European Environment Agency

8th Environment Action Programme

Economic losses from weather- and climate-related extremes in Europe

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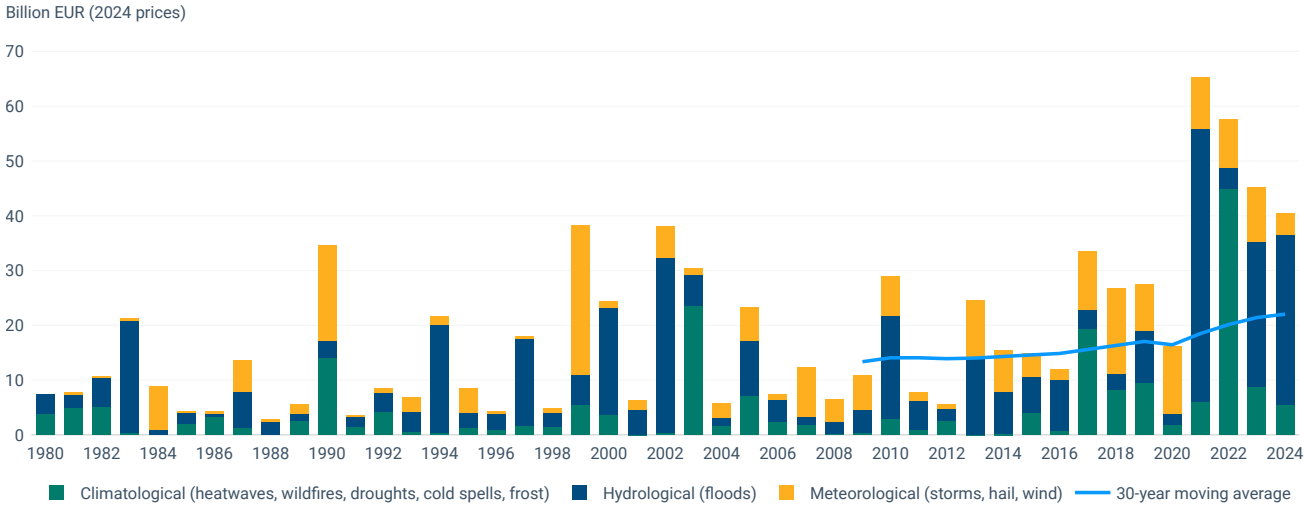
Weather- and climate-related extremes caused economic losses of assets estimated at EUR 822 billion during 1980 - 2024 in the European Union, with over EUR 208 billion (25%) between 2021 and 2024. Analysing trends in economic losses is challenging, primarily due to large annual variability. Statistical analyses revealed that economic losses increase over time and the last four years are all in the top five years of the highest annual economic losses since 1980. As severe weather- and climate-related extreme events are expected to intensify further, associated economic losses will likely continue to increase.

Figure 1. Annual economic losses caused by weather-and climate-related extreme events in the EU Member States



Climate-related **hazards**, such as temperature extremes, heavy precipitation and droughts, pose risks to human health [1] and ecosystems and can lead to substantial **economic losses**[2]. These losses equally create pressures on public finances[3].

The 2021 EU Adaptation Strategy[4] aims to build **resilience** and ensure that the EU is well prepared to manage climate risks. The EU intends to ultimately reduce the overall monetary losses from weather- and climate-related events[5].

The first European Climate Risk Assessment (EUCRA) concluded that climate risks are accelerating and that cascading climate risks can lead to system-wide challenges affecting whole societies. Climate-related extreme events are expected to intensify further and the adaptation pace is not following the same speed. However, It seems unlikely, although uncertain, that the EU will be able to sufficiently mitigate the impact of these events by building resilience. Associated economic losses will likely continue to increase.

The future cost of climate-related hazards depends on the frequency and severity of events and several other factors, such as the value of the assets exposed[6] and the effectiveness of the implemented climate adaptation measures. Studies show the **benefits of adaptation** measures, including nature-based solutions, to mitigate the impacts of weather- and climate-related extremes in Europe[7][8]. A comprehensive, integrated approach is required to adapt to and manage the risks, and develop strategies that deal with the remaining and residual risks not mitigated by adaptation measures.

