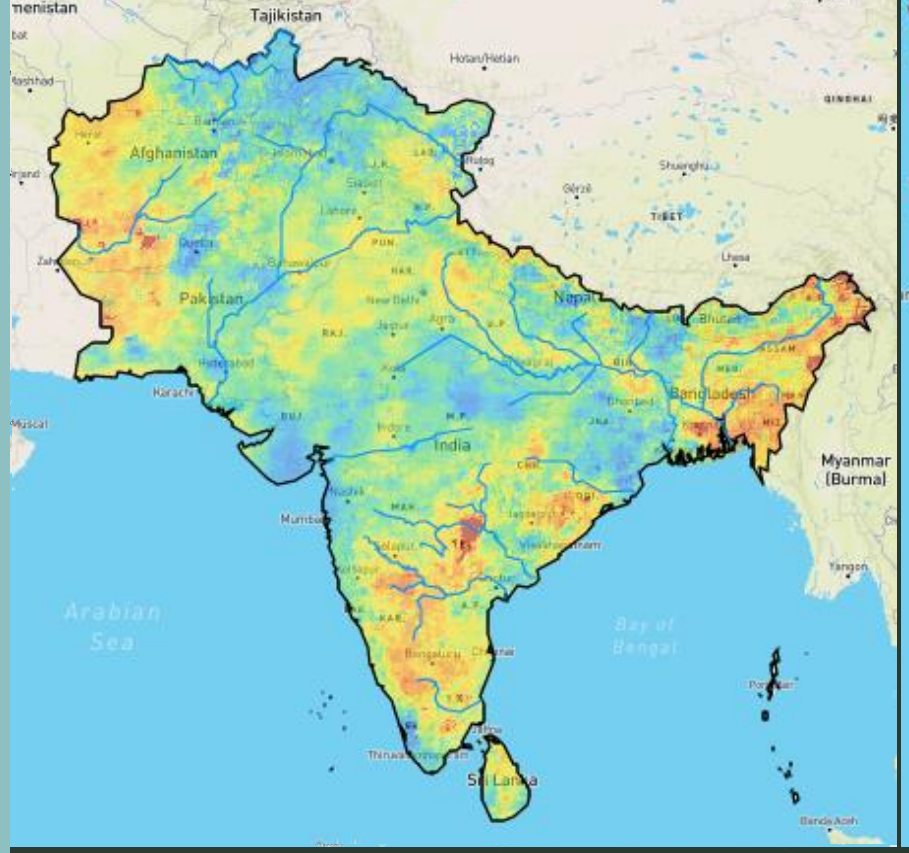


IWMI
International Water Management Institute

SADMS
South Asia Drought Monitoring System

May 2021 | Issue 1

South Asia Drought Outlook

CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems

ICAR

MAFF
Ministry of Agriculture, Forestry and Fisheries
農林水産省

Issue Date: 31 May 2021

How to use the bulletin?

- Tracks how likely the weather forecast for the next four weeks will have the dry spell or droughts, and to a lesser extent of lesser rainfall
- Maps drought situations at regional and national levels and for range of products from rainfall anomaly, SPI, vegetation index and composite drought index i.e. IDSI to assess the overall drought impacts
- Determine areas of short and long-term drought outlooks and drought alert maps
- Briefing of media reporting on drought impacts affecting the region's

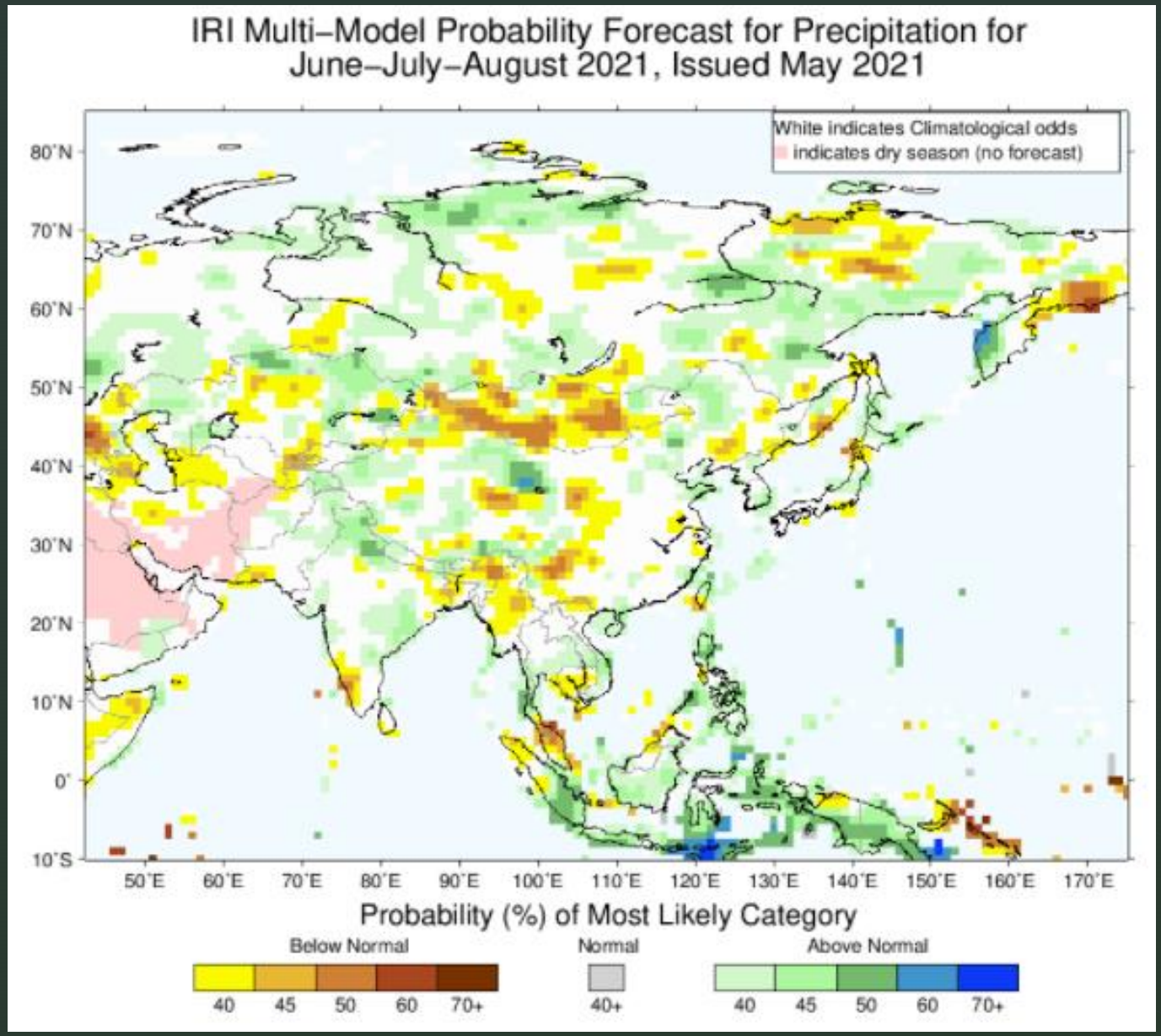
The SADMS bulletin is published by the 15th of each month.
View and download the latest issues at :

