

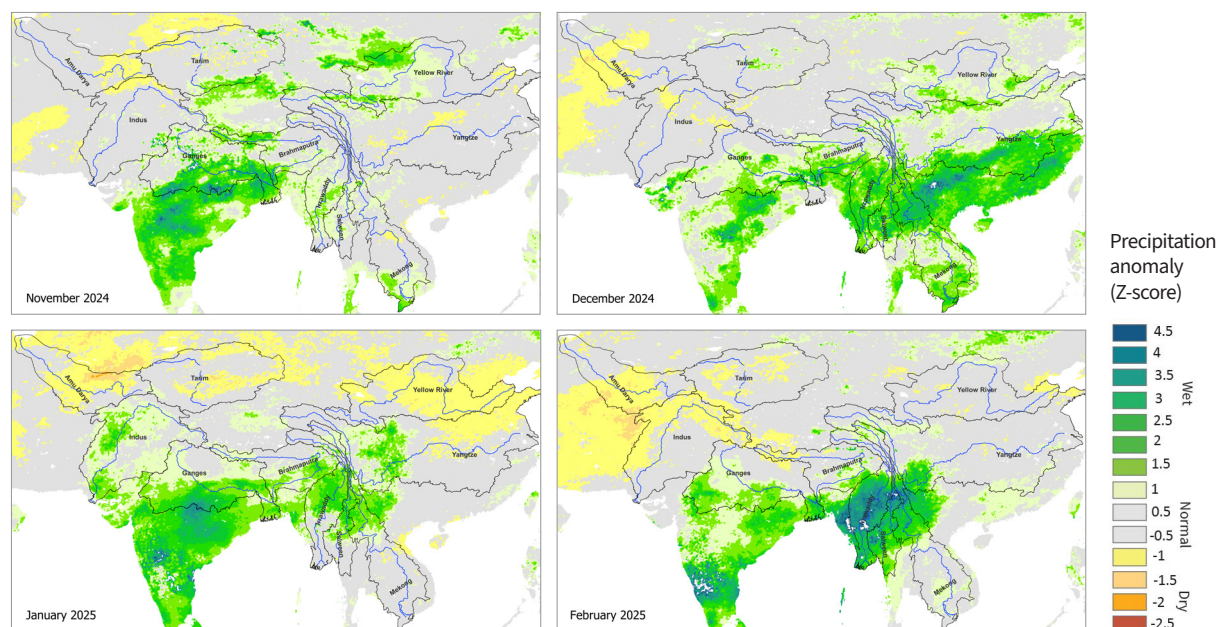
Regional Drought Monitoring and Outlook System

Seasonal outlook November 2024–February 2025

The following brief presents seasonal anomaly maps¹ from November 2024 to February 2025 in major river basins of the Hindu Kush Himalaya (HKH) region based on data generated by the Regional Drought

