

World Water Day, 2023

Water + Spain: main points

Past water trends and the current situation (at 1.1°C global heating)

- **Temperature** The rate of atmospheric warming in the Mediterranean region, including Spain, since the 1980s has exceeded the global average warming rate. In future decades, summertime warming across the region is projected to be 50% greater than the global average (Ali et al., 2022 in CCP4.1.3).
- **Rainfall** Many parts of Spain, especially in the south and central regions, have experienced a decrease in annual precipitation over the past few decades, primarily during the summer months, while an increase in annual rainfall has been observed in Galicia and Asturias in the north of the country (Arias et al., 2021 p130; Senent-Aparicio et al., 2023).
- **Water stress** Analysis published in 2019 suggests that 11 of Spain's 15 river basin districts were under water stress largely because of human demand for water from different sources excluding hydro (approximately 80% for cultivation, 16% urban use, 4% industry), although the decrease in available water due to changing weather patterns is a factor. Only four districts (Cantábrico Occidental, Cantábrico Oriental, Galicia Costa, and Miño-Sil) had little or no water stress at the time of the analysis. The three districts with extremely high water stress are Duero, Tajo, and the internal basins of Catalonia (Vargas & Paneque, 2019).

Future water trends

- **Temperature** If global average temperature rises by 2°C, the annual hottest day in Spain is projected to be from approximately 3°C hotter than the reference period (1850–1900) by the middle of this century, rising to more than 4°C hotter than the baseline period under a 3°C rise in global average temperature (IPCC 2023, in Figure SPM.2).
- **Rainfall** Although many regions of Spain are projected to become dryer as an annual average, periods of rainfall (or snow/hail) are projected to become more intense, with the volume of rain (or snow/ hail) that falls on the annual wettest day in Spain expected to increase by up to 10% in comparison to the baseline period (1850–1900) under all global average temperature rise scenarios (from 1.5°C to 4°C above the baseline). This could increase the risk of flooding (Douville et al., 2021; IPCC, 2023 in Figure SPM.2).

- Soil moisture Widespread loss of soil moisture is projected for Spain under continued global heating (IPCC 2023, in Figure SPM.2).
- Water stress Projections for southern Europe are that as the global warming level reaches 2°C above the baseline period (1850–1900), more than one-third of the population will experience water scarcity, with the risk of more frequent and/or severe agricultural and ecological drought (Ali et al., 2022; IPCC, 2022). Water scarcity and extreme events such as drought negatively impact ecosystems because habitats can shrink, the growth rate of trees can slow down, the risk of soil erosion increases and there is an increased risk of wildfire (Ali et al., 2022 in CCP4.1.2).

Key water-related issues for Spain

- Drying soils Drying soils increases the risk that crop production and yields will decline. As the land warms, rainfall or water in lakes evaporates more rapidly, which can exacerbate soil dryness, or aridity (Arias et al., 2021 in AR6 WGI Box TS.6)
- Extreme weather Combinations of extreme weather scenarios place a huge burden on people and ecosystems. For example, if drought, fire weather and high rainfall events take place within a short period, many different sectors such as agriculture, forestry, ecosystems, can simultaneously be negatively affected (Arias et al., 2021; AR6 WGI TS.4.3.2).
- Human health Increased air temperature together with high humidity can increase the risk of death from hyperthermia and can be particularly risky for vulnerable groups including babies, the elderly and people with pre-existing health conditions. Projections for Spain suggest that under continued climate heating, the proportion of the country that will experience between 1 and 10 days of extremely hot and humid conditions that increases the risk of death from hyperthermia is expected to grow, with the potential for even more frequent high risk days for those living along the eastern and southern coasts of the country (IPCC 2023, in Figure SPM.3).

Adaptation and maladaptation:

Some land-related adaptation actions such as sustainable food production, improved and sustainable forest management, soil organic carbon management, ecosystem conservation and land restoration, reduced deforestation and degradation, and reduced food loss and waste are being undertaken, and can have mitigation co-benefits (high confidence).

There is increased evidence of maladaptation in various sectors and regions. Examples of **maladaptation** in agriculture includes, for example, **using high-cost irrigation in areas projected to have more intense drought conditions**. (IPCC SYR 2023, Long report).

Key overall climate risks for Spain

Listed below are the key risks to Spain, as per the IPCC report cited, by 2100 under a high emissions scenario (SSP5–RCP8.5).

- (risks to) marine ecosystems;
- (risks to) terrestrial ecosystems;
- inland flooding;
- coastal sea-level rise;
- (risks to) human health and well-being (such as from extreme heat or flash floods);
- water scarcity and drought;
- wildfires; and
- decreased crop yield.

The important factor to note is that swift action to stop greenhouse gas emissions and move to green energy and technology can have a positive impact to reduce the effect on the climate. Climate heating-induced risks can be mitigated with adaptations and, crucially, can be reduced by stopping further emissions (Ali et al., 2022 in Figure CCP4.7):

References

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