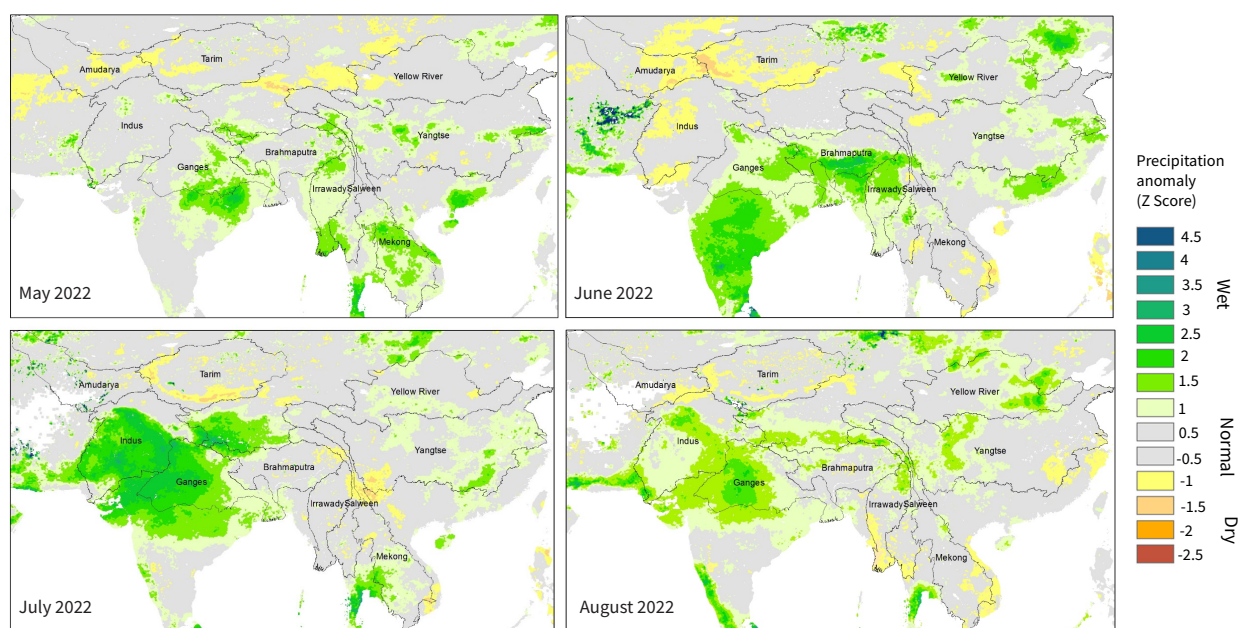


Regional Drought Monitoring and Outlook System

Seasonal outlook May–August 2022

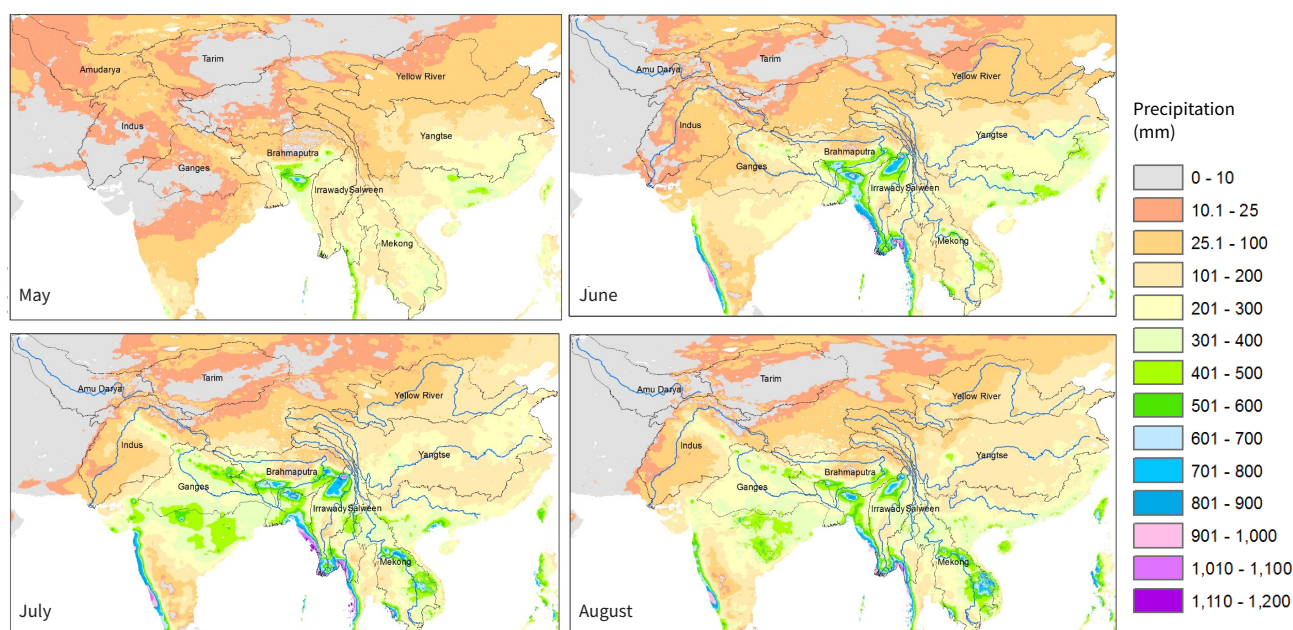
The following brief presents seasonal anomaly maps¹ from May–August 2022 in major river basins of the HKH region based on data generated by the RDMOS. Long-term average conditions (climate normal) are also