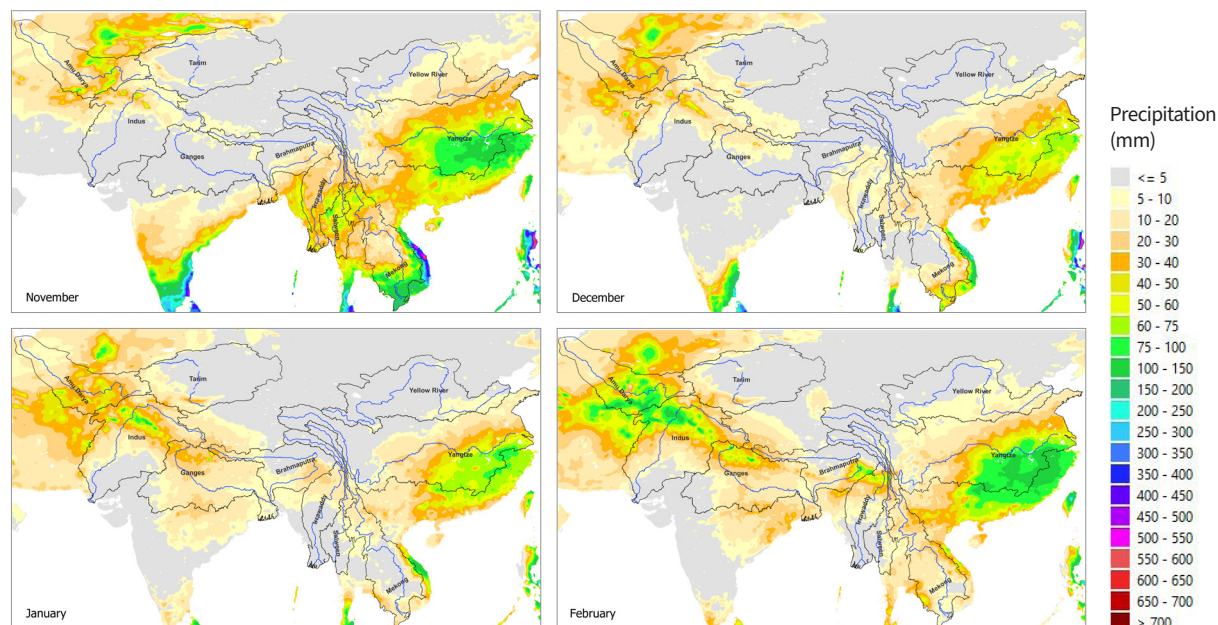
Monitoring and Outlook System (RDMOS). Long-term average conditions (climate normal) are also given for an overall understanding of precipitation, temperature, evapotranspiration and soil moisture patterns in the region. Read more about the RDMOS [here](#).

Precipitation Outlook for November 2024 – February 2025



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 November – February based on observation during 2000–2020



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 2000 to 2020.

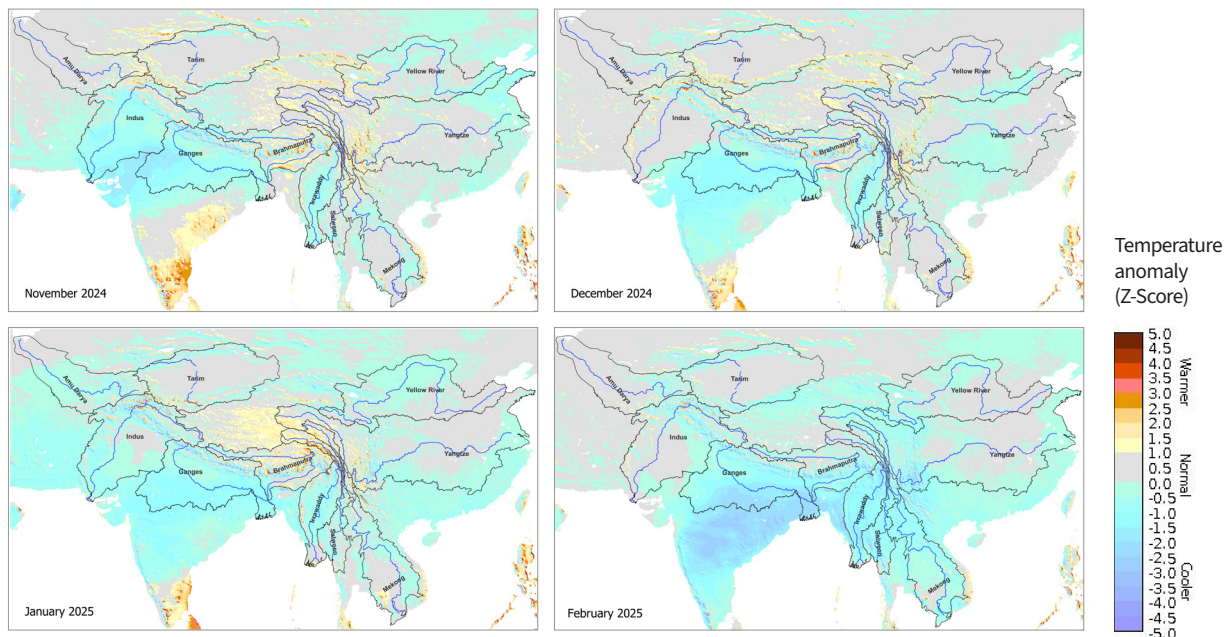
Precipitation outlook for November 2024 – February 2025