Between 1980 and 2024, economic losses due to weather- and climate-related **extremes** amounted to an estimated EUR 822 billion (2024 prices) in the EU. Hydrological hazards (floods) account for 47% and meteorological hazards (storms, including lightning and hail) for around 27% of the total. For the climatological hazards, heat waves caused almost 18% of the total losses. The remaining 8% were caused by droughts, wildfires, cold spells and frost.

Relatively few events were **responsible** for most of the economic losses: 5% of climate-related events with the biggest losses were responsible for 59% of losses, and 1% of the events caused 37% of losses. On the other hand, 66% of events, that reflect events with the smallest losses, recorded a total of only 5% of the losses [9][10][11][12].

The average **annual** (constant 2024 EUR prices) economic losses were around EUR 8.6 billion in 1980-1989, 14.9 billion in 1990-1999, 16.5 billion in 2000-2009, 19.7 billion in 2010-2019 and 44.9 billion for the period 2020-2024. A statistical analysis of a 30-year moving average reveals that economic losses increased over time. A linear trendline through these 30-year averages represent a 54% increase from 2009 to 2024, or 3.4% per year[13].

The five years with highest annual values are:

- 1999 (EUR 38.2 billion);
- 2021 (EUR 65.2 billion);
- 2022 (EUR 57.7 billion);
- 2023 (EUR 45.1 billion);
- 2024 (EUR 40.4 billion).

Figure 2. Economic losses and fatalities caused by weather - and climate - related extreme events (1980-2024) - per country

Country	Total losses million EUR	Loss per km² EUR	Loss per capita EUR	Insured losses million EUR	Insured losses %	Fatalities
Austria	19,757	235,538	2,417	3,669	19	2,426
Belgium	18,404	600,130	1,742	7,610	41	14,827
Bulgaria	6,292	56,684	801	99	2	3,190
Croatia	4,742	83,796	1,083	110	2	2,146
Cyprus	459	49,607	635	8	2	253
Czechia	21,711	275,270	2,086	2,885	13	1,382
Denmark	9,347	217,750	1,724	5,690	61	1,036
Estonia	352	7,766	250	54	15	547
Finland	2,422	7,159	465	74	3	1,873
France	138,104	216,302	2,218	48,009	35	69,059
Germany	186,908	522,718	2,304	57,663	31	107,508
Greece	18,311	139,046	1,734	912	5	14,096
Hungary	12,813	137,755	1,261	617	5	8,453
Ireland	4,833	69,095	1,169	813	17	295
Italy	145,226	480,766	2,503	6,373	4	56,855
Latvia	1,302	20,153	570	90	7	251
Lithuania	2,968	45,467	899	70	2	731
Luxembourg	1,409	543,089	2,980	685	49	218
Malta	83	261,285	204	2	2	170
Netherlands	13,241	354,112	828	6,255	47	5,450
Poland	27,885	89,395	738	1,611	6	6,773
Portugal	17,653	191,412	1,721	617	3	20,339
Romania	23,964	100,521	1,121	334	1	6,495
Slovakia	2,549	51,989	478	106	4	1,281
Slovenia	18,480	911,559	9,176	642	3	861
Spain	119,577	236,326	2,804	14,415	12	113,627
Sweden	3,831	8,563	419	990	26	927
Total EU-27	**822,624**			**160,403**		**441,069**
Iceland	27	267	93	0	0	3
Liechtenstein	22	139,338	674	11	48	1
Norway	4,462	11,604	956	3,079	69	77
Switzerland	22,749	550,999	3,056	7,978	35	19,408
Türkiye	7,978	10,225	120	535	7	3,222

The economic impact of climate-related extremes varies across the EU. In absolute terms, the **highest** economic losses during the period 1980-2024 were recorded in Germany, Italy, France and Spain. Highest losses per capita were calculated in Slovenia, Switzerland, Luxembourg and Spain. The highest losses per area (in km^2) were found in Slovenia, Belgium, Switzerland, Luxembourg and Germany.

