MILLIMAN ANNUAL REPORT

Extreme weather in Europe

2024: THE YEAR OF THE FLOOD

The insurance industry impact of 2024 events and actionable steps for insurers to take a leading role in managing climate-related financial risks

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Executive summary

The year 2024 was the warmest on record, eclipsing the previous year and becoming the first to exceed the pre-industrial global mean temperature by more than 1.5°C. As in 2023, Europe saw a range of extreme weather events linked to climate change. While multiple climate hazards affected the continent, our analysis reveals flooding as the predominant and costliest threat to many European countries.

Unprecedented rainfall, including both repeated precipitation events and episodes of intense precipitation over very short periods, resulted in severe flooding and wide-ranging damages and casualties across several countries, including Belgium, France, Germany and the Netherlands. Storm Boris, to name one particularly devastating event for Central Europe, combined with flood events in Spain and Germany, killed more than 250 people and cost a combined EUR 13.5 billion in damages.[1]

This paper outlines numerous episodes of flooding and other extreme weather events that affected 10 European countries during 2024. As in past editions of this annual report, we also examine the short- and long-term impacts of these events on insurers, governments and communities. We conclude with some actionable steps that insurers can take when seeking to proactively manage climate-related financial risks and foster more sustainability.

Need for improved climate risk assessment and mitigation strategies

As in 2023, the impact of repeated severe weather events in 2024 increased pressure on reinsurance markets, with the surge in reinsurance premiums leading to higher premiums for consumers. In the aftermath of Storm Boris, for example, one of Austria's leading insurers is considering no longer covering certain regions or adjusting its products because of the significant increase in payouts caused by natural disasters.

Such challenges have highlighted the need for insurers to re-evaluate risk-sharing measures in order to meet the challenge of providing adequate coverage for natural disasters while keeping premiums affordable. Several countries have pursued advanced risk modelling and assessment tools, including Austria's HORA 3D system, which offers the option to visualise "realistic flood scenarios"; Italy's increasing use of geographic information systems; and the Netherlands' pioneering work in flood forecasting. Examples like these demonstrate a shift towards more sophisticated, data-driven approaches to understanding and pricing risk.

Evolving public-private risk-sharing arrangements

One emerging trend that continues across many European countries is the development of new collaborative approaches between governments and the insurance sector. New regulations in Italy, for example, require companies to insure assets such as land, commercial buildings, industrial facilities and equipment against risks like earthquakes, floods and landslides. In France, the insurance market has seen an increase in reinsurance premiums that allow the Caisse centrale de réassurance (Central Reinsurance Fund, CCR) to protect mutualisation and insurability in the French insurance market.

These types of measures aim to foster cooperation between insurance companies and the government in addressing natural disasters and their associated costs. Going forward, Europe will likely see more collaborations like the United Kingdom's Flood Re, a joint industry and government initiative that makes flood coverage more affordable for properties in high-risk areas. Such innovative risk-sharing arrangements reflect a growing awareness that neither private insurers nor governments alone can manage the financial burden of increasingly severe weather events linked with climate change.

Towards more sustainable solutions

In addition to more data-driven risk modelling, insurers in various countries are developing and launching parametric insurance solutions, which pay out predetermined amounts based on the occurrence of specific parameters or "triggers" associated with events (such as a certain level of rainfall or magnitude of an earthquake) rather than basing payouts on assessment of actual loss or damage incurred.

In summary, 2024 proved to be another watershed year for the European insurance industry, as insurers across the continent recognised the need to adapt their strategies and implement preventive measures to confront the reality of climate change. At the same time, governments are continuing to step in when it comes to policy interventions, regulatory reforms and new risk-sharing models aimed at bolstering the insurance sector's ability to respond to this reality.

Such proactive, collaborative measures will become increasingly important as the insurance industry continues to adapt and innovate in pursuit of a more resilient, sustainable future.

Europe overview

The World Meteorological Organization confirmed that 2024 was the warmest year on record and the first calendar year to see a global mean temperature of more than 1.5°C above the pre-industrial average observed from 1850 to 1900. This continues a general warming trend, with the past decade (2015–2024) comprising the 10 warmest years on record.[2]

Focusing on Europe, the 2024 temperature across the continent measured 2.92°C above the pre-industrial level, according to Copernicus, the EU's Earth observation programme—an increase largely due to record high temperatures experienced in central, eastern and southeastern countries.[3]

This new warming record has put a stress on the long-term temperature increase goal of the Paris Agreement, which is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and to pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."[4] Indeed, the goal is to limit the temperature increase to 1.5°C on average on a climate-relevant period (around 20 to 30 years). While the fact that a single year is above this limit does not mean that the terms reached in the Paris Agreement have been breached, the current warming rate should motivate leaders to act adequately to avoid that increasingly probable outcome.

Most expensive insured events: May and September floods

In a year when extreme events such as storms, severe heat, droughts and wildfires had significant impacts around the world, Europe experienced the impact of flooding most acutely. This includes a range of damaging precipitation events like Storm Boris in September, which brought record-breaking rainfall and severe flooding to Central and Eastern European regions. According to the Met Office, in partnership with Met Éireann and the Royal Netherlands Meteorological Institute (KNMI), the 2023–24 storm season saw 12 named storms, classified as such due to their potential to cause medium or high impacts in the United Kingdom, Ireland or the Netherlands; this is the highest number since the naming standard was introduced in 2015.[5] Across Europe, some estimates suggest that close to 50 named storms occurred during 2024.[6]

According to catastrophe insurance data provider PERILS, the two costliest insured events in Europe in 2024 were the Central European floods in September (EUR 2.2 billion) and the southern German floods in May (EUR 1.6 billion).[7] This parallels our findings in our 2021 Extreme Weather Events in Europe report, which estimated the costliest European event as the July 2021 flooding, which caused approximately EUR 11.5 billion in insured losses.[8]

Given the increasing number of extreme weather events linked to climate change—and their associated losses—the European Insurance and Occupational Pensions Authority (EIOPA) recommended in January 2025 that insurers update the way they account for natural catastrophe (Nat Cat) risk in their standard formula calculations.[9] Based on the most recent climate data and advanced risk modelling, the organisation has proposed adjusting standard formula risk factors for natural disasters such as floods, hail, earthquakes and windstorms for certain regions and expanding the number of countries included in the standard formula in an effort to ensure that the risk parameters remain valid and accurate. In summary, the EIOPA report emphasised the need for regular updates to Nat Cat risk parameters to reflect the profound impact of climate change.

Milliman analysis shows 2024 as most flood-prone year on record

Last year at Milliman we conducted an in-depth analysis of what rising global temperatures and emissions mean for natural hazards such as heat stress, cold stress, drought, extreme precipitation, extreme wind, forest fire and hail. We have updated this analysis to use the latest available data and include the year 2024. Using the years 1981 to 2010 as a reference period, Milliman analysed the European Extreme Events Climate Index (E^3CI) dataset, and our findings indicate that the trends are consistent with, or even worse than, those observed in previous years.[10]

European economies and insurance industries are experiencing a period of transformation caused by climate change exacerbated by human activities, with an increase in the severity of extreme events and their economic impacts. The year 2024 was marked by significant floods and droughts as well as wildfires. Looking ahead, the situation could deteriorate further, with coastal flooding and windstorms becoming more frequent. Additionally, we may witness more deadly heatwaves and widespread severe storms like Boris.

Using the E^3CI dataset, Milliman calculated the probability of exceeding the 95th percentile threshold. Based on the assumption that all indices follow a standardised normal distribution, the sum of these distributions should follow a Gaussian distribution, allowing us to approximate probability by the formula:

$$p(index > t) = 1 - p(index \leq t)$$

FIGURE 1: PROBABILITY OF EXCEEDING 1981–2010 THRESHOLD AND ODDS RATIOS, AT EUROPE LEVEL

	YEAR	DROUGHT	HEAT STRESS	COLD STRESS	EXTREME PRECIPITATION	EXTREME WIND	FOREST FIRE	HAIL	E^3CI
	2012	5%	50%	29%	21%	0%	50%	6%	51%
	2013	1%	17%	25%	19%	1%	8%	1%	14%
	2014	0%	38%	1%	22%	4%	2%	1%	2%
	2015	5%	67%	0%	16%	27%	31%	2%	54%
	2016	6%	45%	0%	27%	0%	30%	1%	24%
	2017	9%	48%	0%	19%	18%	34%	1%	40%
	2018	16%	57%	4%	10%	12%	67%	1%	59%
	2019	1%	62%	0%	8%	12%	48%	2%	50%
	2020	48%	55%	1%	30%	29%	66%	1%	66%
	2021	26%	41%	3%	38%	17%	11%	12%	33%
	2022	54%	76%	0%	15%	30%	69%	0%	61%
	2023	0%	67%	0%	36%	26%	61%	17%	60%
	2024	0%	78%	0%	57%	8%	54%	1%	54%
Average	1981–2010	6%	6%	6%	6%	6%	6%	5%	6%
Average	2011–2024	15%	54%	5%	23%	13%	42%	4%	44%
Odds ratio	2011–2024	2.5	8.7	0.8	3.8	2.4	7.0	0.8	7.7
Odds ratio	2024	0.0	12.6	0.0	9.2	1.4	9.1	0.2	9.4

To generate aggregated results at the European level, Milliman began with each country's index values from E³CI and weighted them according to each country's population. This produced a time series showing the probability of exceeding the 95th percentile threshold for each hazard, as illustrated in Figure 1.

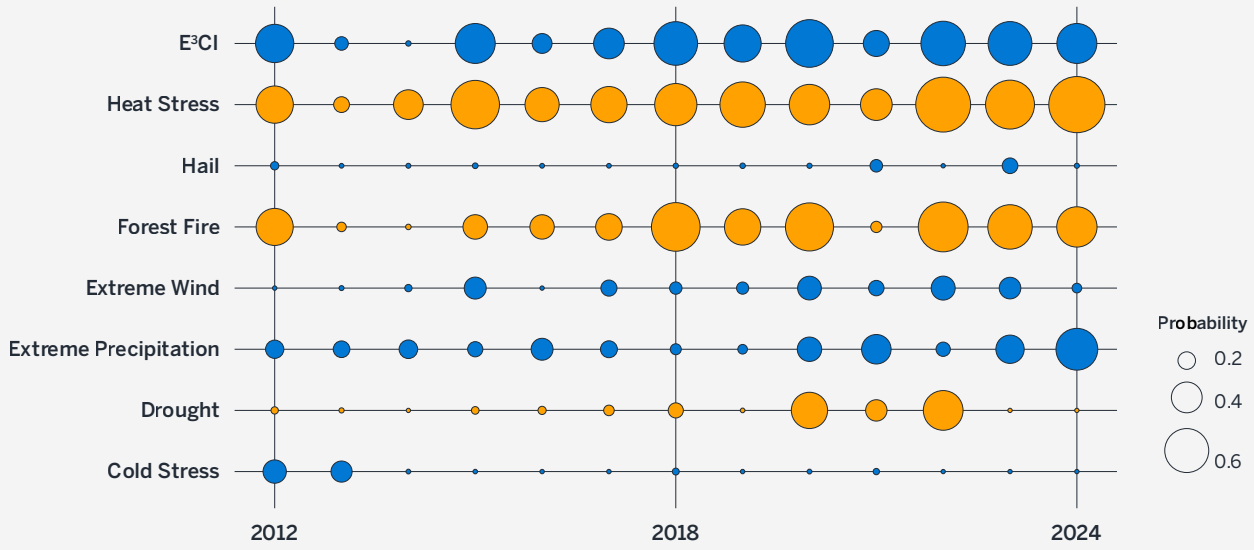
Additionally, Milliman verified whether the empirically observed index exceeded the 95th percentile threshold. We define the odds ratio[11] as the ratio of the average of probability of exceeding the 95th historical percentile in the year 2024 (or the 2011–2024 period) and the reference period of 1981–2010, also shown in Figure 1. This means:

- An odds ratio of less than 1 indicates a lower probability of exceeding the 95th percentile compared to the reference period.
- An odds ratio of greater than 1 indicates a higher probability of exceeding the 95th percentile compared to the reference period.

Climate change continued to affect trends in catastrophic events in 2024, as shown by the odds ratios, which confirm the increasing trend. Heat stress was 12.6 times higher than during the 1981–2010 reference period, while extreme precipitation was 9.2 times higher, suggesting that the old reference period no longer reflects actual exposure trends.

In fact, odds ratios confirm 2024 as the most flood-prone year on record. Extreme precipitation indices increased compared to 2023, with a clear rising probability of exceeding critical thresholds—making 2024 the worst year of the last 13 years. As a result, flooding became a major issue in many European countries.

FIGURE 2: EXTREME INDICES TREND, 2012–2024, AT EUROPE LEVEL



Source: Milliman elaboration on IFAB data.

Meanwhile, drought had a tremendous impact on agriculture in 2024, though this is challenging to observe in the overall index due to the effect of averaging over different periods and countries. For example, Italy experienced a drought that lasted almost six months, resulting in roughly EUR 2.8 billion in damages, a significant impact that is not reflected in the index value.

As shown in Figure 2, the rising frequency and severity of extreme weather events are straining resources, infrastructure and financial systems, particularly within the insurance industry. The fact that these hazards are inherently interconnected—droughts can increase the likelihood of floods, and extreme heat can lead to both droughts and wildfires—further amplifies their overall impact. As a result, European economies face mounting challenges in adapting to and mitigating the effects of climate change, necessitating stronger, more proactive policies and strategies to manage these risks effectively.

