

# Monthly Drought Bulletin For the Month of November 2023

## Highlights

- During the month of November 2023, Light to moderate rainfall events were reported across the country where as most of the areas in Balochistan and Sindh received trace to zero rainfall during the month.
- Less to No Precipitation over most of the areas of Balochistan, Sindh and Cholistan region in Punjab province have raised the moisture stressed conditions in previously moisture stressed areas over there.
- During the month of December 2023, overall a tendency for normal to slightly above normal rainfall is expected in most parts of the country. Temperatures are forecasted to remain slightly above normal nationwide
- Moderate Drought conditions may observed in Nokundi, Jiwani, Gwadar while Mild Drought conditions may observed in Sibi, Dalbandin, Kharan, Turbat, Jiwani, Awaran districts and coastal areas of Balochistan. In Sindh, Johi, Dadu, Tharparkar, Umerkot, Sanghar, Chorr districts while cholistan in Punjab Mild Drought conditions may be observed. Keeping in view the weather forecast for the month of December 2023, disaster management authorities are requested to plan DRM activities accordingly.

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# 1. Weather Summary for the Month of November, 2023

The spatial distribution of rainfall is shown in Figure 1. During the month of November 2023, Light to moderate rainfall events reported across the country where as isolated parts of Khyber Pakhtunkhwa, Balochistan and most areas of Sindh province received trace to zero rainfall during the month. The chief amounts of monthly rainfall recorded across Pakistan during November 2023 are shown in Table:1

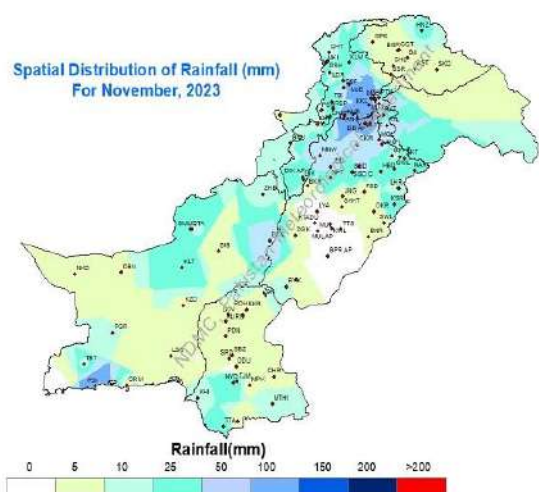


Figure 1: Spatial Distribution of rainfall

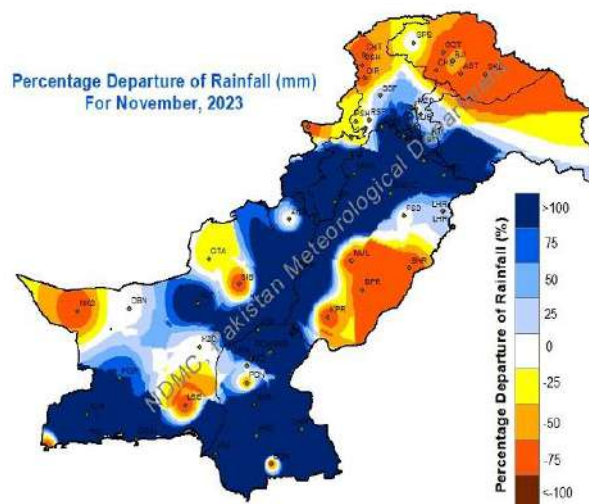


Figure 2: Percentage Departure of rainfall

Figure 2 depicts the percentage departure of rainfall from the normal. Below-normal rainfall was reported in Gilgit Baltistan, Badin, Padidan in Sindh, In Balochistan Nokundi, Quetta, Sibi, Lasbella, western Khyber Paktunkhawa, cholistan in Punjab province while rest of the areas got normal to slightly above normal rainfall as shown in blue colour due to very low or zero normal rainfall over there.

