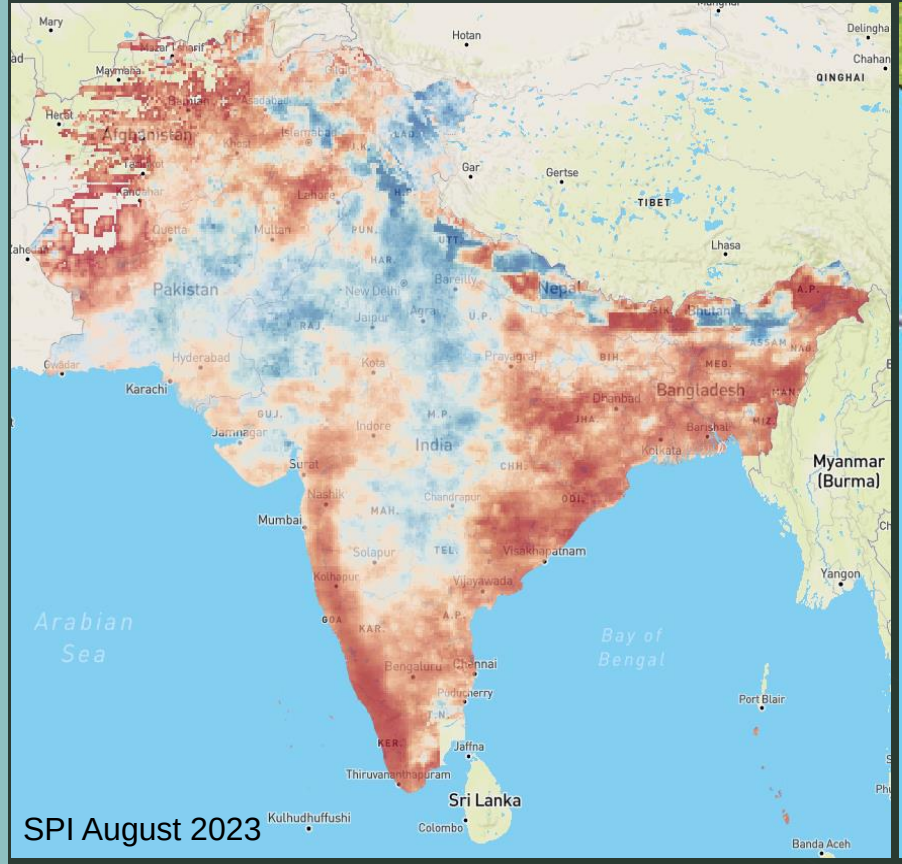

SPI August 2023

NDVI Aug 2023

Aug 2023 | Issue 1

South Asia Drought Outlook

SADMS South Asia Drought Monitoring System

International Water Management Institute

CGIAR INITIATIVE ON NEXUS Gains

CGIAR INITIATIVE ON Climate Resilience

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

ICAR

Issue Date: 06 September 2023

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 01st of each month.
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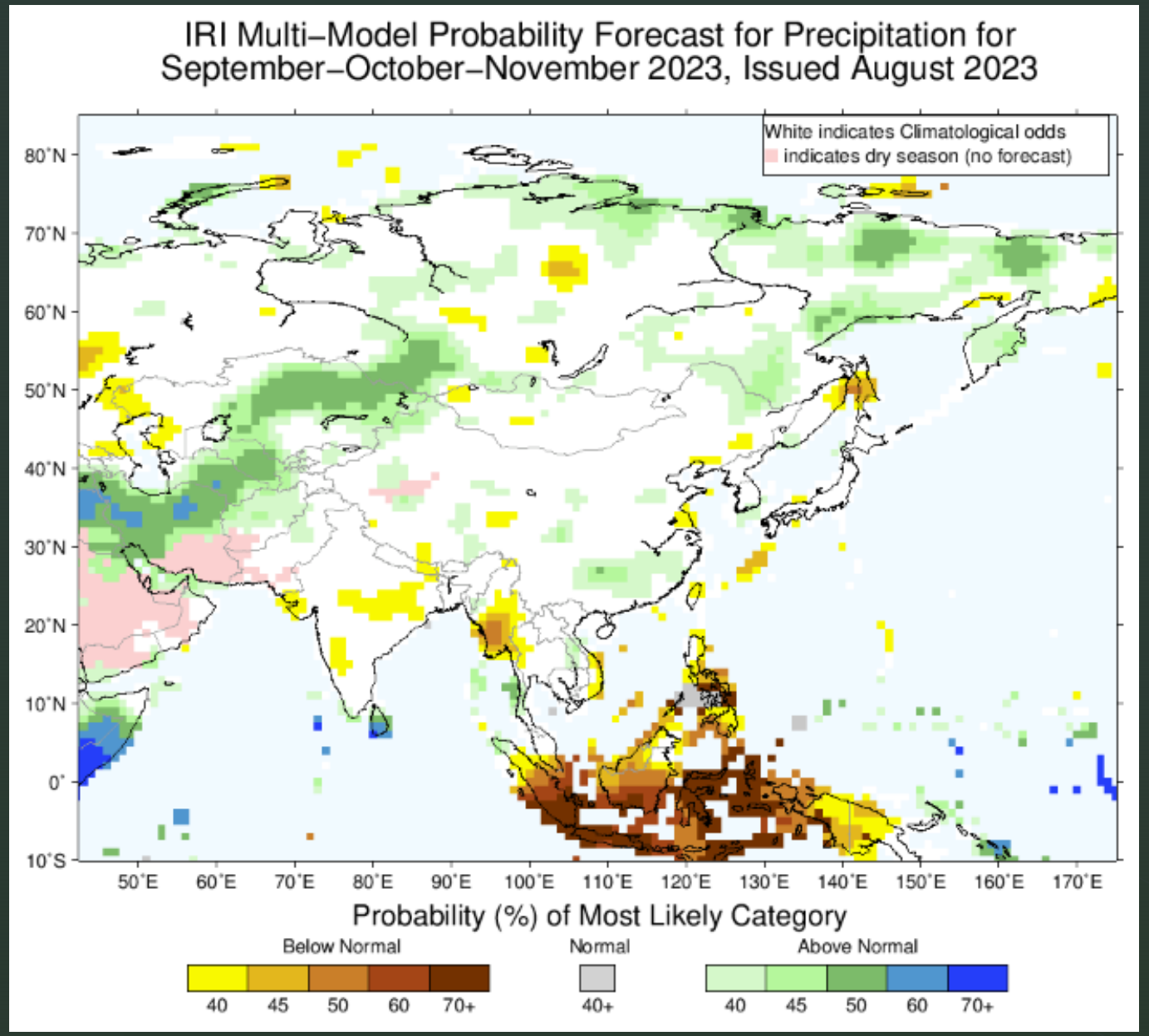
https://www.iwmi.cgiar.org/resources/drought-monitoring-system/drought-bulletin/

