

Creating solutions for sustainability

Our re/insurance solutions help to address key environmental and social challenges. We focus on natural catastrophes and climate change, food security, renewable energy, funding longer lives, and insurance cover in emerging and developing countries.

By managing risks and covering losses, re/insurance creates stability and enables economic growth. However, some environmental and social challenges can undermine sustainable progress if left unaddressed. Helping our clients and society at large to tackle such risks is a key component of our commitment as a responsible company and our overarching vision of making the world more resilient.

Currently, we focus on the following themes: climate and natural disaster risks, agricultural risks, sustainable energy, and funding longer lives. We develop our solutions as part of our established risk modelling and underwriting activities or by creating innovative new products, in close cooperation with our clients and partners.

Thus, our solutions frequently include:

- Public-sector partners: Besides direct insurers and corporate clients, we develop risk transfer solutions for, and in cooperation with, governments and various public-sector organisations;
- Index-based insurance products: We are a pioneer in creating innovative insurance solutions that use an index to determine payments;
- Insurance-linked securities (ILS) or cat bonds: We are a leading developer of these products, which enable large risks to be transferred to the capital markets.

One of our overarching goals is to create solutions that suit the special needs of emerging and developing countries. If governments and communities have financial protection against risks such as windstorms, earthquakes, drought and flooding, they can better cope with the immediate consequences of a disaster.

But, just as importantly, re/insurance protection safeguards investments, allows governments to stabilise budgets and gives people the financial stability required to get loans. In this way, our solutions help to create the conditions for sustained social and economic development.

Natural catastrophes and climate change

Natural catastrophes are a key risk in our Property & Casualty (P&C) business. The damage caused by floods, storms, earthquakes and other natural disasters can affect millions of lives and the economies of entire countries. In 2015, the total worldwide economic losses from natural and man-made catastrophes were estimated at USD 92 billion – of these, USD 37 billion were insured. Having access to effective re/insurance protection against natural catastrophes creates significant benefits for our clients – as well as society at large. In 2015, we received USD 2.6 billion of P&C Reinsurance premiums for natural catastrophe covers (for losses larger than USD 20 million), which was equivalent to 17% of total premiums in this business segment.

 For more information see [swissre.com/global_partnerships/](https://www.swissre.com/global_partnerships/)



Insurance stress tests

In our Financial Report we describe the insurance risk associated with natural catastrophes and disclose the expected impact on our economic capital of four types of single event losses with a 200-year return period (ie with a 0.5% probability): Atlantic hurricane, Californian earthquake, European windstorm and Japanese earthquake. See 2015 Financial Report, pages 66–67.

USD 2.6 bn

Natural catastrophe premiums in our P&C Reinsurance business

(USD 2.9 billion in 2014)



For more information see swissre.com/climate_action/



For more information see swissre.com/rethinking/climate_and_natural_disaster_risk/

On average, both economic and insured losses caused by natural catastrophes have increased steadily over the past 20 years. The key reasons have been economic development, population growth, urbanisation and a higher concentration of assets in exposed areas.

This general trend will continue. But crucially, losses will be further aggravated by climate change. The scientific consensus is that a continued rise in average global temperatures will have a significant effect on weather-related natural catastrophes. According to the Special Report on Extremes (SREX, 2012) and the Fifth Assessment Report (AR5, 2014) published by the Intergovernmental Panel on Climate Change (IPCC), a changing climate gradually leads to shifts in the frequency, intensity, spatial extent, duration and timing of extreme weather events.

If climate change remains unchecked, the makeup of the main drivers will thus gradually shift, with climate change accounting for an increasingly large share of natural catastrophe losses.

To assess our Property & Casualty business accurately and to structure sound risk transfer solutions, we need to clearly understand the economic impact of natural catastrophes and the effect of climate change. This is why we invest in proprietary, state-of-the-art natural catastrophe models and regularly collaborate with universities and scientific institutions.