Austria

THE WARMEST YEAR ON RECORD AND THE “NEXT CENTURY FLOOD”

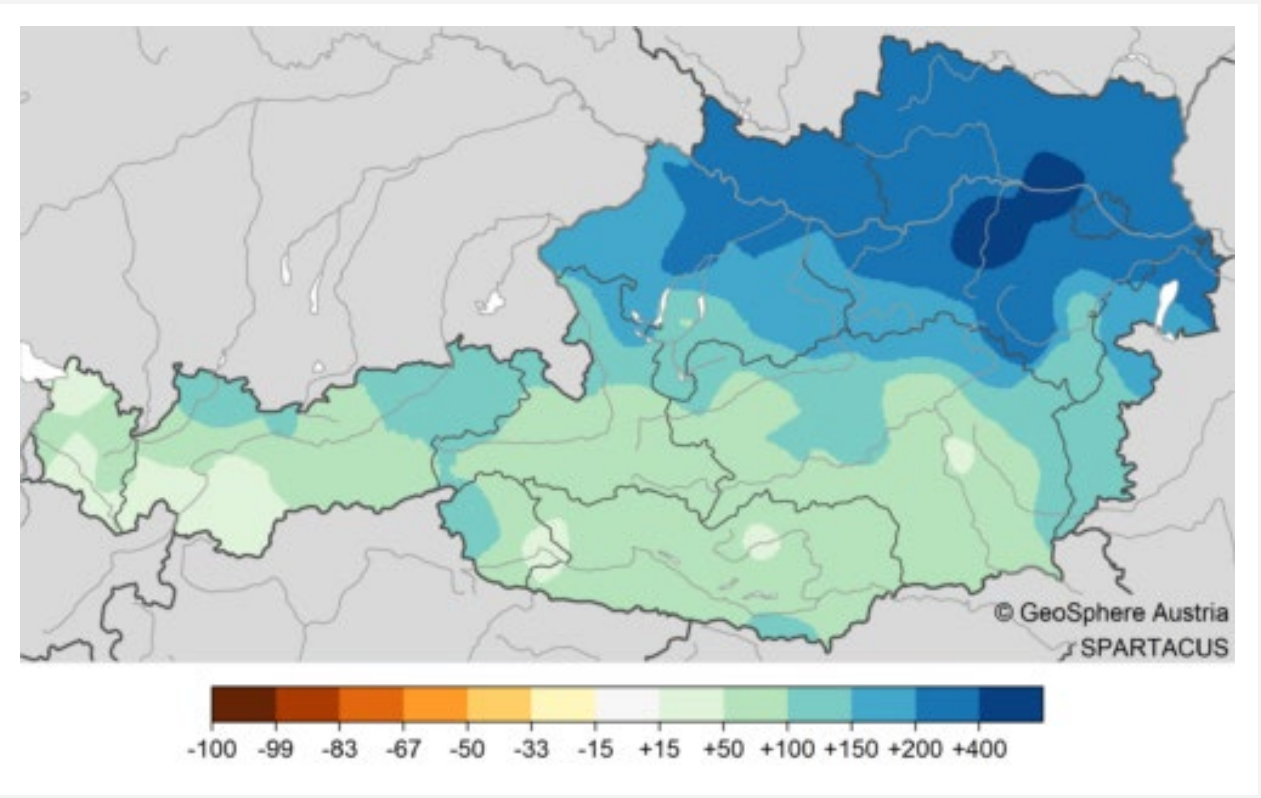
The year 2024 in Austria was marked by many unprecedented climatic extremes, including late frosts, droughts and numerous storms. In addition, three seasons reached record-high temperature levels, and numerous individual station records were set.

An early growing season and a cold spell in April caused significant frost damage to fruit and wine crops. From May onwards, storms and floods further impacted farmers. Then, a lack of rainfall, combined with the heat, particularly affected autumn crops such as corn, soybeans and sugar beets. As the year drew to a close, a final analysis confirmed that 2024 was the warmest year in Austria since record-keeping began in 1767.[12]

But perhaps even more significant than the extraordinary temperatures was what has been termed the “next century flood” that followed Storm Boris, which swept across Central and Eastern Europe in September 2024.

In Austria, the region from Salzburg Flachgau to northern Burgenland and Upper Styria was affected, as were neighbouring countries, particularly the Czech Republic and southern Poland. Severe, even unprecedented, rainfall combined with storms and snowfall in the high mountains led to extreme flooding. Lower Austria and Vienna were the hardest hit.[13]

FIGURE 3: RAINFALL EVENT IN SEPTEMBER 2024: PRECIPITATION DEVIATION FROM 1991–2020 AVERAGE



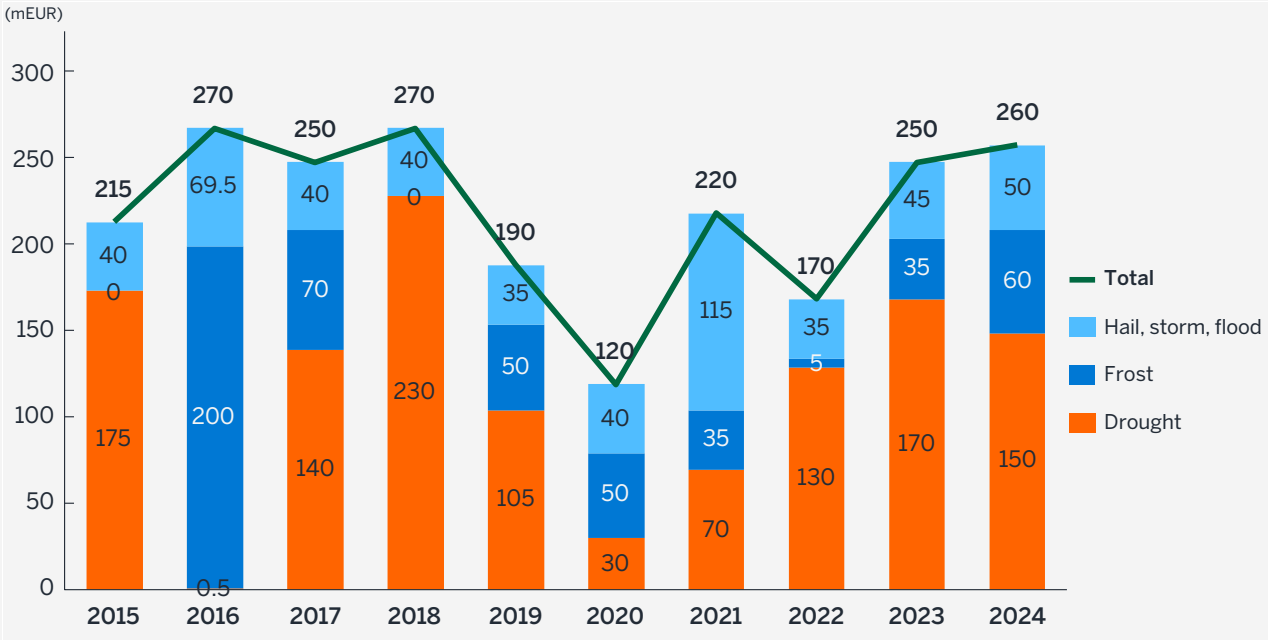
Source: BMK. https://infothek.bmk.gv.at/assets/uploads/2024/10/niederschlaegeSep24-500x306.png.

At around 60 of GeoSphere Austria's weather stations, more than 200 L/m² of rain were recorded; 12 stations saw more than 300 L, while over 400 L were recorded at St. Pölten. This represented two to five times the typical rainfall for the entire month of September within just a few days, far more than has ever been recorded, especially in Lower Austria and Vienna. The record rainfall resulted in devastating floods and five fatalities.[14] Figure 3 illustrates the deviation in precipitation compared to previous years.

The damages in Austria from the post-Boris flooding are estimated at around EUR 1.3 billion, according to the Supply Chain Intelligence Institute Austria (ASCII), the Institute of Economic Research (WIFO), and the Complexity Science Hub (CSH). Of this total, approximately EUR 700 million is attributed to private households, according to the Austrian Insurance Association (VVO).[15]

Overall, the Austrian Hail Insurance Association reviewed the damage to agriculture in 2024 and estimated a total of EUR 260 million in losses due to extreme weather events (as shown in Figure 4). Late frost caused EUR 60 million in damages in late April alone (shown in dark blue), while drought accounted for EUR 150 million (shown in orange) in losses. Hail, storms and floods contributed to another EUR 50 million in damages (shown in light blue).[16]

FIGURE 4: DAMAGE TO AGRICULTURE FROM DROUGHT, FROST AND PRECIPITATION, 2015–2024



Source: Adapted from Österreichische Hagelversicherung. https://www.hagel.at/presseaussendungen/jahresbilanz-2024/.

IMPACT OF THESE EXTREME WEATHER EVENTS

As a consequence of Storm Boris, one of Austria's leading insurers, Uniqa, is considering no longer insuring certain regions or adjusting its products because of the significant increase in payouts necessitated by natural disasters. According to Uniqa CEO Andreas Brandstetter, such events now cause annual damages in Austria of approximately EUR 1 billion, compared to EUR 400 million 20 years ago.[17]

To counteract the increasing costs, VVO Secretary General Christian Eltner highlighted the need for improvement in Austria's personal natural disaster prevention measures. Eltner emphasised that heavy rainfall events are increasing and are now even flooding basements in Vienna. He suggested that individuals could take relatively simple measures to reduce potential damage.[18]

The VVO also promoted the use of the HORA risk map,[19] developed after the major flood of 2002. HORA was launched as a digital hazard map for natural disasters. According to Klaus Scheitegel, vice president of the VVO, the online portal aims to raise awareness among the population and encourage personal preparedness. Available since 2023, HORA 3D offers the option to visualise "realistic flood scenarios" and show how much a house would be affected by flooding. This would provide an overview of the safest places to be in one's home during such an event and where valuable items should ideally be stored.[20]

In the longer term, the VVO is advocating for a national legislative solution to balance risks across federal states. One proposal includes extending fire insurance coverage to include natural disasters, rather than implementing a general mandatory insurance. This inclusion would be added to each fire contract. This approach could offer higher coverage sums for natural disasters while keeping premiums affordable.[21]

Belgium

EXTREME RAINFALL TRIGGERS MULTIPLE FLOODS

In 2024, Belgium experienced a record amount of rainfall since measurements started to be kept in 1833. The number of days recorded with rain was not exceptional, but the number of days with intense rain was.[22]

This extreme rainfall triggered multiple floods in Belgium. The most notable one impacted the Belgian commune of Fourons, which was hit by severe floods in May. Minister of the Environment Zuhal Demir said the situation was worse than during the floods in 2021, when the Fourons region was also heavily affected.[23]

Water submerged many houses, and as a result the insurance industry received around 5,000 claims amounting to EUR 25 million in damage, of which EUR 5 million concerned the Fourons area alone. These amounts represent material damage only and exclude the psychological impact of these severe events.[24]

After weather forecasts predicted stronger rains in October, the commune of Fourons took preventive measures such as building dikes.[25] Ultimately, the heavy rain mostly struck the provinces of Namur, Luxembourg and Liege. The commune of Couvin adopted an emergency flood plan. Among other measures, a rescue team safeguarded around 20 people, some of whom were evacuated from a camp site by an army helicopter.[26]

IMPACT OF THESE EXTREME WEATHER EVENTS

The Belgian insurance industry has already started adapting to catastrophic flood events.

As of 1 January 2024, the federal government began enforcing the raised ceiling of insurance coverage for natural disasters: EUR 1.6 billion, more than four times the previous level.[27] The increase was implemented in response to the impact of floods in 2021, when the Walloon Region and the insurance sector had to negotiate a way to fully compensate damages.

For damages exceeding EUR 1.6 billion, it is not yet clear how the insurance sector and the government will respond. If insurance companies need to use reinsurance, then insurance premiums will surely increase, especially for small insurance companies.[28] In 2024, Assuralia[29] called for the future administration to find a sustainable solution for coverage of natural catastrophes.[30]

In addition to changes that have already been implemented, the National Bank of Belgium has stressed the increasing importance of taking into account physical risks as well as transition risks.[31]

Moreover, during Insurance Europe's 14th International Conference in May 2024, Assuralia underlined the importance for insurers to invest in green products while keeping in mind the need for diversification.[32]

France

15% MORE PRECIPITATION THAN AVERAGE

Cyclone Chido, which struck Mayotte Island in the southwest Indian Ocean on 14 December 2024, devastated the island. Wind speeds exceeded 200 km/h, including gusts of more than 225 km/h. Torrential rainfall accompanied the winds, with about 176 mm of rain falling in 12 hours. Moreover, average wave heights topped 5 m.

As the World Meteorological Organization reported, "Such was the strength of the cyclone that it destroyed some of Météo-France's observational structure."[33] This particular event was especially damaging because of the vulnerability of local structures and caused EUR 650 million to 800 million in damages, according to CCR, the French public reinsurer.[34]

However, in mainland France, the most damaging event was the remnant depression of Hurricane Kirk on 10 October, which featured wind gusts around 200 km/h; a gust of 221 km/h was recorded in the Pyrenees. In some places, the equivalent of a month's rain fell in a few hours. This led 28 departments to declare a state of high alert for flood and severe winds. While the Loire Valley and the Paris regions were particularly affected by this storm,[35] more than 1.5 million people were impacted by this event.

