

Exploring and shaping the risk landscape

We engage in regular dialogue with our stakeholders. By sharing expertise and know-how, we help society to develop effective responses to key risks.

With our re/insurance solutions we help our clients and partners to cope with the risks they face. This helps to create stability and enables economic growth. But many of today's risks are complex and may threaten sustainable progress. To find effective, long-term responses to such risks, partners from the public and the private sector need to work together.

This is why we attach great importance to ongoing dialogue with our stakeholders. Drawing on the expertise from our core business, we identify key risk topics and take an active role in discussions about them. We share and exchange knowledge through many channels, eg our renowned publications including the *sigma* series, international dialogue platforms, events hosted by the Centre for Global Dialogue (part of the Swiss Re Institute as from 1 March 2017), and cooperation with governments and academic institutions. Through this ongoing dialogue, our stakeholders give us valuable feedback and new insights for risk management and product development.

Our Top Topics

Via Group Issue Management, Swiss Re identifies topics that are strategically important to us, our clients and society at large. These Top Topics denote the global challenges we want to help address and set an important focus for our global stakeholder dialogue.

In 2015, we formed a new Reputation Management Committee, which comprises representatives from across the Group, ie our three Business Units, Investor Relations, Group Risk Management, Group Communications and – as from 1 March 2017 – the Swiss Re Institute. The Committee coordinates the content of our stakeholder dialogue across all our Business Units, functions and regions in order to optimise its effectiveness.

In 2016, we continued to focus on our Top Topics in our stakeholder dialogue:

- Advancing sustainable energy solutions
- Funding longer lives
- Managing climate and natural disaster risk
- Partnering for food security
- Supporting financial resilience

We worked on these Top Topics with many partners from the public and private sectors. In the following sections we introduce each topic, explain why we consider it to be important and give examples of our communications activities.

Advancing sustainable energy solutions

The agreement reached in 2015 at the COP21 UN Climate Change Conference in Paris underscored that sustainable energy sources are essential to combat global warming. Reducing greenhouse gas emissions while, at the same time, satisfying the energy needs of a growing population will be one of the great challenges we face in the coming decades. Sustainable energy projects continue to increase in scale and complexity, as do the risks associated with them.



Staying fit and enjoying it... By devoting one of our Top Topics to "Funding longer lives", we want to help ensure that people can continue to reap the benefits of living longer.

Innovative risk transfer solutions help to drive investment in the sector by reducing risk for investors. Building on our long-standing commitment to sustainability, we have recently intensified our renewable energy research to help our clients and the global community to develop and establish secure energy supplies for the future.

Our notable achievements in 2016:

- Together with the World Energy Council (www.worldenergy.org) and Marsh & McLennan Companies (www.mmc.com), we published two new reports on financing resilient energy infrastructure. Following up on the report published in 2015 on extreme weather, they focus on the energy-water-food nexus and cyber threats (see special section on page 44);
- As a founding member of the RE100 initiative (www.theRE100.org), we continued to work towards our goal of obtaining 100% of our energy from

renewable sources. By increasing demand for clean power in a joint effort with our partners, we expect RE100 to make it more viable for energy companies in challenging markets to build renewable energy plants (see page 54);

- Through Swiss Re Corporate Solutions' partnership with Solar Impulse (www.solarimpulse.com), we supported the first round-the-world flight powered by solar energy only. The mission was successfully completed in July 2016, underscoring our commitment to cutting-edge innovations in clean energy.

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



Modern energy infrastructures are highly vulnerable to cyber attacks. Three recent reports we produced together with partners look at the key risks that need to be addressed to make energy infrastructure more resilient.

Partner reports on Financing resilient energy infrastructure

In 2016, the World Energy Council (WEC, www.worldenergy.org), Swiss Re Corporate Solutions and Marsh & McLennan Companies (www.mmc.com) presented the findings of their report “The road to resilience: financing resilient energy infrastructure”, ahead of the World Energy Congress. The publication summarises three comprehensive studies focusing on key risks the global energy sector needs to manage: extreme weather, energy-water-food dependencies and cyber crime.

These risks impact both the physical structures and the capital returns needed to reach a more sustainable energy future.

Extreme weather

Events such as hurricanes, storm surges, heat waves and ice storms are growing in frequency and severity. Hurricane Sandy or Typhoon Haiyan for example illustrated that energy infrastructure is often entirely inadequate to handle disruptions of

such magnitude. In general, insured losses from severe convective storms have increased by more than 40% over the last 20 years.

