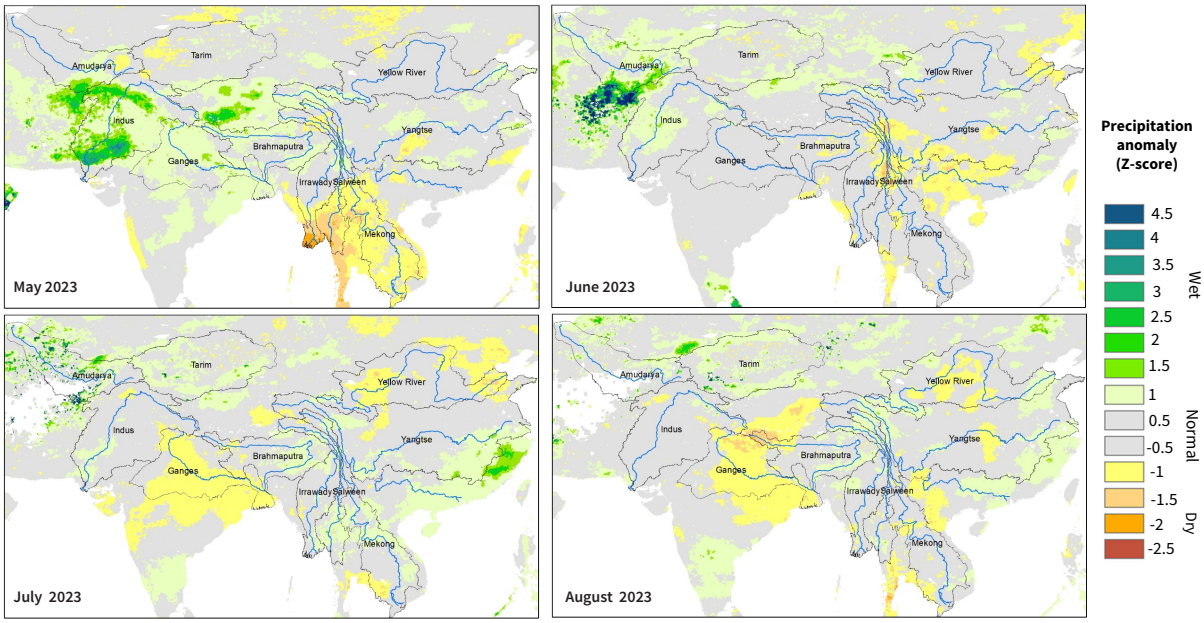
ICIMOD

Regional Drought Monitoring and Outlook System

Seasonal outlook May–August 2023

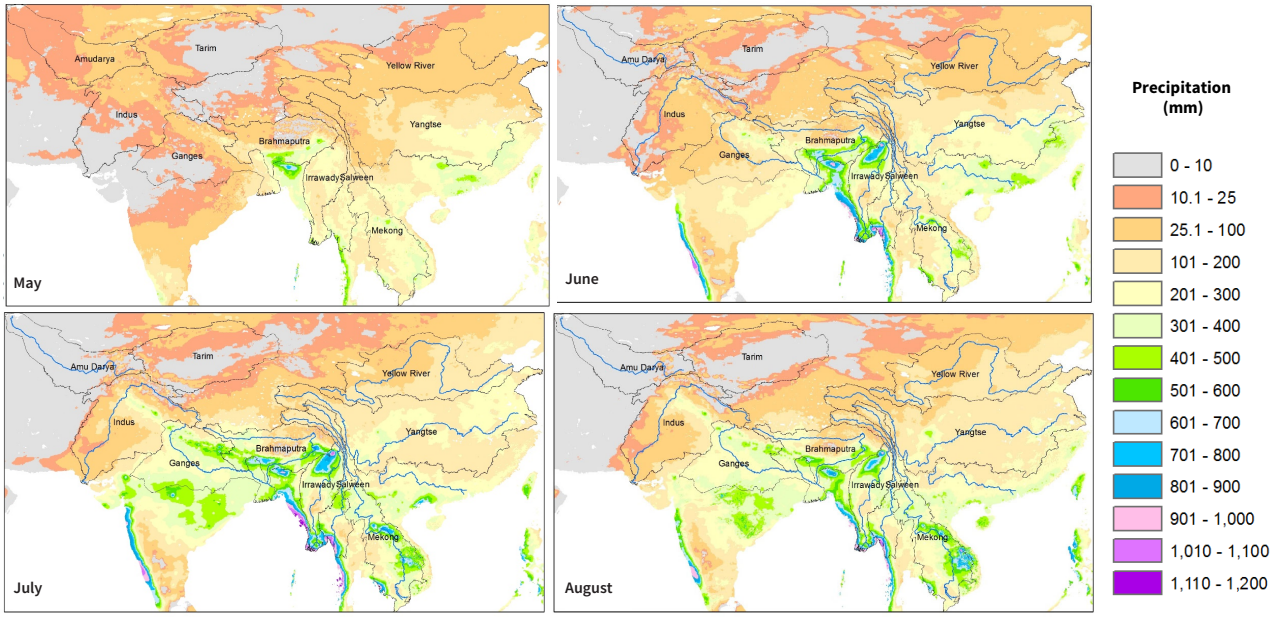
The following brief presents seasonal anomaly maps[1] from May–August 2023 in major river basins of the Hindu Kush Himalayan (HKH) region based on data generated by the Regional Drought Monitoring and Outlook System (RDMOS). Long-term average conditions (climate normal) are also given for an overall understanding of precipitation and temperature patterns in the region. Read more about the RDMOS here.