Just a week later, ex-hurricane Leslie affected about 900,000 people in the Gier Valley near Lyon. The Kirk depression had left the ground waterlogged, and when heavy rainfall occurred over a few hours it could not be absorbed. As a result, the event caused damages between EUR 350 million and 420 million, according to CCR.[36]

Throughout the year in France, excess precipitation was a regular occurrence. After a winter that saw close to normal precipitation, the spring of 2024 was the wettest since 2008 and the fourth wettest since measurements began to be kept in 1959, according to Météo-France.[37] Overall, France experienced an average of 1,000 mm of precipitation (15% more than the average) over the year, making 2024 the seventh rainiest year since 1959. The last three years (2022, 2023 and 2024) represent what France could experience in the future with climate change: high precipitation volatility, ranging from extreme rainfall over a few days to long periods of drought. In 2022, total precipitation was 24% lower than average, while 2023 had total precipitation 3% above average.

This excess of precipitation has led to the persistence of wet soil, which has less capacity to absorb rain. Indeed, in 2024, the soil maintained moisture levels that were well above normal for eight months, a duration that was last seen 30 years ago.

In addition, France experienced seven serious floods, all related to excess rainfall—the result of repeated precipitation events and episodes of very intense precipitation over very short periods.

Events included:

- Mid-January 2024 flooding in northern France (Haut-de-France and Pas-de-Calais) leading to 315 cities declaring natural catastrophes.
- Easter 2024 floods from Limousin to Centre-Val de Loire and Burgundy linked to Storm Nelson.
- Mid-May 2024 flash floods in Moselle and Bas-Rhin associated with mudslides that caused 277 cities to declare natural catastrophes.
- Mid-June 2024 flash floods and mudslides in Isère combined with snowmelt to cause severe damage in La Bérarde hamlet. The natural catastrophe insurance system allowed the CCR to buy back the 18 owners who lost their homes.
- Early September 2024 flash floods in the Pyrenees caused by the equivalent of one month of rainfall in one day (150 mm were measured in 12 hours in Gavarnie).

- Early October 2024 floods linked to Hurricane Kirk were particularly severe in Seine-et-Marne and Eure-et-Loir.
- Mid-October 2024 floods in Cevennes caused by intense precipitation in the Mediterranean.

According to CCR, the first half of 2024 was marked by a succession of small-scale floods costing around EUR 200 million.[38]

One major issue France is experiencing is the trend of building in flood-prone areas. Indeed, urbanisation is increasing, sometimes near rivers or inside high-risk areas, which is leading to an overall increase in flood risk even if the hazard itself is not evolving. Furthermore, this urbanisation makes the soil impermeable, preventing water from penetrating the soil and exposing larger areas to another type of flood: water runoff (also known as pluvial flooding).

IMPACT OF THESE EXTREME WEATHER EVENTS

In total, 2024 extreme weather events in France caused insured damages amounting to around EUR 5 billion.[39] As a result of these weather events, France's insurance market has seen an increase in mitigation measures, along with more prevention measures and alerts, as detailed in previous editions of Milliman's Extreme Weather in Europe report. There has also been an increase in reinsurance premiums for the public reinsurer that allow the CCR to protect insurability in the French market by reducing the burden on insurers in high-risk areas and funding prevention measures.

Going forward, a greater emphasis is being placed on sustainability and resilience, with insurers advocating for risk mitigation measures and offering incentives for adopting environmentally friendly practices. The industry is also exploring parametric insurance solutions, which provide quicker payouts based on predefined triggers, in order to address the challenges posed by climate-related events.

Germany

THE WETTEST 12 MONTHS SINCE 1881

Germany has experienced an unprecedented increase in extreme weather events in recent years. The Extreme Weather Congress 2024 in Hamburg, organised in collaboration with the German Weather Service (DWD), provided a comprehensive overview of the current state of science regarding extreme weather phenomena in the context of climate change in Germany.

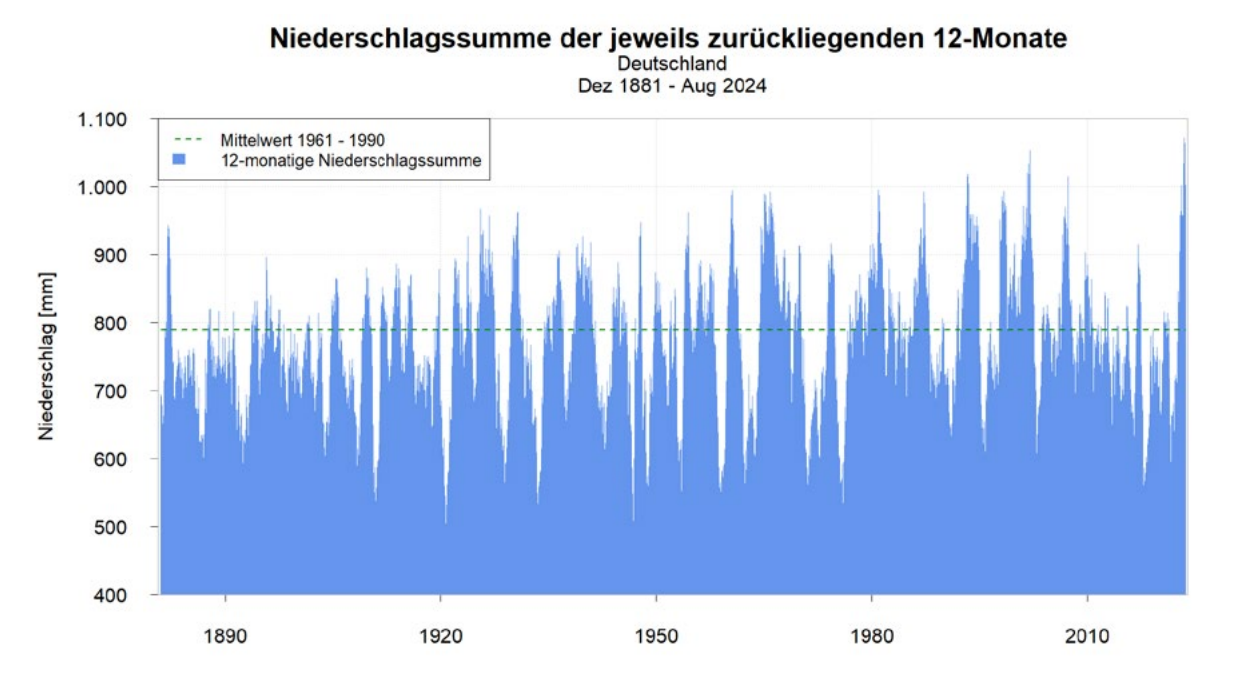
Participants noted that in Germany, the number of hot days—those with maximum daily temperatures of at least 30°C—has almost quadrupled since the 1950s. The year 2024 once again highlighted this trend.

The frequency of dry spells has also increased, leading to a higher risk of wildfires. Summers in recent years have been characterised by longer dry periods, which was also observed in 2024, though this year saw less severe dryness than previous years.

In addition, one important peril in 2024 was rainfall, with several large-scale prolonged rainfall events in the first half of the year leading to flooding in various parts of the country. As shown in Figure 5, the period from July 2023 to June 2024 was the wettest 12-month period since records began being kept in 1881.

The General Association of the German Insurance Industry reported that the southern and southwestern regions of Germany were particularly affected by flooding in the spring, with Saarland and Rhineland-Palatinate experiencing insured damages of around EUR 200 million over Pentecost. A major flood in June primarily impacted parts of Bavaria and

FIGURE 5: RAINFALL FROM 1881 TO 2024 IN GERMANY, INCLUDING MEAN COMPARISON



Source: ExtremWetterKongress 2024. https://www.dwd.de/DE/klimaumwelt/aktuelle_meldungen/240924/faktenpapier_extremwetterkongress_download.pdf;jsessionid=F01718688113E6FD30BE48C055CFEF15.live31094?__blob=publicationFile&v=3.

Baden-Württemberg, resulting in insurance payouts of approximately EUR 2 billion for property and motor vehicle damages.

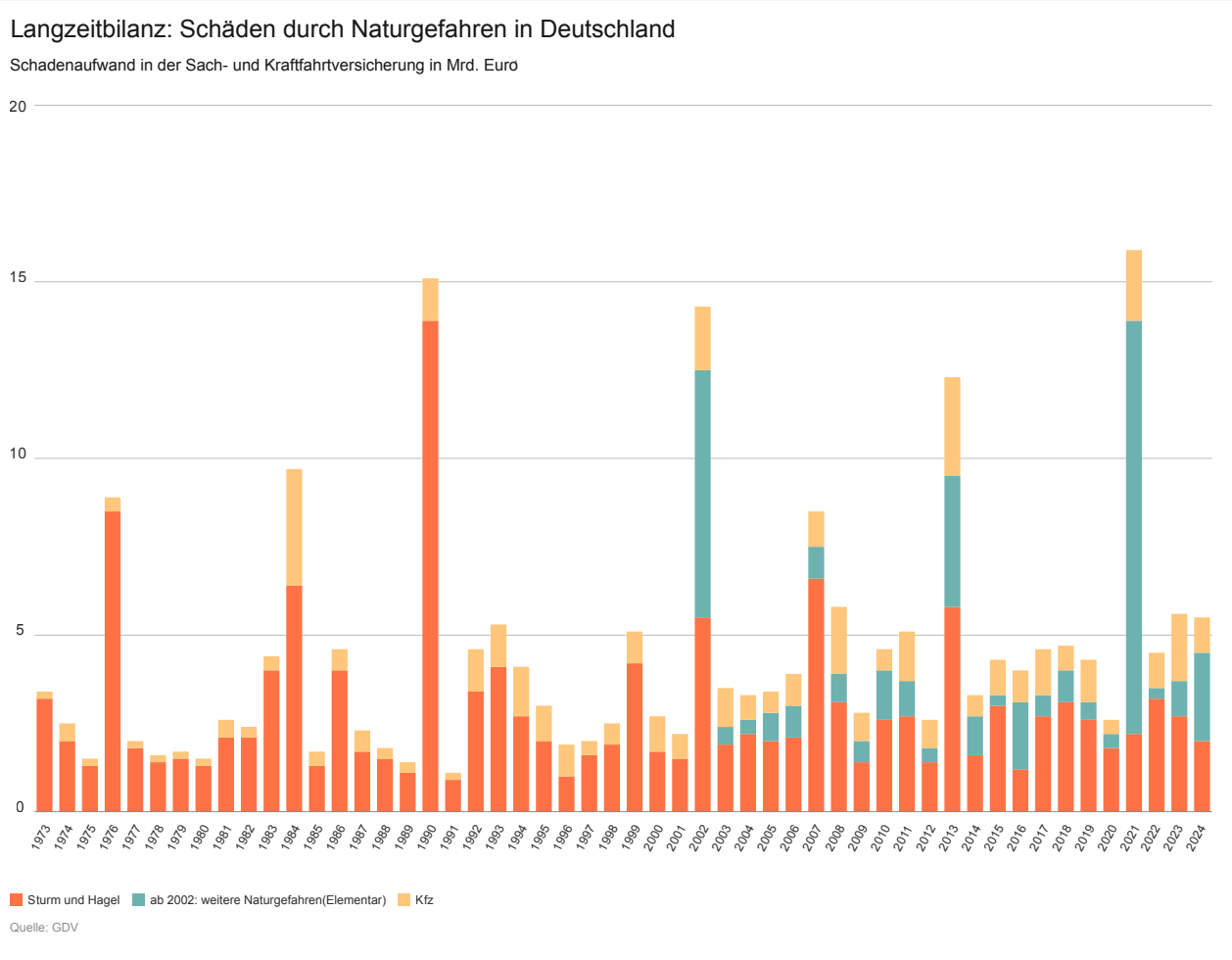
IMPACT OF THESE EXTREME WEATHER EVENTS

In the property insurance sector, which covers damages to buildings and furniture, total insured damages in Germany in 2024 amounted to EUR 4.5 billion. Of this, EUR 2 billion was due to storm and hail damage, while EUR 2.5 billion was attributed to natural hazards such as flooding from heavy rainfall. Motor vehicle insurers reported damages of around EUR 1 billion, slightly below the long-term average of EUR 1.2 billion to 1.3 billion.[40]

In total, 2024 extreme weather events in Germany caused insured damages amounting to around EUR 5.5 billion.[41] This is a slight decrease compared to 2023, when insured damages totalled EUR 5.7 billion, but it remains a significant financial burden.

Anthropogenic climate change is leading to rising sea levels, increasing the risk of storm surges. In the German Bight, a continuous sea level rise of more than 2 mm per year has been observed, which has long-term implications for coastal protection.

FIGURE 6: DAMAGE CAUSED BY NATURAL HAZARDS IN GERMANY FROM 1973 TO 2024



Source: Gesamtverband der Versicherer. https://www.gdv.de/gdv/medien/medieninformationen/wetterextreme-verursachen-2024-schaeden-in-hoehe-von-5-5-milliarden-euro--184762.

Italy

THREE SIGNIFICANT FLOODS ON TOP OF DEVASTATING DROUGHT

In 2024, Italy experienced several severe weather events that significantly impacted the nation. The most notable were the 15–17 May, 17–19 September and 17–21 October floods, which had return periods ranging between 1/5 and 1/50[42] and resulted in more than EUR 2 billion[43] in losses. The regions most affected were Emilia-Romagna, Tuscany and Lombardy.

