

Pakistan Meteorological Department



Monthly Drought Bulletin For the Month of September 2024

Highlights

- During the month of September 2024, moderate to heavy rainfall events were reported across the country. However, isolated places like Baluchistan (Nokkundi, Dalbandin, Turbat, Sibbi, Quetta, Zhob), and Punjab (Bahawalpur, Rahim Yar Khan), Sindh (Sukkur, Rohri, Khanpur, Hyderabad, Tandojam) received no rainfall.
- Mean monthly temperatures were recorded 1°C to 5°C above-normal across the country except Jiwani where temperature was recorded below normal.
- During the month of October 2024, above-normal precipitation is likely over most parts of the country, particularly in Sindh. Whereas normal to slightly below normal rainfall is expected in Gilgit Baltistan and adjoining areas of Azad Kashmir and upper Khyber Pakhtunkhwa.
- Above normal mean temperature is likely in most parts of the country, particularly in Gilgit Baltistan during the months of October.
- Moderate to Heavy rains during September 2024 have improved moisture conditions in Sindh, Punjab, North Baluchistan, while western areas of Balochistan are still under moisture stress due to deficient rainfall.
- Keeping in view the weather forecast for the month of October 2024, disaster management authorities need to plan DRM activities accordingly.

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1. Monthly Rainfall and Temperature Analysis for the Month of September, 2024

During the month of September 2024, moderate to heavy rainfall were received across the country. The spatial distribution of rainfall is shown in Figure 1. Chief amounts of rainfall was recorded across traditional areas of moonson such as Potohar, North East Punjab, Kashmir and adjoining areas of KP. The highest amounts of monthly rainfall are shown in Table1.

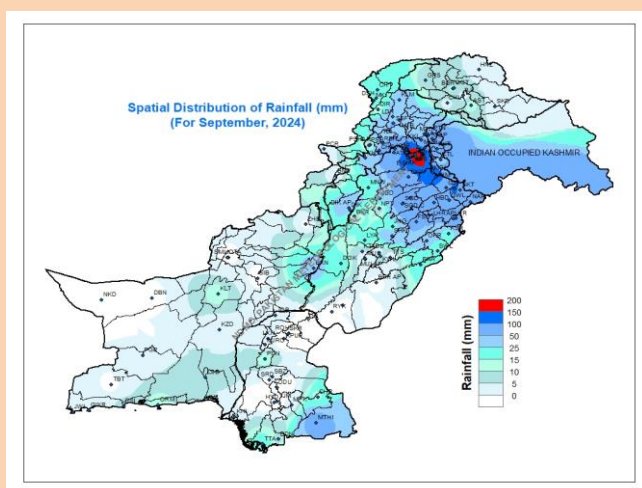


Figure 1: Spatial Distribution of rainfall

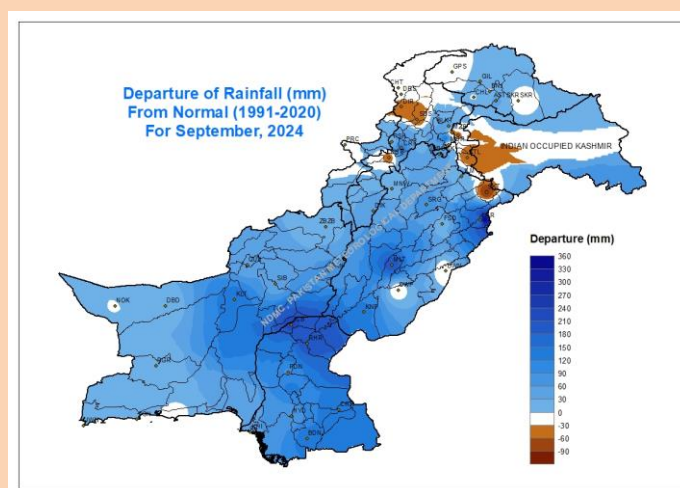


Figure 2: Departure of rainfall from Normal

Figure 2 depicts the departure of rainfall from the normal(1991-2020). Above-normal rainfall was recorded across most part of the country except at isolated places like Sialkot, Murree, Kotli, Dir, Swat and Kohat, as they received below normal rainfall during the month.

