



Energy, Climate change, Environment

Climate Action

Consequences of climate change

Climate change affects all regions around the world. Polar ice shields are melting and the sea is rising. In some regions, extreme weather events and rainfall are becoming more common while others are experiencing more extreme heat waves and droughts. We need climate action now, or these impacts will only intensify.

Climate change is a very serious threat, and its consequences impact many different aspects of our lives. Below, you can find a list of climate change's main consequences. Click on the + signs for more information.

Natural consequences



What are the consequences of climate change for the natural world?

High temperatures

The climate crisis has increased the average global temperature and is leading to more frequent high-temperature extremes, such as heatwaves. Higher temperatures can cause increased mortality, reduced productivity and damage to infrastructure. The most vulnerable members of the population, such as the elderly and infants, will be most severely affected.

Higher temperatures are also expected to cause a shift in the geographical distribution of climate zones. These changes are altering the distribution and abundance of many plant and animal species, which are already under pressure from habitat loss and pollution.

Temperature rises are also likely to influence phenology – the behaviour and lifecycles of animal and plant species. This could in turn lead to increased numbers of pests and invasive species, and a higher incidence of certain human diseases.

Meanwhile, the yields and viability of agriculture and livestock, or the capacity of ecosystems to provide important services and goods (such as the supply of clean water or cool and clean air) could be diminished.

Higher temperatures increase the evaporation of water, which – together with the lack of precipitation – increases the risks of severe droughts.

Low-temperature extremes (cold spells, frosty days) could become less frequent in Europe. However, global warming affects the predictability of events and therefore our capacity to respond effectively.

Drought and wildfires

Due to the changing climate, many European regions are already facing more frequent, severe, and longer lasting droughts. A drought is an unusual and temporary deficit in water availability caused by the combination of lack of precipitation and more evaporation (due to high temperatures). It differs from water scarcity, which is the structural year-round lack of fresh water resulting from the over-consumption of water..

Droughts often have knock-on effects, for example on transport infrastructure, agriculture, forestry, water and biodiversity. They reduce water levels in rivers and ground water, stunt tree and crop growth, increase pest attacks and fuel wildfires.

In Europe, most of the roughly EUR 9 billion annual losses caused by drought affect agriculture, the energy sector and the public water supply. Extreme droughts are becoming more common in Europe, and the damage they cause is also growing.

With a global average temperature increase of 3°C, it is projected that droughts would happen twice as often and absolute annual losses from droughts in Europe would increase to EUR 40 billion per year, with the most severe impacts in the [Mediterranean and Atlantic regions](#) .

More frequent and severe droughts will increase the length and severity of the wildfire season, particularly in the Mediterranean region. Climate change is also expanding the area at risk from wildfires. Regions that are not currently prone to fires could become risk areas.

Availability of fresh water

As the climate heats up, rainfall patterns change, evaporation increases, glaciers melt and sea levels rise. All these factors affect the availability of fresh water.

More frequent and severe droughts and rising water temperatures are expected to cause a decrease in water quality. Such conditions encourage the growth of toxic algae and bacteria, which will worsen the problem of water scarcity that has been largely caused by human activity.

The increase of cloudburst events (sudden extreme rainfall) is also likely to influence the quality and quantity of fresh water available, as storm water can cause uncleaned sewage to enter surface water.

Europe's rivers generally originate in mountainous areas, and 40% of Europe's fresh water comes from the Alps. However, changes in snow and glacier dynamics, and patterns of rainfall may lead to temporary water shortages across Europe. Changes to river flows due to drought may also affect inland shipping and the production of hydroelectric power.

Floods

Climate change is expected to lead an increase of precipitation in many areas. Increased rainfall over extended periods will mainly lead to fluvial (river) flooding, while short, intense cloudbursts can cause pluvial floods, where extreme rainfall causes flooding without any body of water overflowing.

River flooding is a common natural disaster in Europe, which has, along with storms, resulted in fatalities, affected millions of people and incurred massive economic losses in the last three decades. Climate change is likely to increase the frequency of flooding across Europe in the coming years.

Heavy rainstorms are projected to become more common and more intense due to higher temperatures, with flash floods expected to become more frequent across Europe.

In some regions, certain risks such as early spring floods could decrease in the short term with less winter snowfall, but the increased risk of flash flooding in mountain areas overloading the river system may offset those effects in the medium term.

Sea-level rise and coastal areas

The sea level rose over the course of the 20th century, and the tendency has accelerated in recent decades.

The rise is mostly due to thermal expansion of the oceans because of warming. But melting ice from glaciers and the Antarctic ice sheet is also contributing. It is predicted that Europe will experience an average 60 to 80 cm sea-level rise by the end of the century, mainly depending on the rate at which the Antarctic ice sheet melts.

