

Monthly Drought Bulletin For the Month of December 2023

Highlights

- During the month of December 2023, Light to moderate rainfall events were reported in the country where as most of the areas in Balochistan, Sindh, Punjab and KP 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 January 2024, overall near 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, Gawadar, Ormara, Bolan, Sibbi while Mild Drought conditions may observed in Kharan, Kech, Turbat, Killa Saifullah, Quetta, Zhob districts and coastal areas of Balochistan. In Sindh, Dadu, Tharparkar, Umerkot, Sanghar, Khairpur, Ghotki, Thatta, Badin, Sajawal and Karachi districts while cholistan in Punjab Mild Drought conditions may be observed.
- Keeping in view the weather forecast for the month of January 2024, disaster management authorities are requested to plan DRM activities accordingly.

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This bulletin is regularly being published on monthly basis under the guidance of
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1. Weather Summary for the Month of December, 2023

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

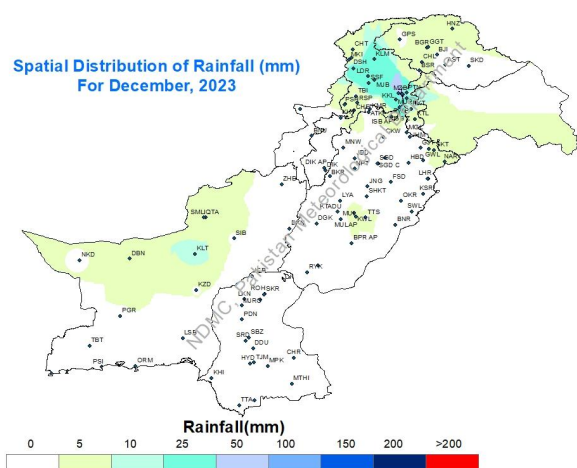


Figure 1: Spatial Distribution of rainfall

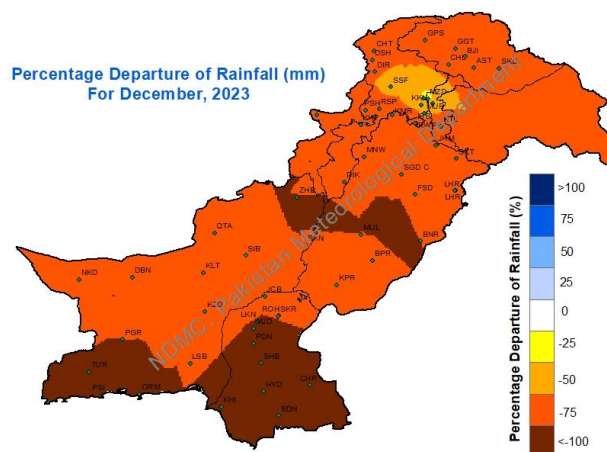


Figure 2: Percentage Departure of rainfall

Figure 2 depicts the percentage departure of rainfall from the normal. Below-normal rainfall was reported in Gilgit Baltistan, AJK Sindh, Balochistan Khyber Paktunkhawa, Punjab province.

Table-1: Chief amount of rainfall recorded across Pakistan during the month of December, 2023					
Sr.No.	Station	Rainfall(mm)	Sr.No.	Station	Rainfall(mm)
1	MUZAFFARABAD AIRPORT	33.31	11	KAKUL	9.01
2	BALAKOT	24.00	12	Vehova	8.20
3	Peshawar Airport	17.20	13	PATTAN	7.00
4	MURREE	17.01	14	RAWALAKOT	6.21
5	KALAM	14.60	15	KALAT	6.00
6	G.DOPATTA	13.00	16	Upper Dir	5.60
7	SAIDU SHARIF	12.60	17	DROSH	5.20
8	DIR	12.00	18	Bandi Abbaspur	4.50
9	LOWER DIR	12.00	19	MIRKHANI	4.00
10	MALAMJABBA	12.00	20	QUETTA (SAMUNGLI)	3.00

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, Gawadar, Ormara, Bolan, Sibbi while Mild Drought conditions may be observed in Kharan, Kech, Turbat, Killa Saifullah, Quetta, Zhob districts and coastal areas of Balochistan. In Sindh, Dadu, Tharparkar, Umerkot, Sanghar, Khairpur, Ghotki, Thatta, Badin, Sajawal and Karachi districts while cholistan in Punjab Mild Drought conditions may be observed.