According to estimates for 1980-2024, less than 20% of total losses were privately insured. This varied among countries, from less than 3% in Bulgaria, Croatia, Cyprus, Lithuania, Malta, Romania and Iceland to over 35% in Belgium, Denmark, France, Luxembourg, Netherlands, Liechtenstein, Norway and Switzerland. There were significant **differences** between event types. For meteorological events, over 35% of the economic losses were insured. It was around 15% for hydrological events and slightly over 10% for all climatological events, including heatwaves, wildfires, droughts, cold spells and frost.

The EU adaptation strategy[4] aims to promote action at **national level**. All countries have a national adaptation policy[14] [15]adopted using different instruments such as strategies and national, regional and sectoral plans, also laws with adaptation relevance reflecting differences in governance in between countries[15]. The Climate-ADAPT platform — developed by the European Commission and the EEA — supports action by sharing knowledge on climate change and its impacts, adaptation strategies and plans, and case studies.

Supporting information

Definition

This indicator considers estimated values for the number of fatalities, the overall and insured economic losses from weather- and climate-related events in the European Environment Agency (EEA) member countries, i.e., in the 27 EU Member States, Iceland, Liechtenstein, Norway, Switzerland and Türkiye. Focus of the indicator is on total economic losses for the EU-27. Further details are provided on the Climate-ADAPT dashboard presenting information on total economic losses, insured economic losses and fatalities for the EU-27 and EEA member countries; per country, per year and per hazard type. Hazards considered are those classified as meteorological hazards, hydrological hazards and climatological hazards, based on the classification by the International Council for Science (ICSU)[16].

Methodology

Data have been adjusted to account for inflation. They are presented in 2024 prices (Euro). The implicit GDP deflator is used as an economic metric that measures the price level changes of all new, final goods and services produced in an economy over a specific period, relative to the base year, including those that are not included in the consumer price index (CPI), such as investment goods and exports. As the CPI only reflects the price changes of a specific basket of goods and services that consumers purchase, the implicit GDP deflator is a more comprehensive measure of price changes than the CPI.

Definition of a loss event: the event can occur in several countries; events are counted by country and by year and type of natural hazard[17]. The 30-year moving averages are based on the value of the year and the 29 preceding years. The estimated annual increase over the period from 2009 to 2024 is based on a linear trendline determined with the least squares method[18].

Loss per capita is defined as the cumulative losses over the period 1980-2024 divided by the average population over the 1980-2024 time period.

There are more than 190,000 more fatalities reported in the 1980-2024 dataset compared to the previous 1980-2023 dataset for the same period. This is due to a large addition of heatwave events. They adhere to the methodology used by the data provider RiskLayer. These additional events are included when peer-reviewed and trusted datasets publish them. Total and insured economic losses also changed between the 1980-2024 dataset and the 1980-2023 dataset for the 1980-2023 period. This is due to Eurostat changes in price index and exchange rates that change every year and retroactively, as well as the changes in values of the losses for the events already registered in the dataset, on top of the addition of new events.

The European Commission is working with Member States, the ISDR and other international organisations to improve data on disaster losses. The JRC, with the disaster risk management knowledge centre and the risk data hub, has prepared guidance for recording and sharing disaster damage and loss data, status and best practices for disaster loss data

recording in EU Member States and recommendations for a European approach for recording disaster losses[19]. Once comparable national databases on disaster losses are available for all EU Member States and EEA member countries and these data are reported, this EEA indicator can build on such data.

Data sources & providers

This assessment is based on the estimates provided by the RiskLayer CATDAT dataset (dataset url is not available) and the Eurostat collection of economic indicators, whereas data from earlier years not covered by Eurostat have been completed using data from the Annual Macro-Economic Database of the European Commission (AMECO), the International Monetary Fund's (IMF) World Economic Outlook (WEO), the Total Economy Database (TED) and the World Bank database. More information on the data quality and aggregation process is provided in the 2025 report on economic losses and fatalities[20].

Data are received from the RiskLayer CATDAT under institutional agreement.

Methodology for gap filling

Data gap filling is not necessary.