Food-water-energy nexus

98% of the world’s power supply depends on water. Food production, in turn, requires both water and energy. In other words, the food-water-energy nexus can significantly impact energy supplies.

Cyber attacks

Finally, the energy sector is highly vulnerable to cyber attacks. As Ukraine experienced recently, an attack on a power grid can cut off a whole country’s power.

Modern energy infrastructures are evolving into complex systems with many interdependent parts, and disruptions to any of these can have truly dramatic consequences. The summary report offers seven recommended action items for governments, business leaders and

the finance sector to improve the financing of resilient energy infrastructure.

The role of insurance

Throughout the report, the authors emphasise the role of insurance in achieving resilience. The insurance industry is already helping energy companies cope with the risks identified in the studies. Pioneering insurance transactions illustrate that protection against unfavourable weather is available for wind, solar and hydroelectric facilities. Advanced cyber solutions combine comprehensive insurance protection with risk mitigation and remediation services.

On our website you can learn more about the reports and their recommendations: swissre.com/rethinking/sustainable_energy/financing_resilient_energy_infrastructure_recommendations.html

Funding longer lives

People are living longer today than ever before, but the share of the working population is shrinking. At the same time, more of the financial responsibility is shifting from public to private balance sheets. This could have significant financial consequences for individuals, insurers, employer pension funds and society in general. Public-private partnerships are needed to overcome this challenge.

Life and health reinsurance is part of our core business, and we are the world's largest reinsurer of mortality risk. Consequently, we are a natural home for the longevity and health risks associated with ageing societies, and have the financial strength to take on risks across a person's whole lifespan. Swiss Re has a broad base of expertise to help insurers understand the medical and social factors that affect longevity, mortality and morbidity, and we can bring new insights from our experience in markets around the world. We want to help clients create solutions that better support people across the different phases of ageing and retirement.

Our notable achievements in 2016:

- We contributed an insurance perspective to the World Economic Forum (www.weforum.org) briefing on "Global Population Ageing: Technological Innovations for Health and Wealth". This report explores how the interplay between wearables, connected devices, robotics and artificial intelligence can advance the social connections, emotional health, cognitive ability and physical fitness of older adults;
- The 2016 Entrepreneurs for Resilience Award of the Swiss Re Foundation focused on innovative solutions that enable the elderly to live independently at home. The four entrepreneurs in the final selection share CHF 800 000 in prize money, which will allow them to further their inventions ranging from robotic helpers and video therapy to online care coaches and health monitoring.

- We hired a dedicated Head of Ageing to prioritise Swiss Re's efforts in this area and lead a global team of experts from various functions. Our immediate priority is to better understand the needs of elderly consumers across different markets and share lessons learned in an increasingly complex social, economic and regulatory environment.


Managing climate and natural disaster risk

Losses from floods, storms, earthquakes and other natural catastrophes can have a dramatic impact on the citizens and economies of entire countries. Insurance helps people, businesses and societies to get back on their feet after disaster strikes.

Hurricane Matthew and the Louisiana floods are just two examples of events that killed many and destroyed the livelihoods of even more. Total economic losses from disaster events in 2016 almost doubled to USD 175 billion, primarily due to natural catastrophes. This shows that our world is still not resilient enough to avoid the negative effects of natural disasters – let alone to assure the funds needed to rebuild affected communities after a disaster.

In the future, these negative effects will become even more severe. The expectation is that, as a result of climate change, extreme weather events like hurricanes and floods will increase. Moreover, rising losses will also come from higher concentrations of assets in exposed areas, in particular in the world's rapidly growing cities. If no action is taken, climate change could cost the world economy an estimated 20% of global GDP by the end of this century.

By financing measures to mitigate disaster risks and adapt to climate change, we can strengthen the resilience of citizens, businesses, local and national economies and societies. As insurance puts a price tag on risk, it helps to create an incentive to invest in prevention measures.

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

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



Italy has experienced an increase in serious flooding over the last decade. One of the expertise publications we published in 2016 describes a new approach to improve insurance protection in the country against this risk.

Understanding natural catastrophe risks and the impact of climate change is critical to cost our business accurately and to structure sound risk transfer solutions. By sharing this knowledge, we help our partners to identify cost-effective protection measures. In addition, we provide solutions to cover the residual risk that cannot be avoided.

Our notable achievements in 2016:

- We published new expertise publications on floods and earthquakes for Switzerland, Argentina, Italy, Canada and California, which provided the basis for discussions with stakeholders in these countries, ranging from insurers to government officials;

- We released a totally new version of our CatNet® services tool which brings the benefits of our big data & smart analytics skills in natural catastrophes to our stakeholders (see page 20);
- Through conferences, publications and social media channels, we communicated how we used a brand new concept to insure Guangdong Province against losses of up to USD 350 million from tropical cyclones and excessive rainfall (see page 22).