Sr.No.	Station	Rainfall(mm)	Sr.No.	Station	Rainfall(mm)
1	Islamabad (Zeropoint)	191.1	11	Lahore, City	84.6
2	Chaklala Airbase	188.0	12	Sialkot Cantt	83.0
3	Mangla	134.8	13	Rawalakot	81.7
4	Sialkot Airport	123.9	14	Mithi	79.0
5	Islamabad, Airport	107.1	15	Sargodha Airbase	77.0
6	G.Dopatta	105.8	16	Attock	74.6
7	Jhelum	104.5	17	Gujranwala	72.3
8	Murree	95.0	18	Gujrat	70.0
9	Mandibahauddin	88.5	19	Chakwal	68.5
10	Narowal	88.3	20	Faisalabad Airport	65.2

Spatial distribution of mean temperature recorded at PMD stations for the month of September 2024 are shown in Figure 3. During the month of september 2024, Central and Southern Punjab, Sindh and Western Balochistan experienced the mean maximum temperature up to 34°C.

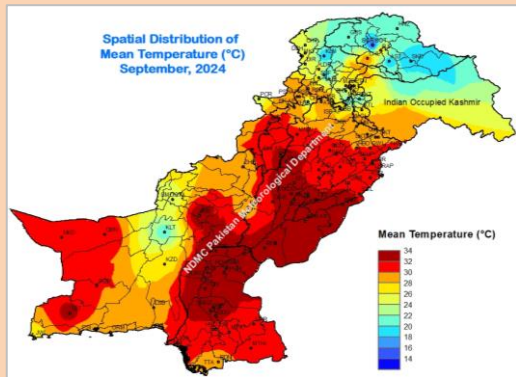


Figure 3: Monthly Mean Temperature (°C)

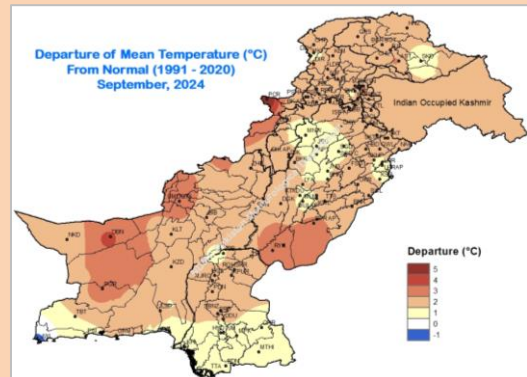


Figure 4: Monthly Departure from Normal

Departure of mean temperature from the normal (1991-2020) is shown in Figure 4, which show normal to above-normal mean temperatures across most part of the country except Jiwani where temperature was recorded below normal.

Monthly normal (1991-2020) rainfall for the month of September and monthly normal mean temperature(°C) for the month of September are shown in the Figures 5 and 6 respectively.