Table-1: Chief amount of rainfall recorded across Pakistan during the month of November, 2023					
Sr.No.	Station	Rainfall(mm)	Sr.No.	Station	Rainfall(mm)
1	PASNI	94	11	G.DOPATTA	44
2	CHAKLALA AIRBASE	83.02	12	ISLAMABAD,ZEROPOINT	43.92
3	ATTOCK	75	13	MUZAFFARABAD CITY	41.3
4	BALAKOT	74	14	Kalam	40.2
5	KAKUL	72	15	BARKHAN	36
6	MALAMJABBA	68	16	CHAKWAL	31.8
7	MURREE	57.01	17	JHELUM	29.3
8	MIANWALI AIRBASE	47.01	18	KOTLI	29
9	KAMRA AIRBASE	46.72	19	SIALKOT	25.02
10	MANGLA	45	20	QUETTA	14.81

## 2. Drought Situation Analysis

The spatial drought monitor map based on the output results from different drought monitoring indices and Pakistan Meteorological Department ground station data across Pakistan is represented in Figure. 3.

Moderate Drought conditions may be observed in Nokundi, Jiwani, Gwadar while Mild Drought conditions may be observed in Sibi, Dalbandin, Kharan, Turbat, Jiwani, Awaran districts and coastal areas of Balochistan. In Sindh, Johi, Dadu, Tharparkar, Umerkot, Sanghar, Chorr districts while cholistan in Punjab Mild Drought consitions may be observed.