https://www.iwmi.cgiar.org/resources/drought-monitoring-system/drought-bulletin/

Drought Outlook Summary

- Despite a revival of the Southwest Monsoon forecast for several eastern states of India and Bangladesh are recording deficit rainfall received so far in June.
- Subseasonal forecast till end Jun shows dry conditions in western and parts of southern states and good rainfall in the Indo-Gangetic region of Nepal and India. Most part of the Pakistan and Afghanistan scattered or low rainfall across four week of rainfall forecast;
- SPI 3-month for Apr and May 2021 explains drier condition in Southern, western and northwestern provinces in Afghanistan. In India states of Karnataka, Maharashtra, Kerala, Odisha, parts of Andhra Pradesh, Telangana including norther eastern states experience in dry conditions.
- Vegetation condition in reference to May 2021 are healthy condition in most of the states this could be due to the peak growth of both in rainfed and irrigated areas in areas.
- As per government of Afghanistan, with prevailing drought situation between Dec to April.
- It is important the stakeholders adopt timely drought relief and response strategies to mitigate drought risks;

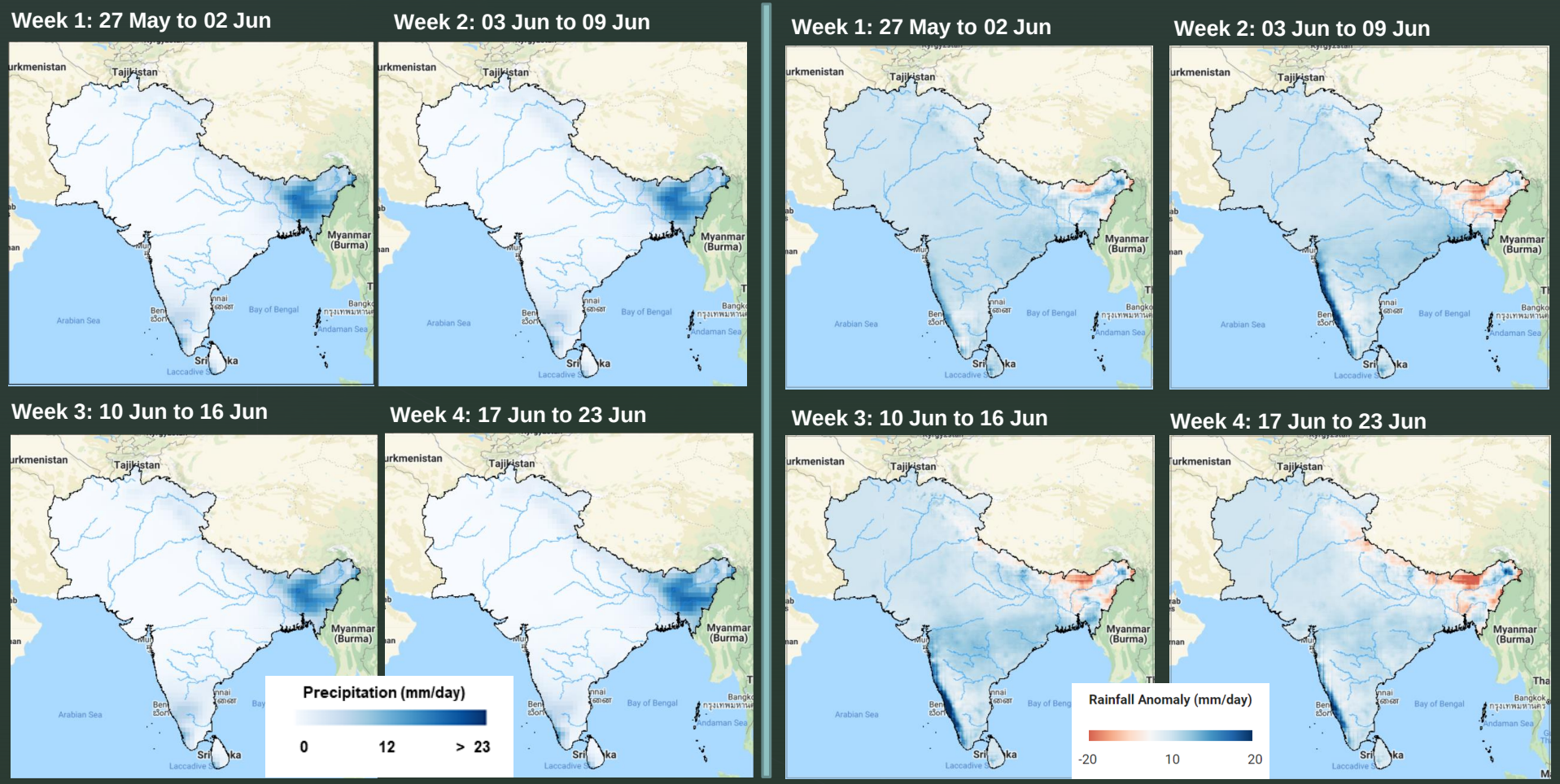
Seasonal climate forecast



Source: IRI

Precipitation forecast for most parts of Northern and central India is above normal for Jun-Jul-Aug 2021. However, central India and northern Sri Lanka receive normal rainfall, while Bangladesh, South western, and northeastern India, as well as southwestern Pakistan, Afghanistan receive below normal rainfall.

Weather forecast (Current and anomaly rainfall)

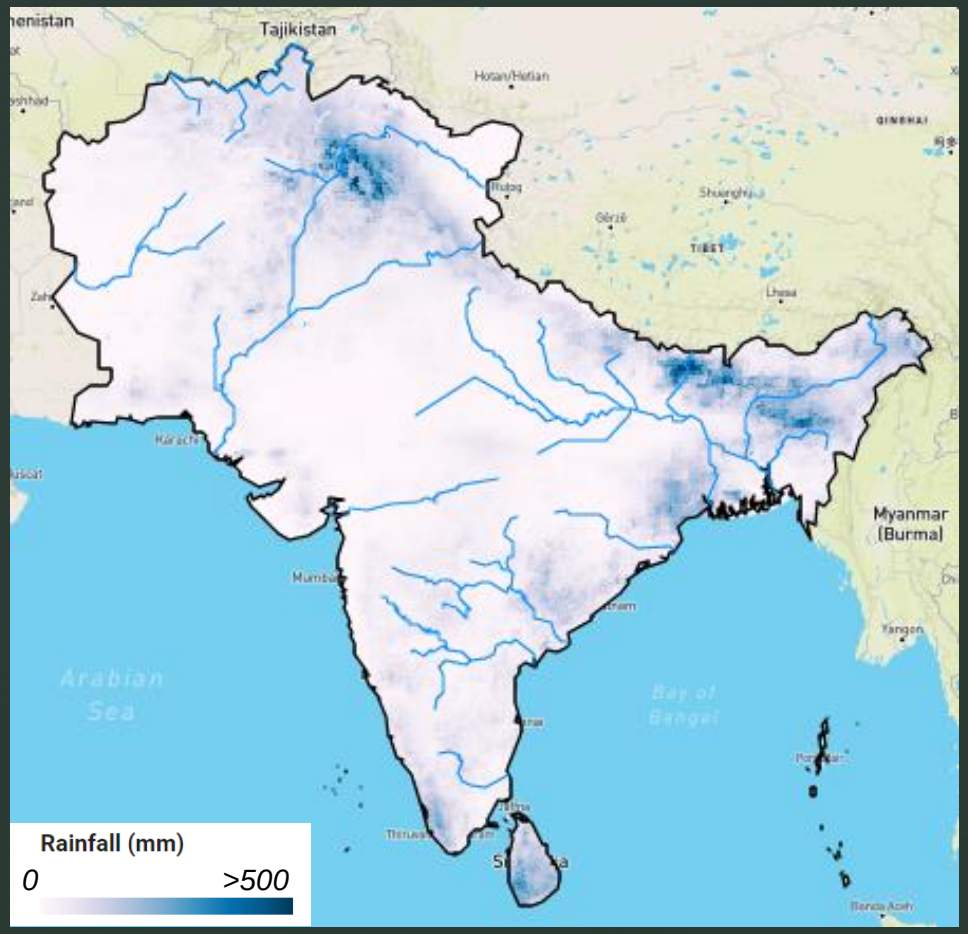


Sub-seasonal forecast and Extended Range Prediction group of IITM has been providing experimental real-time forecast of the active-break spells of Indian Summer Monsoon Rainfall since 2011 up to 4 pentad lead using an indigenously developed Ensemble Prediction system (EPS) based on the state-of-the-art Climate Forecast System Model Version 2 (CFSv2). This product provides 32 days of forecasted precipitation data with spatial resolution of ~50-km (0.5-deg x 0.5-deg).