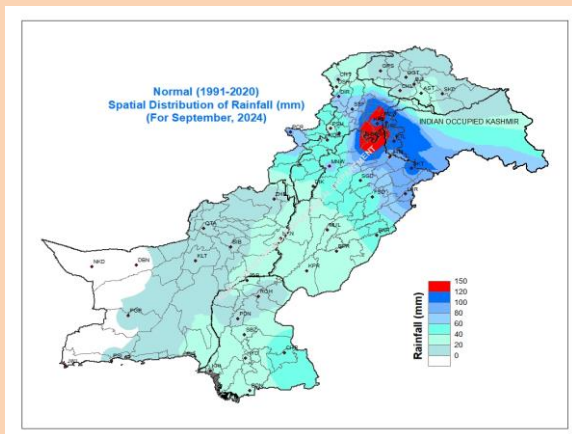


Figure 5: Monthly Normal Rainfall (mm) September

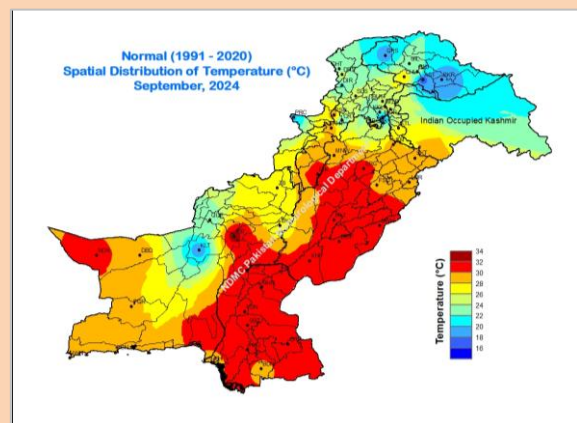


Figure 6: Monthly Mean Temperature September (°C)

2. Comparison of Actual to Normal Monthly Rainfall for September

The comparison of actual to normal rainfall (1991-2020) for the month of September 2024 is shown in Figure 7 (a) Khyber Pakhtunkhwa, Figure 7 (b) Gilgit Baltistan and Azad Jammu & Kashmir, 7 (c) Punjab, Figure 7 (d) Balochistan and Figure 7 (e) Sindh.