Partnering for food security

805 million people – one in 11 – are chronically hungry and malnourished on the planet today. By 2050, the world's population is expected to grow to an estimated 9 billion people, which will further aggravate the situation. Meeting this demand for food will be particularly challenging, as supply is constrained by factors such as climate change, depleted agricultural soils and the distribution of land, water and energy.

Small-scale subsistence farmers who feed their families and sell a small surplus on local markets provide food to the majority of people on the globe. This needs to change as more and more people are living in cities. Recently, the urban population exceeded the rural one for the first time ever, which means that cities are becoming increasingly dependent on the remaining farmers for their food.

The surplus subsistence farmers currently produce will not be enough to feed the growing urban population. Smallholder farmers must make the transition to commercial agriculture to feed the world. For this, they need access to credit so they can buy tools, seeds and fertilizer. But lending will remain restricted if banks fear that farmers will be unable to pay back their loans in the event of a lost harvest due to drought, flood or other disasters. Here, insurance can play the same role in the developing world as it already does in developed countries: protecting farmers against the perils of nature to keep them in business, even if disaster strikes.

Our notable achievements in 2016:

- We discussed with a range of stakeholders how we insured farmers in 28 counties in Helongjiang Province in China against risks of flood, excessive rain, drought and low temperatures (see page 21);
- We continued to provide data and information on agricultural insurance through our fact sheet series for African countries. In addition, we published the first such publication on an Asian country (Sri Lanka), looked at protecting cotton farmers in China and how big data can help crop insurance in the US;
- We hosted the conference “Insuring food safety: What’s on the menu?” at our Centre for Global Dialogue, inviting industry experts to discuss operational risk management and insurance solutions to the challenges previously raised in our publication “Food safety in a globalised world” (see page 48).

Supporting financial resilience

Re/insurance supports financial resilience by acting as a shock absorber and promoting growth through its core businesses. This is particularly important in a challenging and volatile macroeconomic environment.


However, unconventional monetary policies implemented by central banks following the financial crisis of 2008 – 2009 present a challenge for our industry and have contributed to an environment that is not conducive to sustainable economic growth.


As long-term investors, re/insurers could play a pivotal role in bridging the emerging infrastructure financing gap, which, in turn, would contribute to a healthier economic environment. But for that to happen, the right framework needs to be put in place. Standardisation of infrastructure investments would be an important step forward, while infrastructure debt as a tradable asset class would certainly make infrastructure more attractive for long-term investors.

At Swiss Re, we are striving to influence these developments by actively participating in and contributing to the global and local financial reform dialogue. Ultimately, we want to ensure long-term investors can act – not only think – on a long-term horizon to achieve greater financial resilience.

Our notable achievements in 2016:

- We continued to take an active role in the debate on the consequences of financial repression for savers and long-term investors as well as the broader implications for financial resilience, eg through a fact sheet, a by-liner in the IMCA quarterly report no. 41 (www.imcagroup.org) and by sharing our views with key public and private sector stakeholders;
- We remained at the forefront of the policy call to make infrastructure debt a tradable asset class as we believe that bridging the large infrastructure financing gap is key to sustainable economic growth;
- We launched a joint research project with the London School of Economics and Political Science (www.lse.ac.uk) on long-term investing and monetary policy. Its key objectives are to analyse the effect of low interest rates on structural reforms, investigate the effect of monetary policy on capital markets and consider alternative monetary policy tools.

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

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

Our Centre for Global Dialogue

The Swiss Re Centre for Global Dialogue (the “Centre”) is an important platform for interaction with our external stakeholders. Located at Rüslikon near Zurich, this state-of-the-art conference centre hosts industry-leading events on risk and insurance.

The Centre reflects our commitment to being a knowledge company. As of 1 March 2017, it forms part of the newly established Swiss Re Institute.

Below you can read summaries of three events the Centre organised in 2016:

Insuring food safety: What’s on the menu?

“Partnering for food security” is one of Swiss Re’s Top Topics. Demand for food is growing, not just driven by worldwide population growth, but also by globalisation which has led to shifts in eating habits. One prominent trend is the rising popularity of convenience foods and ready-to-eat meals, which effectively means that many households increasingly delegate food safety to producers and processing companies. These, in turn, operate in highly complex supply chains, or “supply webs”, seriously complicating the task of ensuring food safety.