Drought Outlook Summary

- Although the India Meteorological Department (IMD) has predicted a normal 2023 southwest monsoon, the onset of the monsoon with a delay of about a week has resulted in a 10 per cent rainfall deficit for the month of June. However, as per the latest long-term forecast for August 2023, the monthly rainfall in August over India as a whole fell below 94% of the long-term average (LPA) for the month.
- The sub-seasonal forecast for the end of November 2023 has predicted below-normal rainfall over a significant area of southern central and western Indian states. Also, above-normal rainfall is expected in Afghanistan and normal rainfall is expected for all other areas in South Asia.
- Comparing August 2022 with August 2023 shows a significant rainfall deficit over a large area of South Asia. This is further confirmed by the fact that more than 80% of South Asia's total land area is represented by negative values od SPI.
- There is a high probability that the existing vegetation will not improve further in the coming months as many parts of the South Asia region will record significantly below-normal rainfall according to the probable rainfall forecast.
- Drought conditions in Sri Lanka more likely to continue as probable rainfall forecasts provide bellow-normal rainfall and all meteorological and agricultural drought indices represent severe drought conditions.
- In Bangladesh, an increase in dryness in August is indicated in the SPI index, but the agricultural drought indices do not indicate a drought condition. However according to the forecasts, as the rainfall is less than the season, there is a higher possibility of affecting the crop health in the coming months.
- It is important the stakeholders adopt timely drought relief and response strategies to mitigate drought risks;

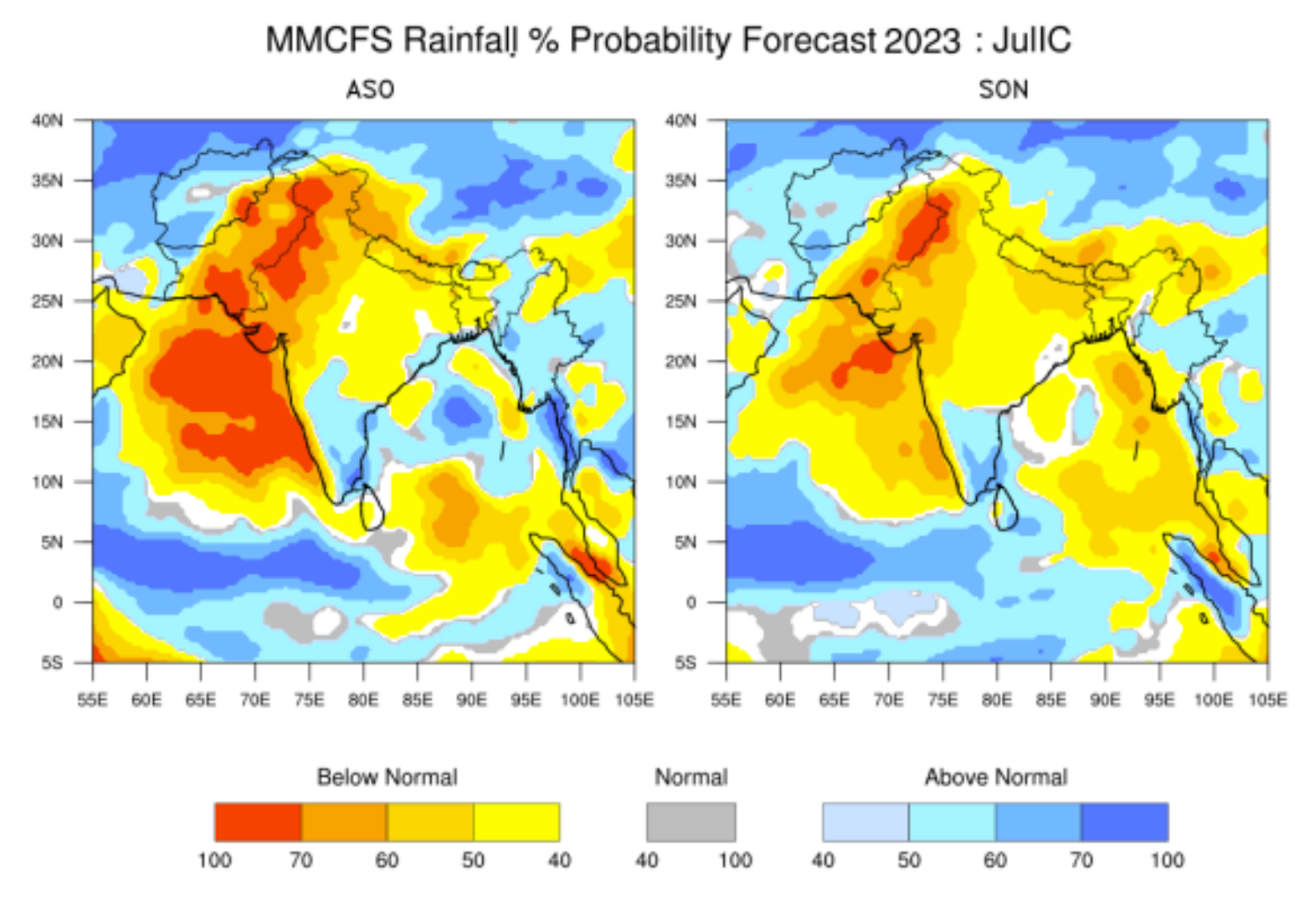
Seasonal climate forecast



Source: IRI

Precipitation forecast for most parts of South Asia is likely with normal or below-normal for Sep-Oct-Nov 2023. However, large isolated areas of central and western India show a 40% deficit in rainfall, while Afghanistan has a 40% positive rainfall forecast.