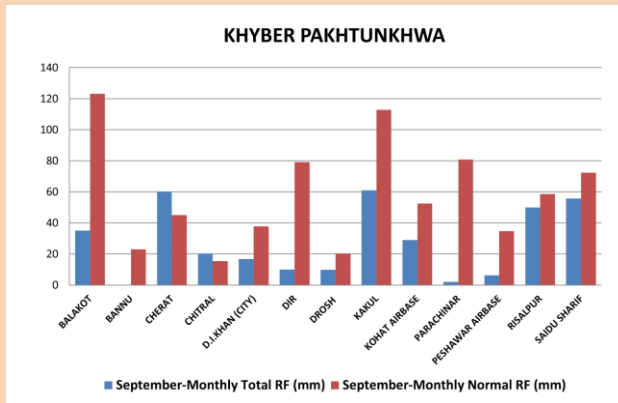


Figure 7a

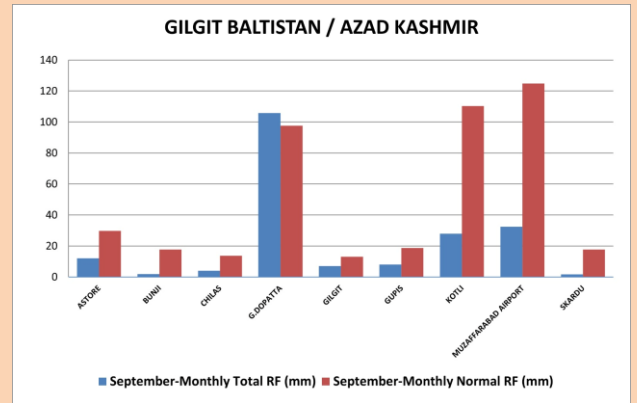


Figure 7b

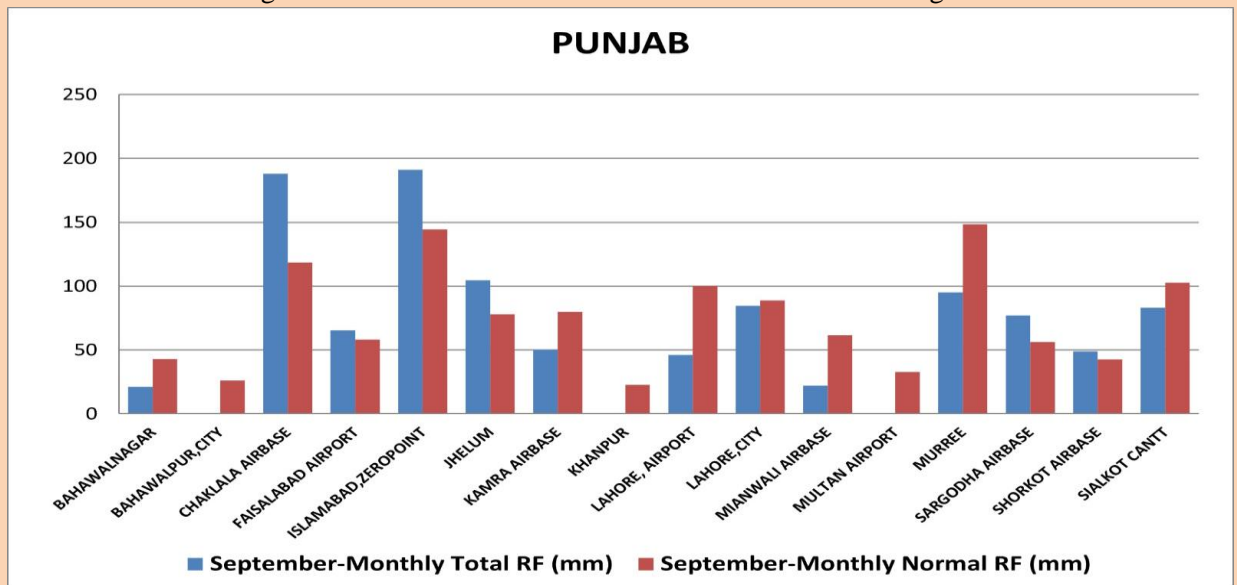


Figure 7c

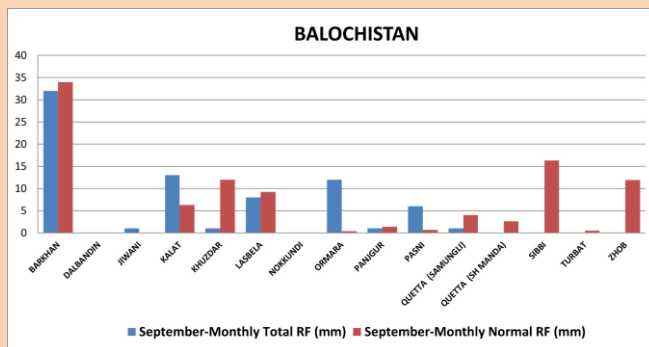


Figure 7d

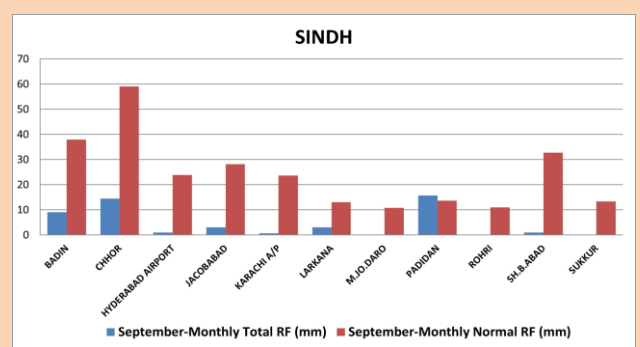


Figure 7e

3. Normalized Difference Vegetation Index (NDVI)

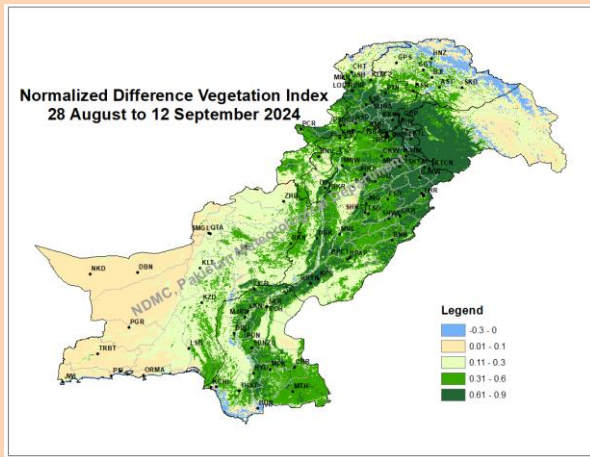


Figure 8: NDVI

Normalized Difference Vegetation Index values for September 2024 are shown in Fig.8. NDVI conditions are high in AJK, Punjab, Khyber Pakhtunkhwa, and along the Indus belt, depicting the widespread vegetation in fields. Such condition nourish the chlorophyll content stored in the plants and enhance the vegetation cover over the fields.

4. Land Surface Temperature (LST)