Borgo Mantovano, Lombardy, experienced wind gusts ranging from 150 to 200 km/h, while Milan experienced up to 130 mm of rain in a single day, which resulted in flash floods.[44]

These regions have a long history of similar catastrophic events, underscoring a persistent vulnerability to extreme weather phenomena. Notably, the 2023 flood events in Emilia and Tuscany caused EUR 9.2 billion and 2 billion in damage, respectively.[45]

Additionally, the 10–20 July heatwave deserves special mention. This extreme weather event affected both Italy and Greece and killed at least 23 people.[46] Extreme heat events in the Mediterranean are now expected every 10 years due to a 1.3°C increase caused by human-induced climate change. Such temperatures would have been virtually impossible without fossil fuel emissions: The temperatures observed in July 2024 would have been 3°C cooler in a world without climate change.[47]

But the most damaging event of 2024 was a prolonged drought in the south of Italy (Sicily and Sardinia) from 1 March to 30 September, which caused EUR 3 billion in damage, with a return period of 1/100.[48] The Standardized Precipitation Index (SPI) and the Standardized Precipitation-Evapotranspiration Index (SPEI), which measure drought intensity using precipitation and evaporation as variables, both indicate that without the influence of climate change and human impact, an extreme drought today would not be that severe. Including this event, agricultural organisation Coldiretti estimates that climate change caused EUR 8.5 billion damage to the agricultural sector in 2024.[49]

The drought devastated 20% of the durum wheat fields used for pasta, with yield reductions of 40%–50% in the south. Soft wheat production for bread also declined by 8%. The prolonged lack of rain severely affected another staple of the Mediterranean diet, extra virgin olive oil, which had a 32% decrease in production. Wine production also dropped by 13% compared to the average in recent years.

IMPACT OF THESE EXTREME WEATHER EVENTS

Flooding remains the primary natural hazard in Italy. According to a 2024 study published by Banca d'Italia, businesses affected by flooding face a 7% higher probability of insolvency.[50] Those that survive typically experience an average revenue decline of 5% within three years. Smaller, newer and lower-tech firms typically suffer the greatest impact.

For the first nine months of 2024, Assicurazioni Generali SpA, Italy's largest insurer, reported a significant EUR 930 million impact from adverse weather conditions across Europe.[51] The decline in non-life operating income, which fell by 14%, was primarily due to natural catastrophes and a reduced benefit from discounting.

As of 31 March 2025, businesses are required to have mandatory insurance policies against natural catastrophe perils. Under the new regulation, companies are required to insure assets such as land, commercial buildings, industrial facilities and

equipment against risks like earthquakes, floods and landslides. This measure aims to foster cooperation between insurance companies and the government in addressing natural disasters and managing rebuilding costs. Indeed, a state-owned company (SACE) will create a public fund to help cover Nat Cat damages, with 50% being paid by the government, up to EUR 5 billion. This market is highly uninsured, especially among small and medium firms, and non-compliance could result in the denial of public contributions, subsidies and facilities.

In anticipation of the imminent implementation of the Nat Cat law, the insurance sector is actively developing new solutions to effectively analyse Nat Cat risks and exposures. While comprehensive solutions are still under development, insurers are increasingly using geographic information systems to merge risk data with business information in an effort to better protect policyholders' needs. One such innovation is the development of parametric insurance policies, which differ from traditional insurance by paying out predetermined amounts based on the occurrence of specific events, such as a certain magnitude of earthquake or level of rainfall, rather than on the assessed loss. This allows for quicker and more transparent settlements. These advancements are part of the industry's ongoing efforts to enhance Italy's resilience and responsiveness to natural disasters.

Luxembourg

SEVERE THUNDERSTORMS CAUSE MILLIONS IN DAMAGES

On 29 June 2024, severe thunderstorms hit Luxembourg, impacting thousands of residents and businesses, in what became the most damaging weather event of the year.

Following the event, which brought torrential rainfall, high lightning activity and powerful wind gusts,[52] Luxembourg insurers received more than 3,750 claims related to damages to homes and businesses, totalling EUR 24.5 million, according to the Association des Compagnies d'Assurances et de Réassurances (ACA).[53] In addition to property damage, 374 vehicles were reported damaged, with some declared beyond repair.[54]

These storms caused considerable financial strain, with a significant impact on Luxembourg's insurance industry. Two-thirds of the total EUR 24.5 million in damages was caused by flooding, while the remaining amount was attributed to storm-related impacts such as wind damage.[55]

The influx of claims following the event tested the insurance industry's organisational preparedness and prompted a swift and coordinated response to address policyholder needs.

IMPACT OF THESE EXTREME WEATHER EVENTS

Over the past year, the Luxembourg insurance sector has been adapting to the challenges posed by climate change and the increasing frequency of extreme weather events. While there have been no immediate changes to coverage terms or exclusions following the 2024 flooding, the industry has recognised the likelihood of long-term adjustments. One notable trend is the growing acknowledgment that premiums may rise over time as climate change has already and will in the future continue to increase the frequency and severity of weather events.[56,57]

Regulatory advancements in 2024 also reflected a heightened focus on environmental sustainability. Information Note 24/4, published by the Commissariat aux Assurances (CAA) in April 2024, provided a comprehensive reminder to insurers regarding compliance with various sustainable finance regulations.

The note emphasised the importance of aligning with the Sustainable Finance Disclosure Regulation (SFDR) and other related EU directives. Additionally, it highlighted the evolution of the own risk and solvency assessment (ORSA), encouraging insurers to integrate climate-related risks and their long-term implications into risk management processes, like in other European countries. This initiative requires that insurers evaluate the financial impact of climate risks more comprehensively and adopt strategies to effectively mitigate them.[58]

The Netherlands

EXCESSIVE PRECIPITATION—BUT EFFECTIVE FLOOD PREVENTION

The year 2024 marked yet another chapter in the climate history of the Netherlands, underscoring the impacts of a changing climate. The first half of the year was the wettest on record, with rainfall reaching 570 mm, significantly surpassing the average of 362 mm for the period.[59]

Despite the excessive precipitation, major flooding was largely averted, thanks to the country's robust flood management infrastructure. In addition to heavy rainfall, 2024 tied with 2023 as the warmest year ever recorded in the Netherlands, with an average annual temperature of 11.8°C, well above the historical average of 10.6°C.[60] This warmth was characterised by mild winters and a lack of days below freezing. However, 2024 also was the first year since 2011 with no recorded heatwave, making it a year of steady warmth but never extreme heat.[61]

The year also saw three major storms—Henk, Conall and Darragh—that tested the resilience of the country. While Storm Boris, which devastated parts of Central Europe, left the Netherlands largely unscathed, it was Storm Conall in late November that stood out as the most significant weather event for the country in terms of damage and impact.

On 27 November 2024, Storm Conall swept through the Netherlands, becoming the first officially designated severe storm to hit the country in more than 16 months.[62] The storm brought sustained wind speeds of up to 101 km/h and gusts that reached 128 km/h in the northern regions, particularly the Wadden Islands.[63] A code orange warning was issued for much of the country, emphasising the severity of the event.

One death and several injuries were reported.[64] The total insured damages from Storm Conall were estimated at approximately EUR 40 million, making it the most financially damaging storm of the year in the Netherlands.[65]

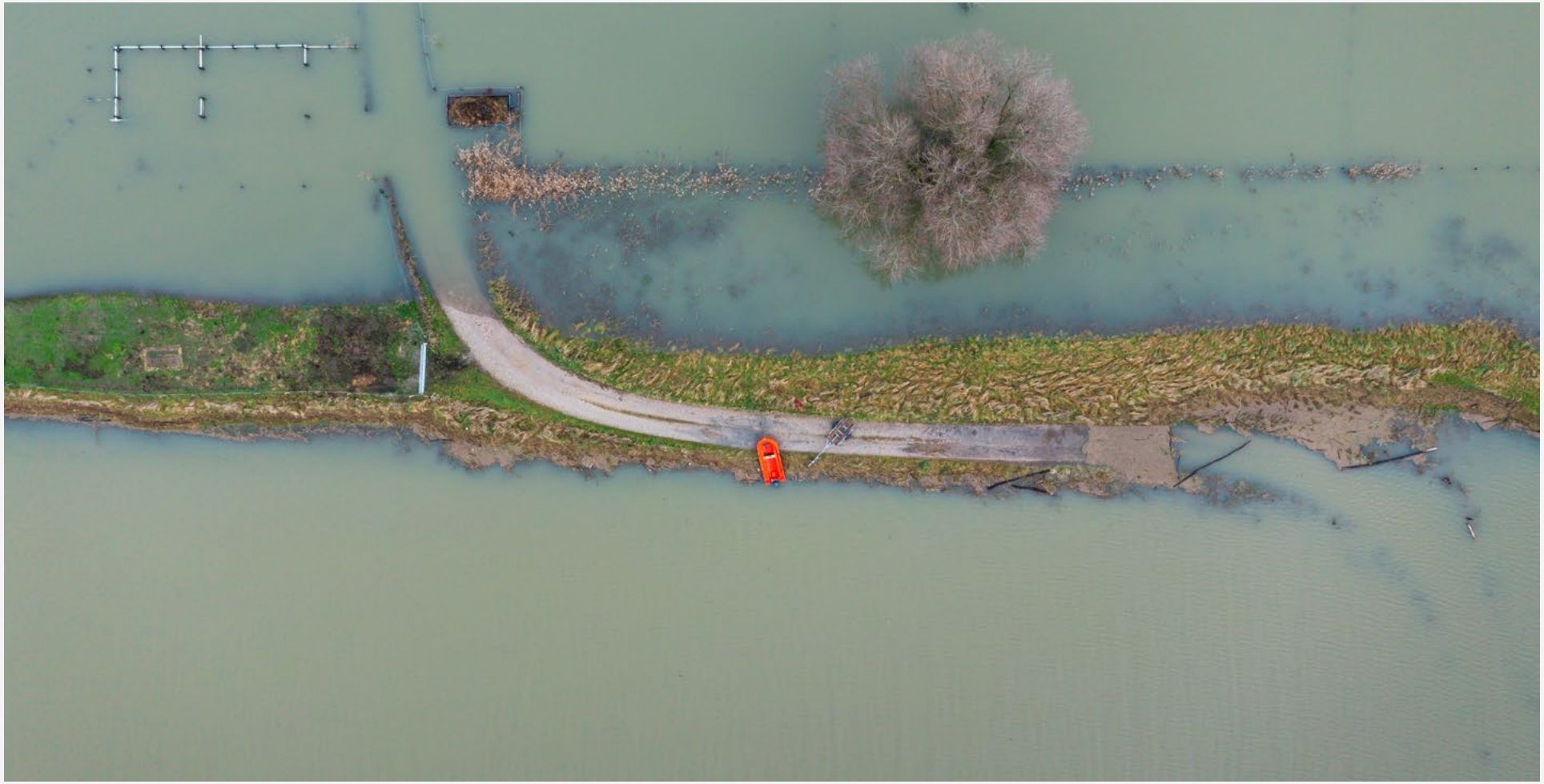
IMPACT OF THESE EXTREME WEATHER EVENTS

The increasing frequency and severity of extreme weather events like Storm Conall have placed pressure on the insurance sector in the Netherlands. While the country's flood defences have historically minimised large-scale flooding damages, the changing climate is presenting new challenges that require significant adaptation. The Dutch government currently sees no need for public-private insurance solutions for flood risk, but insurers can play a role as the central point for handling damage claims.[66]

A regulatory development in 2024 was the proposal by EIOPA to update the flood risk parameter in the Solvency II standard formula for the Netherlands, which was previously set to zero.[67] This change acknowledges the increasing threat posed by flooding and requires insurers to hold additional capital to cover potential losses. Additionally, the hail parameter in the standard formula was increased, reflecting the growing frequency and severity of hailstorms across the country.

In the long term, the Netherlands will be at the forefront of advancing flood risk modelling, developing innovative techniques to better assess and anticipate flood hazards. While these updates are not yet widely adopted by insurers, they represent crucial progress in understanding evolving risks. A key example is the Milliman report on European flood modelling using open data.[68] A Dutch-German collaborative study examines the potential of seasonal flood forecasts to refine insurance premium adjustments,[69] while technological institutes are advancing data analytics for flood prediction, enhancing real-time assessment capabilities.[70]

The events of 2024 have reinforced the need for the Netherlands to stay at the forefront of climate resilience, not just in terms of physical infrastructure but also in the financial mechanisms that underpin recovery efforts. While the country managed to avoid catastrophic flooding, events like Storm Conall and record-breaking rainfall underscored the growing impact of climate change on everyday life. As the insurance industry adapts to these new realities, it remains a critical pillar in supporting the Netherlands' recovery and its preparation for an uncertain future as it continues its journey to maintain a climate-resilient society.



Romania

FLOOD COMBINED WITH EXTREME HEAT AS THE MOST DAMAGING EVENTS

In 2024 Romania saw significant variations in extreme weather events such as heavy precipitation, flood, hail and lightning. During the summer alone, Romania experienced 870 meteorological events, according to the European Severe Weather Database.[71] Intense winds exceeding 90 km/h were distributed over the entire country.