Policy/environmental relevance

In February 2021, the European Commission presented the new EU Strategy on adaptation to climate change. One of the objectives is 'smarter adaptation', within which a key action is 'more and better climate-related risk and losses data', as currently, no coherent mechanism is in place for countries to report losses to the European Commission or the EEA. This is further developed in the Staff Working Document, Closing the climate protection gap[21] [22]- scoping policy and data gaps and in the activities of the Climate Resilience Dialogue, that published its final report in July 2024[23]. In 2024, the European Commission presented the Communication on Managing Climate Risks-Protecting People and Prosperity which sets out how the EU can effectively get ahead of the growing climate-related risks and build greater resilience to the impacts of climate change including to address economic losses. It responded to the first ever European Climate Risk Assessment Report.

Article 6 of the European Union Civil Protection Mechanism (2013) (EUCPM) obliges the EU Member States to develop risk assessments at national or appropriate sub-national levels and to make a summary of the relevant elements thereof[24]. The amendment of the EUCPM of March 2019 introduced joint reporting on national risk assessments, risk management capability assessments and information on the priority prevention and preparedness measures. This with a focus on key risks with cross-border impacts, and, where appropriate, low probability risks with a high impact.

The Sendai Framework for Disaster Risk Reduction (2015-2030), including 'Understanding disaster risk', requires that the signatory countries systematically evaluate, record, share and publicly account for disaster losses and understand the economic impacts at national and sub-national levels.

This is an EEA indicator for EUROSTAT monitoring of the UN Sustainable Development Goals (SDGs, for SDG13 Climate) and a headline indicator for monitoring progress towards the 8th Environment Action Programme[25][5]. It contributes to monitoring aspects of the 8th EAP priority objective Article 2.2. b that shall be met by 2030: 'continuous progress in enhancing and mainstreaming adaptive capacity, including on the basis of ecosystem approaches, strengthening resilience and adaptation and reducing the vulnerability of the environment, society and all sectors of the economy to climate change, while improving prevention of, and preparedness for, weather- and climate-related disasters' [25]. The European Commission Communication on the 8th EAP monitoring framework specifies that this indicator should be used to monitor whether the EU is reducing the overall monetary losses from weather- and climate-related events[5].

Targets

No targets have been identified for this indicator.

Accuracy and uncertainties

No uncertainties have been specified.

Data sources and providers

- CATDAT (link not available), RiskLayer GmbH

Metadata

DPSIR

Impact

Topics

Climate change adaptation

Tags

CLIM039 # 8th EAP # Climate losses insurance # Economic losses # Disasters # Natural hazards

Temporal coverage

1980-2024

Geographic coverage

Austria
Belgium
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
Malta
Netherlands
Norway
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden
Switzerland
Türkiye

Typology

Descriptive indicator (Type A - What is happening to the environment and to humans?)

UN SDGs

SDG13: Climate action, SDG1: No poverty

Unit of measure

Losses in Euros, million and billion Euros, 2024 prices, fatalities as absolute numbers.