Land Surface Temperatures (LST) for the period 28 August to 04 September 2024 are represented in Figure 9. The central parts of the country (South Punjab and Northeastern Sindh) observed average daytime temperatures between 35-40°C, while western parts of Balochistan recorded more than 40°C during the period.

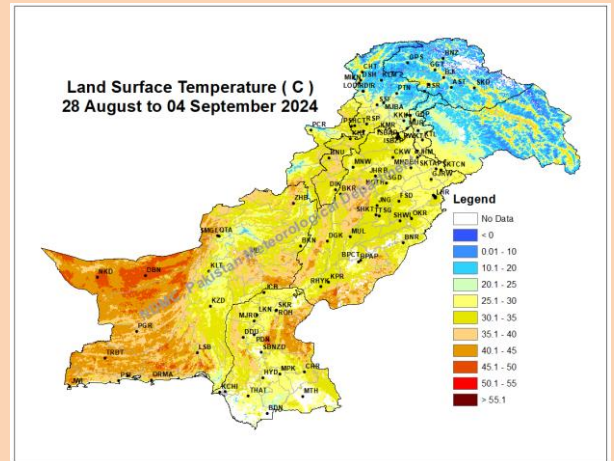


Figure 9: LST (°C)

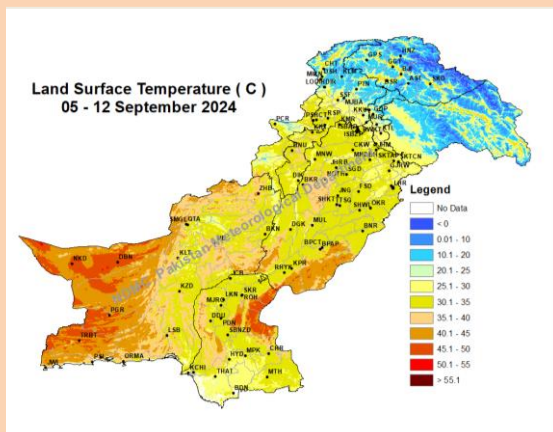


Figure 10: LST (°C)

Land Surface Temperatures during the period 5-12 September are shown in Figure 10. Most of the areas experienced decrease in temperatures due to the rainfall, while Western Balochistan, Northeastern Sindh, Southeastern Punjab experienced relatively higher temperature as compared to the rest of the country.