Precipitation Probability Forecast

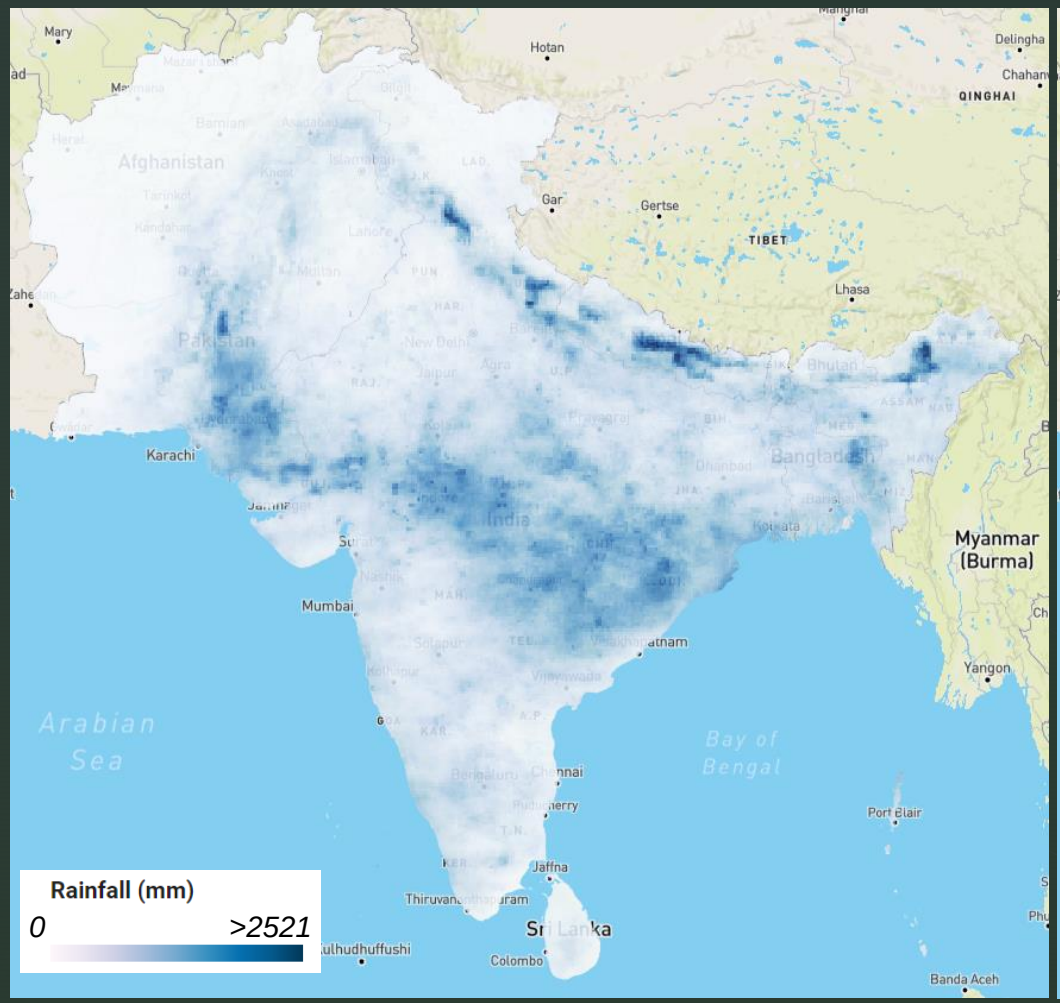


The probability forecasts for precipitation for Aug-Sep-Oct (ASO) and Sep-Oct-Nov (SON) are based on the July initial condition.

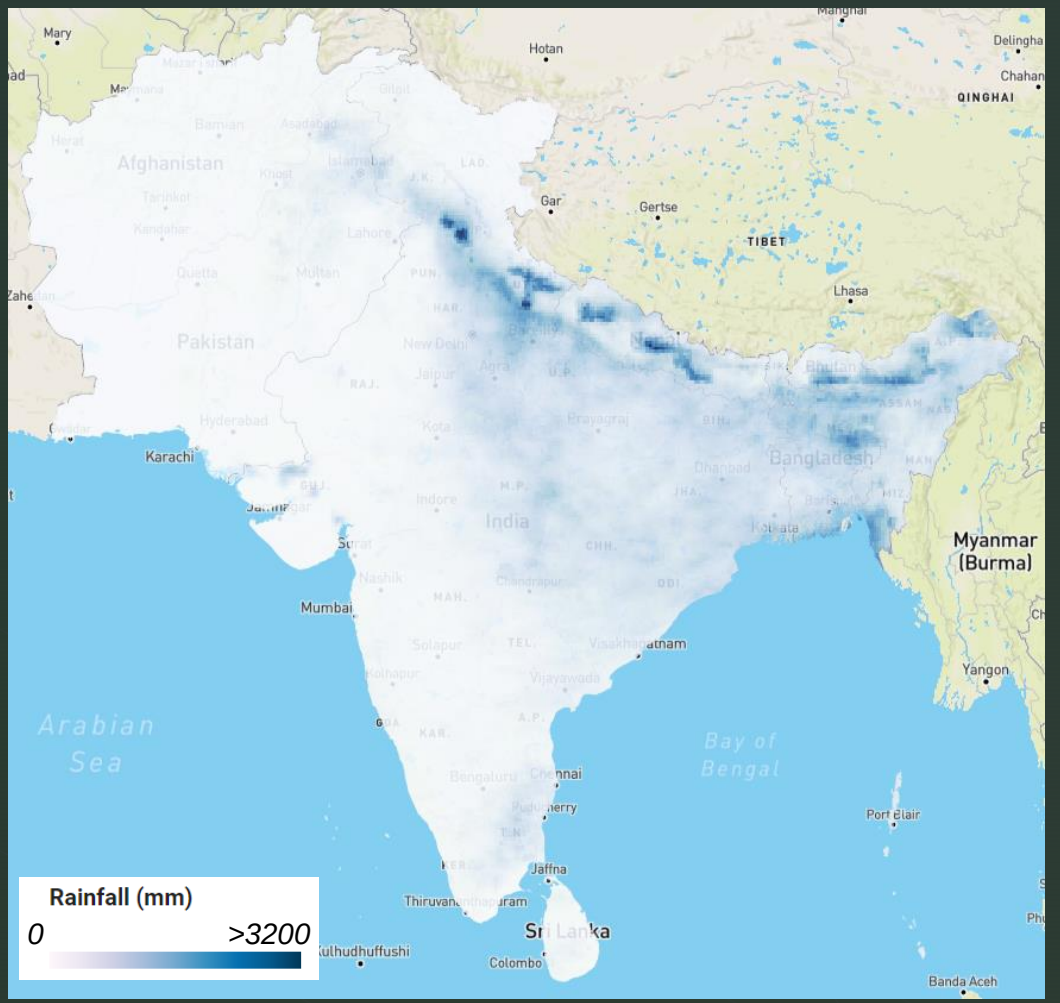
The probability-based rainfall forecast for ASO and SON indicates that most parts of South Asian regions are expected to have below-normal rainfall, except for areas in the northwest, southeast, and the peninsula, where above-average rainfall is expected.