The four-month precipitation outlook from November 2024 to February 2025 indicates a slight deficit in rainfall in the Amu Darya River basin, while near-normal conditions are expected in the Tarim, Indus and Yellow River basins from November through December. Most parts of the lower Ganges and Brahmaputra River basins are expected to have wetter-than-normal conditions. A surplus is expected in the Irrawaddy and Salween River basins. The Mekong and Yangtze River basins are expected to have normal conditions.

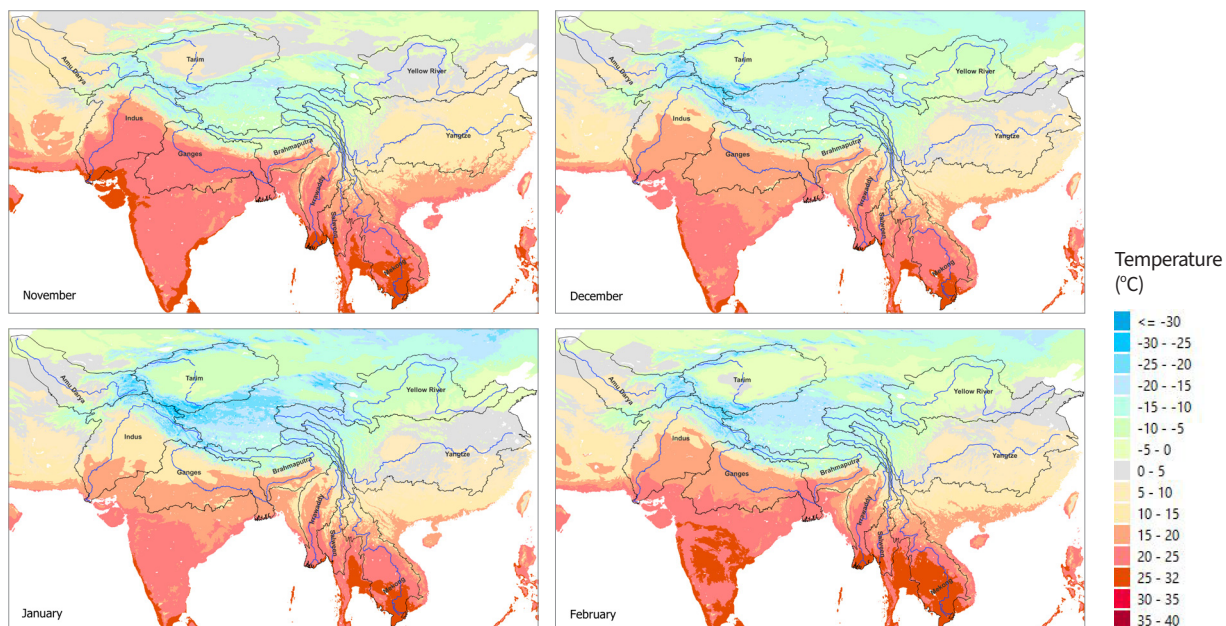
Monthly breakdown

The month of **November** exhibits near-normal conditions for the Amu Darya, Tarim, Indus, Mekong and Yangtze basins while surplus is expected in the lower Ganges and upper part of Brahmaputra. A slight surplus is expected in the parts of the Irrawaddy and Salween basins. In **December** a low-to-moderate surplus is indicated in the lower half of the HKH, along with a slight deficit in the Amu Darya basin. In **January**, the Amu Darya, Yellow River, and Tarim basins show a slight deficit, with the Indus basin showing a low-to-moderate surplus. The Yangtze basin exhibits a distribution of normal, slightly wet and dry conditions. **February** shows near-normal conditions for the Tarim, Yellow River, Yangtze, and Indus basins. A moderate surplus across the Irrawaddy and Salween basins is expected.