While the impact of climate change will increase gradually over the coming decades, most of our business is renewed annually and our risk models are refined every few years. Risks are normally covered for 12 months (up to five years for cat bonds). Thus, reinsurance premiums do not reflect expected loss trends over the coming decades. Rather, for underwriting and risk management purposes, our models provide an estimate of the current risk. But as natural catastrophe losses continue to rise as a result of the different factors described above, our models will gradually factor in this trend, since they are updated and refined at regular intervals.

In our Financial Report we detail the insurance risk currently posed to our business by severe instances of four types of natural catastrophes.

In addition to providing re/insurance covers, we offer our clients strategic expertise and integral risk assessments of natural disasters and climate adaptation. These include our Economics of Climate Adaptation (ECA) studies, free access for our clients to Swiss Re's CatNet® tool and our expertise publications. (You can see a sample of our recent publications on pages 46 and 74–75.)

Two new Economics of Climate Adaptation (ECA) studies

Through the ECA methodology, we also analyse the effects of climate change on a longer timescale, enabling us to provide our clients with strategic advice and integral risk assessments about natural disasters and climate adaptation. ECA studies quantify today's climate risks, the potential increase of populations and assets at risk due to economic development, plus the additional risk posed by climate change, with a time horizon of up to 30 years. In a second step, our studies identify cost-effective measures to minimise and adapt to these risks. In this way, they give decision makers important information needed to integrate climate adaptation with economic development, paving the way for sustainable growth.

In 2015, we completed two new ECA studies, both at the request and with the support of the German Development Bank (KfW): one for Barisal in Bangladesh and one for San Salvador in El Salvador (see page 18). They are the first two ECA studies for which KfW has provided the funding in order to systematically identify adaptation measures with a high potential. The bank then helps to finance their implementation, together with the local city government.



Our ECA study for San Salvador found that further improving river bank reinforcements such as these can significantly reduce damage from flooding and protect vulnerable houses.

Our ECA study for Barisal

Barisal is the administrative capital of Barisal Division in south-central Bangladesh and has a population of approximately 330 000. Lying on the banks of the Kirtankhola River, it is one of the country's most important river ports. The biggest climate risks the city faces are cyclones and floods. At present, they pose a particular threat to citizens, residential and commercial buildings and cause most damage in the poorer Western parts of the city.

Our ECA study found that Barisal's total climate risk due to economic development and climate change (under a moderate scenario) must be expected to roughly triple by 2030, but that 60% of the expected damage can be avoided by taking appropriate adaptation measures. The most effective of these include reinforcing river embankments, planting flood-resilient crops and improving solid waste management.

Our ECA study for San Salvador

San Salvador is the capital of El Salvador and by far the country's largest city; the municipality itself has a population of slightly more than half a million, while the whole metropolitan area counts almost two and a half million inhabitants. The three major climate-related risks are floods, tropical cyclones and landslides.

Our ECA study revealed that the annual expected damage from flooding around Acelhuate River is likely to increase almost four-fold by 2040. However, urban planning (such as river bank reinforcements), ecological restoration and the construction of absorption wells could protect many people against flooding and reduce the risk by approximately USD 150 million. Ecological restoration would have particular benefits for people living in the city's poorer neighbourhoods: Strengthening the buffer capacity of the ecosystem in the Acelhuate catchment area through reforestation could reduce the risk of flood damage there by up to USD 50 million over three decades.

Damage from landslides must also be expected to increase substantially in vulnerable areas with steep slopes and a high potential for water accumulation. Here, effective adaptation measures are reforestation and the construction of terraces, as well as finding more suitable places for San Salvador's most vulnerable people to live.

 For more information see
[swissre.com/eca/](https://www.swissre.com/eca/)

CatNet®: free natural hazard information for our clients

The CatNet® tool offers our clients natural hazard information combined with Google maps™ and satellite imagery. Its functions and data facilitate a professional overview and assessment of natural hazard exposure for any location worldwide. This makes CatNet® a valuable tool in preparing local, regional and cross-regional risk profiles. Its three main features are a natural hazard atlas, country-specific insurance data and a link to disaster statistics. More information is available at swissre.com/catnet.