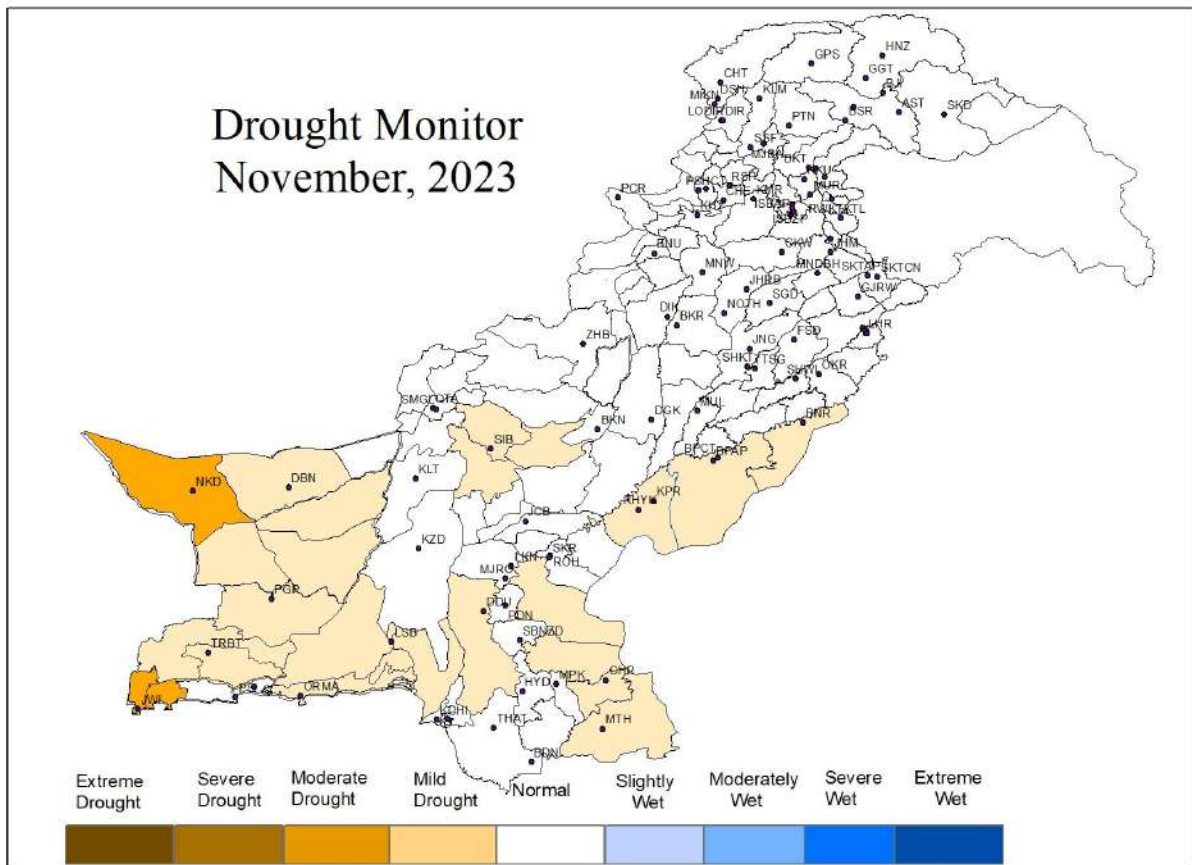
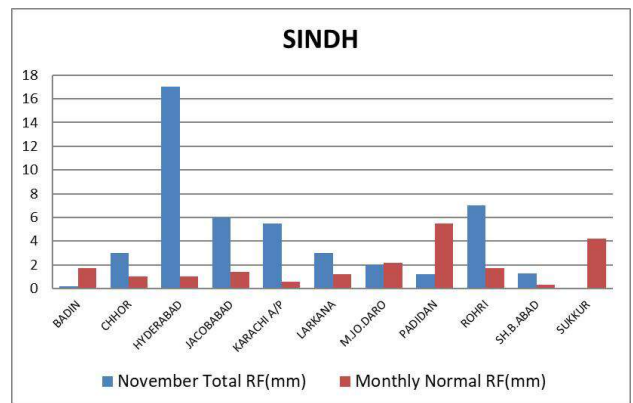
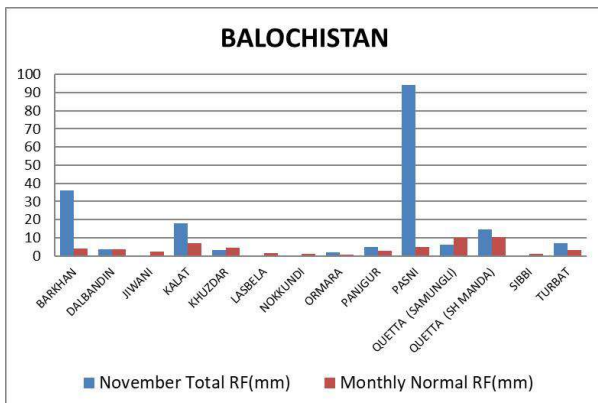
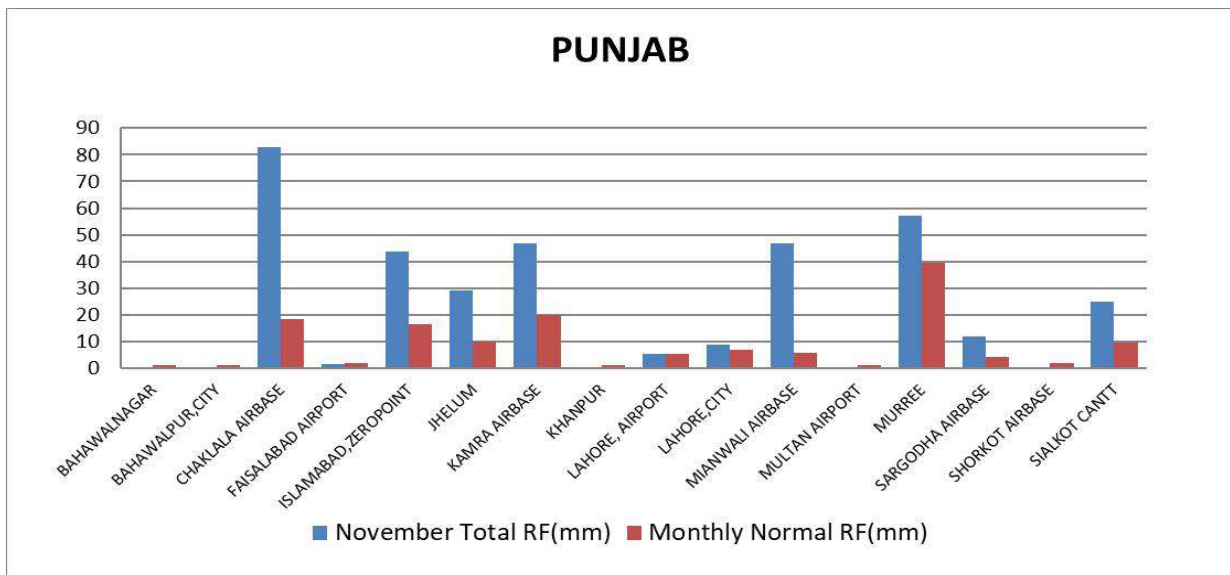
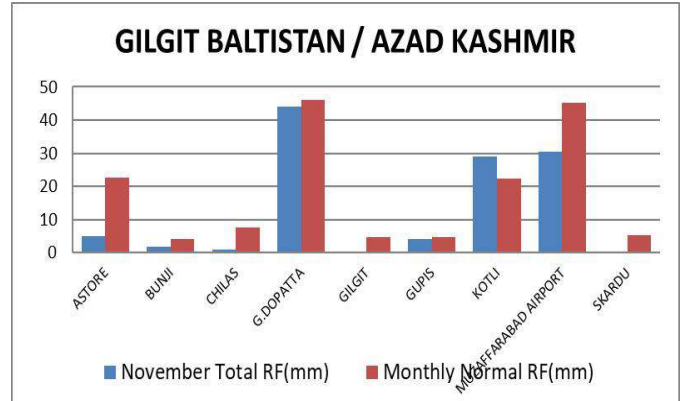
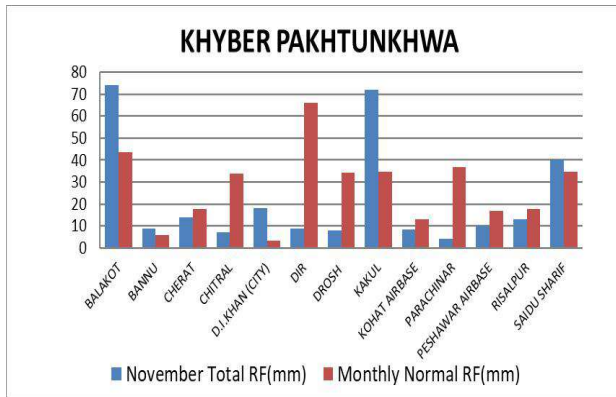