Actual Rainfall Distribution

Aug 2022



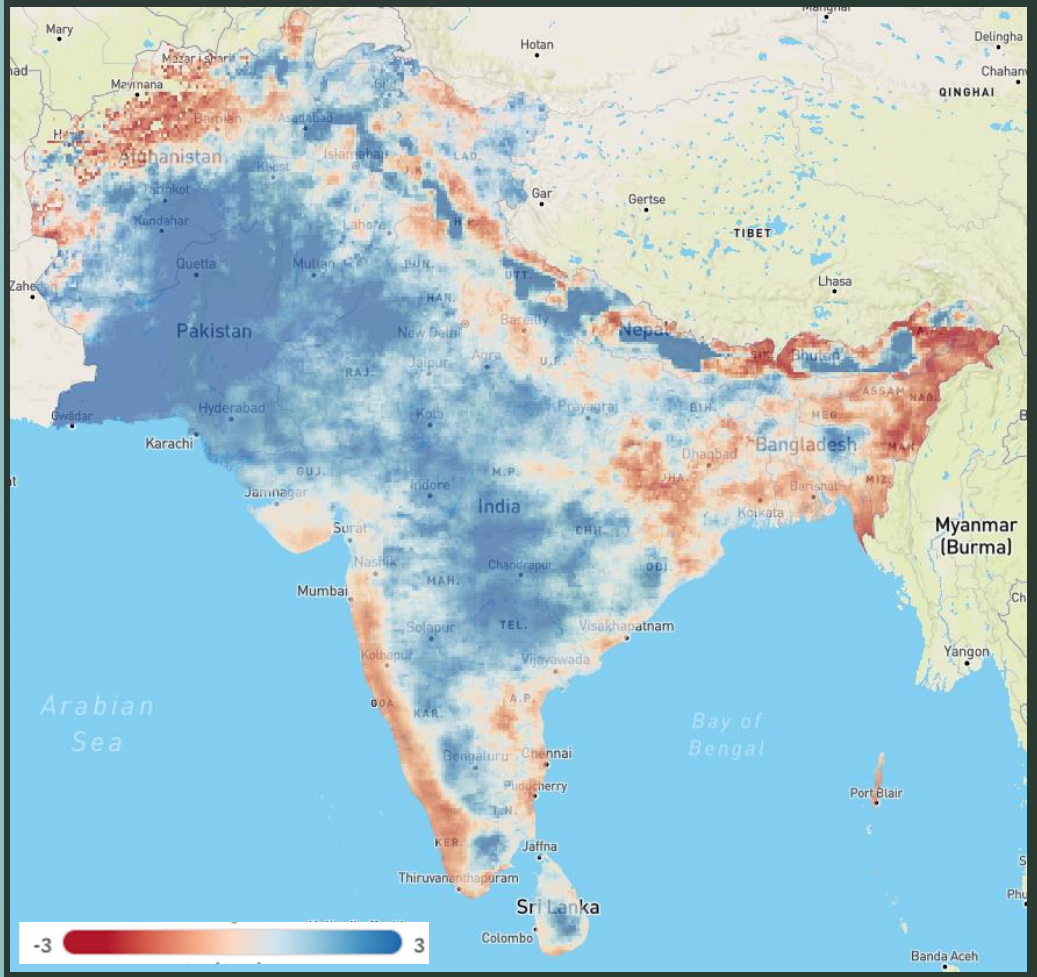
Aug 2023



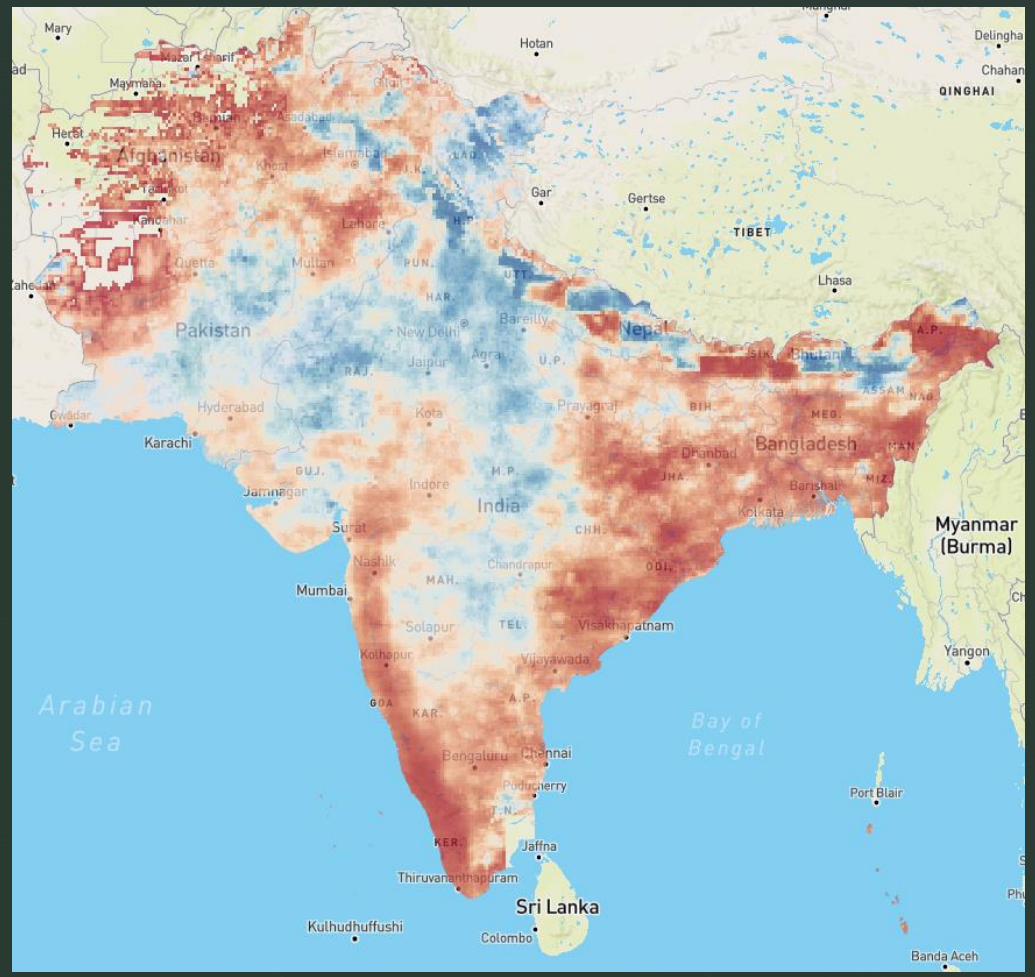
The Global Precipitation Measurement (GPM) data from the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center sources was used to produce the spatial distribution of the monthly precipitation for South Asia. Across South Asia, there has been a notable reduction in rainfall when comparing August 2023 to August 2022. Although a few isolated areas in North India and Nepal have experienced extremely heavy rainfall, there is a clear and considerable overall decrease in precipitation.