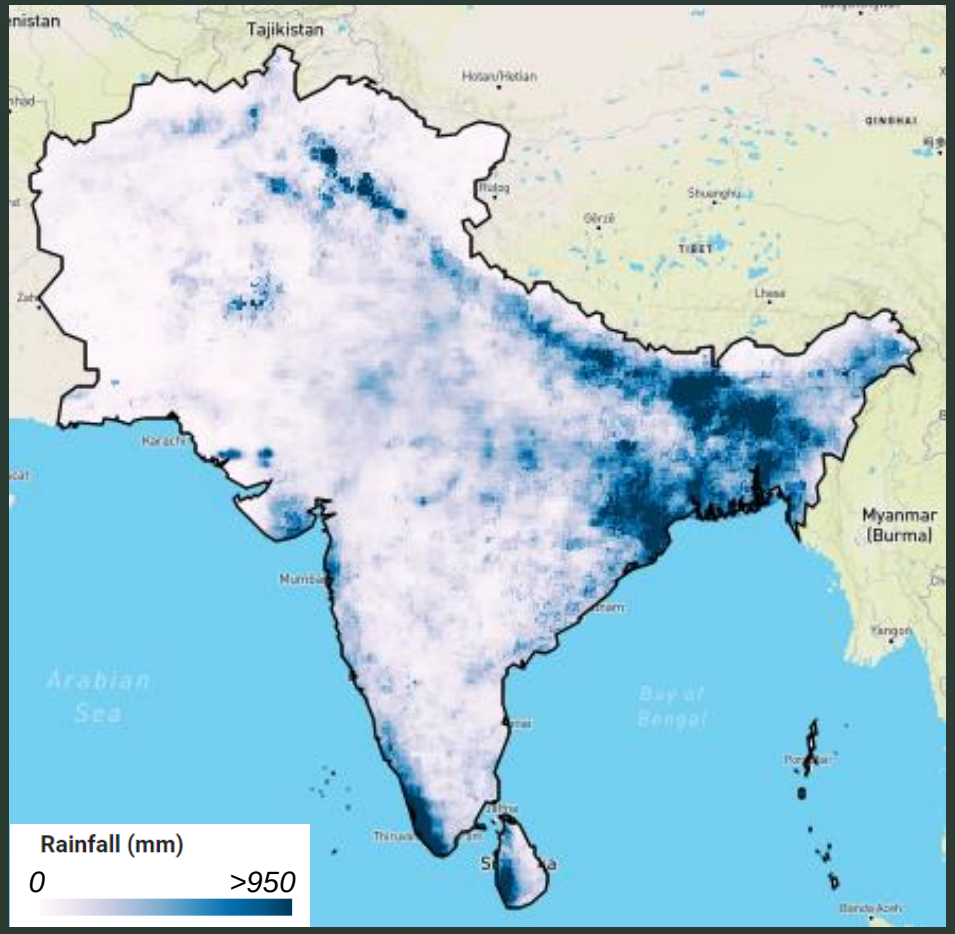
To identify rainfall variability, the subseasonal forecast data in reference to historical rainfall data from CHIRPS was used to identify areas of deficit rainfall. Values greater than 10 (mm/day) explains positive rainfall and values less than 10 (mm/day) show possible areas of deficit rainfall that are likely under drought.

Actual Rainfall Distribution

Apr 2021



May 2021

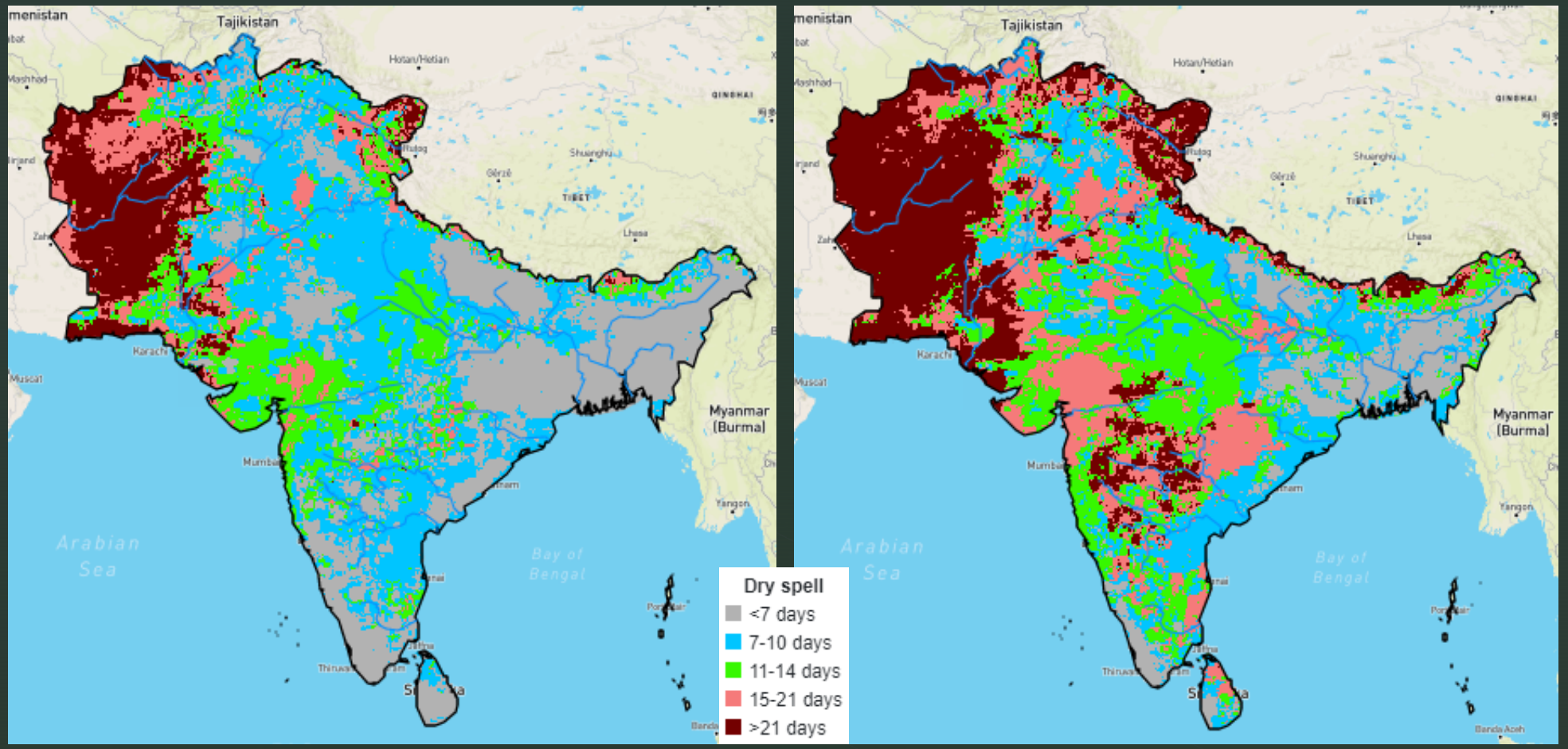


The Global Precipitation Measurement (GPM) data from the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center sources was used to produce the spatial distribution of the monthly precipitation for South Asia. The month of May clearly shows low to moderate rainfall across south Asia except the eastern region with areas of extreme rainfall. Similar rainfall observation noticed in States of Kerala, Odisha, Southern Nepal and Bangladesh.