Figure 3: Drought Monitor of Pakistan

# I. Monthly Normal to Actual Rainfall Comparison for November-2023





## II. Normalized Difference Vegetation Index (NDVI)

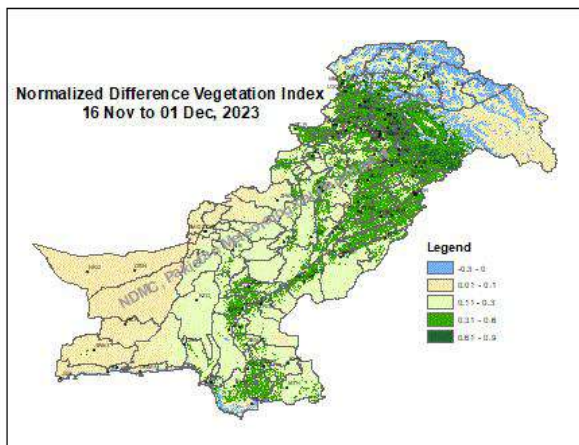


Figure 4: NDVI

Normalized Difference Vegetation Index values for November 2023 are shown in Fig.4. NDVI conditions in AJK, Punjab, Khyber Pakhtunkhwa, and along the Indus belt are good, depicting the wide spread vegetation in fields good conditions due to good chlorophyll content stored in the plants and the vegetation cover.

## III. Land Surface Temperature (LST)

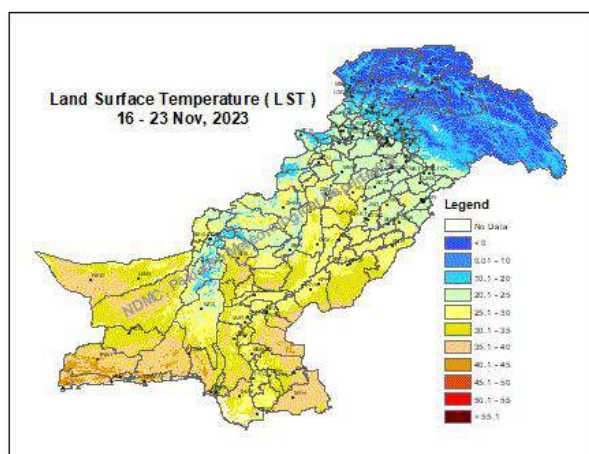


Figure 5: LST ( $^{\circ}\text{C}$ )

Land Surface Temperatures (LST) for the period 15 to 22 November 2023 are represented in Fig. 5. In the central parts of the country, average daytime temperatures were below  $25^{\circ}\text{C}$  while in lower parts of the country, the temperature was reported above  $30^{\circ}\text{C}$  during the period.