 For more information see swissre.com/clients/client_tools/about_catnet.html

Strengthening risk resilience: highlights of 2015

Hereafter, we describe some key transactions and initiatives strengthening risk resilience in which we were involved during 2015. Covering natural disaster, weather and pandemic risks, they help communities become more resilient to such shocks by ensuring that adequate funding is in place for quick and effective responses.

Strengthening earthquake resilience in Turkey

In Turkey we supported the Turkish Catastrophe Insurance Pool (TCIP) to further improve insurance protection against earthquakes in Istanbul. With a population of 14 million, the metropolis generates a significant share of Turkey's GDP, while living under the constant threat of severe earthquakes.

Originally set up in response to the strong Kocaeli and Duzce earthquakes of 1999, TCIP has done much over the years to improve insurance protection in the country. In addition to the support we provide through traditional reinsurance, in 2015 Swiss Re Capital Markets co-structured a USD 100 million catastrophe bond sponsored by the TCIP. Covering Istanbul's large metropolitan area, the three-year bond has a parametric trigger that will pay out if the specified earthquake conditions are met. It was well received by investors and ensures that TCIP will have access to additional reconstruction funds in the event of a major earthquake.

Supporting the African Risk Capacity

As a provider of reinsurance capacity and expertise, in 2014 we helped to launch the African Risk Capacity (ARC), the continent's first parametric natural disaster insurance pool. It offers governments insurance protection against drought, which poses a recurring threat in large parts of Africa and puts the livelihoods of millions of citizens at risk.

Insurance-linked securities

We are a leading player in the insurance-linked securities (ILS) sector. ILS are capital market instruments, typically in bond or derivative format, designed to meet the risk or capital management needs of a transaction sponsor. In exchange for a coupon or premium payment, the sponsor receives single or multi-year collateralised protection for specified risk events. If such an event occurs, the sponsor receives all or part of the principal; otherwise this is paid back to the investors in full at maturity.

ILS are particularly well-suited to provide protection against peak risks – events that happen infrequently but tend to lead to high losses, for example earthquakes or windstorms. ILS are used for both risk and capital management purposes in the P&C and the L&H business. For reinsurers they are attractive because they free up scarce capital; for insurers and corporate clients they provide multi-year collateralised protection; and for investors they offer attractive diversification possibilities, as they are relatively uncorrelated with other asset classes.

In 2015, our registered broker-dealer subsidiaries arranged non-life ILS worth USD 825 million, all of them for clients. In addition, they arranged USD 410 million of extreme mortality ILS, both for clients and Swiss Re.

 For more information see swissre.com/investors/ils/

CREATING SOLUTIONS FOR SUSTAINABILITY

Through ARC's in-house risk modelling platform, Africa RiskView, the participating governments can assess the drought risk they face and decide how much of it they want to insure at what loss threshold. Based on satellite rainfall data, payouts are then made automatically to the governments when the agreed drought thresholds are exceeded. To take part in the scheme, countries need to have contingency plans in place that show how payouts will be used to support the affected population.

In its initial 2014/2015 season, ARC offered drought insurance for a total of USD 129 million to four governments: Kenya, Mauritania, Niger and Senegal. Less than a year into the programme, the latter three received payouts totalling

more than USD 26 million, following a severe drought in the Sahel. In the 2015/16 season, further countries joined the risk pool, thereby increasing total coverage.

Protecting the Florida Hurricane Catastrophe Fund

The state of Florida has over USD 3 trillion of coastal assets, one of the highest concentrations anywhere in the world. But as the state lies within the infamous "hurricane alley", its population faces a latent natural disaster risk. In response, the state-run Florida Hurricane Catastrophe Fund (FHCF) established its first-ever reinsurance programme in 2015 and chose Swiss Re as one of its leaders.