Romania is considered a flood zone, and flood insurance is mandatory; it is managed by the Insurance Pool Against Natural Disasters (PAID).[72] According to the National Administration "Apele Romane," in 2024, in the Prut basin, specifically at the Cârja hydrometric station, heavy precipitation registered 253 l/mp (translating to 253 mm of rain), and the flood in the region of Galati was considered a 1 in 100–120 event, meaning it has a probability of returning once every 100 to 120 years.[73] The heavy precipitation in one day in Vaslui County during the same time was extremely heavy and corresponded to a year of rainfall in the region, according to the same institution.[74]

The severe weather in Romania in 2024 also included heat. According to Infoclima, a press agency specialising in climate change, and Copernicus, Romania was confronted with severe high temperatures in 2024.[75,76] August in particular was 0.71°C warmer than the average recorded between 1991 and 2020; in some areas, the deviation from the average was as much as 5°C. The southern part of Romania, especially Muntenia, experienced the worst heat.

In most of Romania, 2024 saw record-setting maximum summer temperatures. (In the far eastern part of the country, specifically the Dobrogea area, as well as eastern Muntenia, 1946 remains the year with the record high temperature.)

On a long-term basis, Romania saw an increase in temperature during the summer months throughout the country from 1940 to 2024. The areas where the increase in temperatures were highest are statistically significant and show a clear trend—the temperature rise is not a short-term change, although it is still not considered a hazard.

In addition to the average and record temperatures over the long term, it is important to analyse how people experience this level of heat. The Universal Thermal Climate Index (UTCI) offers a way to determine the thermal comfort that people feel by considering additional factors including humidity, wind and solar radiation.[77] Thermal stress is measured in the number of hours during which the UTCI is greater than 32°C. The difference between the UTCI values in the summer of 2024 compared to the 1991–2020 summer average shows that the values were positive for more than 250 additional hours (representing about 10 extra days) across southern Romania, including Bucharest.

When viewed over the wider timeframe of 1940–2024, the year 2024 did not reflect the highest UTCI; for most of the country, this occurred in 1946. In the western part of Romania, however, 2024 was indeed the year with the highest UTCI.

Additionally, according to Romsilva, the national forest administration, these severe conditions—including high temperatures and drought—caused significant increases in the number of wildfires in 2024.[78] In the first half of the year, there were seven times more fires (367) compared to the same period in 2023, and 3,365 ha were affected. To prevent more fires, Romsilva adopted several measures, including patrol intensification and public awareness campaigns.

Overall, the record-breaking temperatures, the significant increase in thermal stress felt by the population during the summer of 2024, the long-term increase in temperatures and the severe flood events in certain parts of Romania suggest a concerning climate trend.

IMPACT OF THESE EXTREME WEATHER EVENTS

A key regulatory development in 2024 was the proposal by EIOPA to update the flood risk parameter in Romania's Solvency II standard formula. Previously, this parameter was set at 0.3%, but EIOPA proposed reducing it to 0.13% for insurers that cover the flood risks for industrial, commercial and excess residential risks. This adjustment does not necessarily reflect a significant change in the flood risk outlook but rather accounts for the compulsory PAID insurance scheme.

The rising frequency and severity of extreme weather events has increased pressure on the insurance sector in Romania. According to the 4 December 2024 annex to the updated National Strategy for Medium- and Long-Term Flood Risk Management (approved by Government Decision No. 846/2010), a new strategic document is required to address flood risk management over the next 10 years.[79] This document will cover the environmental impact of flood risk over the past decades, flood prevention and mitigation strategies, and updated flood risk management plans, as well as a holistic approach to flood management that considers the entire hydrographic basin, including water systems, land use and related factors. These measures aim to reduce flood-related losses, which could have a significant impact on the insurance industry and, in particular, on PAID's future loss ratios.

Additionally, as the UTCI rises, indicating hotter and potentially more extreme weather conditions, there could be several implications for the insurance industry. First, higher UTCI values can lead to increased health risks such as heatstroke, dehydration, and other heat-related illnesses. Higher temperatures can also affect crop yields and livestock health. Businesses might face disruptions due to extreme weather conditions, affecting their operations. These can all lead to increased claims to insurers while also affecting the cost of insurance, as it could be more difficult to maintain accessible prices for the lines of business most affected by climate change.

Spain

ONE YEAR'S WORTH OF RAIN IN ONE DAY

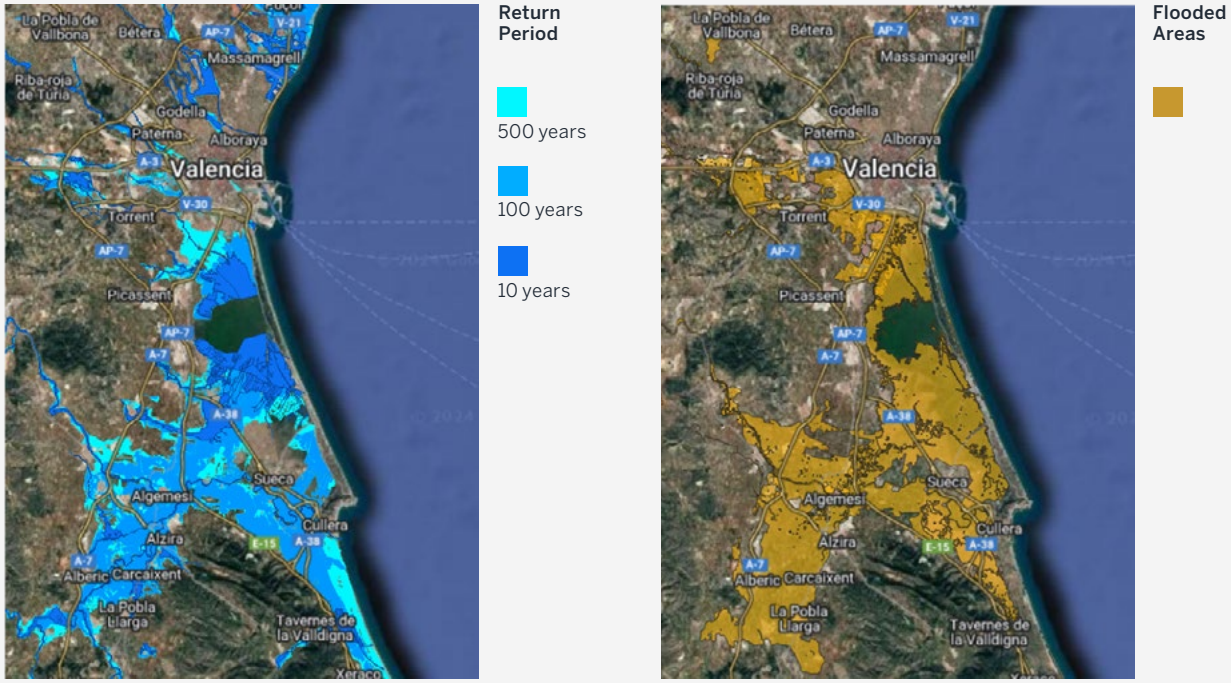
In late October 2024, Spain experienced one of the most severe weather events in modern Spanish history and one of the most catastrophic flood-related events in Europe since 1967: a DANA (depresión aislada en niveles altos), commonly known as a "cold drop."[80]

This meteorological phenomenon occurs when a mass of cold air at high altitudes becomes isolated and interacts with warm, moisture-laden air from the Mediterranean. The resulting atmospheric instability caused by the DANA in October led to intense and prolonged precipitation across multiple regions in eastern Spain, including the regions of Murcia, Andalusia, Catalonia and Castilla-La Mancha, causing widespread flooding, landslides and infrastructure damage. Valencia was particularly hard hit due to its geographical characteristics.

Flooding has historically been a recurring issue in Valencia, with records of disastrous floods dating back to the 14th century. One of the most devastating floods occurred in 1957, when a prolonged cold drop led to the overflow of the Turia River, causing extensive destruction in the city. This flood resulted in at least 81 fatalities and prompted the Spanish government to implement the "Southern Solution" (Solución Sur). This infrastructure project rerouted the Turia River southwards 3 km from its original course, effectively protecting the city centre from future floods. However, while this intervention

FIGURE 7: VALENCIAN COMMUNITY: FLOOD RISK ZONES AND DANA-AFFECTED REGIONS

Risk of flood | **Regions affected by DANA**



Milliman analysis based on data from Copernicus. Sources: (left) MITECO. https://www.miteco.gob.es/es/cartografia-y-sig/ide/descargas/agua/zi-lamina.html; (right) Copernicus. https://rapidmapping.emergency.copernicus.eu/EMSR773/download.

safeguarded Valencia's urban core, it did not provide the same level of protection for the rapidly expanding towns to the south.[81]

The images in Figure 7 clearly show the areas under risk of flooding and the affected regions, particularly the towns south of the city centre. The return periods, for flood risks, signify the likelihood of the event occurrence (flood every *n* years).

On 29 October 2024, record-breaking rainfall was recorded, with certain areas receiving more than 300 mm in a single day, the equivalent of one year's worth of rain. Turís, a municipality in the province of Valencia, registered 771 mm of rainfall within 24 hours, with 185 mm falling in just one hour—a record for Spain.

The torrential downpours led to severe flash flooding, which caused the tragic loss of at least 232 lives, with thousands more people displaced.[82] The floods also resulted in substantial damage to infrastructure, businesses and residential properties. Roads, bridges and rail networks suffered structural impairments, and extensive power outages were reported across the affected regions.[83]

IMPACT OF THESE EXTREME WEATHER EVENTS

The overall economic losses from the October floods have been estimated at approximately EUR 17 billion. This catastrophic event has highlighted the critical role of Spain's unique insurance framework for natural disasters.

In Spain, the Insurance Compensation Consortium (Consorcio de Compensación de Seguros, CCS), a public entity, covers extraordinary risks such as natural disasters, functioning as a guarantee fund to provide coverage for events not typically included in private insurance policies. As of 27 February 2025, the CCS had received and registered 242,534 compensation claims related to the DANA floods, with a net claim count of 229,143 after accounting for duplicates and ineligible submissions.

The majority of these claims are concentrated in just two categories: motor vehicles, which account for approximately 58% of all claims (141,686), and residential housing and property owner communities, representing around 33% of claims (79,392). This distribution reflects the widespread damage to personal property during the catastrophic flooding. Notably, 95.4% of all claims are from Valencia Province, underscoring the concentrated impact of the disaster in this region.

As of 27 February 2025, the CCS had processed 159,782 payments totalling more than EUR 2.1 billion. The largest proportion of these payments was directed towards motor vehicle claims (approximately EUR 893 million) and residential properties (around EUR 655 million), together accounting for more than 72% of the total compensation paid thus far.[84]

The high volume of claims has presented significant logistical challenges for both private insurers and the CCS, leading to extended processing times despite collaborative efforts to expedite claim assessment and payment. The Independent Authority for Fiscal Responsibility estimates that the measures implemented to mitigate the effects of the DANA will have a fiscal impact equivalent to 0.6% of Spain's GDP, distributed over 2024 and 2025.[85]

This catastrophic event underscores the importance of comprehensive risk assessment, adequate reinsurance coverage and prompt claims-handling mechanisms in mitigating financial exposure.

United Kingdom

THE SECOND-WETTEST SIX MONTHS ON RECORD

The United Kingdom saw 12 named storms during the 2023–24 season, the largest number since 2015–16, and was impacted by floods due to heavy rain. The UK storm year runs from September until late August of the following year to coincide with the start of autumn and the end of summer.

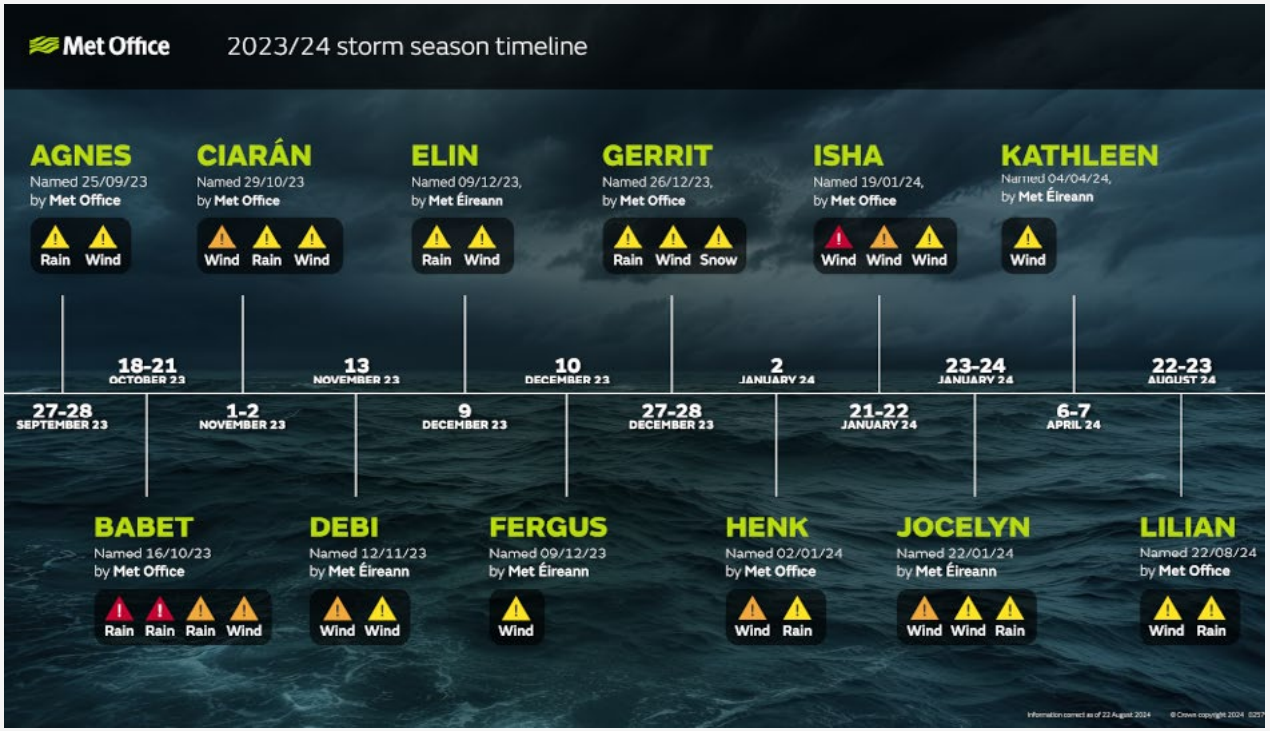
Storm Isha hit the UK in January 2024, the most significant windstorm since Storm Eunice in February 2022, and caused red weather warnings. Although the storm also impacted continental European countries, the estimated losses in the United Kingdom were modelled at GBP 100 million to 250 million.[86]

In all, the period from October 2023 to March 2024 was the second-wettest period on record. The trend looks to continue in the years to come, with four named storms already hitting in the first few months of the 2024–25 season; for example, Storm Darragh led to red weather warnings in December 2024.