Air Temperature outlook for November 2024 – February 2025



Average monthly temperature from November – February based on observation during 2000–2020



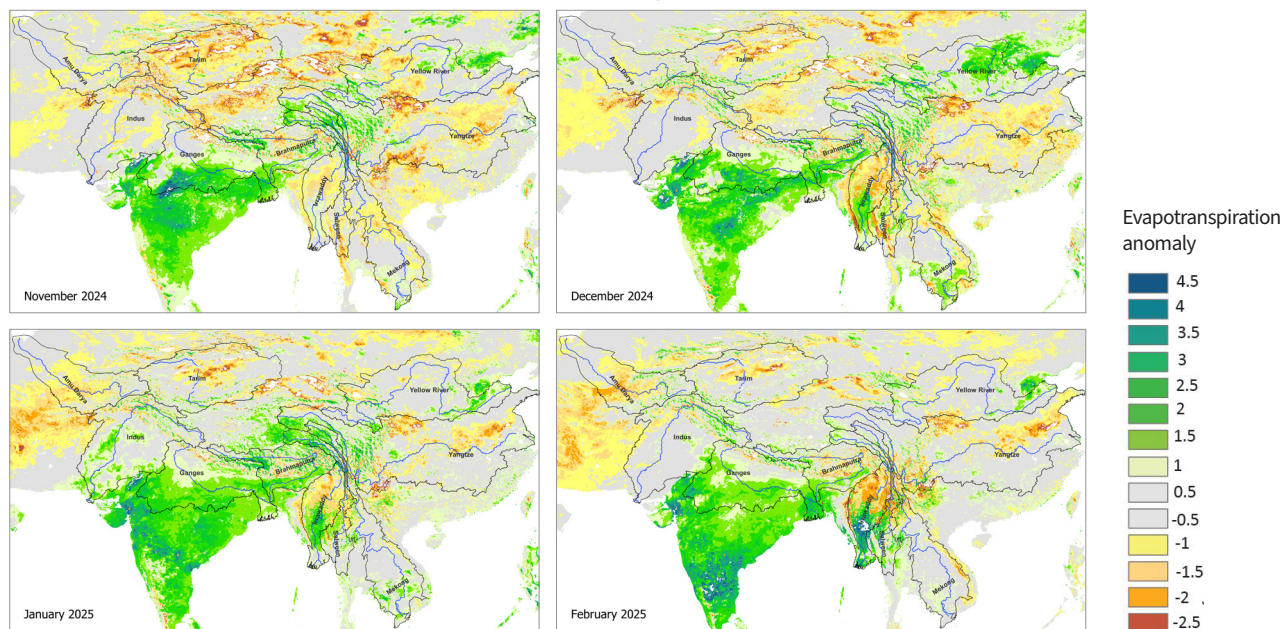
Temperature outlook for November 2024 – February 2025

As shown in the air temperature anomaly maps, the Amu Darya and Tarim basins are expected to remain under near-normal temperatures, with the Amu Darya experiencing cooler-than-normal temperatures in January. The Indus basin exhibits a transition between normal and cooler-than-normal temperatures. The Ganges and Irrawaddy basins show cooler temperatures with a decline in temperature in February. The Brahmaputra, Salween and Mekong basins slowly transition to cooler temperatures in February while the Brahmaputra basin shows a mixture of slightly warm and cool temperatures from November until February. The Yangtze and Yellow River basins show a mixture of normal to cooler-than-normal temperatures with large parts of both the basins transitioning to cooler temperatures in December, January, and February. These regions will have gradual cooler temperatures starting from December onwards.