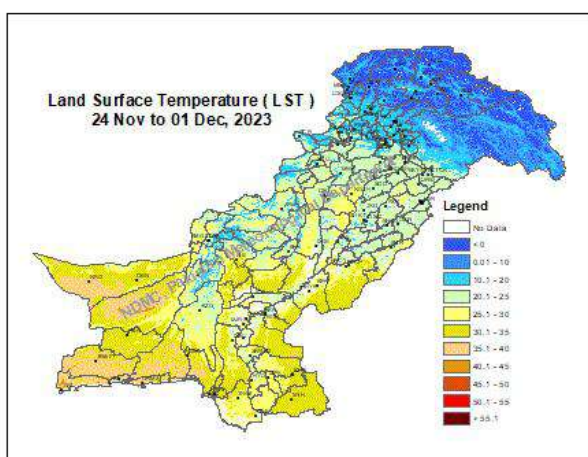


Figure 6: LST ( $^{\circ}\text{C}$ )

Land Surface Temperatures during the period 23 – 30 November are shown in Fig. 6. In some areas in the north parts of the country decrease in temperatures trend has been observed and in the south parts of country decrease in temperature has also been observed.

#### IV. Temperature Vegetation Dryness Index (TVDI)

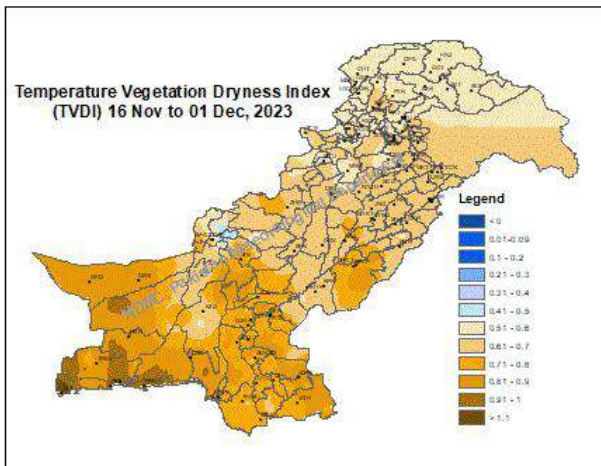
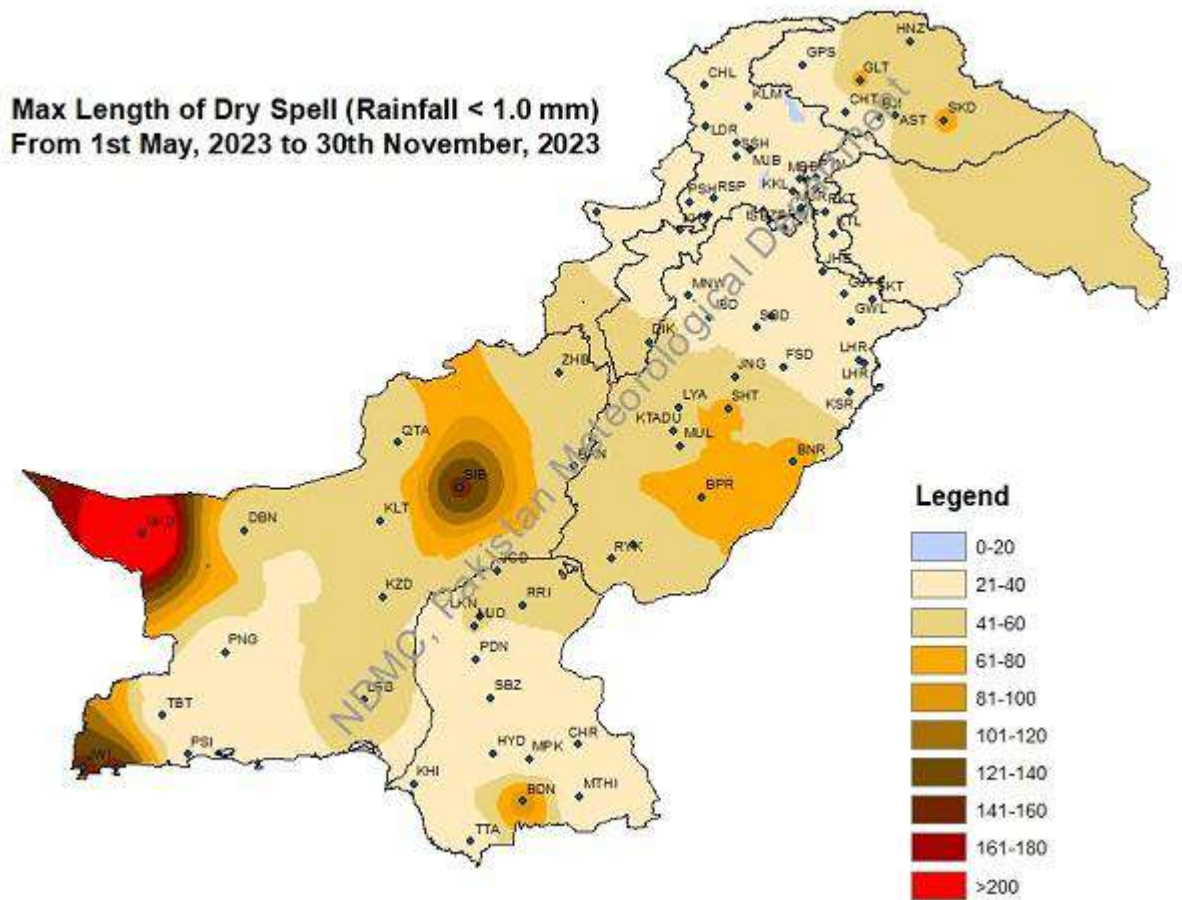