Dry Spell

May 2021 (<2.5 mm precipitation)

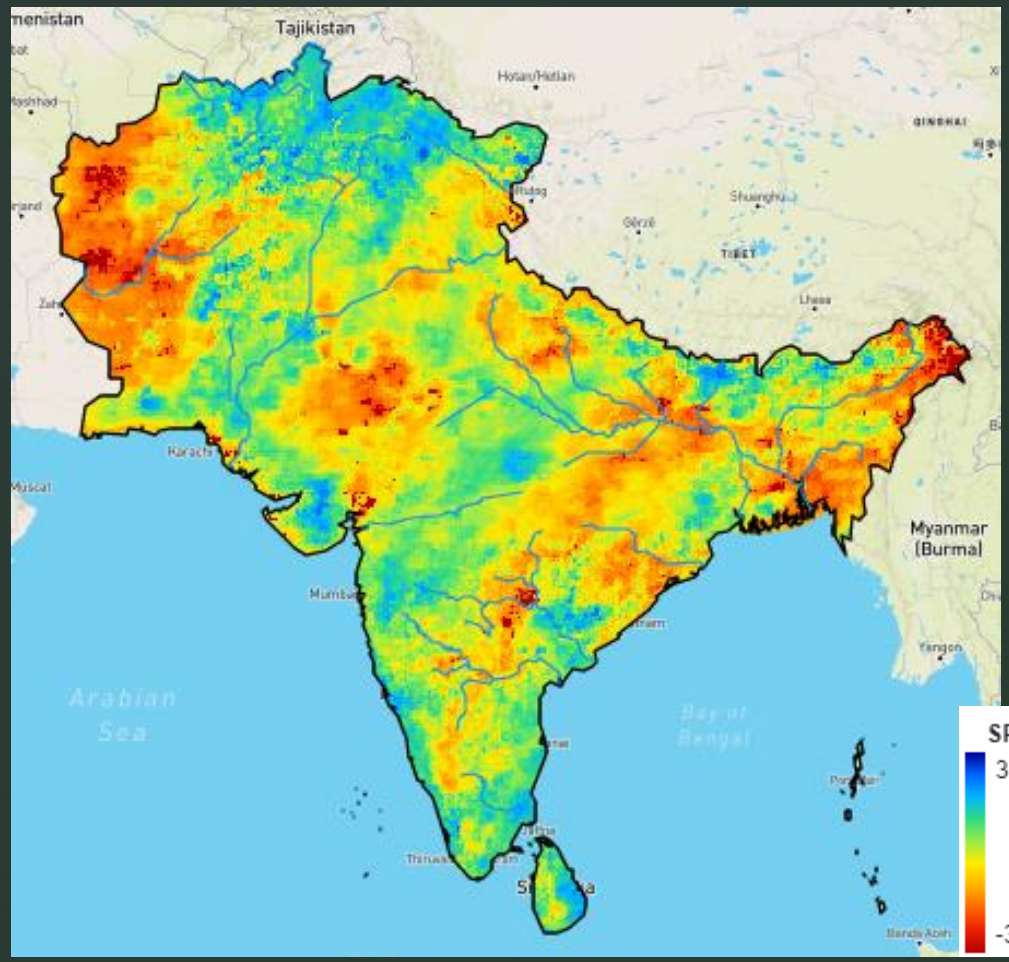
May 2021 (<10 mm precipitation)



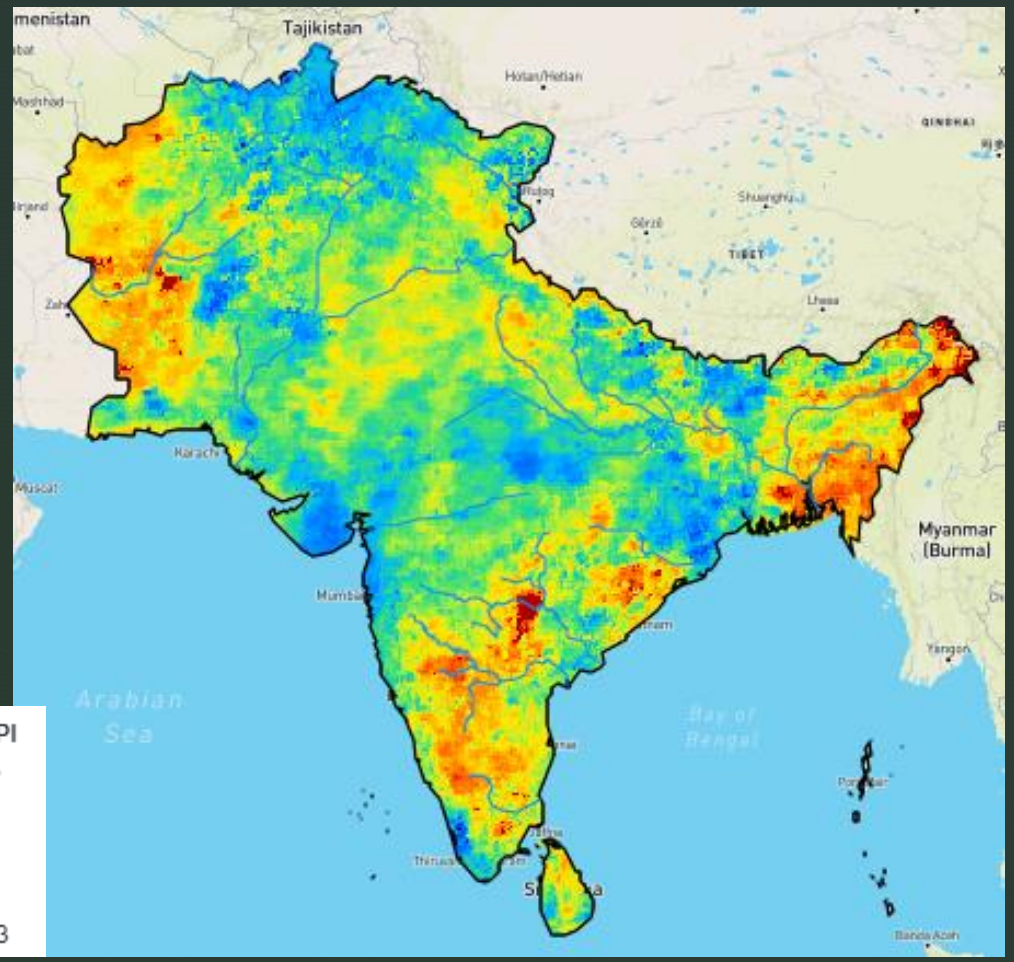
- The dry-Spell is a good indicator of the likelihood of a drought as well as the presence of a prolonged period of drought. Similarly, this indicator reflects the tendency of rainfall over a period of time (short-term, medium-term or long-term).
- A dry spell is defined as the number of consecutive days with a daily precipitation amount below a certain threshold, such as 2.5, 5, 10 mm, preceded and followed by at least one day with rainfall exceeding the threshold. The maps uses rainfall product from GPM to calculate the dry spell for July at 2.5 and 10 mm
- The subseasonal forecast and the dry spells can help users to develop timely agriculture contingency plan for specific crop types in rainfed and irrigated agricultural systems.