Standardized Precipitation Index (3 – month SPI)

3month SPI – Aug 2022



3month SPI – Aug 2023



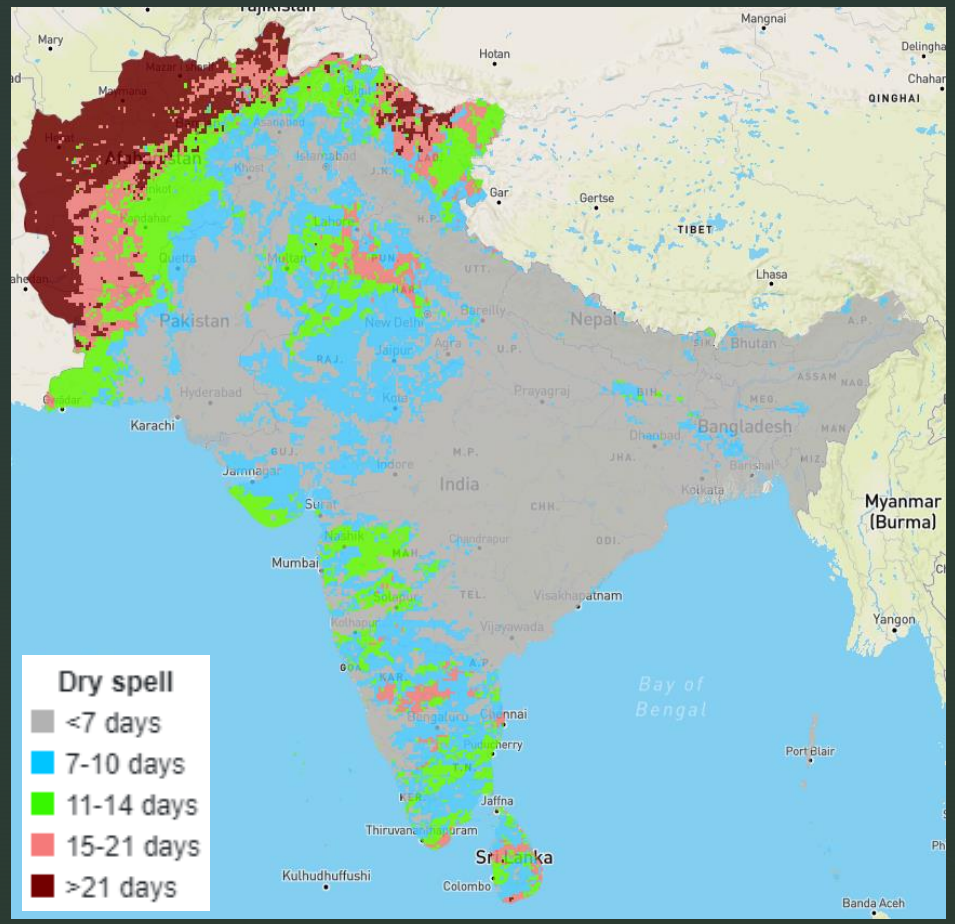
The Standardized Precipitation Index (SPI) the measure of the number of standard deviations of observed cumulative precipitation deviates from the climatological average. The SPI values range from -3 to +3 and Negative values indicate droughts, while positive values indicate wet conditions. Severe drought conditions are determined by high negative values.

Together, the current SPI status and sub-seasonal precipitation forecasts provide a better understanding of future drought events.

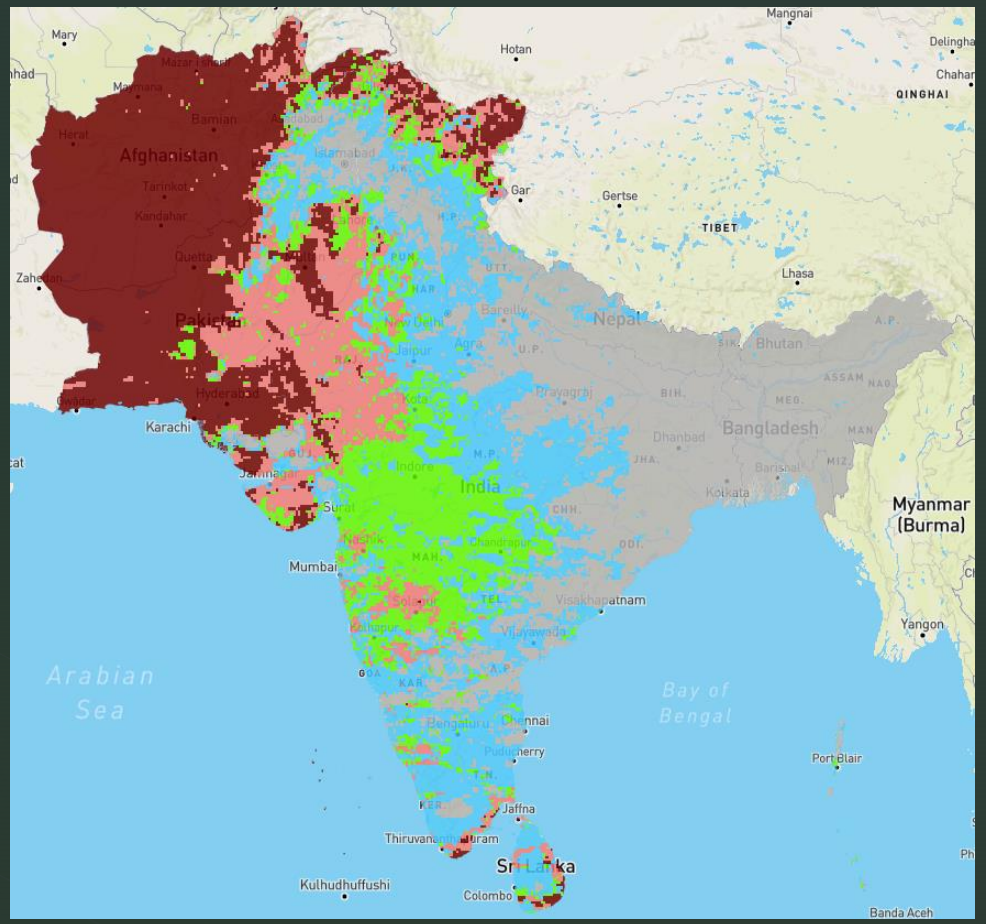
In contrast to the SPI index recorded in August 2022, there is a significant reduction in the SPI index throughout South Asia for August 2023. This confirms the occurrence of meteorological drought in the region.