IMPACT OF THESE EXTREME WEATHER EVENTS

Flood Re, a joint industry and government initiative that provides flood cover for properties in high-risk areas in the United Kingdom, paid out claims totalling GBP 241.6 million in the financial year ending 31 March 2024—an increase of GBP 45.9 million from the prior financial year.[87] In fact, 30% of all claims

FIGURE 8: 2023–24 STORM SEASON TIMELINE



Source: Met Office. https://weather.metoffice.gov.uk/warnings-and-advice/uk-storm-centre/uk-storm-season-2023-24.

received by Flood Re since its 2016 inception were received in the 2023–24 financial year. The growing frequency and intensity of extreme-weather-related events drove this trend.[88]

According to data from the Association of British Insurers (ABI), as of November 2024, the 2024 total property claims to date were GBP 4.1 billion. Claims in the second quarter alone totalled GBP 1.4 billion.[89] Claims in the third quarter totalled GBP 1.3 billion, GBP 200 million higher than the figure from the equivalent quarter in 2023. Of that GBP 1.3 billion, claims for damage to homes because of storms, heavy rain and frozen pipes totalled GBP 136 million. This is GBP 8 million higher than the same quarter in 2023. Claims for weather damage to businesses were GBP 90 million in the third quarter of 2024, 28% higher than in the third quarter of 2023.[90]

ABI data also shows that in the third quarter of 2024, the average premium for home insurance was higher than during the equivalent period in 2023. For a combined building and contents policy, the average premium was GBP 407 in the third quarter of 2024, GBP 56 (or 16%) higher than the third quarter of 2023. For a buildings-only policy, the average premium was GBP 329 in the third quarter of 2024, GBP 9 (or 3%) higher than in 2023. For contents, the average premium was GBP 138 in the third quarter of 2024, GBP 11 (or 3%) higher than during the third quarter of 2023.[91]

In the longer term, as the volume of claims related to floods continues to rise, insurers are increasing premiums and reducing the level of cover they provide, particularly for commercial properties and residential landlords. For example, one town in Worcestershire has flooded seven times in the past four years, which means the majority of shop owners in the town centre cannot now afford insurance.[92] Insurers are also reviewing their risk appetite levels and introducing new parametric insurance products.

In July 2022, Flood Re introduced the Build Back Better initiative to help reduce the cost and physical impact of floods in the United Kingdom. Flood Re has partnered with the British Insurance Brokers' Association (BIBA) to increase awareness of the scheme and to emphasise the need for flood resilience measures.

Conclusion and actionable steps for insurers

In conclusion, 2024 has proven to be another significant year for the European insurance industry, as extreme weather—particularly in the form of intensifying flooding—has further exposed vulnerabilities in existing frameworks.

Analysis of the severe weather events that occurred across various European countries last year underscores the need to look beyond traditional models towards greater collaboration among insurers, governments and communities to implement prevention measures, build industry resilience and develop integrated, sustainable solutions to the escalating risks posed by climate change.

Key strategies for insurers include the following:

STRENGTHENING UNDERWRITING AND PRODUCT INNOVATION

Integration of climate data
Utilising high-resolution climate hazard data in underwriting to improve pricing accuracy and recognise risk-reduction efforts, ensuring sustainable coverage in high-risk areas. For example, Milliman's work to launch its Wildland-Urban Interface (WUI) Data Commons makes granular wildfire mitigation data visible to insurers, enabling underwriters to recognise risk-reduction measures and keep coverage available and affordable in high-risk areas.[93]

Adjustment of coverage and terms for emerging risks
Reassessing and adjusting policy terms in climate-prone regions based on ORSA analyses. This adjustment can help insurers align with regulatory expectations and mitigate exposure. European regulators are raising expectations that insurers quantify physical risks and review exposures by peril and region, potentially prompting changes in product scope or wording.[94] In practice, this might mean tightening terms for flood-prone properties or requiring higher deductibles, which can materially reduce loss ratios. Such adjustments are impactful in steering the portfolio towards sustainability, and they are increasingly necessary as ORSA analyses reveal where climate-related risks are most pressing.[95]

Product innovation
Expanding the product suite to address new climate-related needs. Insurers are introducing index-linked or parametric insurance covers that pay out based on triggers such as rainfall or wind speed; these can protect against previously uninsurable risks (e.g., crop failures during drought).[96] The impact is twofold: Policyholders gain financial resilience against extreme events, and insurers can tap new markets with controlled exposure.

ENHANCING RISK MODELLING AND SCENARIO ANALYSIS

Implementation of advanced climate risk models
Upgrading catastrophe models and actuarial projections to capture the increasing severity and frequency of extreme weather. The Milliman Climate Resilience Initiative has helped insurers by evaluating and validating the latest catastrophe and climate models, then tailoring them to each company's portfolio.[97] For instance, Milliman's recent analysis of flood risk in Europe provided a framework to project home insurance losses in the Netherlands and France under various climate scenarios.[98] Using such enhanced models, which are based on open data and artificial intelligence, improves insurers' ability to anticipate losses, directly informing underwriting and capital decisions. This step is highly impactful—better modelling reduces uncertainty—and it is feasible with today's computing power and expert guidance, even as climate patterns push beyond historical norms.

Regular climate scenario analyses
Conducting comprehensive scenario analyses aligned with regulatory requirements to anticipate financial impacts and refine business strategies and embedding climate scenario testing into enterprise risk management. In the United Kingdom, for example, the Prudential Regulation Authority's 2024 "Dear CEO" letter explicitly called for "further progress…particularly on scenario analysis and risk management" for climate risks.[99] Insurers should explore multiple what-if scenarios (e.g., a

rapid carbon tax increase or a severe heatwave series) to gauge impacts on both sides of the balance sheet. Milliman contributes by developing narrative scenarios beyond the standard regulatory sets, helping firms identify key vulnerabilities and management actions.

Establishment of early-warning indicators
Setting up key risk indicators (KRIs) that track emerging climate trends (such as rising sea-surface temperatures or regional wildfire activity) and linking them to business thresholds helps insurers make climate risk management actionable. By defining trigger metrics (for example, whether annual flood losses exceed a certain percentage of surplus) and monitoring them quarterly, insurers can feasibly incorporate climate signals into day-to-day decision making. This step improves responsiveness—management can act (by repricing, rebalancing portfolios, etc.) before minor issues grow into solvency-threatening events—and demonstrates to regulators that climate risks are managed proactively as part of standard risk dashboards.

ADOPTING CLIMATE-ALIGNED INVESTMENT STRATEGIES

Assessment and rebalancing of asset portfolios
Evaluating investment portfolios for exposure to transition risk (e.g., holdings in carbon-intensive industries that could face devaluation). European regulators are actively debating climate-related capital charges—EIOPA's late-2024 consultation proposes higher solvency capital requirements for insurers' investments in fossil-fuel-related equities and bonds.[100] Milliman's investment consultants advise carriers to identify potential "stranded assets" and either divest or engage with those companies to manage down the risk.[101] The feasibility of rebalancing is high given the growing availability of green bonds and sustainable funds, and the impact is a more resilient portfolio that aligns with long-term climate policy trends (e.g., EU Green Deal targets, Paris Agreement) while protecting the insurer's balance sheet from abrupt market shocks.

Integration of ESG criteria and climate scenarios into investment decisions
Embedding climate scenarios into investment decision making ensures portfolios are resilient to climate risks and aligned with sustainability goals. This goes beyond traditional financial analysis by incorporating environmental, social and governance (ESG) metrics and climate scenario outcomes into the investment process. European policy frameworks support this—for example, the EU SFDR requires insurers and asset managers to tell investors how sustainability risks are considered in investment decisions.[102]

ENGAGING POLICYHOLDERS AND PROMOTING RESILIENCE

Greater engagement with policyholders
Actively engaging with their customers on climate risk preparedness can help insurers raise awareness and incentivise risk reduction. This can include educational campaigns about the increasing risks of floods or heatwaves and the steps homeowners or businesses can take to mitigate damage. Milliman's research emphasises education and awareness as a key tactic; by improving public understanding of weather-related risks and the role of insurance in climate adaptation, insurers help build more resilient communities.[103] In practice, some European insurers now offer premium discounts or benefits to policyholders who invest in loss prevention (for example, installing water leakage detectors or fire-resistant roofing). These measures are highly feasible (often leveraging existing safety programs) and impactful: They reduce claim frequency and severity over time and strengthen customer trust, as insurers become partners in risk management rather than just claim-payers.

Innovation in coverage for vulnerable populations
With climate change disproportionately affecting certain customer segments, including low-income communities, farmers and residents of high-risk zones, engaging these groups with tailored solutions not only fulfils insurers' social responsibility, but can open new markets. The MicroInsurance Centre at Milliman[104] has worked on multiple climate microinsurance programs across the globe.[105] European insurers can draw lessons to develop microinsurance or meso-insurance schemes for their own underserved communities (for example, affordable coverage for extreme weather impacts in low-income areas). This is becoming ever more feasible as technology such as satellite data and mobile platforms lowers administrative costs. The impact is greater insurance inclusion—more households and small businesses gain protection—which ultimately narrows the protection gap and enhances societal resilience to climate shocks.

ENSURING REGULATORY COMPLIANCE AND CLIMATE GOVERNANCE

Alignment with evolving European regulations and disclosure standards

The regulatory landscape in Europe is rapidly sharpening around climate risk. Insurers must stay ahead of requirements like the EU's Corporate Sustainability Reporting Directive (CSRD), which will mandate granular climate-risk disclosure for large companies, as well as national guidelines.
Even where not yet mandatory, the Task Force on Climate-Related Financial Disclosures (TCFD) framework has been widely adopted by European insurers as the de facto standard. In a 2024 Milliman survey of European insurers' climate reports, companies were benchmarked against TCFD pillars covering governance, strategy, risk management and metrics.[106]

LEVERAGING INSURANCE-LINKED SECURITIES AND RISK TRANSFER SOLUTIONS

Utilisation of insurance-linked securities (ILS) to spread risk

Issuance of catastrophe bonds reached a record high in 2024, driven largely by climate-risk mitigation.[107] Milliman has been at the forefront of advising on ILS structures—from modelling trigger conditions to assessing pricing—allowing insurers to efficiently securitise risks like European windstorms or pan-European flood covers. The feasibility of tapping ILS is proven (regulatory frameworks in jurisdictions like the UK and EU facilitate special-purpose vehicles for insurance risk), and the impact is considerable: Insurers gain multi-year protection with collateralised security, lowering dependence on an increasingly costly traditional reinsurance market. Additionally, high investor appetite for diversification and high yields makes this a timely strategy to bolster insurers' solvency against mega-loss events.

Exploration of public-private partnerships for disaster risk

Collaborating with government-backed initiatives can further address the climate protection gap. European authorities have signalled support for systemic solutions; for example, a recent joint proposal by the European Central Bank and EIOPA calls for an EU-wide natural catastrophe insurance framework that pools private insurance risks and uses catastrophe bonds to ensure adequate reinsurance capacity.[108] Insurers should engage in these dialogues and be ready to participate in or sponsor such mechanisms. By proactively exploring how their portfolios could integrate with national or regional pools or ILS-backed facilities, insurers position themselves to take advantage of these innovations. The payoff is potentially huge, including more stable coverage availability even after severe events, reduced individual insurer strain and credit for being a leader in market-wide resilience efforts.

Looking ahead, insurers must take a proactive approach to mitigating climate-change-related risk and implementing innovative, sustainable solutions to create positive change. Actuarial support in these efforts can be essential when it comes to both assessing and modelling risk, as well as designing flexible insurance products and risk-financing frameworks that fully respond to the challenges of the evolving climate reality.

Endnotes

1 Hughes, R. A. (30 December 2024). Germany and Spain experienced some of the world's costliest climate disasters in 2024. Euronews. Retrieved 16 April 2025 from https://www.euronews.com/green/2024/12/30/germany-and-spain-experienced-some-of-the-worlds-costliest-climate-disasters-in-2024.