5. Temperature Vegetation Dryness Index (TVDI)

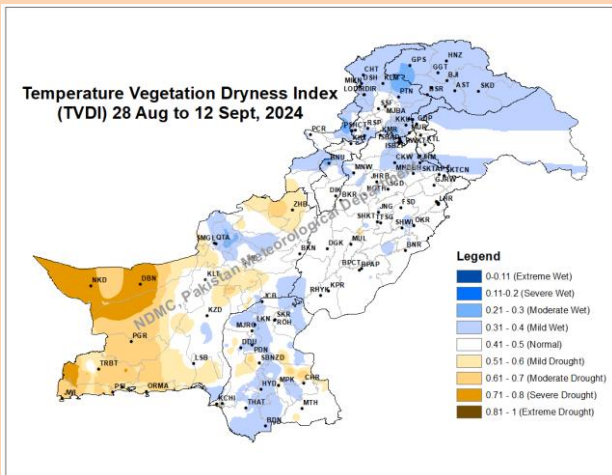


Figure 11: TVDI

Temperature Vegetation Dryness Index (TVDI) derived from MODIS data sets MOD13A2 (NDVI) and MOD11A2 (LST) are shown in Figure 11, which indicates moderate dry like conditions in the west Balochistan (Nokundi, Dalbandin) as highlighted by the TVDI Index. It indicates the increase of dryness and deficient soil moisture conditions in the western parts and coastal areas of Balochistan.

6. Length of Consecutive Dry Days:

The maximum length of consecutive dry days (CDD) is shown in Figure 12. Number of consecutive dry days has increased from 60 to 140 days across western Balochistan (Nokundi, Dalbandin), while rest of the country received sufficient spells of rainfall.

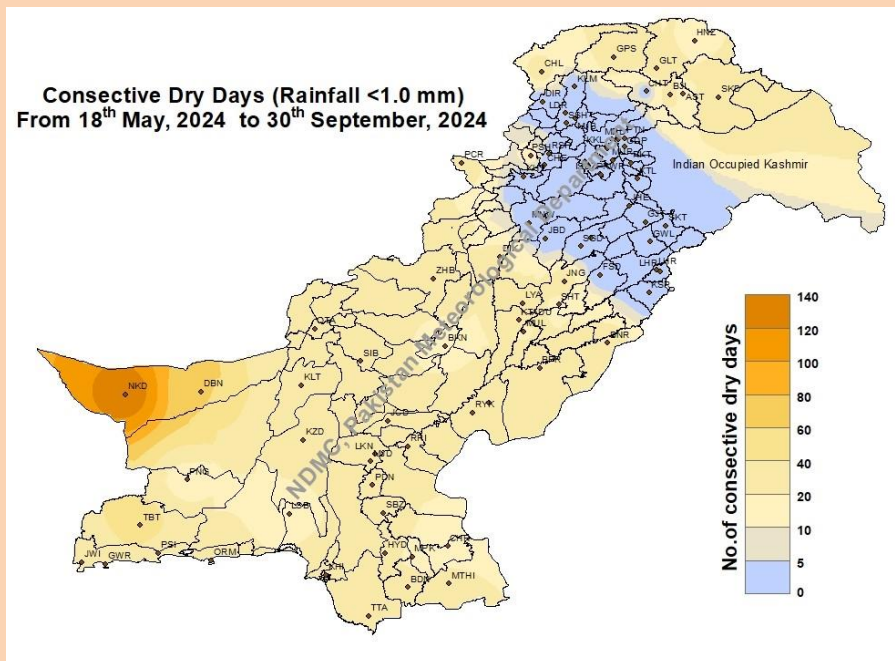


Figure 12: No. of consecutive dry days

7. Drought Monitor for the month of September 2024

Based on different drought monitoring indices as narrated above and ground station data observed by the Pakistan Meteorological Department Network across the country, the spatial drought monitor map is represented in Figure 13 below.

Nokundi, Dalbandin, Jiwani, Gwadar, Turbat, Pasni and Ormara in Balochistan province are under moisture stress due to less rains during past three months.