Dry Spell

Aug 2022 (<2.5mm)



Aug 2023 (<2.5 mm)



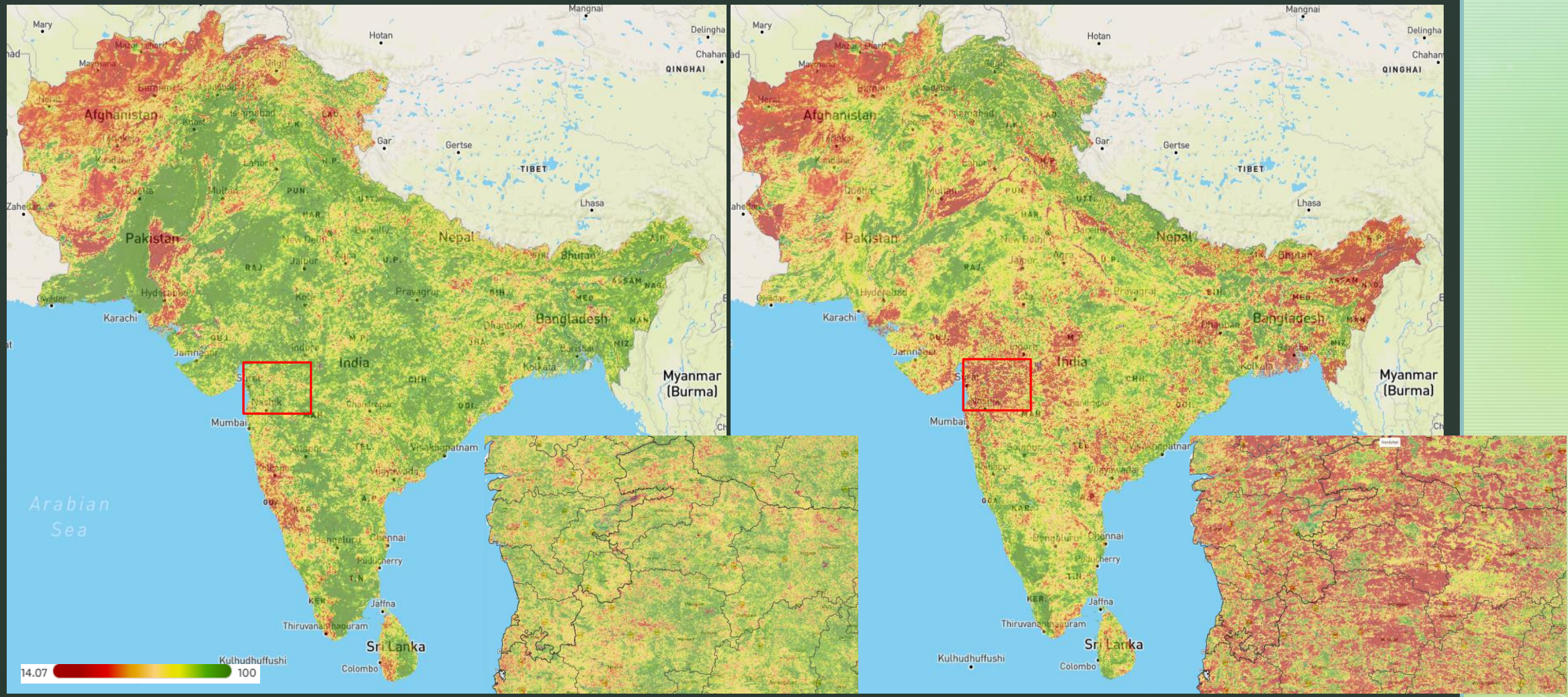
The dry spell is a good indicator of the likelihood of a drought as well as the presence of a prolonged period of drought. Similarly, this indicator reflects the tendency of rainfall over a period of time (short-term, medium-term or long-term).

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, or 10 mm, preceded and followed by at least one day with rainfall exceeding the threshold. The maps use rainfall product from GPM to calculate the dry spell for July at 2.5 and 10 mm

The sub-seasonal forecast and the dry spells can help users develop an agriculture contingency plan depending on the crop type and its condition.

Vegetation Condition Index (VCI)

Aug 2022 **Aug 2023**

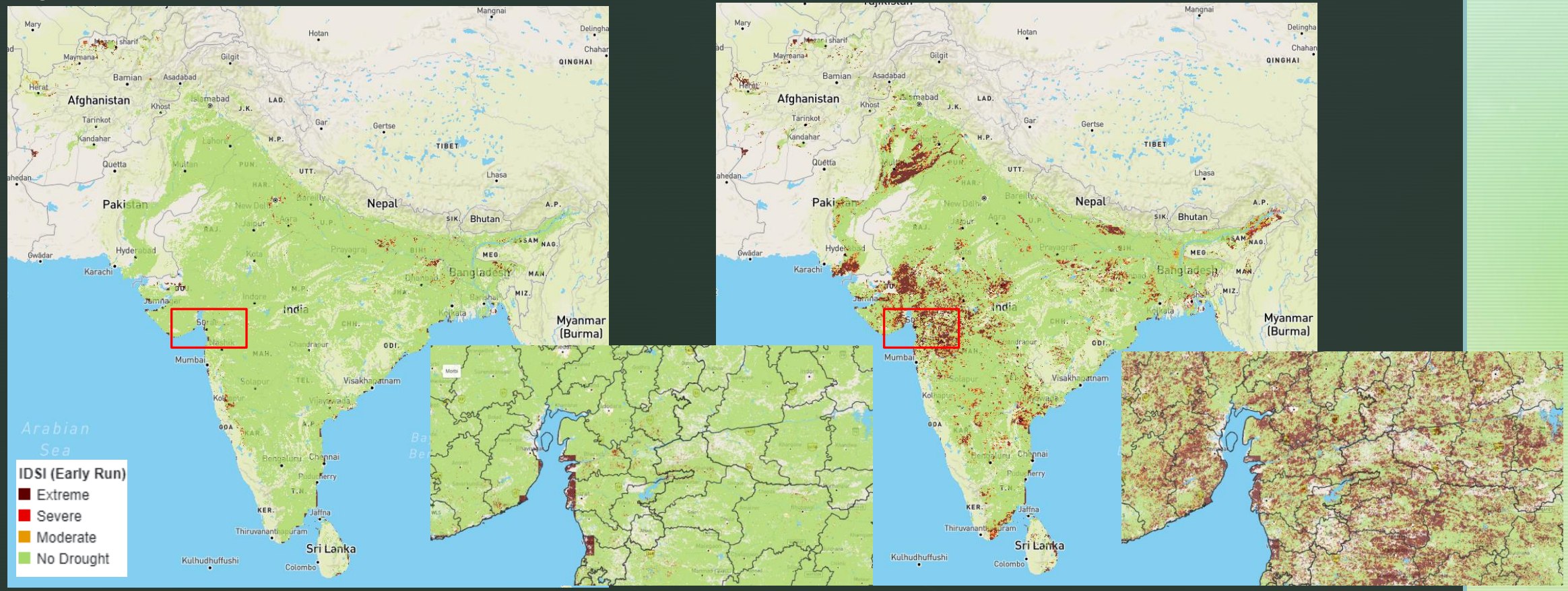


Vegetation Condition Index (VCI) calculation is more effective in identifying the drought condition irrespective of the ecological region. The range of VCI values varies between 0-100 and the value 0 reveals extreme stress while 100 expresses healthy vegetation.