given for an overall understanding of precipitation and temperature patterns in the region. Read more about the Regional Drought Monitoring and Outlook System (RDMOS) [here](#).



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)

PRECIPITATION OUTLOOK FOR MAY–AUGUST 2022



AVERAGE MONTHLY PRECIPITATION FROM MAY TO AUGUST BASED ON OBSERVATION DURING 2001–2018

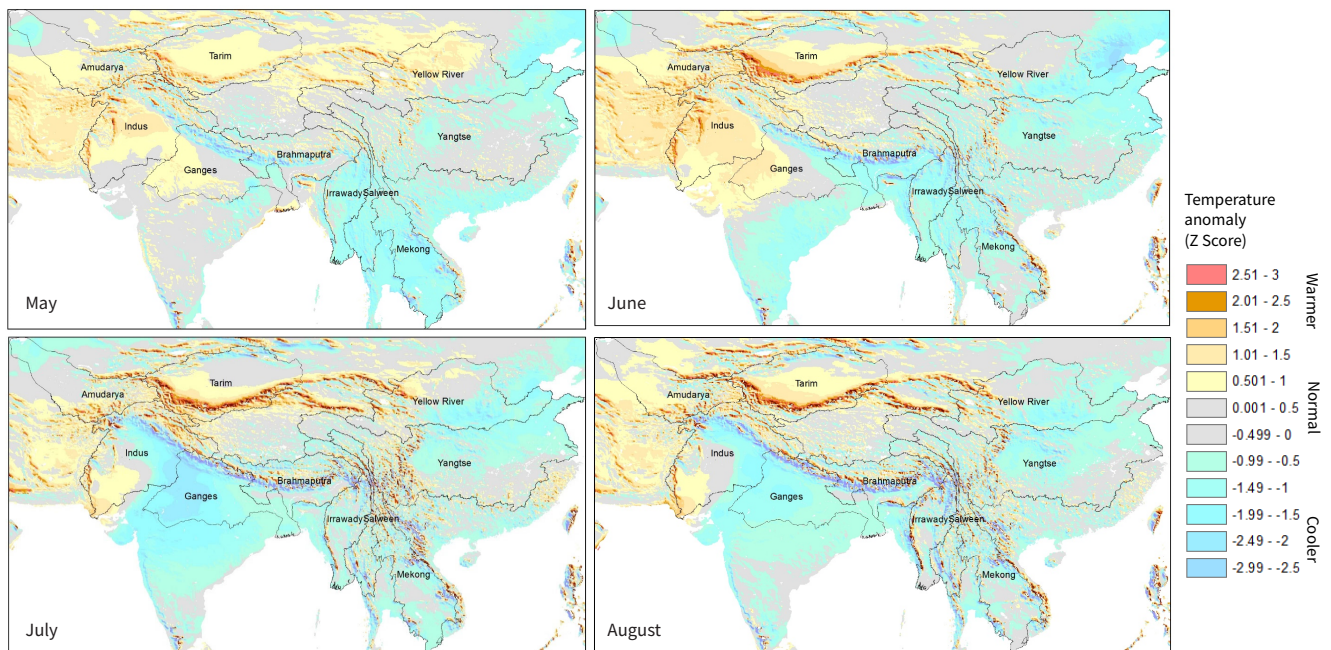
¹ Anomaly maps based on Z-score: The Z-score (anomaly) is a measure that reflects the departure of conditions in a particular month from normal conditions observed during 2001 to 2018.