Precipitation outlook for May–August 2023



Extremely dry(< -3), Very dry (-2 to -3), Dry(-1 to -2), Near normal (1 to -1), Wet(1 to 2), Very wet(2 to 3), Extremely wet(> 3)

Average monthly precipitation from May–August based on observation during 2001–2020



[1] Anomaly maps based on Z-score: The Z-score (anomaly) is a measure that reflects the departure of conditions in a particular month from normal conditions observed during 2001 to 2020.

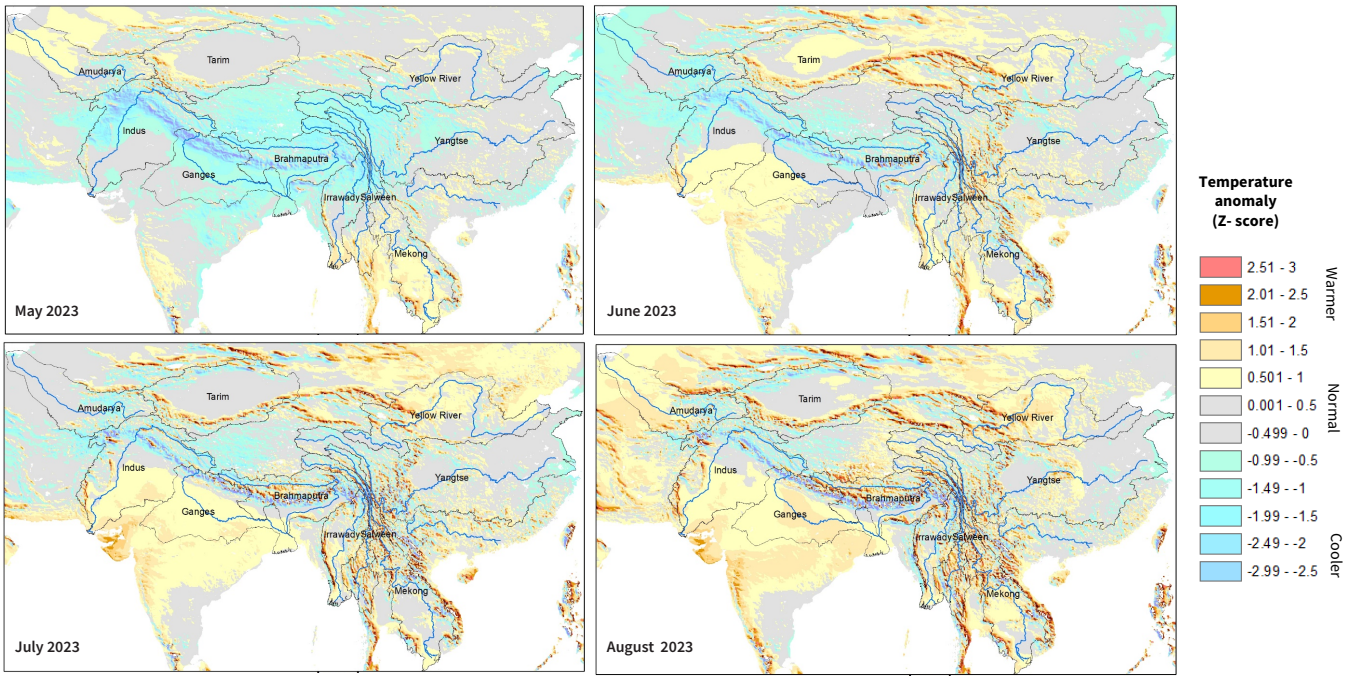
Precipitation outlook for May–August 2023

