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Project Update #15

Welcome to our fifteenth CENTAUR Project Update!

This month, we turn our attention to agricultural droughts and how CENTAUR is contributing with anticipatory insights to improve preparedness in the face of drought.

Agricultural drought and its impacts

Agricultural droughts refer to the impact of meteorological drought on agricultural productivity. While meteorological drought is defined by the magnitude and duration of rainfall shortages, agricultural drought depends on factors such as the timing and amount of rainfall during the crop season, and how well the soil retains water.

Such droughts pose a major challenge to agricultural production and food security, particularly in Africa, where vulnerability is marked by limited water resources and a strong reliance of many farmers on rainfed agriculture.

Recent droughts in 2021 – 2023 over the Horn of Africa caused widespread crop failures, livestock losses, and culminated in water scarcity, affecting millions of people. The consequences of such events go beyond the farm, impacting economies, driving migration, and, in some cases, fuelling instability.

Given these conditions, efforts to manage drought have been mostly reactive, responding after impacts are already visible. But with climate change intensifying extreme weather, it is increasingly urgent to move toward anticipatory action.

This requires data-driven insights: not only monitoring what is happening in real time, but also forecasting what is likely to come. Reliable predictions can give decision-makers weeks or even months of lead time to prepare, allocate resources, and protect the most vulnerable populations.

How CENTAUR is contributing

CENTAUR is addressing this challenge by developing innovative indexes and indicators which combine Earth Observation (EO) data, machine learning, and socio-economic insights to monitor and anticipate the effects of extreme events influenced by climate change, such as drought.

One of the latest examples comes from VITO, in collaboration with ECMWF, two of our project partners. Their recently published paper demonstrates how EO data, meteorological forecast, soil moisture data and a machine learning framework can help to predict below-average NDVI values, an indicator of vegetation stress, up to three months before it becomes visible.

Tested in Mali, Mozambique, and Somalia, the study sets a new benchmark for further developments aimed at transforming drought management, across Africa's most vulnerable regions. It also marks an important step in advancing CENTAUR's ambition to deliver anticipatory insights to address food and water security.

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Upcoming Events

The following month, CENTAUR will take part in the **22nd Conference of the Italian Chapter of the Association for Information Systems (AIS)**, held in Milan from **9 to 11 October 2025.** The event brings together leading academics and research-oriented practitioners in the field of information systems. CENTAUR will present its latest advances on its early warning systems. **More details about this event here.**

CENTAUR will also take part in the **EU Science Preparedness Conference 2025**, which will be held in Turin, Italy, from **4 to 6 November 2025**. Organised by the Joint Research Centre's Copernicus Emergency Management Service (CEMS) and the Disaster Risk Management Knowledge Centre (DRMKC), this conference will provide opportunities for exchanging knowledge, testing new tools, and connecting with others committed to advancing science-based crisis preparedness and response. **Read more here.**

Suggested Readings

1 2 3

Global report on food crises 2025

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Situational report on crop failure due to failed 2024/2025 rains in Syria

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Posters from this year's ESA Living Planet Symposium

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Facts & Figures

30%

of the EU's land area is affected by seasonal water scarcity each year - European Environment Agency

38%

more record-dry months in 2024 than for the baseline period - European Commission

2.73

million metric tonnes of wheat production deficit is projected in Syria in 2025 - FAO

partners: e-geos, ECMWF, gmv, vito, CLS, space·tec, HENSOLDT, Université de Strasbourg, Sertit, DLR, adelphi, ithaca, tracasa, CHERRY DATA

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