

SPECIAL REPORT:

CLIMATE CHANGE

- 30 **Up against the elements**
Extreme weather is now a fact of life – but with advances in science and technology, the world has a chance to adapt

- 32 **Helping the worst affected**
Few in the developing world can afford insurance, making alternative solutions all the more important

This report is sponsored by AXA Corporate Solutions



Up against the elements

Extreme weather is here to stay. In response, humanity is turning to science and the insurance sector

THE PLANET'S CLIMATE IS changing. Extreme weather is increasingly affecting businesses and, consequently, insurers urgently need to incorporate climate change into their models.

According to Lloyd's of London, weather-related losses have risen from an annual average of \$50bn (€40bn) in the 1980s to almost \$200bn in the past 10 years.

Extreme weather events have increased in their number and severity as the global climate system has altered, causing bigger hurricanes, typhoons and heatwaves, according to researchers.

"Large-scale major incidents are becoming more frequent because of climate change," says Jennifer Cole, a research fellow at the Royal United Services Institute's national security and resilience department.

"For instance, severe winters are becoming more frequent. The number of areas suffering from floods and the frequency with which those floods happen have increased."

Typhoon Haiyan, which swept across the Philippines and other South-East Asian countries in November 2013, was one of the strongest tropical cyclones ever recorded.

In 2012, Superstorm Sandy caused \$35bn of insured losses and 2011 was the most expensive year on record for natural disasters.

"Climate change is here to stay," says Trevor Maynard, head of exposure management and reinsurance at Lloyd's. "Hurricanes are becoming stronger worldwide and especially over the north Atlantic.

"At the moment, [global temperatures are set to] rise by four degrees Celsius by the end of the century. There is every indication that [storms] will become more extreme as the temperature rises."

As a consequence, various threats – from property damage to political risk, food security and business continuity – will become more likely and severe. However, science and technology are providing ways to adapt.

"Big data is exponentially increasing the applications of climate insurance," says Tanguy Touffut, global

helping companies understand, measure and transfer the impact of weather on their business."

Building new worlds

Predicting the future behaviour of complex climatic systems is not straightforward because the amount of data is limited for certain natural events and the timespans that have to be studied are vast.

"The best data available relates to hurricanes and high seas, but even [on these] there are only about 50 years' worth of records," says Pier

example, [the university] recently wrote a paper about the El Niño oscillation and its effect on hurricanes and typhoons, [namely] when something very rare is crossed with something else that is also very rare."

Fortunately, advancements in supercomputers in the past decade have given scientists the opportunity to complement observational data with synthetic observations to create models.

Climate models can be run for many hundreds or thousands of years, allowing for the sample size to be augmented significantly. These can also be used to create scenarios for analysis.

Vidale says: "The temperature of the oceans can be changed, which is one of the important drivers of storms. The composition of the atmosphere can be changed, for example the concentration of greenhouse gases. Many things can be done to develop the models and run them into the future. What if the Pacific warmed up for a number of years? What if the amount of moisture in the atmosphere increased?"

Major insurance risk

Models are already proving their value to insurers as scientists use them to analyse European windstorms.

"These storms are a major insurance risk; a big market," says Dr Len Shaffrey, a senior research scientist at the National Centre for Atmospheric Science. "One of the [elements] that was assumed until recently was that windstorms were independent events; if one storm occurred, the

'Climate models can be developed with the same resolution as weather forecasting. The models still need some finessing, but the ability to track a storm and its effect on the environment exists'

Pier Luigi Vidale, Reading University

head of parametric insurance and head of food security and agriculture at AXA Corporate Solutions.

"Data is becoming more specific, abundant and ubiquitous. Satellite imagery provides information on climate, ocean and land parameters.

"One telling example is the use of vegetation data based on evapotranspiration and the absorption of sun rays by plants as a proxy for proper plant development.

"The processing of all this data enables weather risks to be correlated with companies' losses, [so that] the most suitable indicator can be found,

Luigi Vidale, Willis professor of climate system science and climate hazards at Reading University.

"Anything before the war is unknown, except for the Atlantic. So, the set of data is very small and this means that the statistics are not robust."

Adding to this difficulty are climate variability and climate change. "If the record is broken down into the periods that interest people, then it is even harder," says Vidale.

"Challenges arise when studying [elements] that go across different scales in time and space – for

'It is important to show people that they can save, or even make, a lot of money. They need to understand forecasting, have faith in it and adapt what they do'

Patrice Massat, Climpact-Metnext

likelihood of another one occurring was not thought to increase. However, it can now be seen that this is not the case.