The four-month precipitation outlook from May to August indicates that near-normal conditions will persist in most of the basins except the Ganges basin where relatively some deficit is expected. A minor surplus is expected of the lower parts of the Indus basin. A small deficit in the Ganges basin is linked to emerging El Niño conditions which negatively affects the summer monsoon in South Asia.

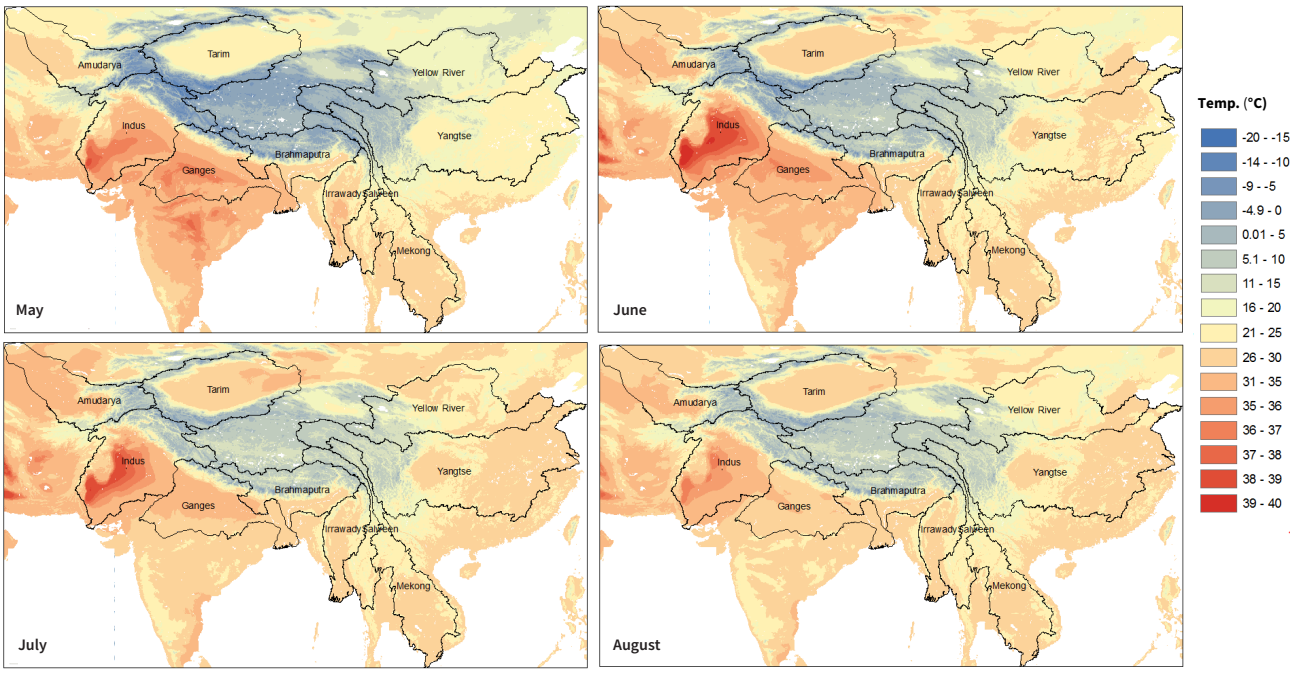
Monthly breakdown

The month of May exhibits variable conditions across the basins with a moderate surplus in the Indus basin, a deficit in the Mekong basin and near-normal conditions in all other regions. June exhibits near-normal conditions across all the basins, and July exhibits relatively drier conditions in the Ganges basin which continues into August, and all other basins show largely near-normal conditions.

Temperature outlook for May–August 2023



Average mean monthly temperature from May–August based on observation during 2001–2020



Temperature outlook for May–August 2023

