

Editorial

Insurance and Adaptation to Climate Change*

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In its fourth assessment report, the International Panel on Climate Change (IPCC)¹ underlines the considerable progress that has been made in understanding how climate is changing in space and in time. Regarding direct observations of recent climate change, it concludes that “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperature, widespread melting of snow and ice and rising global average sea level”.²

Among the extensive range of climatic observations emphasized by the IPCC report, we particularly note the increase of 0.76°C in the average temperature from 1850–1899 to 2001–2005. The year 2005 was the warmest year in a millennium, and Lloyd’s noticed that “the projected rate of increase in global temperatures for the 21st century is likely to be the fastest of any century in the past 10,000 years”.³ Observational evidence also shows that sea surface temperature has increased between 0.2 and 0.6°C over the past century, with correlated effects on the hurricane activity.⁴ Over the last 10 years, extreme hurricanes occurred in the Atlantic, while climate observers noticed a peak in the variance of sea temperature. Global warming can indeed explain the increase of the duration and strength of hurricanes and tropical cyclones, but other explanations like natural cycles must also be taken into account.⁵ The rise of the sea level is more difficult to estimate. In its last report, UNEP revealed an increase of 3 mm per year over the last decade, and it seems to be following a rising pace. Such a phenomenon needs to be seriously considered as 25 per cent of the world’s population lives in coastal zones (7 trillion USD of assets) and 12 of the world’s megacities are in coastal areas. Changes in precipitation might also be a result of climate change. Long-term trends from 1900 to 2005 have been observed and have not only led to significant increased rainfall in the eastern part of North and South America, northern Europe and northern and central Asia, but also to more intense droughts in the Sahel, the Mediterranean area, Southern Africa and parts of Southern Asia. In

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¹ IPCC (2007).

² Cited in IPCC (2007, p. 7).

³ According to the IPCC forecasts, cited in Lloyd’s (2006, p. 14).

⁴ Lloyd’s (2006).

⁵ UNEP (2006).

Europe, extreme floods were recorded in 2005 in Switzerland, Austria and Germany. IPCC notes that such extreme events are expected to increase, and the impressive flooding suffered by the U.K. in the summer of 2007 sadly illustrates this forecast.

The IPCC fourth assessment report also points out that, although climate has always been changing, the likelihood of a human contribution to the current evolution and observed trend is “more likely than not”. Projections of future changes in climate emphasize, for the next 2 decades, a warming of about 0.2°C per decade, and “even if the concentration of all greenhouse gases had been kept constant at year 2000 level, a further warming of about 0.1°C per decade would be expected”.⁶

Concerning extreme weather events, the number of large natural disasters have continuously increased in the last 10 years. The Swiss Re annual survey⁷ notes that the number of such events follow an upward trend from 1985 to nowadays. Regarding insured losses, it underlines that, in the period 1987–2004, property insurance losses due to catastrophes averaged USD 23 billion per year. The record hit by insurance losses due to natural catastrophes in 2004 (116 natural disasters, USD 9 billion of insured losses) is largely exceeded by the data recorded for 2005: the insured losses were up to USD 83 billion, in which USD 60 billion⁸ are due to hurricanes (Rita, Wilma and Katrina). The fact that 2006 was a relatively quiet year should not lead us to forget that Europe already suffered many large-scale disasters in the past. Storms in 1999 cost 13 billion euros, which also corresponds to the cost of floods in 2002, while the heat wave in 2003 cost 10 billion euros. Allianz (2005) recorded that in Europe, 14 climate-related events have cost over 75 billion euros since 1987.

This increase in the costs of natural disasters is strongly linked to the changes in land use and in the concentration of people and capital in vulnerable areas. Global warming, however, is likely to have a significant impact on the intensity of such exceptional events. The European Environment Agency points out that hot summers' frequency will double by 2020 and increase 10-fold by 2080, contrary to cold winters whose frequency will halve by 2020. Europe is also particularly exposed to windstorms and flooding. Indeed, major flood events increased to 15 per year in the last 30 years,⁹ and a study conducted by the Association of British Insurers¹⁰ noted that climate change could also significantly increase the cost of floods, particularly in Europe.

Table 1 summarizes the recent trends and assessment of human influence in the trend and projection for extreme weather events.

These observations are only a few examples of potential climate change impacts, but they illustrate the damages that such climatic evolutions could entail in the future. Importantly, climate change can have multiple and irreversible effects on societies and nature. Even if it is still quite difficult to evaluate the potential damages of these evolutions, it is of the utmost importance to develop adaptation policies in order to moderate them while benefiting from new business opportunities that may arise in such a context.

⁶ IPCC (2007).

⁷ Swiss Re (2006).

⁸ *Ibid.*

⁹ Allianz Group and WWF (2005).

¹⁰ ABI (2005).

Table 1 Recent trends, assessment of human influence on the trend, and projections for extreme weather events for which there is an observed late 20th century trend

<i>Phenomenon and direction of trend</i>	<i>Likelihood that trend occurred in late 20th century (typically post-1960)</i>	<i>Likelihood of a human contribution to observed trend</i>	<i>Likelihood of future trends based on projections for 21st century using SRES scenarios</i>
Warmer and fewer cold days and nights over most land areas	Very likely	Likely	Virtually certain
Warmer and more frequent hot days and nights over most land areas	Very likely	Likely (nights)	Virtually certain
Warm spells/heat waves Frequency increases over most land areas	Likely	More likely than not	Very likely
Heavy precipitation events Frequency (or proportion of total rainfall from heavy falls) increases over most areas	Likely	More likely than not	Very likely
Area affected by drought increases	Likely in many regions since 1970s	More likely than not	Likely
Intense tropical cyclone activity increases	Likely in some regions since 1970	More likely than not	Likely
Increased incidence of extreme high sea level (excludes tsunamis)	Likely	More likely than not	Likely

Source: IPCC (2007).