Around a third of the EU's population lives within 50 km of the coast and these areas generate over 30% of the Union's total GDP. The economic value of assets within 500 m of Europe's seas totals between EUR 500 billion to 1,000 billion.

Alongside other climate change impacts, sea-level rise will increase the risk of flooding and erosion around the coasts, with significant consequences for the people, infrastructure, businesses and nature in these areas.

Moreover, sea level rise is projected to reduce the amount of available fresh water, as seawater pushes further into underground water tables. This is also likely to lead to much more saltwater intrusion into bodies of fresh water, affecting agriculture and the supply of drinking water.

It will also affect biodiversity in coastal habitats, and the natural services and goods they provide. Many wetlands will be lost, threatening unique bird and plant species, and removing the natural protection these areas provide against storm surges.

Biodiversity



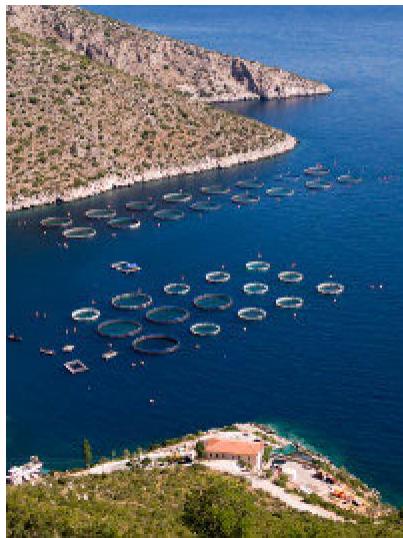
Climate change is happening so fast that many plants and animal species are struggling to cope. There is clear evidence to show that biodiversity is already responding to climate change and will continue to do so. Direct impacts include changes in phenology (the behaviour and lifecycles of animal and plant species), species abundance and distribution, community composition, habitat structure and ecosystem processes.

Climate change is also leading to indirect impacts on biodiversity through changes in the use of land and other resources. These may be more damaging than the direct impacts due to their scale, scope and speed. The indirect impacts include: habitat fragmentation and loss; over-exploitation; pollution of air, water and soil; and the spread of invasive species. They will further reduce the resilience of ecosystems to climate change and their capacity to deliver essential services; such as climate regulation, food, clean air and water, and the control of floods or erosion.

Soils

Climate change may aggravate erosion, decline in organic matter, salinisation, soil biodiversity loss, landslides, desertification and flooding. The effect of climate change on soil carbon storage can be related to changing atmospheric CO₂ concentrations, increased temperatures and changing precipitation patterns. Extreme precipitation events, fast melting of snow or ice, high river discharges and increased droughts are all climate-related events which influence soil degradation. Deforestation and other human activities (agriculture, skiing) also play a role. Saline soils are expected to increase in coastal areas as a result of saltwater intrusion from the seaside because of rising sea levels and (periodically) low river discharges.

Inland water



Climate change is predicted to lead to major changes in water availability across Europe, due to less predictable rainfall patterns and more intense storms. This will result in increased water scarcity, especially in southern and south-eastern Europe, and an increased risk of flooding throughout much of the continent. The resulting changes will affect many land and marine regions, and many different natural environments and species.

Water temperature is one of the central parameters that determine the overall health of aquatic ecosystems because aquatic organisms have a specific range of temperatures they can tolerate. The changes in climate have increased water temperatures of rivers and lakes, decreased ice cover, thereby affecting water quality and freshwater ecosystems.

Marine environment

The impacts of climate change, such as increasing sea surface temperatures, ocean acidification and shifts in currents and wind patterns will significantly alter the physical and biological make-up of the oceans. Changes in temperatures and ocean circulation have the potential to change geographical fish distribution. An increasing sea temperature might also enable alien species to expand into regions where they previously could not survive. Ocean acidification for example will have an impact on various calcium carbonate-secreting organisms. These changes will have unavoidable impacts on coastal and marine ecosystems, resulting in major socio-economic consequences for many regions.

Social threats



What social threats does climate change bring upon us?

Health



Climate change is a significant threat not only to human health but also to animal and plant health. While a changing climate might not create many new or unknown health threats, existing effects will be exacerbated and more pronounced than currently seen.

The most important health effects from future climate change are projected to include:

1. Increases in summer heat-related mortality (deaths) and morbidity (illness);
2. Decreases in winter cold-related mortality (deaths) and morbidity (illness);
3. Increases in the risk of accidents and impacts on wider well-being from extreme weather events (floods, fires and storms);
4. Changes in the impact of diseases e.g. from vector-, rodent-, water- or food-borne disease;
5. Changes in the seasonal distribution of some allergenic pollen species, range of virus, pest and disease distribution;
6. Emerging and re-emerging animal diseases increasing challenges to European animal and human health by viral zoonotic diseases and vector-borne diseases;
7. Emerging and re-emerging plant pests (insect, pathogens and other pests) and diseases affecting forest and crop systems;
8. Risks in relation to change in air quality and ozone.