In response, food producers have already sought to raise their safety standards, but incidents of food contamination and costly product recalls have still increased in number. Bringing together participants from food producers, food safety organisations, academic institutions and the re/insurance industry, this event at the Centre discussed what the food industry can do to further improve food safety and how re/insurers can help to mitigate risks.

A key theme was the need to improve transparency and traceability along the entire supply chain. This can be

supported by modern technology, eg DNA tests at various stages, efficient drying procedures, the introduction of optical sorting machines (including near infrared technology), combined with the use of big data and the Cloud. Attention was also drawn to the industry’s Global Food Safety Initiative (www.mygfsi.com) which, amongst other things, works with certification bodies to ensure maximum audit reliability and seeks to address differences in national food regulations. The re/insurance industry, in turn, can support efforts to enhance food safety by providing risk assessment, ie by identifying potential risks and preparing suitable countermeasures, along with modelling potential loss scenarios.

Agricultural and Natural Catastrophe Insurance Forum

Natural disasters occur frequently in China and are widely scattered. They affect individuals, businesses and governments alike. Up until recently, however, those at risk have largely ignored the potential financial impact of natural disasters when accounting for their financial and fiscal liabilities. Moreover, they have not set aside any contingent capital to prepare for such liabilities. For government bodies, in particular, this protection gap is highly significant as it could grow exponentially in coverage and scale in the future.

When the Chinese State Council carried out a review of the insurance industry a few years ago, it identified this challenge and issued a mandate to formulate and promote natural catastrophe schemes. In response, Swiss Re worked together with the Development Research Center of the State Council (www.en.drc.gov.cn/) to report on “Parametric Insurance and Reform of Natural Disaster Relief Systems in China”. This was subsequently discussed with high-level officials and led to the development of two pilot programmes in the provinces of Heilongjiang and Guangdong, which were successfully launched in 2016 (see pages 21–22).

In 2016, the Centre for Global Dialogue organised the “Agricultural and Natural Catastrophe Insurance Forum” to discuss the underlying challenges, assess possible solutions and share experiences. Nearly 40 Chinese government officials and insurance professionals met with international experts to explore the feasibility of introducing parametric solutions across China, drawing on the learnings offered by the two pilot projects in Heilongjiang and Guangdong. In addition, experts from Swiss Re and other organisations elaborated on the latest developments in flood risk management, catastrophe bonds, agricultural and aquaculture insurance, and public-private partnerships.

4th Swiss Re Symposium on Data Protection: Ethics and e-health in insurance

The digital transformation of the insurance industry is one of the key challenges facing all its players. Digital technology is being implemented across the whole value chain, from distribution through underwriting to claims. This raises crucial questions concerning market dynamics and competitors, customer behaviour, data use, artificial intelligence and more.

Our 4th Symposium on Data Protection looked at one particular aspect of the digital transformation: “Ethics and e-health in insurance”. Capturing new and personalised health data sets, such as real-time monitoring of fitness and exercise data through wearable devices and mobile apps, has clear benefits for individuals as it helps them to maintain a healthy lifestyle. Likewise, it would also have advantages for life and health insurers, enabling them to spot upcoming problems their clients may be facing and to give them corresponding advice. It might even make it possible to provide cover to people so far considered “uninsurable”.



Some impressions from “Insuring food safety: What’s on the menu?”, one of the stakeholder conferences we held at the Centre for Global Dialogue in 2016.

However, the use of such data also raises serious ethical questions that go beyond data and privacy protection. Making sure that no individuals or groups are disadvantaged by the information derived from big data algorithms will be essential. Furthermore, there are concerns about the potential misuse of health and health-related data, inaccurate algorithms, false outcomes and over-diagnosis. These concerns have prompted the EU General Data Protection Regulation (GDPR), for example, to focus on the governance of health and health-related data, substantially strengthening the rights of data providers and requiring more

transparency from data users. As it was argued at the conference, a sound ethical base will be indispensable to create the necessary trust in new ways of managing and analysing health data.

Further events we held at the Centre for Global Dialogue in 2016 include:

Expert Forum on Cyber Risk

institute.swissre.com/events/Expert_Forum_Cyber_Risk_2016.html

Risk Talk on Smart Homes

institute.swissre.com/events/Risk_Talk_on_smart_homes.html

Both these events focused on topics we had previously identified as emerging risks and presented as case studies in past editions of our Corporate Responsibility Report: “Cyber attacks” (2011) and “Challenges of the Internet of Things” (2015).

Collaboration with (inter-) governmental and academic institutions

In recent years, we have collaborated with various (inter-)governmental and academic institutions both to promote effective approaches to sustainability challenges and to share our expertise on managing specific risks.