Precipitation outlook for May–August 2022

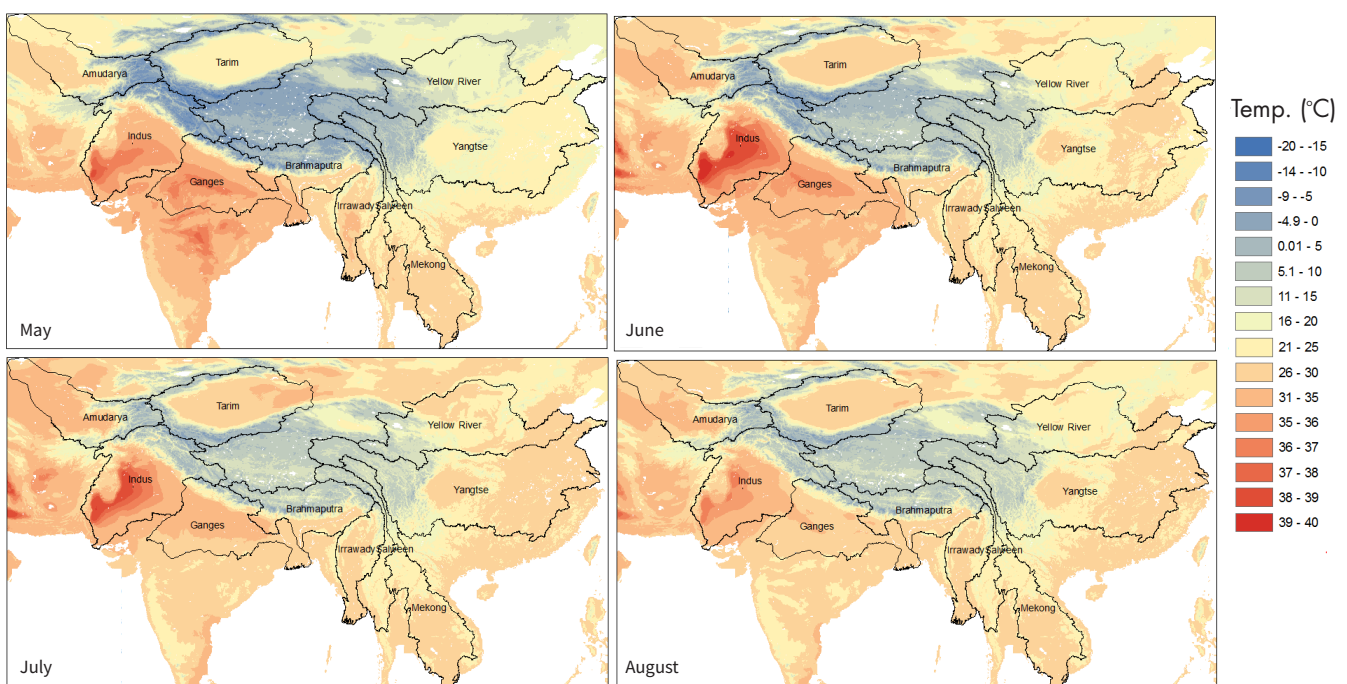
The four-month precipitation outlook from May to August indicates that near-normal conditions will persist in most of the basins except north-western basins of the Amu Darya and the Tarim, where some relative deficit is expected. A minor surplus is expected in the Himalayan foothills in the Ganges and the Brahmaputra basins. The stated near-normal rainfall is linked to lingering La Niña conditions, which favour summer monsoon in South Asia.

MONTHLY BREAKDOWN

May exhibits overall near-normal conditions except minor excess in parts of the Ganges and the Mekong basins. June exhibits relatively drier conditions in the western basins of the Amu Darya, the Tarim, and the Indus and wetter conditions in the Brahmaputra basins while the rest of the area are in near-normal conditions. In July, the Indus basin transitions towards wetter conditions and the Ganges basin also exhibits moderate excess while all other basins are expected to remain near normal. In August, the Ganges basin will continue to remain wetter, and all other basins show largely near-normal conditions.