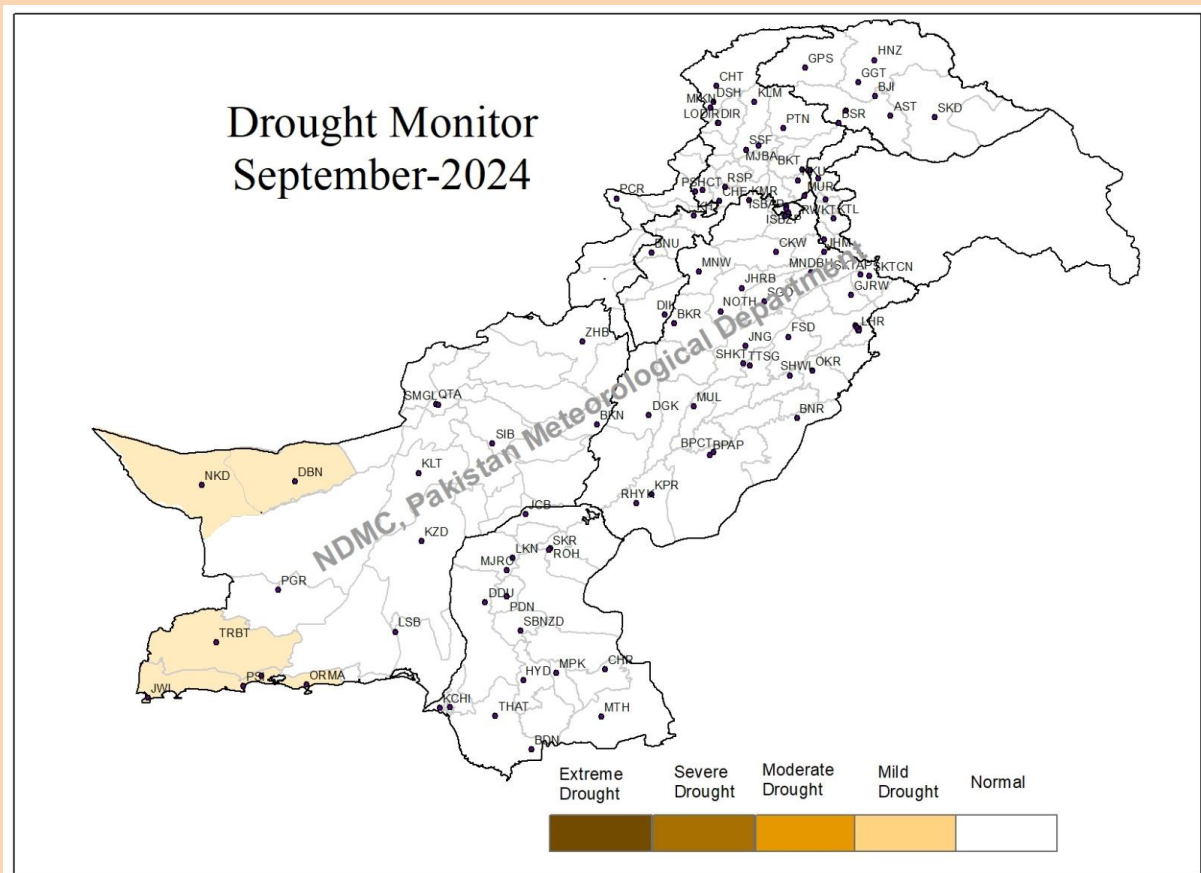


Figure 13: Drought Monitor (September 2024)

8. Water availability/ Dams flow data:

During the month of September 2024, water inflow, outflow and levels of Rawal, Khanpur, Tarbela and Mangla dams are shown in Figure 14. The water level at Mangla, Rawal and Khanpur reservoirs has increased due to moonson rains in their catchment areas. However, water inflow has decreased at Tarbela Dam.