Although ten years have passed since a major hurricane last made landfall in Florida, the FHCF recognises that it is only a matter of time until one strikes again. As the 2005 hurricane season showed, the financial consequences for local insurers, and ultimately homeowners, can be severe. It is the task of the FHCF to ensure that insurers can pay claims from such extreme events and to reduce the impact on taxpayers.

This is why the FHCF has purchased reinsurance protection for the first time in its 22-year history. By adding USD 1 billion of private capital, it can further build the financial stability it needs to ensure Florida's economic resilience in the face of disasters.



Florida has one of the highest coastal value concentrations anywhere in the world but, at the same time, faces a significant hurricane risk. By providing reinsurance protection to the Florida Hurricane Catastrophe Fund, we help strengthen the area's economic resilience in the face of such disasters.

Helping to develop insurance markets in China

Throughout 2015, we continued to take an active role in the expanding insurance markets of China. For example, we helped to develop China's first weather index insurance programme to protect cotton production against low temperatures. It was launched as a pilot in the Xinjiang region, which grows 60% of the country's cotton. While perils such as drought, hail and wind are covered by a government-subsidised agricultural insurance programme, this has not been the case for yield losses due to low temperatures. If the pilot providing protection of RMB 7.6 million (USD 1.2 million) proves to be effective, it will be expanded to the whole region.

We also signed a Memorandum of Cooperation with the provincial government of Heilongjiang on the future rollout of an index-based insurance pilot covering natural disaster risks to its agricultural sector. This builds on previous efforts we have undertaken to improve insurance protection in Heilongjiang, which, as China's biggest crop producer, is key to its food security.

Protecting Vietnamese farmers against livestock loss

We also helped to relaunch an important agricultural insurance pilot in Vietnam. It will protect the livelihoods of poor smallholder farmers in the provinces of Vinh Phuc and Ha Giang by insuring them against the effects a major natural catastrophe or disease may have on their livestock. In total, the scheme covers more than 150 000 cattle and buffalo.

To develop a sustainable product that meets actual needs, the scheme has pursued a holistic approach from the beginning, involving all key stakeholders in a public-private partnership. Stakeholders include various government ministries, the Vietnam National Reinsurance Corporation (in the role of aggregator and bridge between the government and local insurers), local insurers and their branch offices, as well as local people's committees and authorities. The scheme has got off to a promising start and the intention is to expand it rapidly to other provinces.

Helping to develop a Pandemic Emergency Facility

Just like an earthquake, hurricane or other natural disaster, the outbreak of a pandemic is an actual catastrophe that requires a quick, effective response. However, when the Ebola crisis broke out in West Africa in 2014, it took the affected countries and the international community several months to mobilise the resources necessary for an adequate response. The World Bank has made it a priority to address this situation and has mandated Swiss Re and Munich Re as the partners to support the development of a Pandemic Emergency Facility (PEF).

The goal of the PEF is to set up a response system mechanism to ensure that sufficient resources will be available early enough to prevent an epidemic developing into a fully-fledged pandemic. The facility will use pre-determined and transparent criteria to indicate an outbreak. When these triggers are met, funds will be made available within days, either through capital markets or re/insurance. This will allow emergency workers, equipment and medicines to be rapidly deployed to an affected area, to prevent further spread of the disease.



Climate change adaptation

Our solutions offering re/insurance protection against extreme weather events and weather volatility help communities to adapt to climate change, by making them more resilient against such risks.

 For more information see swissre.com/rethinking/food_security/

—
USD
2.1 billion

Total amount of
climate protection
offered to sovereigns
and sub-sovereigns
since 2014

—
1.6 million

Smallholder farmers
benefiting from
the Grow Africa
Partnership

(2 million* in 2014)

*See explanation on the right

Our commitments

... to the United Nations

Many of our recent efforts to expand insurance protection cover losses from natural catastrophes and weather volatility (eg drought or excessive rainfall). As climate change is predicted to increase these losses, such transactions also help communities to strengthen their climate resilience. Furthermore, we have found that partnering with public sector clients, especially national and regional governments, is an effective way to develop solutions.