TEMPERATURE OUTLOOK FOR MAY–AUGUST 2022



AVERAGE MEAN MONTHLY TEMPERATURE FROM MAY TO AUGUST BASED ON OBSERVATION DURING 2001–2018

Temperature outlook for May–August 2022

As shown in the temperature anomaly map on the left, the Indus, the lower Ganges, and the Tarim can expect much warmer than normal temperatures; most of the eastern regions are expected to be normal or cooler than normal. May and June are particularly hotter than normal for most of the Indus, the Ganges, the Amu Darya, and the Tarim basins. Intense warm anomalies are expected in the entire Indus and the lower Ganges in June. The temperature in the Ganges and the central part of the Indus basin is expected to transition to normal or below normal condition during July and August. Most of the high-elevation regions across all the basins are showing warmer-than-normal temperature for the entire four months. In the context of ongoing extreme heatwave events, 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.

Impact on agriculture

Monsoon rains are the lifeline for pre-dominantly non-irrigated agriculture in the HKH region. The anticipated sufficient rains will have a positive impact on agriculture production, but the expected warmer-than-normal temperature in the Indus and the Ganges basin will increase the crop water demand. The months of March and April remained exceptionally dry and hot, resulting in the depletion of soil moisture, which will also increase the need for irrigation water at the planting stage of the summer crop. At the same time, the predicted higher temperatures across the mountain region suggests that we remain vigilant on the increased chances of glacial lake outburst floods and associated hazards.

Background

The RDMOS is an operational service which produces reliable drought indicators for the Hindu Kush Himalaya (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.

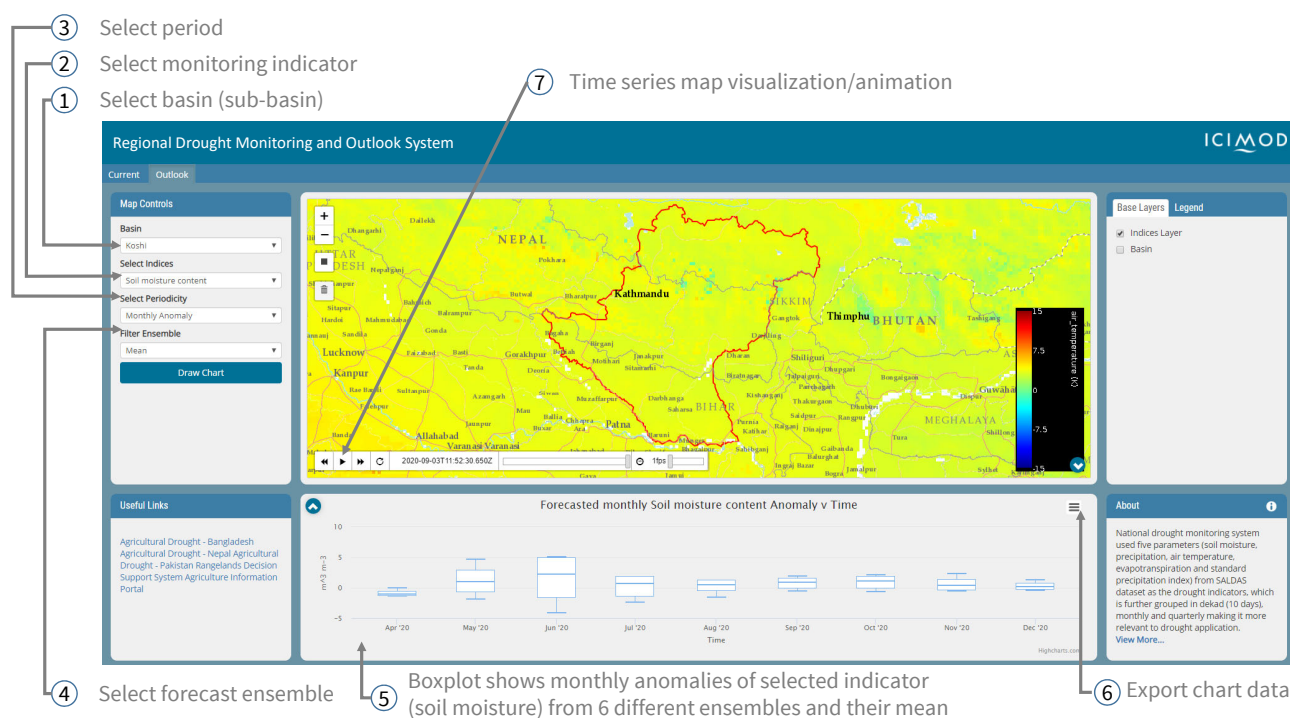
A web-based graphical user interface provides a user-friendly means to analyse drought indices across river basins, national administrative boundaries, or a pre-defined area of interest and to aggregate results along cropping seasons. This capability has been in operation since April 2019 and has provide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