Vulnerable population

People living in low-income urban areas with poor infrastructure, and, generally speaking, population groups with lower incomes and assets, are more exposed to climate impacts but have less capacity to face them.

Women may be disproportionately impacted by climate change and are at a disadvantage when expensive adaptation measures are required. At the same time, women are key actors in adaptation and more generally sustainable practices.

Unemployed and socially marginalised people are among the most vulnerable to climate risks.

Europe's ageing population, disproportionately affected by reduced mobility or health impediments, will result in a higher share of the population being vulnerable to climate change impacts.

Climate change has also already started to have an impact on displacement and migration. Although climate is only one of several drivers of displacement and migration, many partner countries on their path towards sustainable development are among the most affected. People living there often depend heavily on their natural environment, and they have the least resources to cope with the changing climate

Employment

The impact of temperature increases, changes in precipitation regimes or sea-level rise will affect – directly or indirectly – the productivity and viability of all economic sectors in all EU Member States, with labour market implications.

Climate change may affect workforce availability due to a decrease in the health conditions of the population and additional occupational health constraints (higher temperature at work, more frequent and intense natural hazards keeping people from reaching their workplace).

Moreover, several economic sectors are highly vulnerable because of their dependence on regular climate conditions. Sectoral production shifts – in agriculture and tourism for instance – are expected as a consequence of climate change.

Major investments in adaptation could offer employment and income opportunities in activities such as reinforcing coastal defences, buildings and (green) infrastructure, water management and relocation of exposed settlements. Yet, uncertainty remains regarding the possible net job creation effects of such investments. Labour skills upgrading will be necessary to grasp these opportunities.

Education

Reducing vulnerability and implementing adaptation measures is not only the task and responsibility of governments. The severity of climate change requires public and private actors to work together in reducing vulnerability and adapting to the impacts. However, not all stakeholders are aware and informed about their vulnerability and the measures they can take to pro-actively adapt to climate change. Education and awareness-raising is therefore an important component of the adaptation process to manage the impacts of climate change, enhance adaptive capacity, and reduce overall vulnerability.

Threats to business



How does climate change represent a threat to business?

Infrastructure and buildings

The impacts of climate change are particularly pertinent to infrastructure and buildings given their long lifespan and their high initial cost, as well as their essential role in the functioning of our societies and economies.

Buildings and infrastructure can be vulnerable to climate change because of their design (low resistance to storms) or location (e.g. in flood-prone areas, landslides, avalanches). Indeed they can be damaged or rendered unfit for use by any changing climatic condition or extreme weather event: rising sea level, extreme precipitation and floods, occurrences of extreme low or high temperatures , heavy snowfalls, strong winds...

Consequences of climate change for buildings and infrastructure will differ from region to region.



Energy

Climate threats for the European energy system already exist and are projected to increase. Climate change is expected to reduce demand for heating in northern and north-western Europe and to strongly increase energy demand for cooling in southern Europe, which may further exacerbate peaks in electricity demand in the summer.

More intense and frequent heatwaves will shift energy supply and demand patterns, often in opposite directions. Further increases in temperature and droughts may limit the availability of cooling water for thermal power generation in summer (lowering energy supply), whereas demand for air conditioning will increase.

Moreover, greater magnitude and frequency of extreme weather events will cause threats for physical energy infrastructure: overhead transmission and distribution, but also substations or transformers.

Climate change also brings increased uncertainty in weather patterns across Europe. This has a direct negative impact in the long term on the production of renewable energy. Some immediate examples would be less sun or wind in areas where there is usually more or heat and droughts affecting the crops intended for the production of energy from biomass.

Agriculture

Climate change already has and will continue to have a significant negative impact on European agriculture throughout the 21st century due to increased heat, drought, floods, pests, diseases and the decreasing health of soils:

- Substantial losses in agricultural production (lower crop yields)
- Reduction in suitable areas for crop cultivation

Southern regions of Europe will be hit the hardest due to heat and water shortage. While in the North of Europe higher temperatures may open up new areas for warm-season crops, these gains won't offset the losses in other regions.



Forestry

Forests are also affected by climate change, with increased risks of droughts, storms, fires, pests, and diseases disturbing forest health.

The biodiversity of European forests is expected to change, because climate change poses a particular threat to species that are highly adapted to specific climatic and environmental conditions. For example, the limited diversity of tree species in boreal forests makes them less resilient to natural disturbances and therefore more vulnerable to climate change.

Southern Europe is likely to see a general decrease in forest growth due to decreasing precipitation. Furthermore, the impact of wildfires is particularly strong on already degraded ecosystems in the South, and it's expected to get worse with longer and more severe fire seasons.