2 World Meteorological Organization. (10 January 2025). WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level. Retrieved 9 April 2025 from https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level.

3 Copernicus. (10 January 2025). The 2024 annual climate summary: Global climate highlights 2024. Retrieved 9 April 2025 from https://climate.copernicus.eu/global-climate-highlights-2024.

4 United Nations Framework Convention on Climate Change. (n.d.). The Paris Agreement. Retrieved 9 April 2025 from https://unfccc.int/process-and-meetings/the-paris-agreement.

5 Met Office. (29 August 2024). Historic Met Office figures included in 2024/25 storm names. Retrieved 9 April 2025 from https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/weather-and-climate-news/2024/historic-met-office-figures-included-in-2024-25-storm-names.

6 Copernicus. (10 January 2025). The 2024 annual climate summary: Global climate highlights 2024. Retrieved 9 April 2025 from https://climate.copernicus.eu/global-climate-highlights-2024.

7 PERILS. (n.d.). Facilitating risk transfer. Retrieved 9 April 2025 from https://www.perils.org/losses.

8 Milliman. (2022). Extreme weather events in Europe. Retrieved 9 April 2025 from https://www.milliman.com/en/insight/extreme-weather-events-in-europe-2021.

9 European Insurance and Occupational Pensions Authority. (30 January 2025). EIOPA recommends new risk factors for flood, windstorm and hail risk in insurers' standard formula capital calibrations. Retrieved 11 April 2025 from https://www.eiopa.europa.eu/eiopa-recommends-new-risk-factors-flood-windstorm-and-hail-risk-insurers-standard-formula-capital-2025-01-30_en.

10 International Foundation Big Data and Artificial Intelligence for Human Development. (n.d.). The European Extreme Events Climate Index: Observe, understand, and manage climate change. Retrieved 29 February 2024 from https://www.ifabfoundation.org/it/e3ci/.

11 An odds ratio of 10, for example, means that in the year under consideration, the probability of observing an event at or above the 95th percentile was 10 times higher than during the reference period.

12 Zimmermann, N. (31 December 2024). Jahresrückblick 2024: Unwetter und Rekorde in Österreich. UWZ. Retrieved 11 April 2025 from https://uwz.at/de/a/jahresrueckblick-2024-unwetter-und-rekorde-in-oesterreich.

13 Bundesministerium für Land- und Forstwirtschaft, Klima- und Umweltschutz, Regionen und Wasserwirtschaft. (n.d.). Das Hochwasserereignis im September 2024 in Österreich. Retreived 11 April 2025 from https://www.bmluk.gv.at/themen/wasser/wasser-oesterreich/hydrographie/chronik-besonderer-ereignisse/hochwasser-september-2024.html.

14 Mattern-Pinter, M. (22 December 2024). Rückblick: Jahr der klimatologischen Extreme. ORF. Retreived 11 April 2025 from https://orf.at/stories/3379445/.

15 Kleine Zeitung. (8 October 2024). Trotz Prävention: Hochwasserschäden auf 1,3 Milliarden Euro geschätzt. Retrieved 11 April 2025 from https://www.kleinezeitung.at/oesterreich/18943211/hochwasserschaeden-auf-1-3-milliarden-euro-geschaetzt.

16 Österreichische Hagelversicherung. (16 August 2024). Erste Schadensbilanz zeigt 200 Millionen Euro Gesamtschaden. Retrieved 11 April 2025 from https://www.hagel.at/presseaussendungen/schadensbilanz-2024/.

17 Reuters. (5 September 2024). Natural disasters could force insurer Uniqa to alter products, CEO says. Retrieved 11 April 2025 from https://www.reuters.com/world/europe/natural-disasters-could-force-insurer-uniqa-alter-products-ceo-says-2024-09-05/.

18 ORF. (7 June 2024). Naturkatastrophen: Versicherer für mehr eigene Vorsorge. Retrieved 11 April 2025 from https://orf.at/stories/3359959/.

19 See the HORA website at https://hora.gv.at/.

20 ORF. (7 June 2024). Naturkatastrophen: Versicherer für mehr eigene Vorsorge. Retrieved 11 April 2025 from https://orf.at/stories/3359959/.

21 Versicherungsverband Österreich. (20 September 2024). Hochwasser: Österreichische Versicherer befürchten Rekordschadensumme von 600-700 Mio. Euro. Retrieved 11 April 2025 from https://www.vvo.at/presse-artikel/hochwasseroesterreichische-versicherer-befuerchten-rekordschadensumme-von-600-700-mio-euro/.

22 Institut Royal Météorologique de Belgique. (2025). Bilan climatique annuel. Retrieved 12 April 2025 from https://www.meteo.be/resources/climatology/pdf/bilan_climatique_annuel_2024.pdf.

23 Horemans, N. (18 May 2024). "Ergste overstromingen ooit in Voeren" erkend als ramp. HLN. Retrieved 12 April 2025 from https://www.hln.be/voeren/ergste-overstromingen-ooit-in-voeren-erkend-als-ramp~a4edf13f/.

24 De Clerck, J. (23 July 2024). 10 gezinnen worden nog altijd opgevangen door OCMW van Voeren na zware overstromingen in mei. VRT. Retrieved 12 April 2025 from https://www.vrt.be/vrtnws/nl/2024/07/23/10-gezinnen-worden-nog-altijd-opgevangen-door-ocmw-van-voeren-na/.

25 De Clerck, J. (9 October 2024). KMI verwacht wateroverlast in Voeren: brandweer legt preventief dijken aan in Moelingen. VRT. Retrieved 12 April 2025 from https://www.vrt.be/vrtnws/nl/2024/10/09/kmi-verwacht-wateroverlast-in-voeren-brandweer-legt-preventief/.

26 François, A. (10 October 2024). Kirk a surtout inondé les provinces de Namur, Luxembourg et Liège, Fourons et le Limbourg ont été épargnés. VRT. Retrieved 12 April 2025 from https://www.vrt.be/vrtnws/fr/2024/10/10/kirk-a-surtout-inonde-les-provinces-de-namur-luxembourg-et-lieg/.

27 Arnoudt, R. (20 July 2023). Federale regering verhoogt plafond voor verzekeraars bij natuurrampen, sector is niet tevreden. VRT. Retrieved 12 April 2025 from https://www.vrt.be/vrtnws/nl/2023/07/20/federale-regering-verhoogt-plafond-voor-verzekeraars-bij-natuurr/.

28 Ibid.

29 Assuralia is the association of domestic and foreign insurance and reinsurance companies operating in Belgium.

30 Assuralia. (4 July 2024). Assuralia roept toekomstige regering op om een duurzame oplossing voor natuurramprisico's te vinden. Retrieved 12 April 2025 from https://press.assuralia.be/assuralia-roept-toekomstige-regering-op-om-een-duurzame-oplossing-voor-natuurramprisicos-te-vinden.

31 Truong, G. (2024). Insights: How does the Netherlands assess the impact of floods on their financial sector? Cerac. Downloaded 12 April 2025 from https://www.cerac.be/fr/publications/2024-10-comment-les-pays-bas-evaluent-ils-limpact-des-inondations-sur-leur-secteur.

32 Assuralia. (6 June 2024). 14ème conférence internationale d'Insurance Europe : "Protect, connect, invest." Retrieved 12 April 2025 from https://www.assuralia.be/fr/article/14eme-conference-internationale-dinsurance-europe-protect-connect-invest.

33 World Meteorological Organization. (17 December 2024). Tropical cyclone Chido devastates Mayotte in Indian Ocean. Retrieved 12 April 2025 from https://wmo.int/media/news/tropical-cyclone-chido-devastates-mayotte-indian-ocean.

34 CCR. (19 December 2024). Cyclone tropical Chido : CCR estime le coût entre 650 M€ et 800 M€ pour le régime Cat Nat. Retrieved 12 April 2025 from https://www.ccr.fr/en/-/cyclone-tropical-chido-ccr-estime-le-cout.

35 Peychieras, J. (9 October 2024). Dépression Kirk : 64.000 clients privés d'électricité, chutes d'arbres, routes inondées, le point sur les dégâts. Ici. Retrieved 12 April 2025 from https://www.francebleu.fr/infos/meteo/depression-kirk-trains-a-l-arret-immeuble-effondre-rues-inondees-le-point-sur-les-degats-lies-aux-intemperies-6872579.

36 Dauvergne, G. (23 October 2024). Inondations d'octobre : Première estimation du coût par CCR entre 350 et 420 millions d'euros. L'argus de l'assurance. Retrieved 12 April 2025 from https://www.argusdelassurance.com/green-assurance/inondations-d-octobre-ccr-estime-leur-cout-pour-l-assurance-entre-350-et-420-millions- d-euros.233290.

37 Météo-France. (2024). Bilan climatique de l'année 2024. Retrieved 12 April 2025 from https://meteofrance.com/sites/meteofrance.com/files/files/editorial/Bilan-climatique-annuel-2024-meteo-france-web_0.pdf.

38 CCR. (5 September 2024). Un début d'année marqué par une succession d'inondations : Résultats 1er semestre 2024. Retrieved 12 April 2025 from https://www.ccr.fr/en/-/resultats-1er-semestre-2024.

39 Les Echo. (26 March 2025). Assurance : Le coût des événements climatiques a atteint cinq milliards d'euros en 2024. Retrieved 12 April 2025 from https://www.lesechos.fr/finance-marches/banque-assurances/assurance-le-cout-des-evenements-climatiques-a-atteint-cinq-milliards-deuros-en-2024-2156180.

40 Gesamtverband der Versicherer. (30 December 2024). Wetterextreme verursachen 2024 Schäden in Höhe von 5,5 Milliarden Euro. Retrieved 12 April 2025 from https://www.gdv.de/gdv/medien/medieninformationen/wetterextreme-verursachen-2024-schaeden-in-hoehe-von-5-5-milliarden-euro--184762.

41 Ibid.

42 JBA Risk Management. (12 September 2024). Storm Boris: September 2024. Retrieved 14 April 2025 from https://www.jbarisk.com/knowledge-hub/event-response/storm-boris-september-2024/.

43 43 Wells, K. (20 March 2025). PERILS ups industry loss figure for Sept Central Europe floods to €2.19bn. Reinsurance News. Retrieved 14 April 2025 from https://www.reinsurancene.ws/perils-ups-industry-loss-figure-for-sept-central-europe-floods-to-e2-192bn/.

44 Ragozhina, N. (17 May 2024). Italy hit by severe flooding after heavy rain. BBC. Retrieved 14 April 2025 from https://www.bbc.com/news/articles/c9xz8w2p8l8o.

45 Swiss Re. (9 August 2023). Severe thunderstorms account for up to 70% of all insured natural catastrophe losses in first half of 2023, Swiss Re Institute estimates. Retrieved 14 April 2025 from https://www.swissre.com/press-release/Severe-thunderstorms-account-for-up-to-70-of-all-insured-natural-catastrophe-losses-in-first-half-of-2023-Swiss-Re-Institute-estimates/cea79f3c-6486-41a8-9c6e-09df260efe30.

46 World Weather Attribution. (31 July 2024). Deadly Mediterranean heatwave would not have occurred without human induced climate change. Retrieved 14 April 2025 from https://www.worldweatherattribution.org/deadly-mediterranean-heatwave-would-not-have-occurred-without-human-induced-climate-change/.

47 Ibid.

48 World Weather Attribution. (4 September 2024). Climate change key driver of extreme drought in water scarce Sicily and Sardinia. Retrieved 14 April 2025 from https://www.worldweatherattribution.org/climate-change-key-driver-of-extreme-drought-in-water-scarce-sicily-and-sardinia/.

49 Coldiretti Roma. (29 November 2024). Clima: Coldiretti/Censis, emergenza acqua priorità per 89% italiani. Retrieved 14 April 2025 from https://roma.coldiretti.it/clima-coldiretti-censis-emergenza-acqua-priorita-per-89-italiani/.

50 Clò, S., David, F., & Segoni, S. (April 2024). The impact of hydrogeological events on firms: Evidence from Italy (Temi di discussione no. 1451). Banca d'Italia. Retrieved 14 April 2025 from https://www.bancaditalia.it/pubblicazioni/temi-discussione/2024/2024-1451/en_tema_1451.pdf.

51 Generali. (15 November 2024). Financial information at 30 September 2024: Generali continues to achieve strong growth in operating result driven by all business segments: Solid capital position confirmed. Retrieved 14 April 2025 from https://www.generali.com/media/press-releases/all/2024/Financial-information-at-30-september-2024.

52 Météo au Luxembourg. (18 July 2024). The severe thunderstorms of June 29, 2024: A brief analysis. Retrieved 14 April 2025 from https://www.meteolux.lu/fr/actualites/the-severe-thunderstorms-of-june-29-2024-a-brief-analysis/.

53 Association des Compagnies d'Assurances et de Réassurances. (16 July 2024). Storms and thunderstorms of 29.06.2024: €24.50 million of damage compensated by insurers. Retrieved 13 January 2025 from https://www.aca.lu/en/storms-and-thunderstorms-of-29-06-2024-e24-50-million-of-damage-compensated-by-insurers-2/.

54 Ibid.

55 Ibid.

56 L'essentiel. (17 July 2024). Au Luxembourg : "Maintenant, même si on habite au Kirchberg, on peut être inondé." Retrieved 13 January 2025 from https://www.lessentiel.lu/fr/story/au-luxembourg-on-peut-etre-inonde-en-habitant-n-importe-ou-maintenant-103150558.