Our work with (inter-)governmental agencies to promote effective sustainability responses

- In Europe, we have continued to raise awareness of the important role insurers play in mitigating climate risk through different interactions with policy makers. This includes speaking at industry conferences (Insurance Europe and the ABI), presenting at the European Commission's DG Climate Action's working group on Climate Adaptation and bilateral engagement with the European Commission and national governments. We also remain engaged in the debate via our trade association memberships (eg the Reinsurance Advisory Board);
- In the US, we have maintained regular dialogue with the National Association of Insurance Commissioners (NAIC), principally on climate change and natural catastrophes;
- For our participation in the Financial Stability Board's Task Force on Climate-related Financial Disclosures, see page 31.

Our work with (inter-)governmental agencies to share risk management expertise

- With Global Partnerships, we have a team that works strategically with public-sector bodies to improve risk resilience:
 - directly with sovereigns or sub-sovereigns and their agencies, recently with the government and prefectures of two Chinese provinces to establish major natural catastrophe insurance schemes, with the UK government as part of a programme set up to make flood insurance more affordable for homeowners, with the Florida Hurricane Catastrophe Fund to strengthen risk resilience or the Turkish Catastrophe insurance Pool to improve re/insurance protection against earthquakes;
 - with the United Nation's International Strategy for Disaster Reduction (UNISDR) in a consulting role;
 - with development agencies such as the United States Agency for International Development (USAID), the UK's Department for International Development (DFID), the Swiss Agency for Development and Cooperation (SDC), the World Bank, the Asian Development Bank (ADB), the Inter-American Development Bank (IADB) or the German Development Bank (KfW).
- We have regularly contributed to platforms such as the World Economic Forum, B20, G20 and G8 to share our insights on key risks, and support the United Nations Framework Convention on Climate Change (UNFCCC) process.

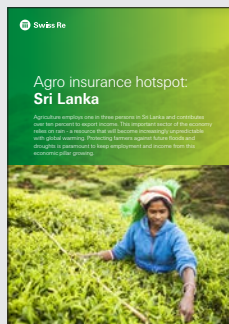
Working with academic institutions

- We support the Integrative Risk Management and Economics project at the Swiss Federal Institute of Technology (ETH) Zurich, which aims to advance a holistic approach to managing risks and educate a new generation of researchers;
- We have supported the integrated research activities conducted by Swiss-based ProClim – the Forum for Climate and Global Change – and received access to the latest scientific findings;
- We support the "20th Century Reanalysis" project of the NOAA Earth System Research Laboratory and the University of Colorado, Boulder. It contains objectively-analysed four-dimensional weather maps and their uncertainty from the late 19th to the 21st century.
- In 2016, we announced a formal partnership with the London School of Economics and Political Science (LSE) to support an 18-month research programme on monetary policy and long-term investment (see page 47).

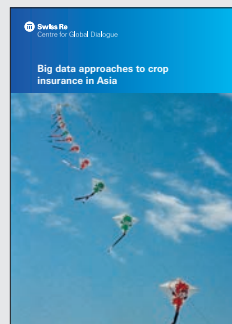
Selected publications of 2016

The publications and other media we produce in-house or in cooperation with our partners play an important role in our efforts to help clients and society form effective responses to key risks. Listed below are publications mentioned in this chapter. Further Swiss Re publications are displayed on pages 80–81.

Swiss Re publications



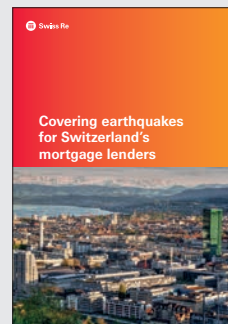
Agro insurance hotspot:
Sri Lanka



Big data approaches to
crop insurance in Asia



Closing the gap:
Protecting China's
cotton crop against
low temperatures



Covering earthquakes
for Switzerland's
mortgage lenders



Earthquake California



Flood resilience
in Italy: Acting together



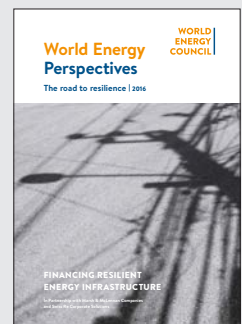
Promoting resilience
and growth in Africa



Staying afloat:
Flood Risk in Argentina



The road to flood
resilience in Canada



With the World
Energy Council:
**World Energy
Perspective: The
road to resilience –
Financing resilient
energy infrastructure**

Publication with partner organisation