The VCI index indicates that stress on agricultural crops has significantly increased in India as well as in many parts of Sri Lanka and Afghanistan in August 2023 compared to 2022 August.

Integrated Drought Severity Index (IDSI)

Aug 2022

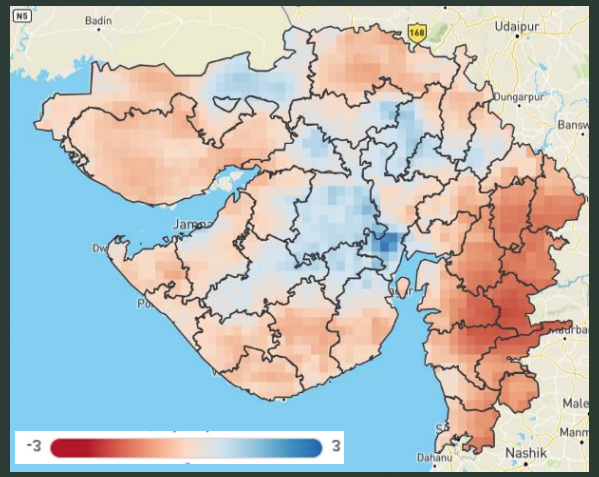


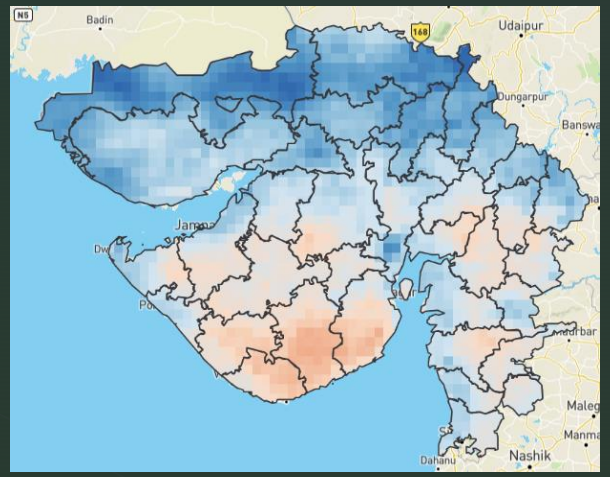
Aug 2023

- 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 from FLDAS and SMAP.
- The IDSI of the zoomed areas Maharashtra and Gujarat clearly indicate an increase in drought in August.
- IDSI can be used 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 the district level to mitigate drought risks;

State of Gujarat – Drought assessment

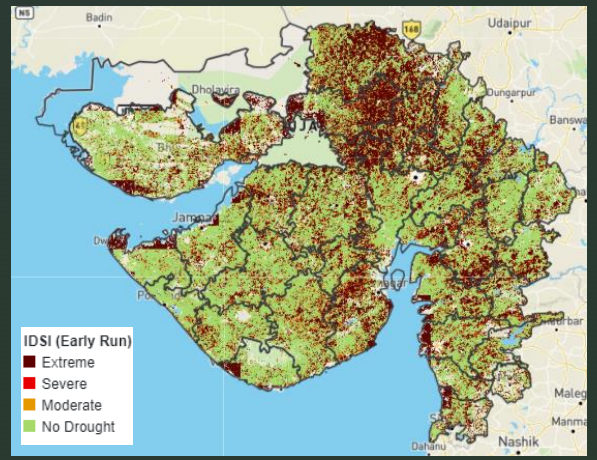
Meteorological Drought using SPI (August 2023 vs 2022)





- The Standardized Precipitation Index (SPI) the measure of the number of standard deviations of observed cumulative precipitation deviates from the climatological average.
- SPI for August 2023 shows severe dry conditions across Gujarat due to deficit rainfall and it also reflects soil moisture leading to decreased sown area for a particular location.

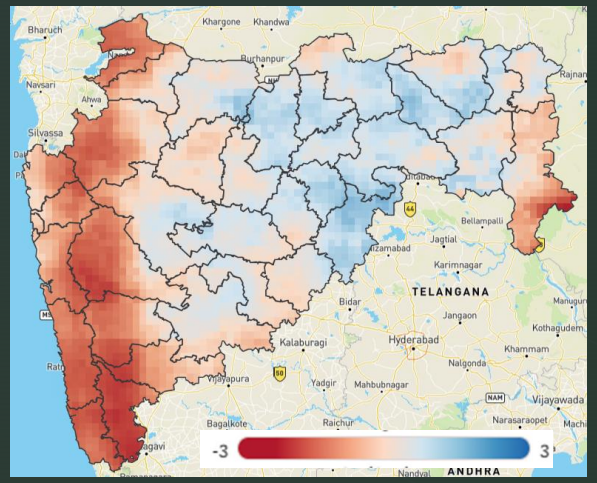
Drought Severity Map using IDSI (August 2023 vs 2022)

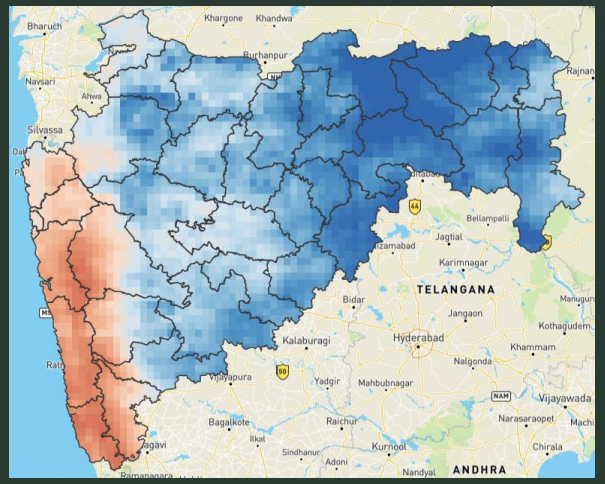


- IDSI explains areas of drought severity by considering precipitation (input to the system), soil moisture (storage of the system), actual ET (loss to the system) and VCI (vegetative response of the system).
- The drought severity map (IDSI for August 2023) in reference to last year shows wider spread agricultural drought impact leading to food prices inflation and disturb crop exports.