Building on these experiences, we made a significant commitment to the United Nations at its Climate Summit in September 2014. Personally addressing the government leaders present at the summit, our Group CEO Michel M. Liès made the following pledge: "By the year 2020, Swiss Re commits to having advised 50 sovereigns and sub-sovereigns on climate risk resilience and to have offered them USD 10 billion against this risk."

We have agreed with the United Nations to report publicly on the progress we make on this commitment. By the end of 2015, we had advised 13 sovereigns and sub-sovereigns on climate risk resilience and offered them a total of USD 2.1 billion in re/insurance protection.

... to the Grow Africa Partnership

In our work to bring risk protection to underinsured communities, in recent years we have put a focus on the African continent, in particular Sub-Saharan Africa. In 2012, we made an important commitment to the Grow Africa Partnership (www.growafrica.org). This initiative was launched by a number of organisations to promote public-private collaboration and investment in African agriculture. As most smallholder farmers in Sub-Saharan Africa have had no access to insurance protection to date, addressing this problem is crucial to protect families' livelihoods, facilitate economic development and reduce poverty.

Our commitment to the Grow Africa Partnership thus centres on the following three goals:

- Give farmers in Sub-Saharan Africa access to tools such as weather and yield index insurance products;
- Invest in resources equivalent to about USD 2 million per year to support the development of sustainable agricultural risk management markets;
- Provide agricultural insurance for up to 1.4 million smallholder farmers.

Working together with different partners, we helped to bring weather insurance to 1.6 million smallholder farmers in 11 Sub-Saharan countries by the end of 2015. The fact that this is less than the 2 million recorded in the previous year is mainly due to changes in how one country participating in the African Risk Capacity has structured its coverage under the programme. It has substantially revised its assumptions on the drought exposure of its farmers and reduced the percentage of farmers covered by the scheme.



Climate change mitigation

By facilitating the construction of offshore wind farms, these solutions support efforts to reduce CO₂ emissions and hence mitigate climate change.

Sustainable energy solutions

Sustainable energy sources play a crucial role in reducing CO₂ emissions and securing future energy supplies. Given our strategic focus on climate change, we are keen to support energy generation from renewable sources. But as sustainable energy projects increase in scale and complexity, so do the risks associated with them. However, innovative risk transfer solutions can help reduce these risks and drive investment in the sector.

Offshore wind is considered one of the most promising renewable energy sources. But like renewable energy in general, it presents very complex risks. Unlike traditional lines, there is no long loss history to refer to. Underwriting such risks is therefore challenging from an insurance perspective.

Swiss Re Corporate Solutions takes a special interest in offshore wind as it has both the large capacity and the technical expertise to help manage the associated risks. We are continually enhancing our

understanding of these risks and share our insights with our clients as well as other insurers. As a result, we are now considered a “lead market” for offshore wind risks.

In the last five years, Swiss Re Corporate Solutions has participated in more than 30 offshore wind projects, including wind farms, standalone offshore substations and standalone export cables. In the 2015, we were involved in 18 offshore wind farm projects worldwide and were the lead re/insurer in eight of them.

Block Island: first offshore wind farm in the US

In 2015, we insured a number of offshore wind projects in different countries, including the Block Island Wind Farm in the US (dwwind.com/project/block-island-wind-farm). Developed by Deepwater Wind, this is the country’s first-ever offshore wind facility. The project is situated in the Atlantic Ocean, approximately three miles from Block Island, off the coast of Rhode Island, where there are strong



For more information see swissre.com/rethinking/sustainable_energy/



The foundations for the turbines of Block Island Wind Farm are being put in place. We insure construction and start-up delay risks of this project, the first-ever offshore wind farm in the US.

18

Offshore wind farm projects we were involved in during 2015

and steady winds. Thanks to its expertise and proximity to the client, Swiss Re Corporate Solutions was appointed as the project's lead insurer and provides both a construction all risk (CAR) and a delay in start-up (DSU) cover.