As shown in the temperature anomaly map above, most of the mountain regions areas are expected to remain under cooler-than-normal temperatures during May and June. The temperature in the lower Ganges, Indus and Yellow River basins is expected to transition to above-normal condition during July and August. Most of the high elevation regions across all the basins are showing near-normal temperatures during this period. In the context of ongoing extreme heatwave event, it is important to note that such meteorological events cannot be precisely predicted beyond two weeks and therefore cannot be captured in the seasonal outlook.

Background

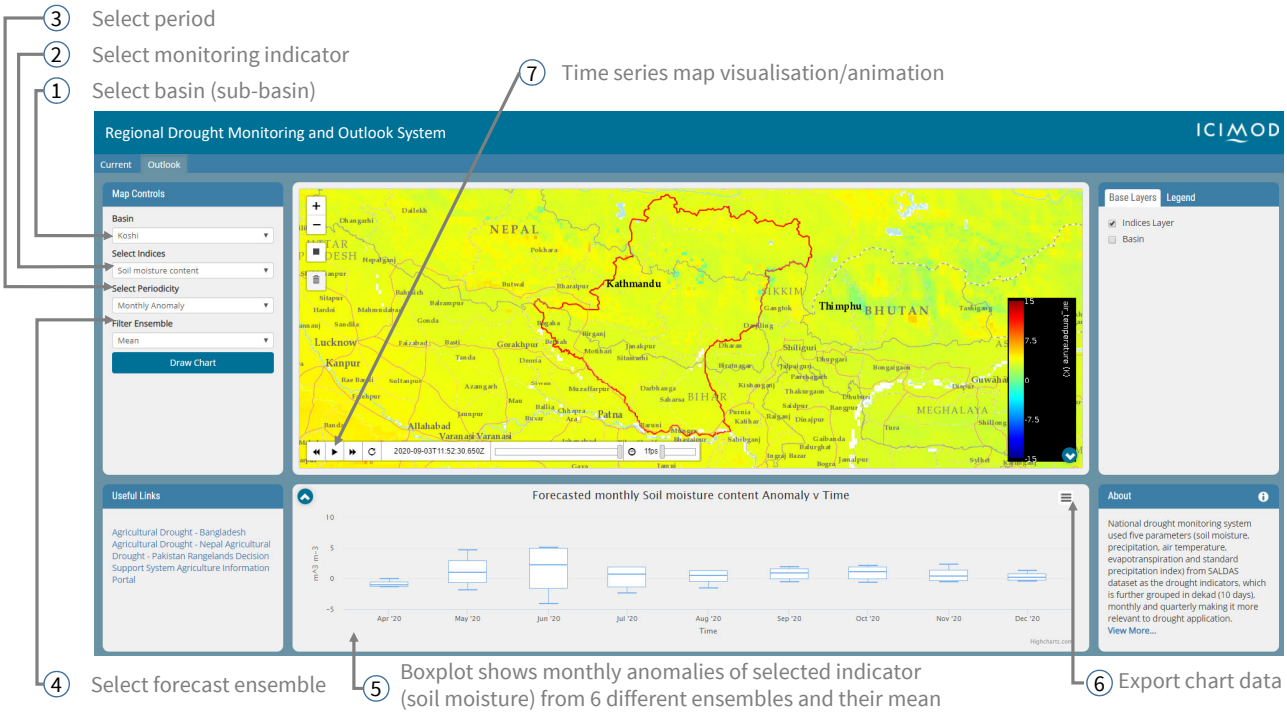
The RDMOS is an operational service which produces reliable drought indicators for the HKH region with a specific focus on Afghanistan, Bangladesh, Nepal, and Pakistan. The system incorporates climatic models with suitable Earth observation data and land surface models to produce drought indices – precipitation, temperature, soil moisture, and evapotranspiration – and vegetation conditions at 10-day intervals for near real-time monitoring of droughts. The RDMOS also provides seasonal outlooks at four-month intervals to support drought management and preparedness processes.