"Modelling has demonstrated that if a strong windstorm happens, the likelihood of another strong windstorm occurring is increased.

He adds: "If within an annual insurance contract, windstorms are assumed to be independent, clients will be quoted in one price. However, if it is assumed that windstorms are clustered, the contract will be more expensive. So, one of the key questions for the European insurance market currently is: just how clustered are storms?"

"With only a limited data set, the information needed to answer this question is not available. So, looking at the climate models, [scientists] create a toy atmosphere to complement the observational data and help [them] understand how

these one-in-100 or one-in-200-year storms would be clustered."

New markets

Modelling also has the potential to create and develop new markets. For example, in 2012, disasters caused \$186bn in economic losses and \$77bn in insured losses, according to reinsurer Swiss Re. The difference between these two figures represents an opportunity.

As Vidale explains: "One of the main reasons why losses are not insured is that, in many parts of the world, the data is so poor that it is impossible to estimate what the risk is.

"Insurers cannot predict whether they will make a profit or a major loss and so cannot provide cover. However, models can help complement the observational data in these areas. That is a major potential market.

"[Insurers] may be able to prevent these losses and turn a profit."

THOUGHT LEADERSHIP

Through new technologies, we as insurers can help companies and the emerging world



More discussion about the weather is needed. Anomalies are increasing as a consequence of climate change and companies should think hard about how this will affect them in the future.

The past few years have shown that the weather can dramatically affect lives and, according to the Intergovernmental Panel on Climate Change (IPCC), it is almost certain that there will be more temperature extremes, as well as extreme precipitation events.

Their frequency is even expected to be multiplied by five in the next 40 years. This means more floods, storms and heatwaves. Weather risk coverage is becoming a more relevant solution for many companies – and could even become the norm.

Further, it is not only the immediate effect of floods and storms that needs to be considered. Increasing extreme weather means more unpredictability as well as physical damage. Companies need to defend themselves against events that could have longer-term consequences on their business; weather coverage offers protection against losses in revenues, increased costs and production damage that could happen anywhere in a firm's value chain.

When considering the impact of the weather, it is incredible how delicately poised and dependent many companies are.

For example, in France, some vineyards require a certain combination of temperature and humidity. If such weather conditions are not met, the development of a specific fungus on the grapes is either insufficient or excessive. This can lead to a decrease in the quality of the wine – and in revenues.

Many firms are now incorporating weather forecasts to adapt their supply and logistic chains. For example, a food and beverage company could plan on pushing for hot soups instead of salads if the weather is expected to be unusually cold in the coming two weeks. In less developed countries, weather forecasts could be used to optimise sowing periods at a country level.

However, beyond 15 days, forecasts tend not to be reliable and if prevention is key, a risk transfer is often required to fully mitigate the risks.

AXA is already covering businesses worldwide in sectors ranging from construction and tourism to energy, food and beverage, distribution and transportation.

Nevertheless, businesses are not the only ones that can be affected by the weather. Entire populations, notably in developing countries, face severe food security risks caused by drought or excess rain, and AXA has produced innovative solutions to protect the most vulnerable.

AXA recently entered a public-private partnership with the World Bank Group to boost insurance coverage and capacity and improve safety in emerging markets, notably in Asia, Africa and Latin America.

This is a unique global partnership that recognises the crucial role of the insurance sector in establishing and fostering innovation, private sector growth and overall economic development.

AXA strives to join forces to attain its goal of boosting the ability of the insurance sector to further play its repair, protection and prevention roles in the emerging world.

Tanguy Touffut, global head of parametric insurance and head of food security and agriculture at AXA Corporate Solutions



Helping the worst affected

Few in the developing world can afford insurance, making alternative solutions all the more important

A GLANCE AT THE NEWS IS enough to understand that unpredictable climate usually affects the poorest the hardest.

However, the effects of severe weather are often made worse by the fact that so few in the developing world have insurance, a situation that locks vulnerable populations in a vicious cycle of destitution, unable to move on after severe weather events.

To tackle this problem and improve life chances around the world, the World Bank Group set up the Global Index Insurance Facility (GIIF), a multi-donor trust fund (funded by the EU, the Netherlands and Japan) supporting the development and growth of local markets for weather and disaster index-based insurance in developing countries – primarily sub-Saharan Africa, Latin America and the Caribbean and the Asia-Pacific region. This is an example of alternative insurance to cover a risk as complex as climate change.

“[The GIIF] wanted to introduce new, innovative products in the insurance space and thought index-based products could be a useful tool,” says Gilles Galludec, manager of the GIIF.