The recent report on climate change conducted by the Harvard Medical School for Swiss Re and the United Nations Development Program emphasizes that “the availability and affordability of insurance are essential to economic development, financial cohesion [...] in a world where hazards are abound and are increasingly unpredictable”.¹¹ Insurance can bring societies the necessary tools to implement sustainable development in this context, and it is thus through it that adaptation strategies as well as new decision instruments and cooperation networks between the different economic agents (policyholders, insurance, financial market, state) should be defined. The insurance industry thus has a twofold responsibility. On the one hand, it needs to prepare itself for the adverse effects that climate change may entail on its business and on its customers. On the other hand, it can significantly help economic agents to mitigate the economic risks associated with climate changes by providing products and services that are relevant for these new risks.

In order to reach the first goal, the insurance industry needs to assess the cost of new weather patterns, and in particular extreme weather-related events, on their business lines and also on processes used for their management (risk assessment, insurability and financial coverage). It also needs to emphasize the arising challenges to deal with these effects and to adapt to them. Moreover, beyond its own adaptation, the insurance industry must also find solutions to reduce the economic risks linked to

¹¹ Swiss Re (2005, Chapter 3, p. 91).

climatic evolutions and possibly to help society to cope with the root that causes global warming by promoting new technologies that should enhance mitigation of GHG emissions.¹² As noted by the Allianz Group - WWF report,¹³ the insurance sector must help society “to enter the low-carbon economy by providing appropriate products and services”.¹⁴

Several studies on financial risks related to climate change conclude that many of these costs could be avoided, or greatly mitigated, by taking appropriate measures today. For example, the report on financial risks of climate change conducted by ABI¹⁵ evaluates that the decrease in carbon dioxide emissions from the high (business-as-usual) to the low scenario would reduce the impact on losses for extreme windstorms by 80 per cent, and would limit the increase in flood risk across Northern Europe, allowing us savings of USD 120 billion each year by the 2080s. Reducing carbon emissions, as mentioned in the Kyoto Protocol, leads to define mitigation strategies and tools. Implementing green technologies to provide energy and green buildings that allow energy savings are good practices that need to be promoted. Insurance can help the financing of such projects and the promotion of their development, but it will also have to face new risks and challenges that will arise from this changing environment.

In this regard, this special issue provides us with the opportunity to assess where the insurance industry currently stands on the climate change front, and how the insurance industry may transform climate risks into new business opportunities. It brings together contributions of 9 authors.

In the light of the fourth IPCC assessment report, Andrew Dlugolecki reviews the different ways in which climate change may impact the insurance industry and considers how insurance can help to define and implement policies in a “responsible and effective way”. He proposes to consider how changing weather patterns and environmental conditions may influence insurers’ activities and analyses their ability to adapt their business to such climatic change and to help society to contend with it. This article also considers the issue of climate change mitigation for the insurance sector. It emphasizes the impact of current actions to reduce carbon dioxide emissions on its activity, as well as the role and responsibilities of insurers to define and implement climatic policies.

Arthur Charpentier investigates the potential impacts of climate change on the insurance and reinsurance markets and studies the ability of these markets to deal with such impacts. His article analyses the insurability of climate risks in the changing environment related to long-term climatic evolutions. It also considers the risk transfer instruments that have been developed to hedge such risks.

Kim Clemo presents an insurer’s point of view on such a topic. She proposes several practical ways in which an insurance company can help small and medium firms to adapt to these climatic evolutions.

¹² Chemarin and Bourgeon (2007); Lecomte and Mills (2006).

¹³ Allianz Group and WWF (2005).

¹⁴ *Ibid.* chap. 4, p. 25.

¹⁵ ABI (2005).

David Crichton further investigates the role of insurance to deal with extreme weather-related events in Europe, paying particular attention to the recent flooding events in UK. The article surveys the several existing schemes developed among European countries to cope with flood risks, and especially analyses the role of State intervention on the insurance market to define the right incentives to carry out adequate risk prevention measures and to prevent excessive losses.

Finally, Robert Ward, Trevor Maynard, Emmanuel Leblanc, Erwann Michel-Kerjan and Frederic Morlaye present the main concerns and recommended strategies of private sector stakeholders involved in risk management, to deal with the new challenges and opportunities associated with climate change adaptation and mitigation.

Robert Ward emphasizes the leading role that the insurance industry should play in society's adaptation to climate change. He points out that firms are more prone to implement measures to reduce their greenhouse gas emissions than to consider their own adaptation to the potential effects of climate change on their activities.

Trevor Maynard analyzes the pro-active role that the insurance industry can play to enhance adaptation and mitigation. He surveys the rising challenges for the insurance sector to reach such an aim, as well as several innovating instruments that are already available.

Emmanuel Leblanc particularly considers the broker's point of view on the mitigation issue. He shows how insurance can support the development of renewable energy projects and considers the related emerging risks and market challenges. He also shows how to model the value of insurance for a wind farm business plan.

Finally, Erwann Michel-Kerjan and Frederic Morlaye consider the development of financial innovation, and particularly insurance-linked securities, to deal with extreme weather-related events in the perspective of climate change. The article presents a prospective view of their development through examples of successful innovating products such as credit derivatives and weather derivatives.

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