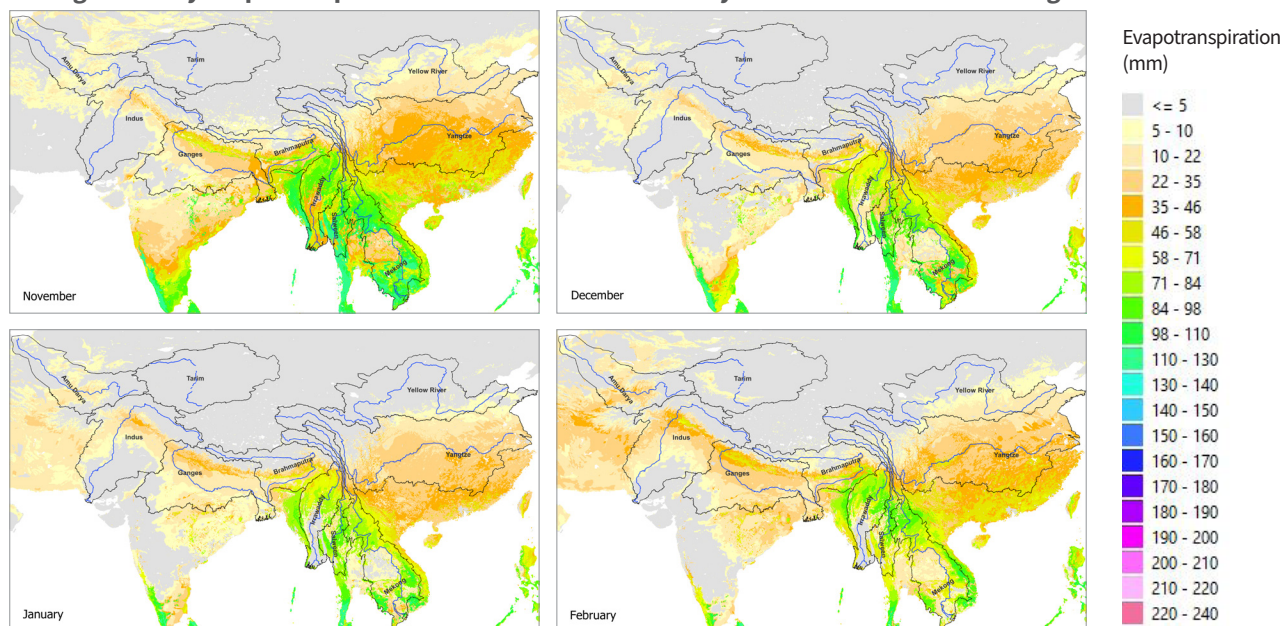
Evapotranspiration outlook for November 2024 – February 2025

November indicates the lowest degree of evapotranspiration (ET) throughout the HKH in subsequent months. The Amu Darya basin shows a gradual transition from near normal to lesser ET through January, with the Tarim and Yangtze basins experiencing the opposite. The Indus and Mekong basins indicate near-normal conditions with lower ET in November through December. The Ganges basin indicates moderate ET throughout this period. Parts of the Brahmaputra, Irrawaddy and Salween basins show a gradual increase in ET from December. The Yellow River basin shows mostly near-normal conditions with December experiencing moderate ET in the eastern region.

Evapotranspiration outlook for November 2024 – February 2025



Average monthly evapotranspiration from November – February based on observation during 2000–2020