Standardize Precipitation Index (3 month SPI)

3month SPI – Apr 2021



3month SPI – May 2021

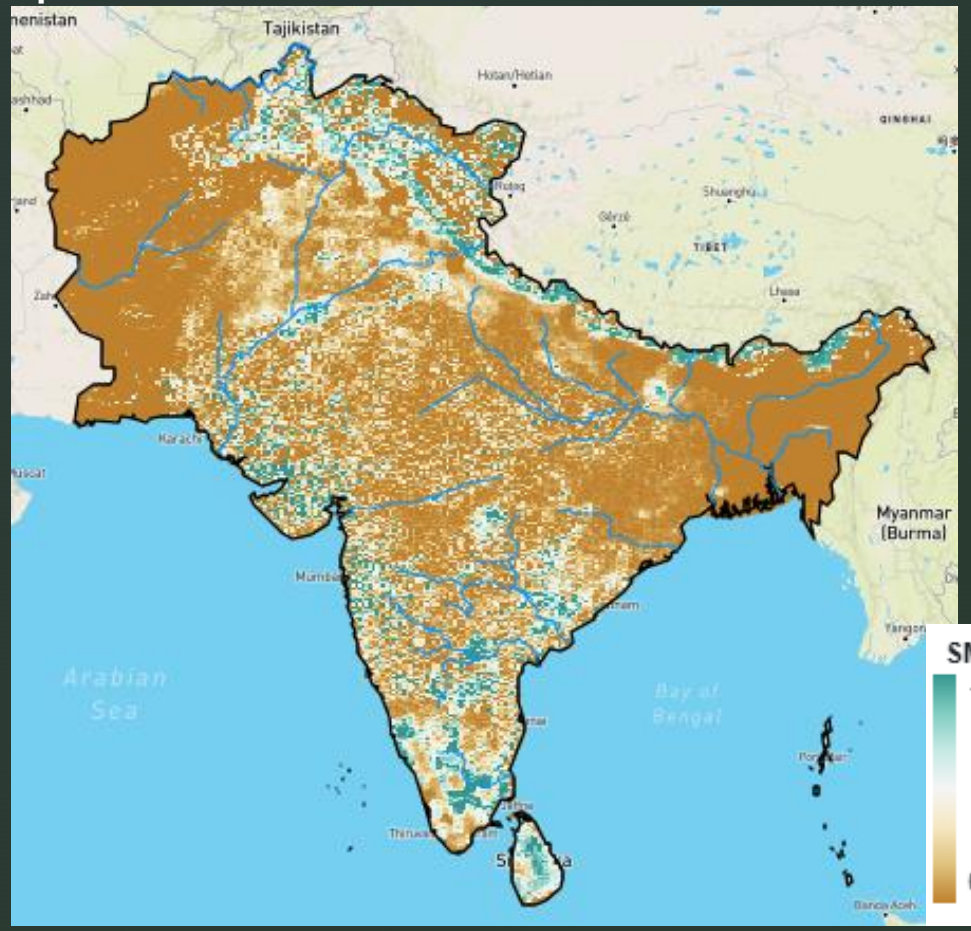


- The SPI is a measure of the number of standard deviations of observed cumulative precipitation deviates from the climatological average. The SPI values range are from -3 to +3 with negative values indicate droughts, while positive values indicate wet conditions. Severe drought conditions are determined by high negative values.