This system applies the Noah-MultiParameterization (NoahMP) Land Surface Model (LSM) in the NASA Land Information System (LIS), driven by downscaled meteorological fields from the Global Data Assimilation System (GDAS) and Climate Hazards InfraRed 20 Precipitation products (CHIRP and CHIRPS) to optimise initial conditions. The NASA Goddard Earth Observing System Model – sub-seasonal to seasonal (GEOS-S2S) forecasts, downscaled using the National Center for Atmospheric Research (NCAR) General Analog Regression Downscaling (GARD) tool and quantile mapping, are then applied to drive 5-km resolution hydrological forecasts to a 9-month forecast time horizon.

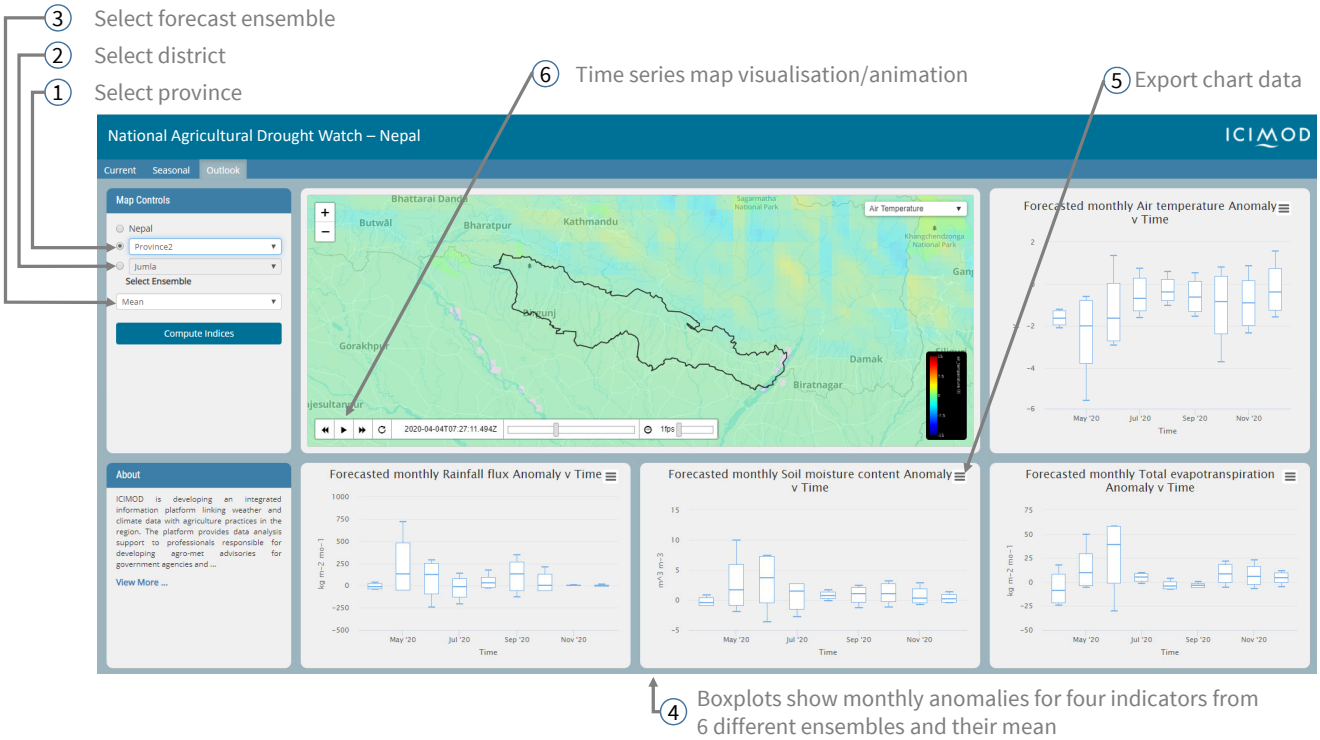
A web-based graphical user interface provides a user-friendly means to analyse drought indices across river basins, national administrative boundaries, or a pre-defined area of interest and to aggregate results along cropping seasons. This capability has been in operation since April 2019 and has provided reliable outlooks of emerging seasonal water availability scenarios for the region.