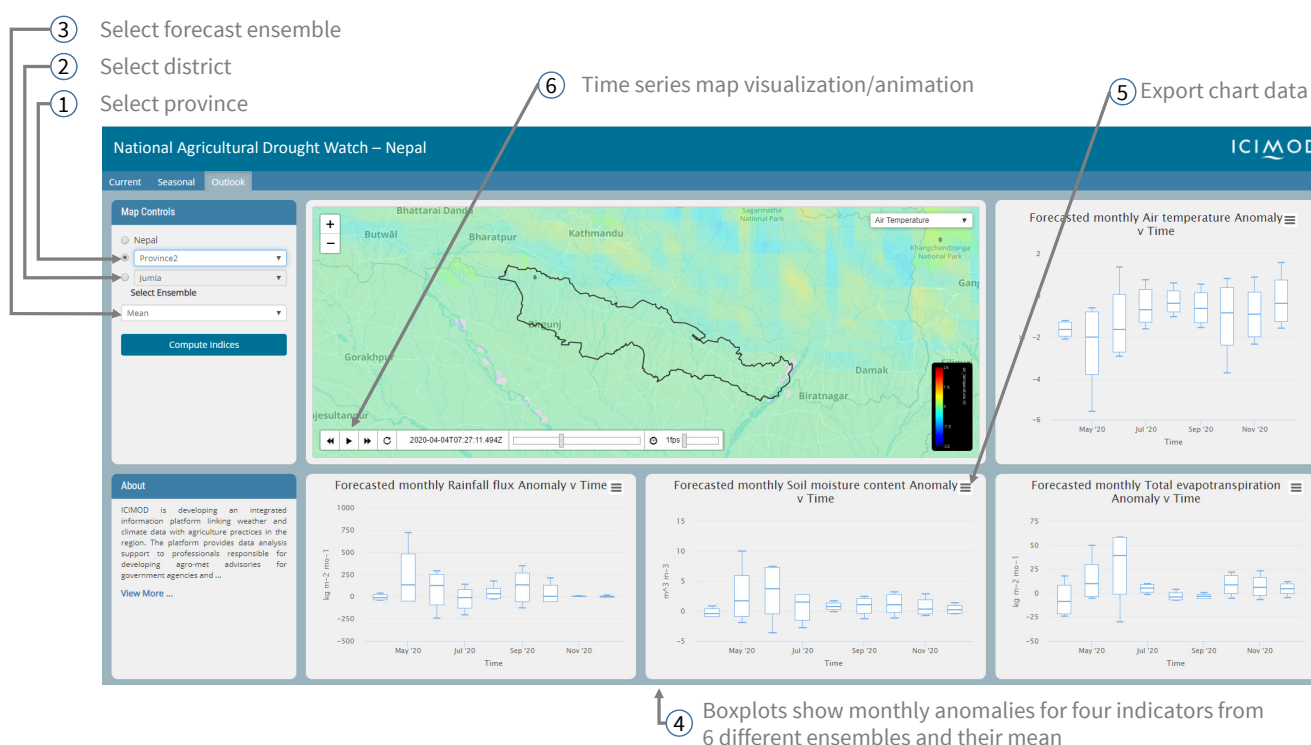
User guide for visualisation of drought outlook at the sub-basin level

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/>



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



VISUALIZATION OF DROUGHT OUTLOOK AT THE DISTRICT LEVEL FOR PROVINCE 2 IN NEPAL.
<http://tethys.icimod.org/apps/droughtnpl/>

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 2022 on 30 April 2022.

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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, prioritizing activities in Afghanistan, Bangladesh, Myanmar, Nepal, and Pakistan. For more, visit servir.icimod.org

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