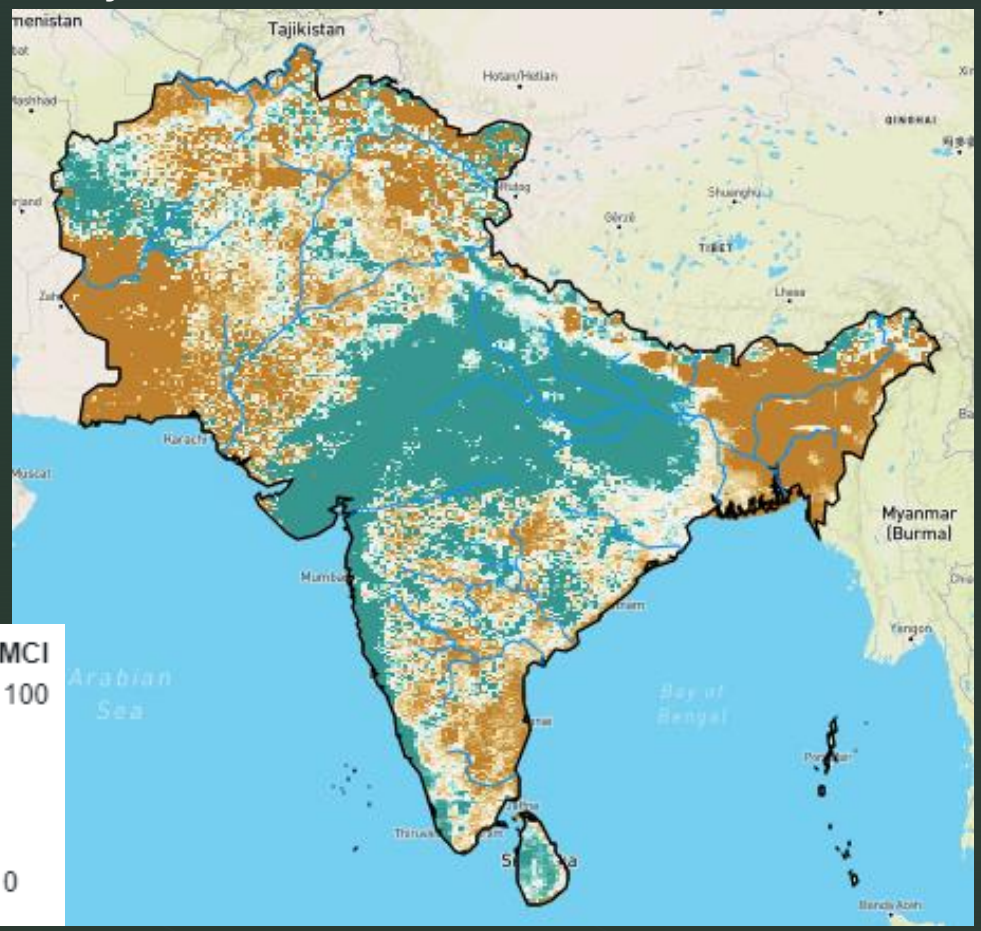
- The current SPI condition and sub-seasonal rainfall forecast together provides better understanding of the future drought occurrences and its impact on agriculture and smallholder farmers.

Soil Moisture Condition Index (SMCI)

Apr 2021



May 2021

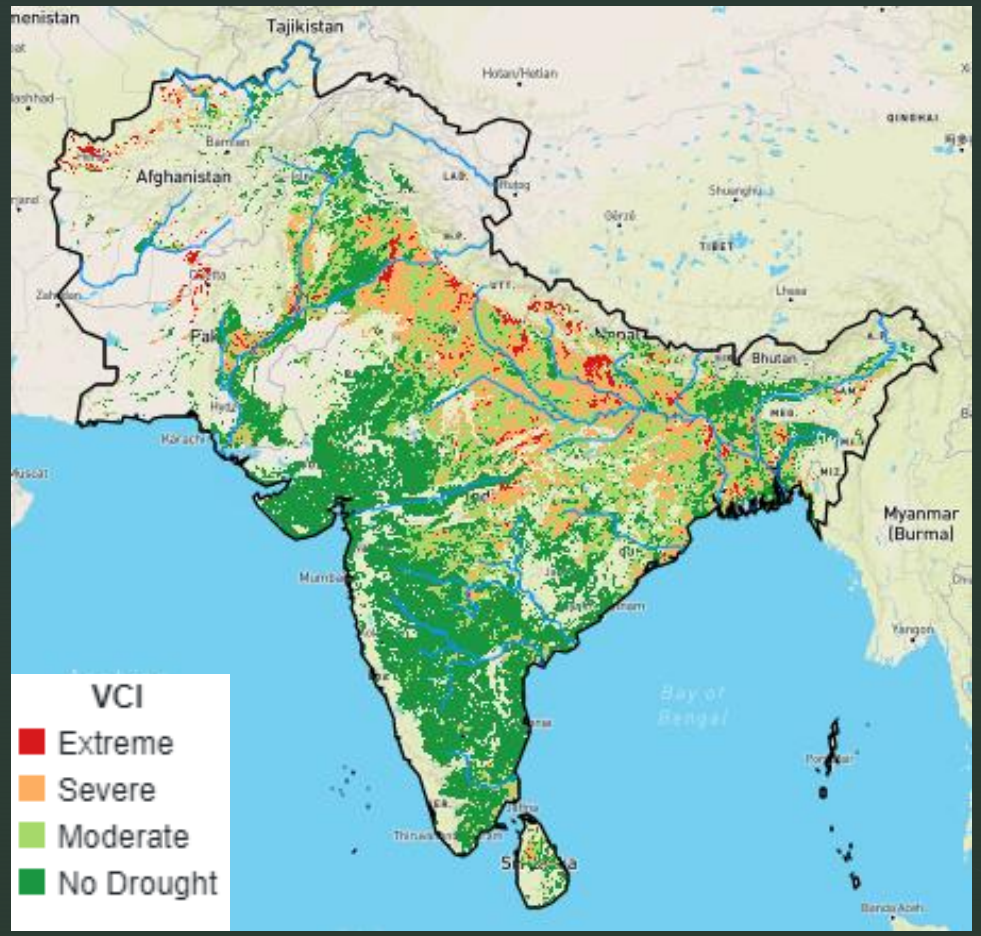


- SMAP satellite developed by NASA provides direct sensing of soil moisture in the top 5 cm of the soil column. Soil Moisture Condition Index (SMCI) represents soil moisture condition with respect to the historical values and the SMCI value range varies between 0-100, where the value nearby 0 represents extreme soil moisture stress, while values close to 100 explains extremely wet condition.