State of Maharashtra – Drought assessment

Meteorological Drought using SPI (August 2023 vs 2022)





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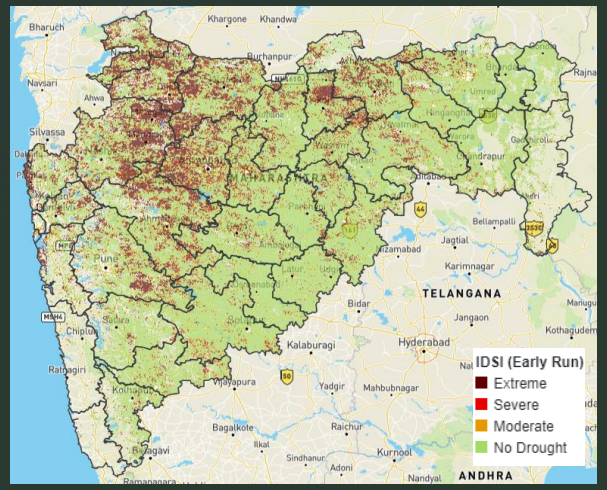

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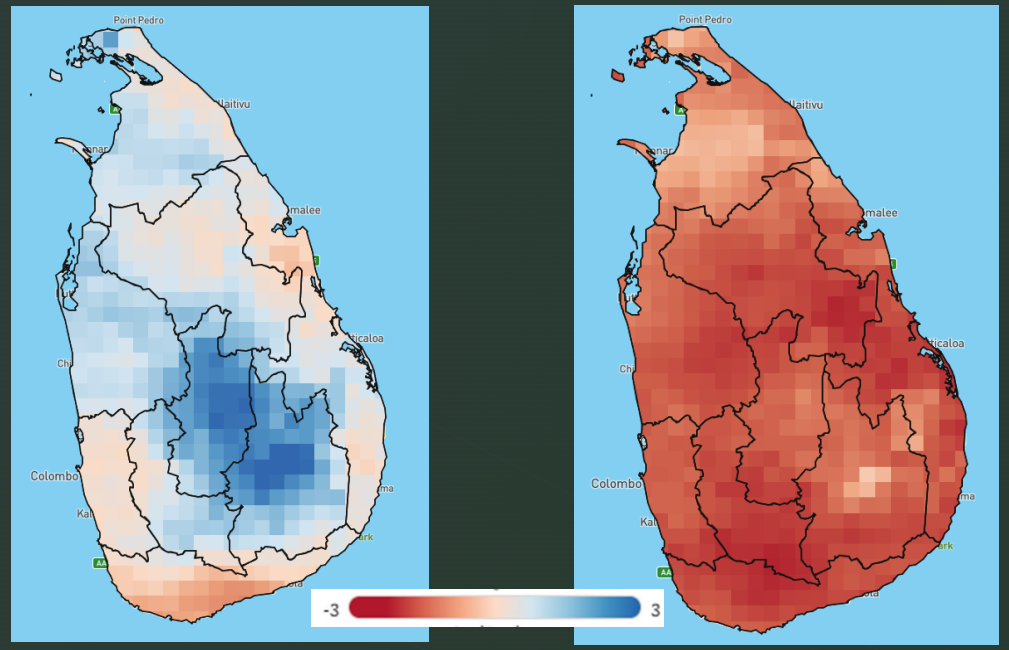
Sri Lanka – Drought assessment

Meteorological Drought using SPI (August 2023 vs 2022)



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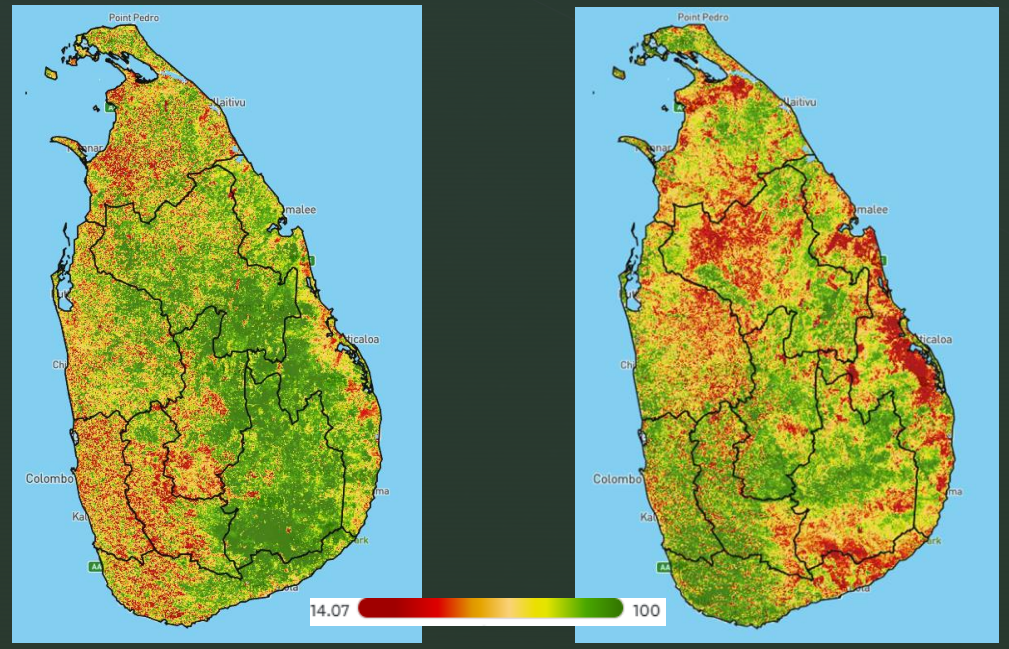
Drought Severity Map using VCI (August 2023 vs 2022)



- Vegetation Condition Index (VCI) calculation is more effective in identifying the drought condition irrespective of the ecological region. The range of VCI values varies between 0-100 and the value 0 reveals extreme stress while 100 expresses healthy vegetation.
- Both VCI and SPI of Sri Lanka clearly indicate an increase in drought in August 2023.

Media Reports

- https://timesofindia.indiatimes.com/india/31-of-india-facing-moderate-to-extreme-dryness-imd-data/articleshow/103073175.cms
- https://www.hindustantimes.com/india-news/kerala-faces-potential-drought-as-southwest-monsoon-rainfall-deficit-stands-at-47-101692992238478.html
- https://www.downtoearth.org.in/news/agriculture/kharif-season-2023-drought-like-situation-in-16-districts-no-sowing-in-2-million-hectares-90641
- https://reliefweb.int/report/pakistan/drought-bulletin-pakistan-july-2023

SADMS
South Asia Drought Monitoring System

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esa

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UC SANTA BARBARA

SADMS Team

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CRIDA/ICAR: KV Rao

Access archived south Asia bulletin (Click here)

For additional information or to share feedback contact the team

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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.

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Thank You