesses or governments spread risks over time and geographic area. With its financial clout and geographically diversified reach, the global insurance industry is uniquely positioned to provide the requisite financing for disaster preparedness. It is also a key ally to national and local decision-makers seeking to add risk transfer to their mix of climate adaptation measures. Among the range of solutions available to them are traditional, indemnity-based insurance schemes, but also alternative transactions using catastrophe bonds and other insurance and capital market instruments.

For insurers and reinsurers to deliver commercially viable solutions, public sector authorities need to put in place an appropriate enabling environment. In developed countries with a functioning insurance market, the role of government may be limited to enforcing regulatory policy, setting building codes, regulating land use and performing other key enforcement functions. But in less developed economies, providing risk transfer can be much more difficult.

## Extending climate risk insurance through public-private initiatives could bring far-reaching benefits to the developing world.

Since insuring climate risks generally requires large back-up capital and extensive administrative efforts, strong public-private partnerships are vital to extend adequate cover to populations threatened by large natural disasters in the developing world. With relatively low administrative costs and faster payout times, micro-insurance schemes and index-based weather insurance are therefore particularly attractive for cash-strapped developing countries. Public-private collaboration in several emerging markets has already produced a number of innovative transactions. Among them are weather-index solutions in Africa and India, catastrophe bonds in Mexico, and parametric earthquake and hurricane covers for Caribbean nations.

Many of these and similar solutions can be replicated elsewhere and adjusted to the specific risk exposure of other parts of the world. But since one approach clearly does not fit all circumstances, protecting communities against location-specific climate risks requires constant innovation and tailor-made responses. Global insurers and reinsurers have much to contribute towards these efforts through their expertise in risk management. But it is the combination of public and private resources that deliver the most robust, sustainable solutions to reduce the risks of climate change faced by societies around the world.

### Insurance solutions for Indian farmers

Climate adaptation is a key development issue, and risk transfer an important part of the solution. Access to insurance in the event of a disaster or adverse weather not only caps losses suffered by farmers in emerging markets, but it also gives them the financial means to prepare for the next season without having to sell their assets and migrate to other businesses. In neighbouring regions of Maharashtra in India, Swiss Re pioneered index-based weather insurance in collaboration with microfinance institutions and the local direct insurers as early as 2004. Since then, an industry has developed that provides coverage against poor monsoon rainfalls to several hundred thousand farmers. At an estimated annual premium volume of about USD 100 million, more than 1 500 000 farmers have taken weather insurance policies through schemes provided by the government-run Agricultural Insurance Company and private insurance companies. Weather insurance developed into an alternative to the national agricultural crop insurance, not least due to the relative quick payouts which contrast sharply with the loss settlement of the national scheme that can take up to 24 months until farmers receive their money.

## Conclusion

The effects of climate change are being felt already and are likely to intensify, putting more people and assets at risk. But since it is difficult to predict the exact impact of climate change on local economies, decision-makers will have to make policy and investment choices about climate adaptation under a large degree of uncertainty. This is why a systematic, fact-based risk management approach – which takes into account long-term climate trends and varying future scenarios – is key to protecting communities against the unpredictable consequences of climate change.

In a changing climate, adaptation is essential to make societies more resilient and secure future development paths. It is therefore part and parcel of a country's broader development strategy. This is critically important because the insurability of natural catastrophes and climate-related risk depends as much on social and environmental policies, urban and geographic planning, as it does on physical defences and disaster planning. For decision-makers, then, a major challenge is to adopt a comprehensive risk management approach that not only strikes the right balance between loss prevention and risk transfer, but is also firmly embedded in a broader strategy of economic growth and development.

Practical steps to effective adaptation are available and largely affordable, with insurance playing an important role. The right tools and location-specific information can assist decision-makers in better assessing local climate risk and allocating public and private sector funding to the most cost-effective measures. The challenges of climate adaptation are particularly pressing in the emerging markets of the developing world. In these countries, partnerships between the global insurance industry, public sector institutions and civil society are vital to unlock innovation and create new investment opportunities. Such public-private collaboration would help make available more funding for adaptation at a time when it is more urgently needed than ever.

Effective climate adaptation requires a comprehensive risk management approach that is firmly embedded in a broader strategy of economic growth and development.

In collaboration with governments and other public and private sector partners, Swiss Re has been continuously expanding its work on the economics of climate adaptation in different regions of the world. For more information on individual country case studies and the newest findings, please visit our website at: [www.swissre.com/climatechange](http://www.swissre.com/climatechange)



Aerial view of agricultural fields in the foothills of Rajasthan, India.

Swiss Reinsurance Company Ltd  
Mythenquai 50/60  
P.O. Box  
8022 Zurich  
Switzerland

Telephone +41 43 285 2121  
Fax +41 43 285 2999  
[www.swissre.com](http://www.swissre.com)

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Title:  
Weathering climate change: insurance  
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Authors:  
Patrick Reichenmiller, Andreas Spiegel,  
David Bresch, Reto Schnarwiler

Editing and realisation:  
Esther Baur

Photocredits:  
Page 4, 10: Swiss Re  
Page 9: Keystone/Pival Adhikary, Christian Lehner,  
Jim Reed  
Page 15: David Jay Zimmermann/Corbis Specter

Graphic design and production:  
Swiss Re Media Production Zurich

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