



European
Commission

Drought in Türkiye and Syria February 2023

GDO Analytical Report

2023



Rapid
Mapping



Risk & Recovery
Mapping



Floods



Fires



Droughts



Population



Built-up
areas

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Executive summary

- A severe lack of precipitation affects both Türkiye and Syria with impacts already on soil moisture and rivers' flow
- The crop season has not started yet, but monitoring the evolution of the drought is important to estimate potential impacts and support risk reduction strategies.
- The compound effects of the catastrophic earthquake and the drought may exacerbate impacts on water availability for agriculture and energy

Combined Drought Indicator (CDI) and River Flow

Türkiye and Syria are extensively under warning conditions according to the Combined Drought Indicator (CDI). This reflects a severe lack of precipitation and drier than normal soil moisture conditions. The crop season has not started yet, but the current situation raises concerns for its potential impacts and risks. The Low-Flow Index (LFI) also shows critical values over most of Türkiye. Higher risk is detected in western Türkiye, Caucasus and southern Syria (Fig. 1)

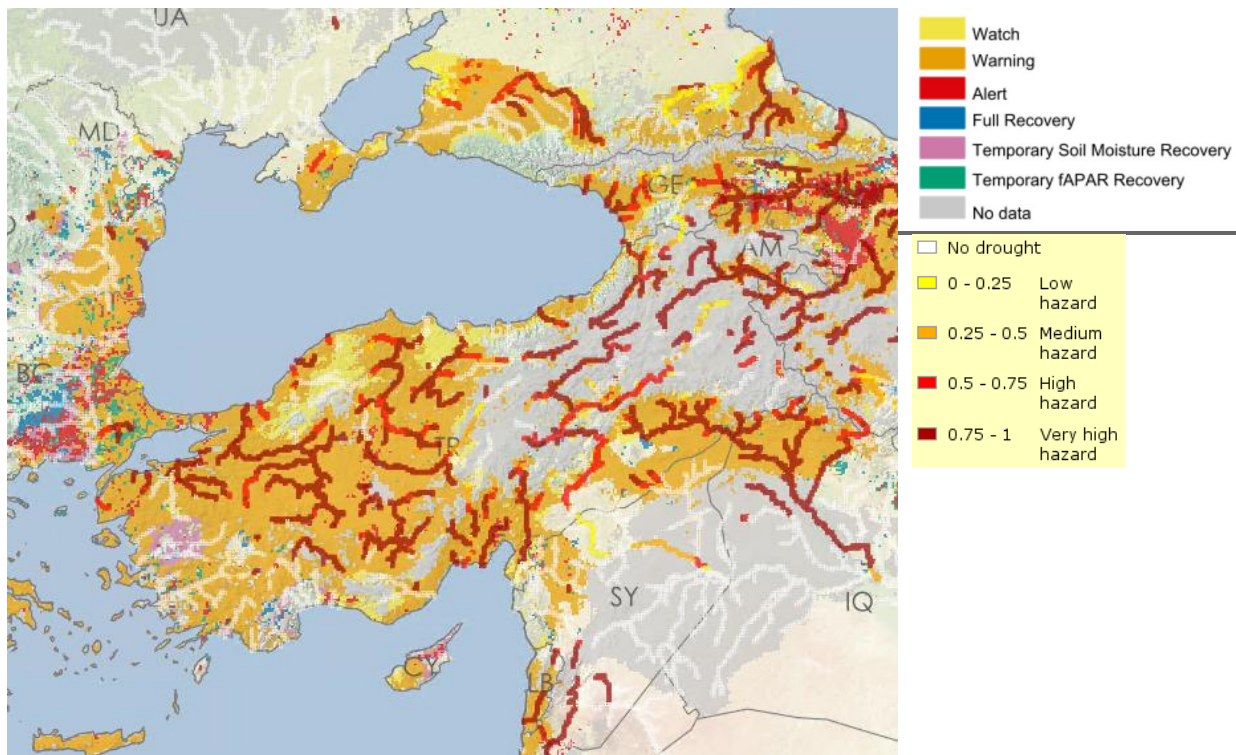


Figure 1: Combined Drought Indicator (CDI) and Low-Flow Index (LFI) at the end of January 2023. A Low-Flow Index of 0 corresponds to no drought and a value of 1 to the highest drought hazard.

Standardized Precipitation Index (SPI)

Türkiye has been affected by negative precipitation anomalies in the last three months from November 2022 to January 2023. The highest negative anomalies are detected in central and north-eastern Türkiye. In Syria, precipitation is generally near normal values (SPI-3, Fig. 2).