Index insurance

Index insurance pays out benefits on the basis of a predetermined index, such as rainfall level, to cover loss of assets and investments resulting from weather and catastrophic events, without requiring the traditional services of insurance claims assessors – meaning claims can be settled more quickly and objectively.

“[The GIIF] wanted to attract the big private sector players, as well as local stakeholders and governments and, more importantly, focus the World Bank’s work on low-income areas,” explains Galludec.

To date, GIIF has worked in 28 countries and its implementing private

sector partners have covered directly more than 600,000 farmers, pastoralists and micro-entrepreneurs with \$119m in sums insured and reached more than a million people with information and access to index insurance. Much more access to insurance has been facilitated through its work on regulation and policy dialogue.

“The focus of GIIF is on a segment that had been set aside by insurers,” says Galludec. “Primarily in the agri-sector, but index insurance can work in other industry sectors as well: tourism, transport, health.

“For the private sector, it is important to diversify the segment and create a portfolio mix that reflects the needs of different markets. [The GIIF] still wants to focus on Africa and Asia, where the impact of weather is more obvious. However, we are conscious that if the focus is only on this, it may not be profitable enough as the market needs time to develop. Success will have to be viewed over the long term. It will take decades for the market to mature.

“What is important for us is to see the industry using its access to big data and technology to create innovative products that can reach out to the four billion people in need of insurance. There is an appetite to look at insurance differently. We can show (re)insurance companies a lot of data that demonstrates why index insurance is a powerful tool.”

The main upside for individuals, households, farmers and small businesses in the developing world is protection for their incomes and livelihoods beside their assets. However, insurance can also help them obtain loans from microfinance organisations and banks, because they become a much better risk with insurance as a guarantee. Index insurance can also be used by aggregators such as financial institutions and agribusinesses as a risk mitigator.

“If insurance is not developed, the microfinance institutions will reach a cap in the growth of the market,” says Galludec. “Without the support of insurers, microfinance institutions will never enter new markets, new segments and risky geographies, which can be so dramatically affected by the weather.”

Other challenges arise too. “Much remains to be done to provide education and help people understand [index insurance],” says Galludec. “If people don’t understand the features, it can lead to difficulties, and this has to be anticipated and prepared for. This is particularly important with regard to small farmers and individuals.

“Index insurance alone is not a panacea. It should be seen as one part of a range of products that should be developed. However, it is a simpler, cheaper product than many other options and one that has a lot of potential to really transform lives.”

Shopfloor models

Strangely, obtaining more precise forecasts is one of the last factors many boards consider.

“This is still very new,” says Patrice Massat, chairman and chief executive of Climpact-Metnext, a group of meteorologists and analysts who provides consulting on weather risk management to firms such as Nestlé, Danone, Pepsi and Unilever.

“It is important to show people that they can save – or even make – a lot of money if they pay attention. They need to understand forecasting, have faith in it and adapt what they do.”

Climate affects many aspects of business in the short, medium and long term. “Between 50% and 70% of business is weather-sensitive,” says Massat, “which means that a firm’s business will vary depending on the weather. [Climpact-Metnext] is providing tools that help companies understand how their business will

be affected by the weather and how they can improve their business and adapt to take advantage.”

Consumer goods, for instance, are highly weather-sensitive. “When it is hot, people will buy more water, ice cream and beer, for example,” says Massat. “If a retailer has a just-in-time supply chain – and is not seriously looking at the weather – it may not have the relevant products when a customer wants to buy them. If, on the other hand, the retailer is looking at the weather, it can have the products to fulfil this higher demand opportunity.

“Arguably, a small improvement can save them millions of dollars. Even with best practice in all other areas, problems can still arise if the weather [is ignored].”

Energy supply is another good example: more gas is used during cold spells. “Tools can be provided to help companies predict how much gas will be consumed, with 80% accuracy,” says Massat. “This is important, because if this information is provided three weeks in advance, companies can position themselves better in the market and take advantage of prices before they rise as the weather dips.

“If [an energy supplier] has too much [gas], it has to pay to store it. If it has too little, it will have to buy it at the top of the market. It may also face fines if it cannot meet demand.”

Risk management

Massat believes that many firms are switching to weather analysis as part of their risk management after seeing how the extremes of recent years have affected their bottom line. “Tools exist to help manage bad weather better. In partnership with insurance, [weather specialists] can help firms reduce their risk,” says Massat.

“What is not manageable will be covered by insurance. However, because the risk will be lower, the insurance will be better value.” **SR**