- Low soil moisture values can detect dry conditions while high values can be used to detect wet conditions. These conditions occur in proportion to the change in rainfall.

Vegetation Index

Apr 2021

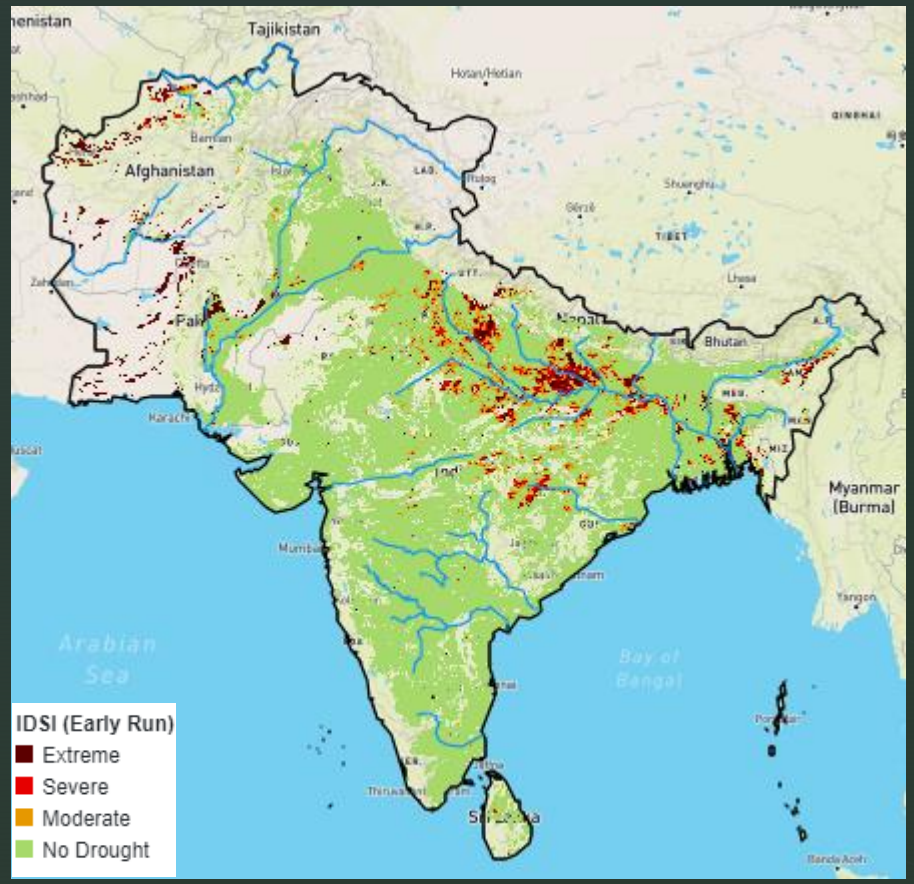


May 2021

- Vegetation Health Index (VHI) is a potential index for agricultural drought monitoring and forecasting. The VHI was developed using NASA' MODIS 16-day combined Terra and Aqua satellite data with a spatial resolution of 250m.
- VHI is an index characterizes the health of the vegetation by integrating NDVI and Temperature. The VHI is used for various purposes, of which its applicability in detecting and monitoring the phenomenon of drought.
- Extreme and Severe VHI classes indicating poor vegetation health while no-drought indicating high vegetation health status. Locations in eastern region of India e.g. Bihar, UP and MP with low to intermediate values of VHI recovered in May month.

Integrated Drought Severity Index (IDSI)

Apr 2021



May 2021

- IDSI explains areas of drought severity by considering precipitation (input to the system), soil moisture (storage of the system), actual ET (loss to the system) and VCI (vegetative response of the system). IDSI being a composite indicator would help determine the drought condition more reliably. The IDSI developed by IWMI incorporates multisource satellite data from MODIS to define Vegetation and evapotranspiration, precipitation data from CHIRPS, and soil moisture conditions derived FLDAS and SMAP.
- The values calculated through IDSI are categorized into three drought classes and the severity of the drought is represented by the extreme, severe and moderate classes.
- IDSI can be used an impact indicators to alert relevant agencies to develop timely early warning to early action to promote drought response strategies e.g. agriculture contingency plans at district level to mitigate drought risks;

SADMS
South Asia Drought Monitoring System

SADMS team would like to acknowledge the support from the following partners for sharing the data and access to the geospatial platform.

Google Earth Engine

NASA

esa

Climate Hazards Center
UC SANTA BARBARA

SADMS Team

IWMI: Giriraj Amarnath; Surajit Ghosh; Niranga Alahacoon; Alok Sikka

CRIDA/ICAR: KV Rao

Access archived south Asia bulletin (Click here)

For additional information or sharing feedback contact the team

Dr. Giriraj Amarnath
a.giriraj@cgiar.org or
wrd@iwmi.org

Disclaimer

The South Asia Drought Monitoring System (SADMS) was created by the International Water Management Institute (IWMI) with the support from CGIAR Research Program of Water, Land and Ecosystems (WLE); Indian Council of Agricultural Research (ICAR) and Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF). The SADMS tool was developed specifically for the purpose of drought early warning to monitor the near real-time drought situation and enable timely action to be taken by the government authorities and relevant development organizations in South Asia.

IWMI, CGIAR WLE, ICAR or Japan's MAFF do not make any warranties on the country or basin boundaries used in this drought outlook, or about the completeness, reliability, and accuracy. Any decisions/actions taken based on this drought outlook are strictly at the discretion of the user, and IWMI, CGIAR WLE, ICAR or Japan's MAFF will not be liable for any loss or damage that may occur as a result of using the tool.

Thank You