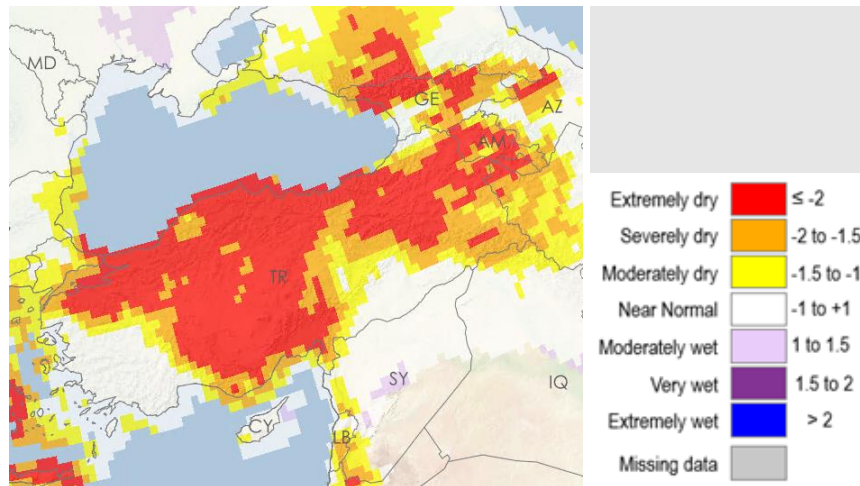


Figure 2: Standardized Precipitation Index SPI-3, three months from November 2022 to January 2023.

Soil Moisture Anomaly

The soil moisture anomaly is markedly negative in most of Türkiye and in northern Syria due to the long-lasting lack of precipitation and the warm-spell at the beginning of the winter 2022-23. Data are coherent with the negative SPI pattern.

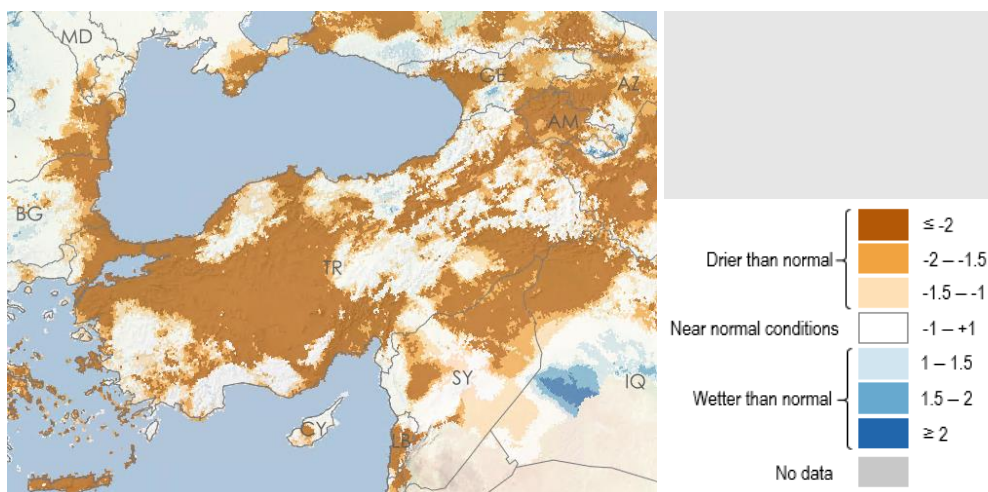


Figure 3: Soil Moisture Anomaly – end of January 2023.

Appendix

The Combined Drought Indicator (CDI) of the European Drought Observatory (EDO) is used to identify areas that may be affected by agricultural drought. The CDI is derived by combining the Standardized Precipitation Index (SPI), the Soil Moisture Index Anomaly (SMA), and the FAPAR anomaly. Areas are classified according to three primary drought classes: (1) “Watch”, indicating that precipitation is less than normal; (2) “Warning”, indicating that also soil moisture is in deficit; and (3) “Alert”, indicating that also vegetation shows signs of stress. Three additional classes – namely “Full Recovery”, “Temporary Soil Moisture Recovery” and “Temporary fAPAR Recovery” – identify the stages of drought recovery processes in terms of its impacts on soil moisture and vegetation.

The Standardized Precipitation Index (SPI) provides information on the intensity and duration of the precipitation deficit (or surplus). SPI is used to monitor the occurrence of drought. The lower (i.e., more negative) the SPI, the more intense is the drought. SPI can be computed for different accumulation periods: the 3-month period is often used to evaluate agricultural drought and the 12-month period for hydrological drought, when rivers fall dry and groundwater tables lower.

Lack of precipitation induces a reduction of soil water content. The Soil Moisture Anomaly index provides an assessment of the deviations from normal conditions of root zone water content. It is a direct measure of drought associated with the difficulty of plants in extracting water from the soil.

The Low-Flow Index (LFI) is based on the daily river water discharge simulated by the LISFLOOD hydrological model. It captures consecutive periods of unusually low streamflow. It compares the consequent water deficit during those periods with the historical climatological conditions.

Glossary of terms and acronyms:

CEMS	Copernicus Emergency Management Service
EDO	European Drought Observatory
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
ERA5	ECMWF Reanalysis v5

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ERCC	European Emergency Response Coordination Centre
JRC	Joint Research Centre
LFI	Low-Flow Index
SMA	Soil Moisture Index (SMI) Anomaly
SMI	Soil Moisture Index
SPI	Standardized Precipitation Index

EDO indicators versioning:

The GDO/EDO indicators appear in this report with the following versions:

- EDO CDI v. 2.2.1
- EDO LFI 2.1.0
- EDO Standardized Precipitation Index SPI ERA5 v. 1.0.0
- EDO Soil Moisture Index Anomaly (SMA), v. 2.1.2

Check <https://edo.jrc.ec.europa.eu/download> for more details on indicator versions.

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