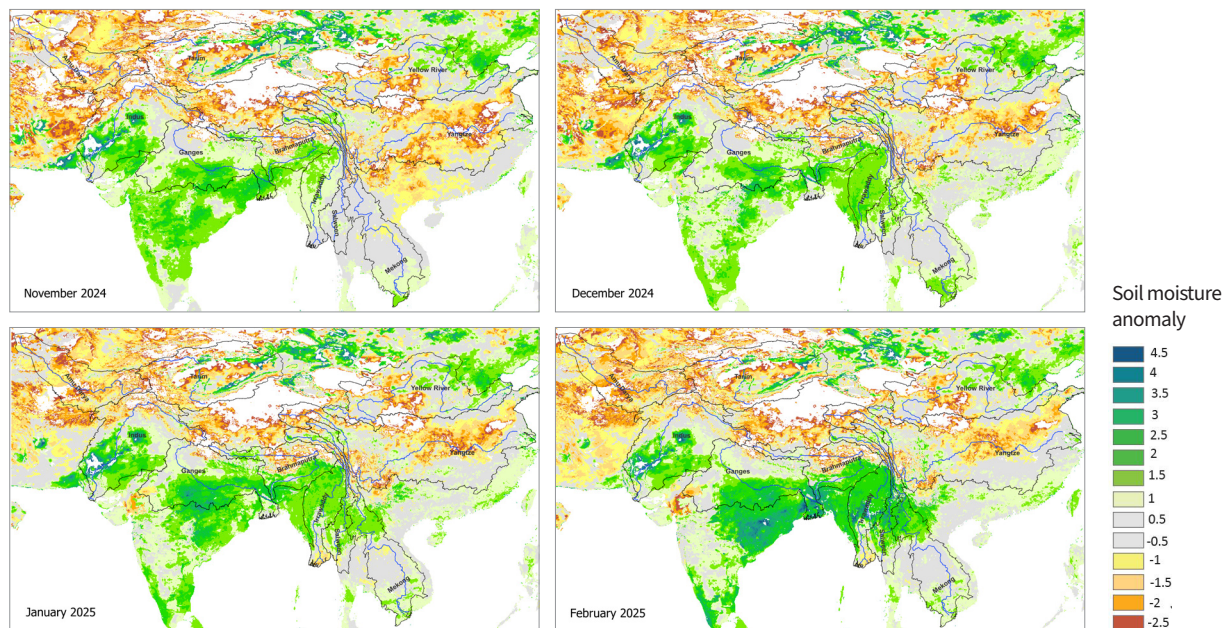


Soil moisture outlook for November 2024 – February 2025

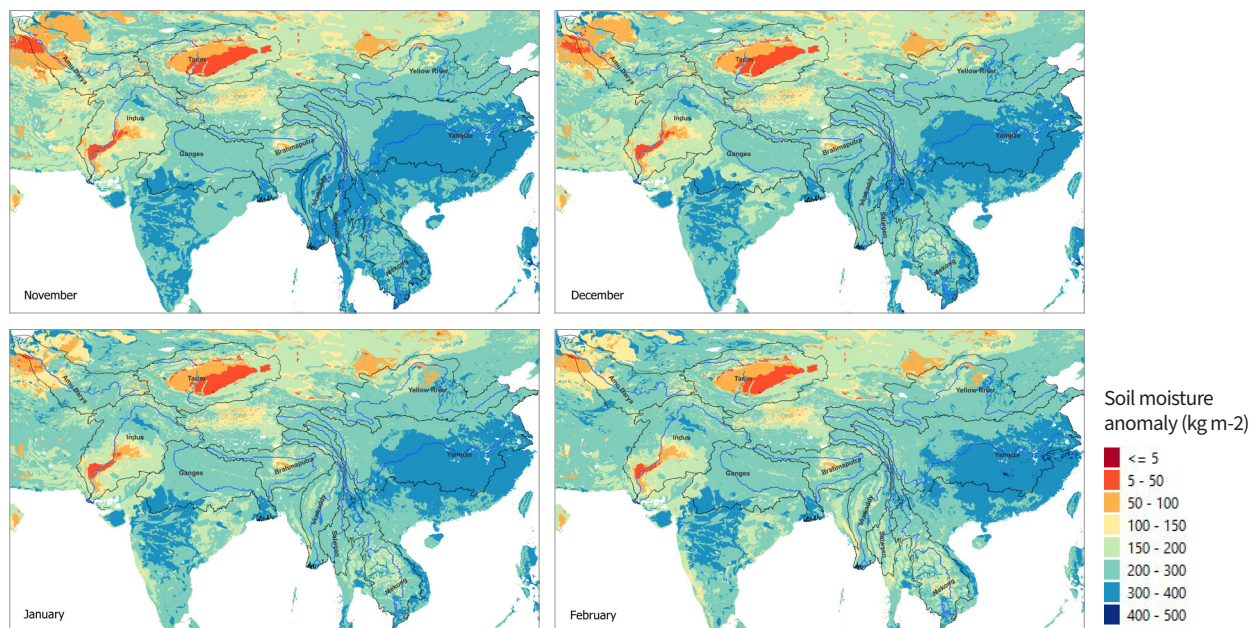
The month of December is expected to have the lowest concentration of soil moisture in the HKH, with the Amu Darya basin remaining dry throughout this period. The Tarim, Brahmaputra, and Yellow River basins indicate a mixed distribution of normal, slightly wet, and dry conditions. The lower Indus, the Ganges, and Irrawaddy basins show wet conditions with the Salween basin