User guide for visualisation of drought outlook at the sub-basin level

Users can interact with the RDMOS to view and download different snapshots; the map control element in the web-based interface allows users to select different sub-basins, indices, periodicity, and filter forecast ensemble via drop-down menus. The map/visualisation and corresponding graph are updated as per the selected variables. The system can be accessed from http://tethys.icimod.org/apps/regionaldrought/



VISUALISATION OF DROUGHT OUTLOOK AT THE SUB-BASIN LEVEL FOR THE KOSHI SUB BASIN.
http://tethys.icimod.org/apps/regionaldrought/



VISUALISATION OF DROUGHT OUTLOOK AT THE DISTRICT LEVEL FOR PROVINCE 2 IN NEPAL.
http://tethys.icimod.org/apps/droughtnp/

The system has been further customised to generate drought outlook at the provincial level for Afghanistan, Bangladesh, Nepal, and Pakistan and can be directly accessed from the following URLs:

National Agricultural Drought Watch – Afghanistan
http://tethys.icimod.org/apps/droughtaf/

National Agricultural Drought Watch – Bangladesh
http://tethys.icimod.org/apps/droughtbd/

National Agricultural Drought Watch – Nepal
http://tethys.icimod.org/apps/droughtnp/

National Agricultural Drought Watch – Pakistan
http://tethys.icimod.org/apps/droughtpk/

ICIMOD researchers generated the RDMOS Seasonal Outlook May–August 2023 on 24 April 2023.

Disclaimer

Acknowledgements

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About SERVIR

A joint initiative of NASA, USAID, and leading geospatial organisations in Asia, Africa, and Latin America, SERVIR partners with countries in these regions to address critical challenges in climate change, food security, water and related disasters, land use, and air quality. Using satellite data and geospatial technology, SERVIR co-develops innovative solutions through a network of regional hubs to improve resilience and sustainable resource management at local, national, and regional scales.

ICIMOD implements the SERVIR Hindu Kush Himalaya (SERVIR-HKH) Initiative – one of five regional hubs of the SERVIR network – in its Regional Member Countries, prioritising activities in Afghanistan, Bangladesh, Myanmar, Nepal, and Pakistan. For more, visit servir.icimod.org

For further information

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