Figure 7: TVDI

Temperature Vegetation Dryness Index (TVDI) derived from MODIS products MOD13A2 (NDVI) and MOD11A2 (LST) is shown in Fig. 7, which indicates mild dry conditions are shown by the TVDI Index showing the start of dryness and less soil moisture conditions in the western Balochistan, coastal areas and some parts of Sindh and Punjab as well.

#### V. Length of Consecutive Dry Days:



### 3. Water availability/ Dams flow data:

In the month of November 2023, water inflow, outflow and levels of the Rawal, Khanpur, Tarbela and Mangla dams are shown in Figs. 8 & 9. The level at Terbela, Mangla and Khanpur reservoirs has dropped while at other major reservoir Rawal no change observed.

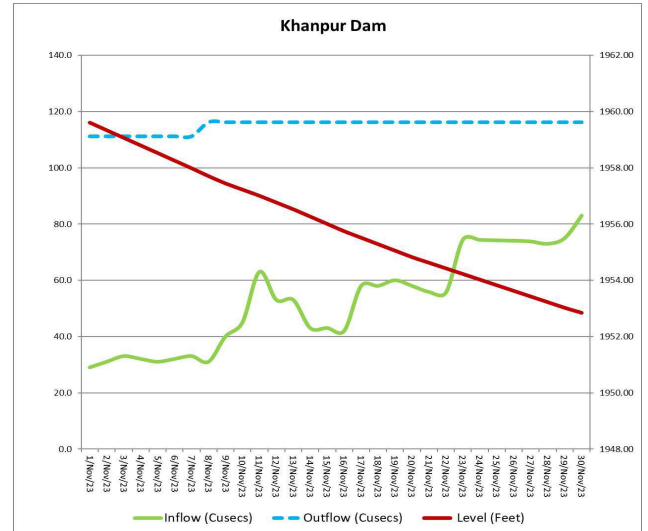
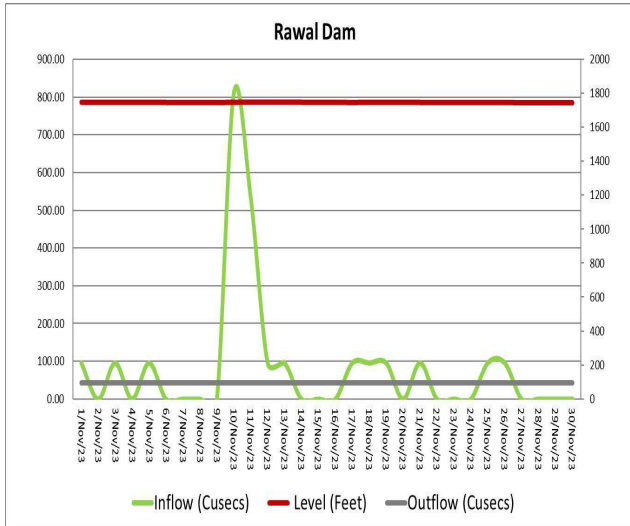