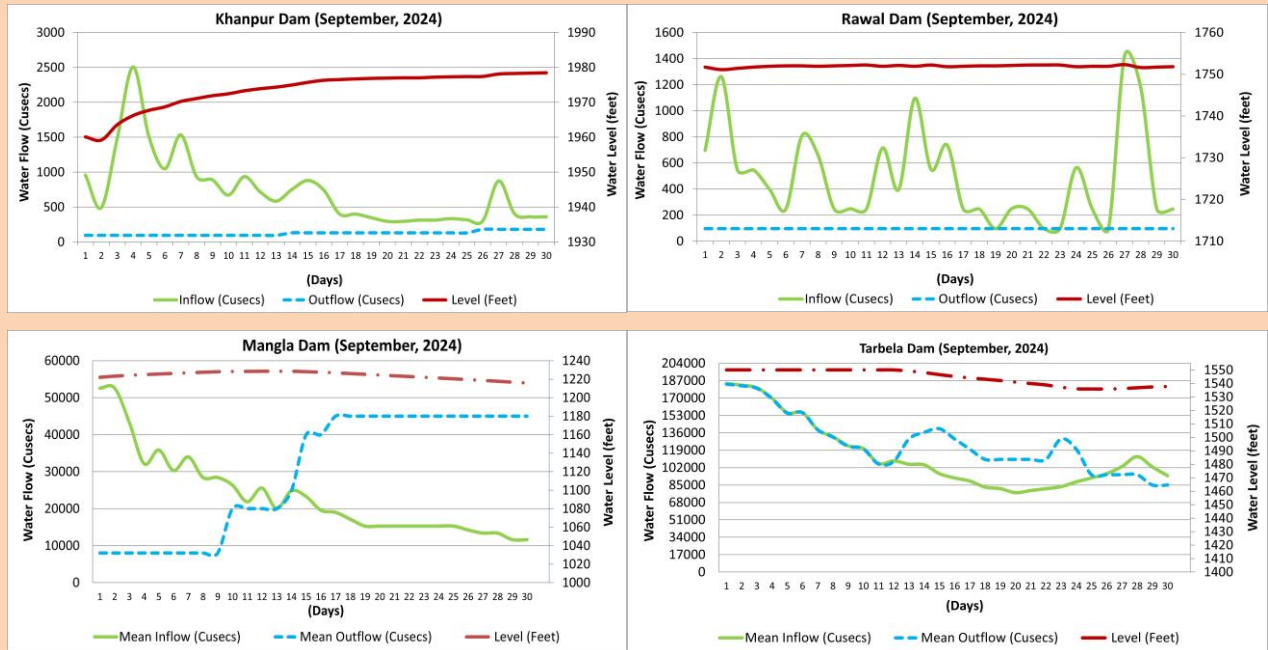


Figure 14: Water inflow, outflow and level of Rawal, Khanpur, Tarbela and Mangla Dams

9. Weather Outlook for October 2024

During October 2024, near-normal precipitation is likely over most parts of the country, whereas slightly below normal rainfall is expected in Gilgit Baltistan and adjoining areas of Azad Kashmir and upper Khyber Pakhtunkhwa. Above normal mean temperature is likely in most parts of the country, particularly in Gilgit Baltistan during the months of October.

Daytime temperatures are expected to reduce in most parts of the country gradually, while night temperatures would significantly decrease in the month.

10. Drought Outlook for October 2024

Keeping in view the forecast for October 2024, few rainfall spells may affect upper parts of the country (with more probability) bringing the temperature down quickly while one or two spells (with less probability) expected in southern parts, which would keep the day temperatures higher and decrease the moisture content in plain areas. Drought conditions are less likely to develop in most parts of the country except already mild drought prone areas of western Balochistan.

All stakeholders across the country (especially lower half) need to make efforts to save water and judicious use so that the available water may be utilized in the upcoming months of deficient rainfalls.

11. Crop Condition

The Kharif crops are usually sown at the beginning of the first rains during the advent of the southwest monsoon season. They are harvested at the end of the monsoon season. Due to satisfactory monsoon rains reported in most of the parts of the country during monsoon, soil moisture conditions are satisfactory to meet the requirements of most of standing seasonal crops like cotton, rice, sugarcane, peanut and gram crops.

12. Advice for Farmers

- I. Reasonable soil moisture is available for sowing of upcoming Rabi crops due to above normal rains during monsoon season, except September during which below normal rains recorded.
- II. Isolated showers / hails/ windstorm may disrupt the harvesting activities of Kharif crops, particularly in the northwestern parts of the country.
- III. Considerable amount of water would be available for irrigation particularly over the upper half, during the month.