Frequency of dissemination

Once a year

References and footnotes

1. For details, see also the European Climate and Health Observatory: https://climate-adapt.eea.europa.eu/en/observatory.
2. Direct losses to infrastructure and physical assets are reported. Indirect losses, e.g. due to reduced productivity, loss of life, hazard-induced injuries, healthcare costs are not included. The costs of building back better or building back elsewhere are also not included. Geophysical hazards, like earthquakes and volcanoes are also natural hazards. As they are not seen as directly impacted by climate change, they are not included in this indicator.
3. EC, 2022, *The fiscal impact of extreme weather and climate events: Evidence for EU countries*, Discussion Paper 168, European Commission, Brussels.
4. EC, 2021, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Forging a climate-resilient Europe — the new EU strategy on adaptation to climate change', COM(2021) 82 final.
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5. EC, 2022, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the monitoring framework for the 8th Environment Action Programme: Measuring progress towards the attainment of the programme's 2030 and 2050 priority objectives*,
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6. Ranasinghe, R., Ruane, A. C., Vautard, R., Arnell, N., Coppola, E., Cruz, F. A., Dessai, S., Islam, A. S., Rahimi, M., Ruiz Carrascal, D., Sillmann, J., Sylla, M. B., Tebaldi, C., Wang, W. and Zaaboul, R., 2021, 'Climate change information for regional impact and for risk assessment', in: Masson-Delmotte, V., Zhai, P., Pirani, A., et al. (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.
7. Dottori, F., Mentaschi, L., Bianchi, A., Alfieri, L. and Feyen, L., 2023, 'Cost-effective adaptation strategies to rising river flood risk in Europe', Nature Climate Change 13(2), pp. 196–202 (https://www.nature.com/articles/s41558-022-01540-0) accessed April 4, 2023.
8. Vousdoukas, M. I., Mentaschi, L., Hinkel, J., Ward, P. J., Mongelli, I., Ciscar, J.-C. and Feyen, L., 2020, 'Economic motivation for raising coastal flood defenses in Europe', Nature Communications 11(1), pp. 2119 (https://www.nature.com/articles/s41467-020-15665-3) accessed April 4, 2023.
9. The total losses vary significantly from year to year. This interannual variability is due to the development of assets in vulnerable areas and potential reporting bias over time and because most types of weather- and climate-related extremes across the world have become more severe and frequent as a result of human-caused climate change.
10. There is an increase of records per decade in the CATDAT data source from 646 for the period 1980-1989 to 1419 for the decade 2010-2019 and already with 2222 records for the period 2020-2024 for the EU-27 countries.
11. CarbonBrief, 2022, 'Mapped: How climate change affects extreme weather around the world', Carbon Brief (https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world/) accessed September 1, 2023.
12. XAIDA, 2024 Many devastating extremes in 2023 were amplified by Global Warming, XAIDA H2020 project Media briefing (https://drive.google.com/file/d/12mj4JDBHzzwKxVPtQKQtNV3qMEVoTDje/view?pli=1) accessed August 25, 2024.
13. When expressing the impacts relative to the size of the economy exposed to these hazards, the increase in 30 year average GDP for the EU between 2009 and 2024 is half of the increase rate of the losses (based on an estimate using Worldbank data). Hence half of the increase in losses over this period can be linked to increased wealth and exposure and the losses have increased twice as fast as GDP
14. EEA, 2022, Advancing towards climate resilience in Europe —Status of reported national adaptation actions in 2021, EEA Report, 11/2022, European Environment Agency.

15. EEA, 2023, 'Is Europe on track towards climate resilience? Status of reported national adaptation actions in 2023', (https://www.eea.europa.eu/publications/national-adaptation-actions-of-2023) accessed 10 September 2025.
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16. IRDR, 2014, IRDR Peril Classification and Hazard Glossary, Integrated Research on Disaster Risk (https://council.science/wp-content/uploads/2019/12/Peril-Classification-and-Hazard-Glossary-1.pdf) access 5 October 2025.
17. Chapgain, S., 2024, 'Natural disaster or natural hazard? Even experts interchangeably use these terms', (https://english.onlinekhabar.com/natural-disaster-or-natural-hazard.html) accessed August 25, 2024.
18. For the dataset 1980-2024, the trendline through 30-year moving average (2009-2024): y=0.5451(x-1979)+11.651.
19. Bountzouklis, C., Roeslin, S., Corbane, C., Battistutta, A. and Karagiorgos, K., 2025, 'Disaster loss data management: current Practices, challenges, and opportunities in Europe', Publications Office of the European Union, Luxembourg (https://data.europa.eu/doi/10.2760/8144782) accessed 5 October 2025.
20. EEA, 2025, Economic losses and fatalities from weather- and climate-related extremes (https://www.eea.europa.eu/en/analysis/publications/economic-losses-from-climate-extremes) accessed 5 October 2025.
21. The term 'climate protection gap' is used in reference to the share of non-insured economic losses in total losses after a weather- and climate-related extreme event. In recent years, it has also been used to refer to the notional gap between likely climate-related impacts and existing resilience measures (EC, 2021, p. 3)
22. EC, 2021, Commission Staff Working Document — Closing the climate protection gap - Scoping policy and data gaps, SWD(2021) 123 final.
23. EC and Climate Resilience Dialogue, 2024, *Climate Resilience Dialogue Final Report*, European Commission, Brussels.
24. EC, 2024, Report from the Commission to the European Parliament and the Council on progress on implementation of article 6 of the Union Civil protection Mechanism (Decision No1313/2013/EU) – Preventing and managing disaster risk in Europe, COM(2024) 130 final.
25. EU, 2022, Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a general Union Environment Action Programme to 2030, OJ L 114, 12.4.2022, p. 22–36.
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