Construction of the wind farm is underway and is scheduled to be completed by the end of 2016. Our client, GE Wind (formerly Alstom), is building five powerful, highly efficient turbines that will generate a total capacity of 30 megawatts. The wind farm will give approximately 17 000 households on Block Island access to reliable as well as renewable electricity for the first time. To date, they have had to use diesel generators, which are inefficient and cause substantial air pollution. The power not used on Block Island will be transmitted to the mainland through a 21-mile long cable under the ocean floor.

Gode Wind 1 and 2: large wind farms in the North Sea

Swiss Re Corporate Solutions also continued to be involved in large, mainstream projects, eg the Gode Wind 1 and 2 offshore wind farms. Both are located in the German sector of the North Sea, approximately 45 km off the German coast and 33 km from the islands of Juist and Norderney. Construction of the two wind farms, which are being developed by Danish-based DONG Energy (www.dongenergy.com), started in 2015. We provide a CAR cover, ie an all-risk policy for material damage during the construction phase.

The two wind farms will consist of a total of 97 highly efficient, quiet Siemens turbines generating 6 megawatts each – 55 at Gode Wind 1 and 42 at Gode Wind 2. With a combined capacity of 582 megawatts, they will supply CO₂-free power equivalent to the annual electricity consumption of approximately 600 000 German households. The two wind farms are expected to become fully operational in the second half of 2016.

Life & Health insurance and funding longer lives

Life and health (L&H) insurance products play a crucial role in creating stability for individuals and society. They provide financial security in the event of death or illness, give access to medical treatment and offer dependable income in retirement. We help primary L&H insurers and other clients from the private and public sector to manage such risks efficiently, thanks to our specialist knowledge of mortality, morbidity and longevity trends.

Longevity and health insurance remained two of our strategic priorities in the L&H business. The demand for longevity solutions is expected to grow further as demographics shift. We have invested in research and development to improve our ability to predict mortality and longevity trends. In the last few years, we have completed several longevity insurance contracts with pension funds in the UK.

Demand for commercial health insurance solutions has also been growing, driven by several major demographic and socio-economic trends. These include: the greater healthcare needs of ageing societies; rising healthcare expectations of the

new middle class, especially in growth markets; and healthcare finance reform, particularly in mature markets. We offer a variety of health reinsurance solutions to meet these needs, from short-term protection against the risk of volatility in medical expenses for insurers or employers, to very long-term protection against the financial impact of disability or critical illness.

Longevity transaction with Heineken UK

With life expectancy rising, pension schemes face the risk that they will not be able to meet all their commitments. Longevity transactions cover this risk by insuring the schemes' liabilities in case their members live longer than expected. In 2015, we participated in four major longevity transactions. One of them concerned the pension plan of brewing firm Scottish & Newcastle, part of Heineken since 2008 and now called Heineken UK.

By completing a longevity swap transaction with Friends Life (now part of the Aviva Group), Heineken received longevity insurance for defined benefit liabilities of GBP 2.4 billion, covering around 19 000 pensioners. As the deal's reinsurance partner, we assumed part of this risk from Aviva. Swiss Re is in a position to write such large deals because we have a natural offset through our mortality business, the capacity to write the business to our own balance sheet and the expertise to create tailor-made solutions.



Previous longevity deals in the UK

The longevity solution we have developed for the Scottish & Newcastle Pension Plan is the latest in a host of such transactions in the UK. Other clients in recent years include the Aviva Staff Pension Scheme (19 000 members plus partners), one of AkzoNobel's pension funds (17 000 members), the LV= pension fund (more than 5 000 members) and the Royal County of Berkshire Pension Fund (11 000 members). We have outlined these transactions in more detail in earlier Corporate Responsibility Reports.

 For more information see [swissre.com/rethinking/longer_lives/](https://www.swissre.com/rethinking/longer_lives/)