Figure 8: Water inflow, outflow and level of Rawal and Khanpur Dams

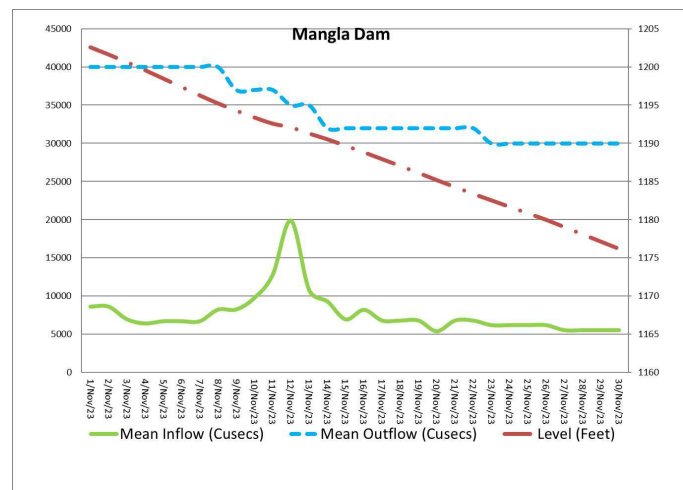
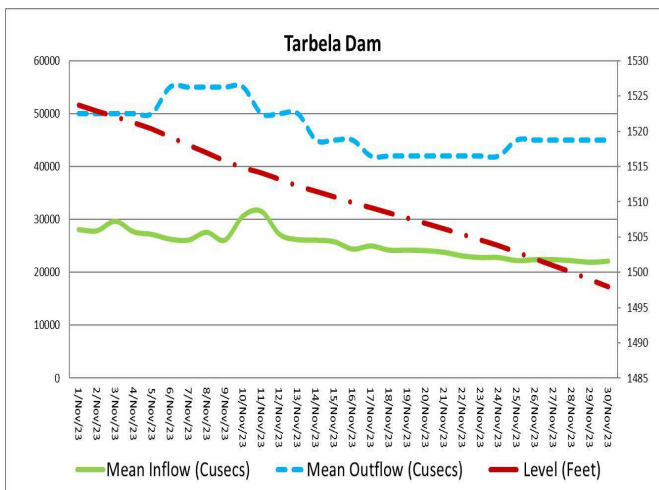


Figure 9: Water inflow, outflow and level of Tarbela and Mangla Dams



#### **4. Weather Outlook for December 2023**

Overall a tendency for normal to slightly above normal rainfall is expected in most parts of the country. The northern half of the country comprising of Khyber Pakhtunkhwa, Kashmir and northern Punjab are expected to receive slightly above normal rainfall during the forecast month. Sindh, southern Punjab and most parts of Balochistan and Gilgit-Baltistan may get near normal rainfall during December. Temperatures are expected to remain above normal nationwide, with maximum departure over Gilgit Baltistan, northern Khyber Pakhtunkhwa, Kashmir and western Balochistan.

#### **5. Drought Outlook for December 2023**

Keeping in view the forecast for December 2023, drought-affected areas of Sindh, Balochistan and Punjab Province may not get enough relief as compared to the previous month.

**All stakeholders are requested to make all efforts to save the water available across rain-fed areas of Sindh, Balochistan and Cholistan region in Punjab, especially in previously drought-affected areas and plan DRM activities accordingly.**

#### **6. Crop Condition:**

Sowing of rabi crops get momentum in December. The rainfall in the month of December would help to accelerate sowing of rabi crops in Khyber Paktunkhwa and upper parts of Punjab. Harvesting of kharif crops like maize, mung bean, sugarcane, peanut, sunflower, soybean, rice and cotton is almost finished.

## **Advice for Farmers:**

- I. Farmers are advised to schedule the irrigation plans in accordance with the expected weather.
- II. Removing weeds from the standing crops is very important as weeds utilize moisture and food which are to be utilized by the crop.
- III. Farmers of cotton crop are advised to prepare field for incoming Rabi crops and complete sowing in time.

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