57 Stevensson, A. (3 July 2024). Insurers receive spate of early storm damage claims. Luxembourg Times. Retrieved 13 January 2025 from https://www.luxtimes.lu/luxembourg/insurers-receive-spate-of-early-storm-damage-claims/15227095.html.

58 Commissariat aux Assurances. (16 April 2024). Note d'information 24/4 relative aux enjeux réglementaires liés à la finance durable. Retrieved 13 January 2025 from https://www.caa.lu/uploads/documents/files/Note_info_24-4_Finance_Durable.pdf.

59 Het Parool. (29 June 2024). Natste halfjaar ooit gemeten, vorige record ruim overstegen. Retrieved 14 April 2025 from https://www.parool.nl/nederland/natste-halfjaar-ooit-gemeten-vorige-record-ruim-overstegen~b2deb9c3.

60 Schapp, S. (30 December 2024). Recordtemperatuur van 2023 herhaalt zich in 2024, KNMI kleurt jaar donkerrood. NOS. Retrieved 14 April 2025 from https://nos.nl/collectie/13871/artikel/2550046-recordtemperatuur-van-2023-herhaalt-zich-in-2024-knmi-kleurt-jaar-donkerrood.

61 Van Straaten, B. (12 September 2024). Voor het eerst sinds 2011 geen regionale hittegolf. Weeronline. Retrieved 14 April 2025 from https://www.weeronline.nl/nieuws/12-9-2024-voor-het-eerst-sinds-2011-geen-regionale-hittegolf.

62 KNMI. (n.d.). Zware stormen in Nederland sinds 1910. Retrieved 14 April 2025 from https://www.knmi.nl/nederland-nu/klimatologie/lijsten/zwarestormen.

63 AD. (28 November 2024). Verzekeraars krijgen ruim 500 claims binnen na storm Conall, vooral in noorden van het land veel schade. Retrieved 14 April 2025 from https://www.ad.nl/binnenland/verzekeraars-krijgen-ruim-500-claims-binnen-na-storm-conall-vooral-in-noorden-van-het-land-veel-schade~a93be2d2.

64 NOS. (27 November 2024). Storm Conall: vrouw (19) omgekomen in Lochem. Retrieved 14 April 2025 from https://nos.nl/artikel/2546163-storm-conall-vrouw-19-omgekomen-in-lochem.

65 Verbond van Verzekeraars. (28 November 2024). Eerste schatting: 40 miljoen euro schade door storm Conall. Retrieved 14 April 2025 from https://www.verzekeraars.nl/publicaties/actueel/eerste-schatting-40-miljoen-euro-schade-door-storm-conall,

66 Van Weyenberg, S. P. R. A., Yeşilgöz-Zegerius, D., & Harbers, M. (18 June 2024). [Memorandum on flood risk insurability.] Retrieved 14 April 2025 from https://open.overheid.nl/documenten/98e76206-097b-435c-9715-992210694e00/file.

67 European Insurance and Occupational Pensions Authority. (3 April 2024). EIOPA consults on natural catastrophe risk reassessments in the standard formula. Retrieved 14 April 2025 from https://www.eiopa.europa.eu/eiopa-consults-natural-catastrophe-risk-reassessments-standard-formula-2024-04-03_en.

68 Postema, J. T., van Dam, D., van Wijk, M., Van der Laan, N., Rainaud, A., & Titon, E. (2 May 2024). Flood risk modelling in Europe. Milliman. Retrieved 14 April 2025 from https://nl.milliman.com/nl-NL/insight/flood-risk%20modelling%20in%20europe.

69 Nguyen, V. D., Aerts, J., Tesselaar, M., Boutzen, W., Kreibich, H., Alfieri, L., & Merz, B. (11 January 2024). Exploring the use of seasonal forecasts to adapt flood insurance premiums. Egusphere. Retrieved 14 April 2025 from https://egusphere.copernicus.org/preprints/2024/egusphere-2023-2862/.

70 See, e.g., Deltares' flood risk resources at https://www.deltares.nl/en/expertise/areas-of-expertise/floods.

71 See the European Severe Weather Database at https://eswd.eu/.

72 See PAID's website at https://www.paidromania.ro/.

73 See https://rowater.ro/

74 Ibid.

75 Infoclima. (27 September 2024). Vara lui 2024 în România: Recorduri alarmante și fenomene extreme. Retrieved 14 April 2025 from https://www.infoclima.ro/acasa/vara-lui-2024-recorduri-alarmante-fenomene-extreme.

76 See https://climate.copernicus.eu/

77 See the Universal Thermal Climate Index website at https://www.utci.org/index.html.

78 Romsilva. (6 August 2024). Crestere semnificativa a numarului de incendii in fondul forestier administrat de Romsilva in prima jumatate a anului. Retrieved 14 April 2025 from https://www.rosilva.ro/comunicate_de_presa/crestere_semnificativa_a_numarului_de_incendii_in_fondul_forestier_administrat_de_romsilva_in_prima_jumatate_a_anului__p_854.htm.

79 Monitorul Oficial. (10 December 2024). Anexă din 4 decembrie 2024 privind actualizarea Strategiei naționale de management al riscului la inundații pe termen mediu și lung, aprobată prin Hotărârea Guvernului nr. 846/2010. Retrieved 14 April 2025 from https://legislatie.just.ro/Public/DetaliiDocumentAfis/292390.

80 Khalip, A., & Laudaro, I. (4 November 2024). What caused deadly floods in Spain? The impact of DANA explained. Reuters. Retrieved 14 April 2024 from https://www.reuters.com/business/environment/spains-deadly-dana-weather-phenomenon-its-links-climate-change-2024-10-30/.

81 Cavero, D. (4 November 2024). Así fue el "Plan Sur" de Franco: El megaproyecto que ha salvado la ciudad de Valencia. La Razón. Retrieved 14 April 2024 from https://www.larazon.es/espana/plan-sur-franco-megaproyecto-ciudad-valencia-p7m_2024110467291639d8f8950001da4c56.html.

82 La Moncloa. (19 February 2025). Actualización de datos del Gobierno de España. Retrieved 14 April 2024 from https://www.lamoncloa.gob.es/info-dana/Paginas/2025/190225-datos-seguimiento-actuaciones-gobierno.aspx.

83 Agencia Estatal de Meteorología. (8 November 2024). Octubre de 2024 fue el más lluvioso de la serie histórica. Retrieved 14 April 2024 from https://www.aemet.es/en/noticias/2024/11/resumen_oct24.

84 Consorcio de Compensación de Seguros. (27 February 2025). Decimotercera nota informativa sobre las inundaciones extraordinarias producidas por la DANA del 26 de octubre al 4 de noviembre de 2024 en la Comunidad Valenciana, Andalucía, Cataluña, Castilla-La Mancha, Baleares, Aragón y otras zonas y la gestión de las indemnizaciones que corresponde asumir al Consorcio de Compensación de Seguros (CCS) del Ministerio de Economía, Comercio y Empresa. Retrieved 14 April 2024 from https://www.consorseguros.es/documents/10184/0/DECIMOTERCERA_nota_informativa_DANA_DEFINITIVA.pdf/4a04bcfa-c3ba-5e63-1e67-d5b21d85dfcb?t=1740662338985.

85 AIReF. (16 January 2025). AIReF raises its GDP forecasts for 2024 and 2025 and estimates fiscal impact of DANA in these years at 0.6% of GDP. Retrieved 14 April 2024 from https://www.airef.es/en/news/airef-raises-its-gdp-forecasts-for-2024-and-2025-and-estimates-fiscal-impact-of-dana-in-these-years-at-0-6-of-gdp.

86 A.M. Best. (26 January 2024). CoreLogic: UK Storm Isha Losses May Reach $318.9 Million. Retrieved 18 April 2025 from https://news.ambest.com/newscontent.aspx?refnum=255636&altsrc=23

87 Cowen, J. (18 July 2024). Flood Re sees claims surge after storms batter UK. Insurance Times. Retrieved 15 April 2025 from https://www.insurancetimes.co.uk/news/flood-re-sees-claims-surge-after-storms-batter-uk/1452499.article.

88 Flood Re. (6 August 2024). Annual report and accounts 2023–2024 for the period 1 April 2023 to 31 March 2024. Retrieved 15 April 2025 from https://www.floodre.co.uk/wp-content/uploads/Flood-Re-Limited-ARA-2024-EJ-Signed.pdf.

89 ABI. (19 November 2024). Year-to-date property claims payouts hit £4.1 billion. Retrieved 15 April 2025 from https://www.abi.org.uk/news/news-articles/2024/112/year-to-date-property-claims-payouts-hit-4.1-billion/.

90 Ibid.

91 Ibid.

92 Murray, J. (1 December 2024). Could Tenbury Wells be the first UK town centre abandoned over climate change? The Guardian. Retrieved 15 April 2025 from https://www.theguardian.com/environment/2024/dec/01/could-tenbury-wells-be-the-first-uk-town-centre-abandoned-due-to-climate-change.

93 Watkins, N., Frievalt, F., Giammanco, I., and Vigus, R. (23 April 2024). The WUI Data Commons: Driving wildfire resilience through data transparency [webinar]. Milliman. Retrieved 15 April 2025 from https://www.milliman.com/en/video/wui-data-commons-wildfire-resilience-data-transparency.

94 European Insurance and Occupational Pensions Authority. (3 April 2024). EIOPA consults on natural catastrophe risk reassessments in the standard formula. Retrieved 15 April 2025 from https://www.eiopa.europa.eu/eiopa-consults-natural-catastrophe-risk-reassessments-standard-formula-2024-04-03_en.

95 European Insurance and Occupational Pensions Authority. (2 August 2022). EIOPA publishes application guidance on how to reflect climate change in ORSA. Retrieved 15 April 2025 from https://www.eiopa.europa.eu/eiopa-publishes-application-guidance-how-reflect-climate-change-orsa-2022-08-02_en.

96 Shah, A., Benkhalfa, M., Penfold, I., Pugassi, F., van Wijk, M., Basetti Sani Vettori, N., Rainaud, A., et al. (April 2024). Extreme weather in Europe. Milliman. Retrieved 15 April 2025 from https://assets.milliman.com/downloads/4-8-24_Extreme_Weather_Report-Milliman-2024.pdf.

97 See the Milliman Climate Resilience Initiative at https://us.milliman.com/en/Insurance/Milliman-climate-resilience-initiative.

98 Postema, J. T., van Dam, D., van Wijk, M., Van der Laan, N., Rainaud, A., & Titon, E. (2 May 2024). Flood risk modelling in Europe. Milliman. Retrieved 15 April 2025 from https://www.milliman.com/en/insight/flood-risk-modelling-in-europe.

99 Spencer, N. (30 January 2024). The 2024 sustainability agenda for UK life and health insurers [White paper]. Milliman. Retrieved 15 April 2025 from https://uk.milliman.com/en-GB/insight/2024-sustainability-agenda-uk-life-and-health-insurers.

100 European Insurance and Occupational Pensions Authority. (7 November 2024). EIOPA recommends a dedicated prudential treatment for insurers' fossil fuel assets to cushion against transition risks. Retrieved 15 April 2025 from https://www.eiopa.europa.eu/eiopa-recommends-dedicated-prudential-treatment-insurers-fossil-fuel-assets-cushion-against-2024-11-07_en.

101 Cantle, N. (15 December 2021). Simplifying climate resilience strategies for insurers. Milliman. Retrieved 15 April 2025 from https://www.milliman.com/en/insight/Simplifying-climate-resilience-strategies-for-insurers.

102 European Commission. (n.d.). Sustainability-related disclosure in the financial services sector. Retrieved 15 April 2025 from https://finance.ec.europa.eu/sustainable-finance/disclosures/sustainability-related-disclosure-financial-services-sector_en.

103 Shah, A., Benkhalfa, M., Penfold, I., Pugassi, F., van Wijk, M., Basetti Sani Vettori, N., Rainaud, A., et al. (April 2024). Extreme weather in Europe. Milliman. Retrieved 15 April 2025 from https://assets.milliman.com/downloads/4-8-24_Extreme_Weather_Report-Milliman-2024.pdf.

104 See the MicroInsurance Centre at Milliman at https://microinsurancecentre.milliman.com/en.

105 Milliman. (15 December 2021). Making climate risk microinsurance work. Retrieved 15 April 2025 from https://www.my-milliman.com/en-GB/insight/making-climate-risk-microinsurance-work.

106 Pouget, F., Payen, J., Buckle, J., Drew, A., Clarke, S., Silveiro, J., Balestreri, A., et al. (2 March 2024). Milliman climate change reporting barometer. Milliman. Retrieved 15 April 2025 from https://www.milliman.com/en/insight/milliman-climate-change-reporting-barometer.

107 Gallin, L. (21 January 2025). Cat bond issuance hits record $17.7bn in 2024: Report. Reinsurance News. Retrieved 15 April 2025 from https://www.reinsurancene.ws/cat-bond-issuance-hits-record-17-7bn-in-2024-report/.

108 Evans, S. (18 December 2024). ECB, EIOPA propose EU nat cat reinsurance solution, with catastrophe bond support. Artemis. Retrieved 15 April 2025 from https://www.artemis.bm/news/ecb-eiopa-propose-eu-nat-cat-reinsurance-solution-with-catastrophe-bond-support.

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