Insurance

The frequency and intensity of most types of extreme events is expected to change significantly as a result of climate change. In the short term, as long as due allowance is made for the underlying trend, premiums would rise gradually and the insurance market would absorb such changes without disruption. However, risk knowledge often advances in 'steps', which can lead to jumps in the price over a short period. In the longer term, particularly in most vulnerable sectors or areas, climate change could indirectly increase social disparities as insurance premiums become unaffordable for a fringe of the population.



Tourism

The economic consequences of climate change for regions where tourism is important can be substantial. The suitability of southern Europe for tourism is projected to decline markedly during the key summer months but improve in other seasons. Central Europe is projected to increase its tourism appeal throughout the year. Projected reductions in snow cover will negatively affect the winter sports industry in many regions.

Cross-cutting issues for businesses

Climate change threatens all businesses, as all exist on Earth. However, some are more vulnerable than others. Impacts are expected to fall disproportionately on SMEs including disrupting business operations, property damage, disruption to supply chains and infrastructure, leading to increased costs of maintenance and materials, and higher prices. However, climate action offers a wide range of new opportunities for businesses to develop products and services that would help both reduce emissions and adapt to a warming world.

Territorial threats



How are different areas affected by climate change?

The Arctic

The Arctic faces major changes including a higher-than-average temperature increase, a decrease in summer sea ice cover and thawing of permafrost. The reduction of ice cover is accelerating and projected to continue to impact local natural and human systems. It also opens up potential additional burdens on the environment, such as extensive oil and gas exploration and the opening of new shipping routes. Thawing of permafrost has the potential to seriously affect human systems, for example by creating infrastructure problems. The fragile Arctic ecosystems have suffered significantly from above-average temperature increases and these impacts are expected to continue.

Northern Europe

Projections suggest less snow and lake and river ice cover, increased winter and spring river flows in some parts and decreases in other parts (e.g. Finland), and greater damage by winter storms. More frequent and intense extreme weather events in the medium to long term might adversely impact the region, for example by making crop yields more variable.

North-western Europe

Coastal flooding has impacted low-lying coastal areas in north-western Europe in the past and the risks are expected to increase due to sea level rise and an increased risk of storm surges. North Sea countries are particularly vulnerable. Higher winter precipitation is projected to increase the intensity and frequency of winter and spring river flooding, although to date no increased trends in flooding have been observed.

Central and eastern Europe

Temperature extremes are projected to be a key impact in central and eastern Europe. Together with reduced summer precipitation this can increase the risk of droughts, and is projected to increase energy demand in summer. The intensity and frequency of river floods in winter and spring (in various regions) is projected to increase due to greater winter precipitation. Climate change is also projected to lead to higher crop-yield variability and more frequent forest fires.

Mediterranean region

The Mediterranean region has been subject to major impacts over recent decades as a result of decreased precipitation and increased temperature, and these are expected to worsen as the climate continues to change. The main impacts are decreases in water availability and crop yields, increasing risks of droughts and biodiversity loss, forest fires, and heat waves. Increasing irrigation efficiency in agriculture can reduce water withdrawals to some degree, but will not be sufficient to compensate for climate-induced increases in water stress. In addition, the hydropower sector will be increasingly affected by lower water availability and increasing energy demand, while the tourism industry will face less favourable conditions in summer. Environmental flows, which are important for the healthy maintenance of aquatic ecosystems, are threatened by climate change impacts and socio-economic developments.

Cities and urban areas

In previous years, increasing urban land take and urban population growth have in many places increased the exposure of European cities to different climate impacts such as heatwaves, flooding, and droughts. The impacts of extreme events such as the flooding of the river Elbe in 2002 or the urban drainage flood in Copenhagen in 2011 demonstrate the high vulnerability of cities to extreme weather events. In the future, ongoing urban land take, growth and concentration of population in cities, as well as an aging population, will contribute to further increase the vulnerability of cities to climate change. Urban design, urban management and enhancing green infrastructure may partly address these effects.

Mountain areas

The increase in temperature is particularly significant in many mountain regions, where loss of glacier mass, reduced snow cover, thawing of permafrost and changing precipitation patterns, including less precipitation falling as snow, have been observed and are expected to increase further. This could lead to an increase in the frequency and intensity of floods in some mountain areas (e.g. in parts of Scandinavia) that can impact people and the built environment. Additional projected impacts include reduced winter tourism, lower energy potential from hydropower in southern Europe, a shift in vegetation zones and extensive biodiversity loss. Plant and animal species living close to mountain tops face the risk of becoming extinct due to the inability to migrate to higher regions.

The retreat of the vast majority of glaciers also affects water availability in downstream areas.

As you can see, climate change is a serious matter and it affects us all. This can be overwhelming, but there's good news: solutions exist. Find out about [what the EU is doing to fight the climate crisis](#) ([/eu-action_en](#)) , and how you can play [your part](#) ([/error/404_en](#)) , too.