transitioning from near-normal conditions in November to a low-to-moderate increase in soil moisture from December through February. The Yellow River basin exhibits dry conditions in November, transitioning to near-normal and moderately wet conditions in December, January, and February. The Yangtze basin is expected to have a mixture of near-normal condition and dry spells, whereas the Mekong basin is expected to have a mixture of near-normal conditions and an increase in soil moisture in the upper region from December through February.

Soil moisture outlook for November 2024 – February 2025



Average monthly soil moisture from November – February based on observation during 2000–2020



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, 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 (GEOS) Model – sub-seasonal to seasonal (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/>

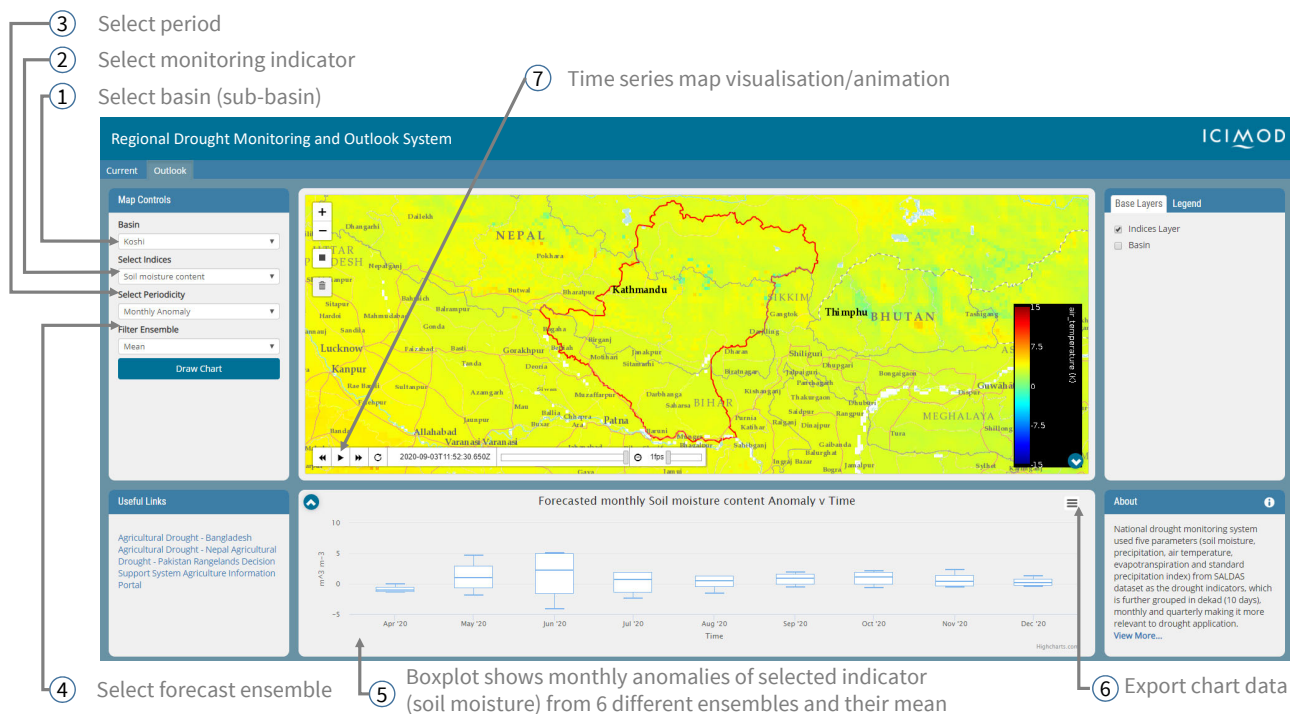
The system has been further customised to generate drought outlooks at the provincial level for Afghanistan, Bangladesh, Nepal, and Pakistan and can be directly accessed from the following URLs:

[National Agricultural Drought Watch – Afghanistan](#)

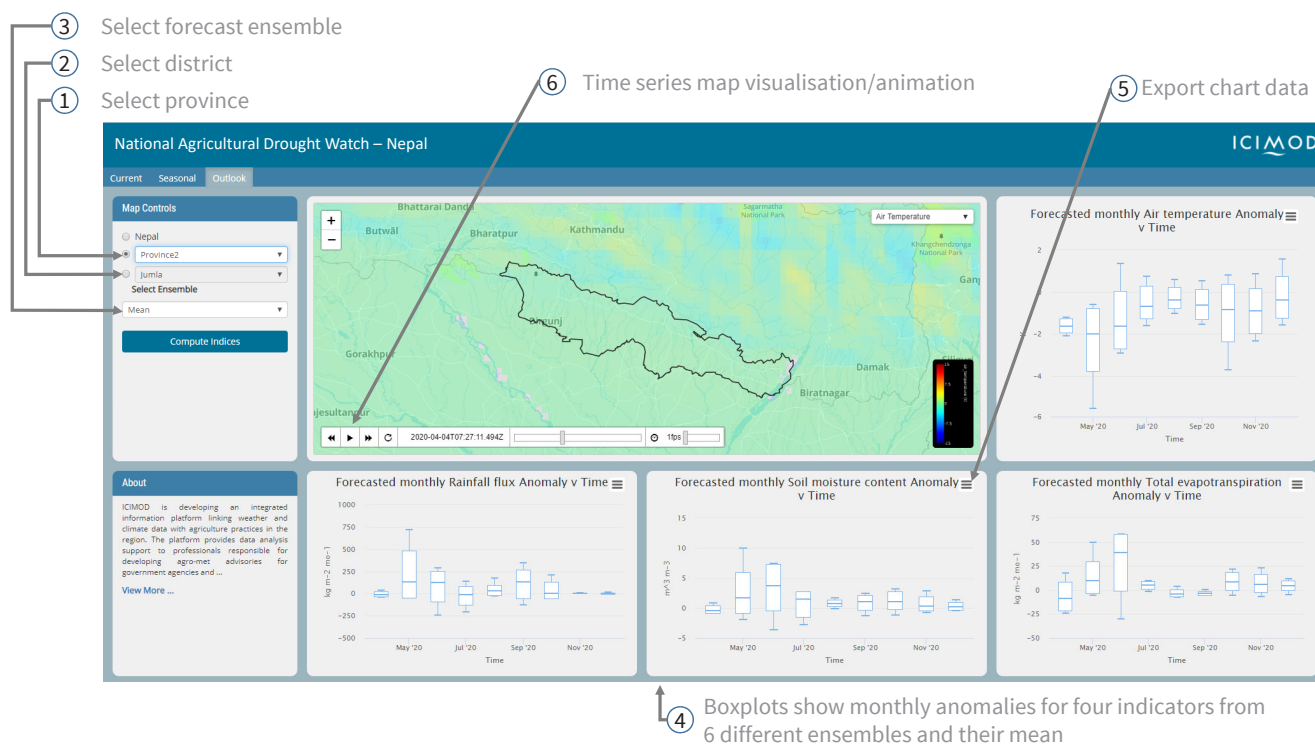
[National Agricultural Drought Watch – Bangladesh](#)

[National Agricultural Drought Watch – Nepal](#)

[National Agricultural Drought Watch – Pakistan](#)



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/>

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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. For more, visit servir.icimod.org

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