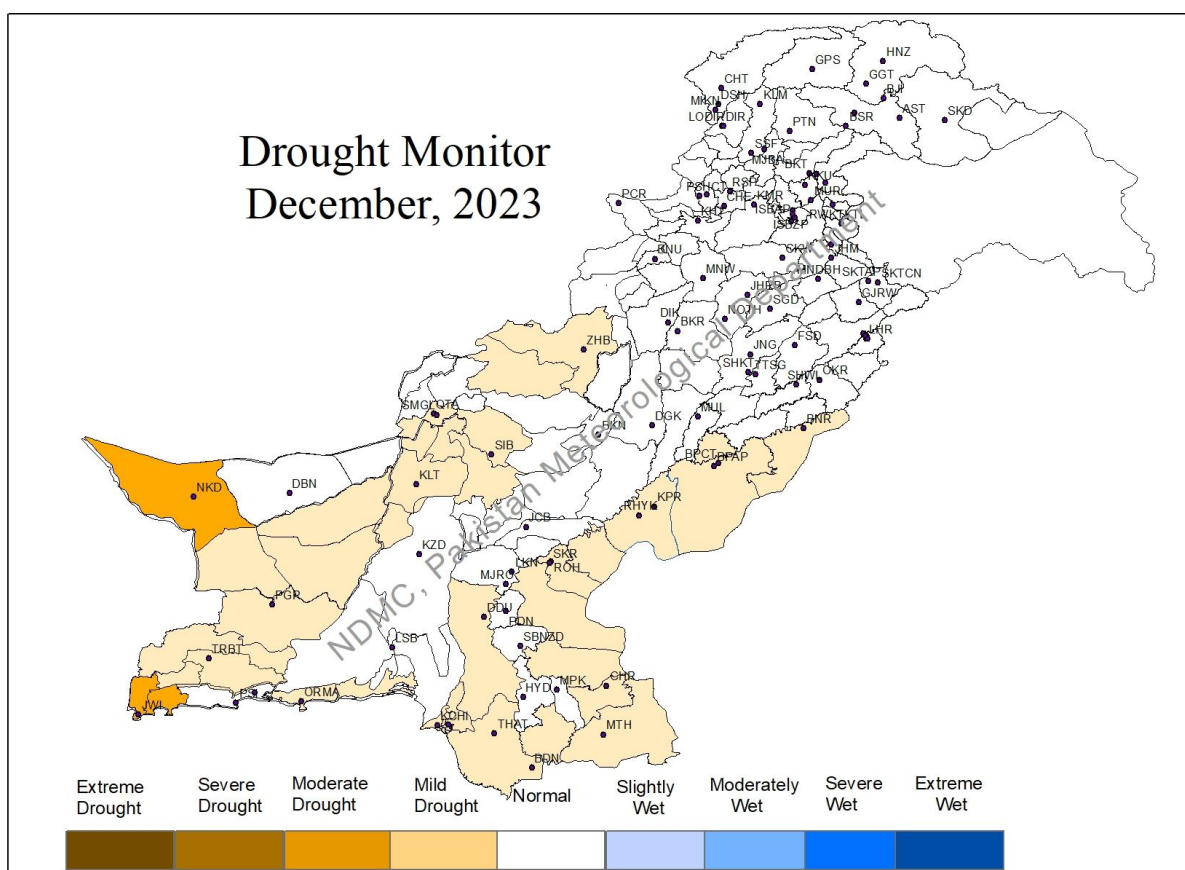
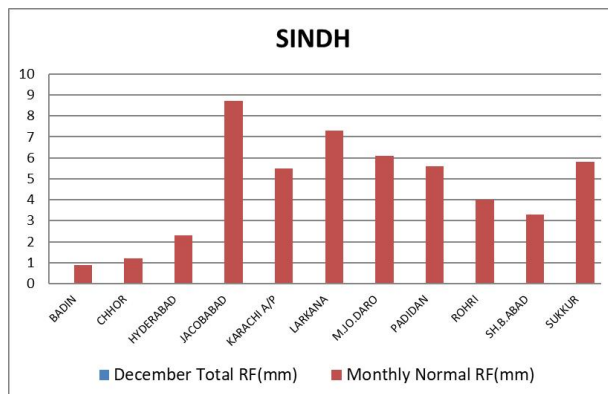
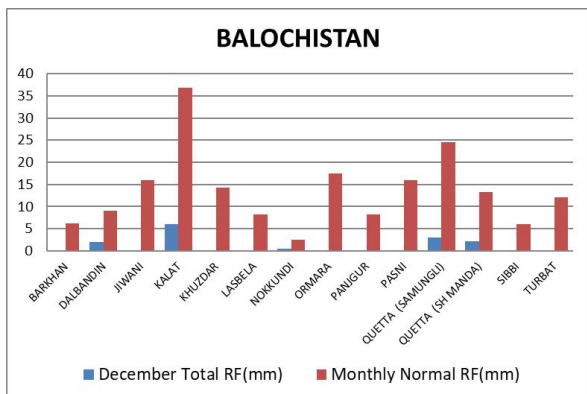
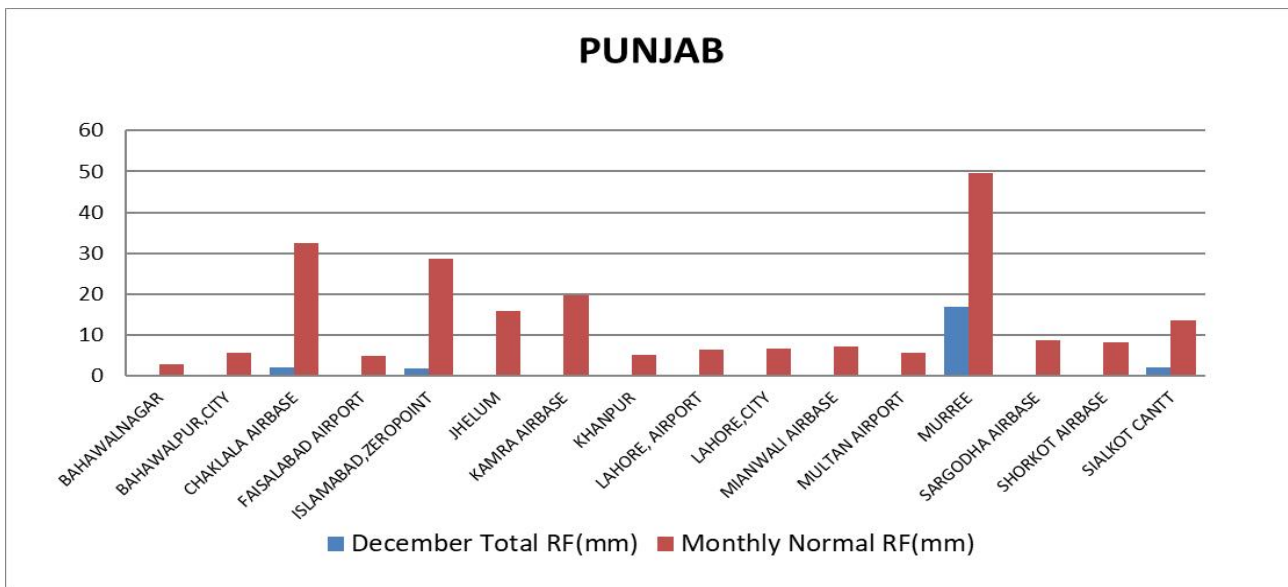
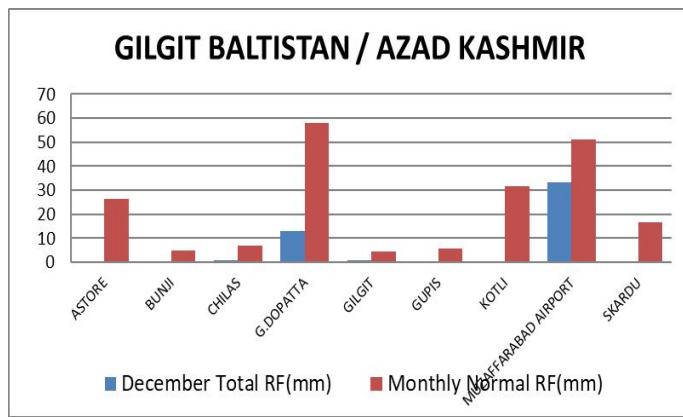
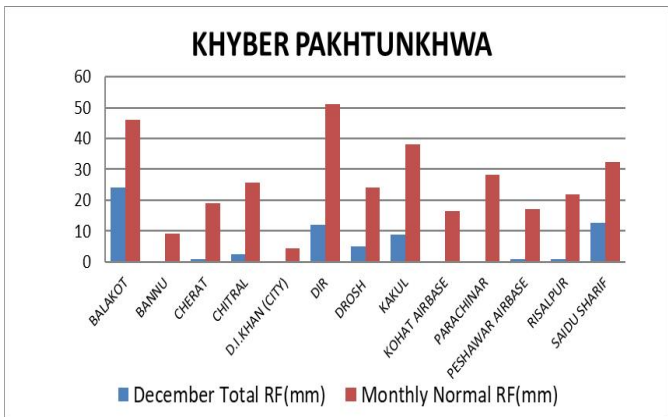


Figure 3: Drought Monitor of Pakistan

I. Monthly Normal to Actual Rainfall Comparison for December-2023



II. Normalized Difference Vegetation Index (NDVI)

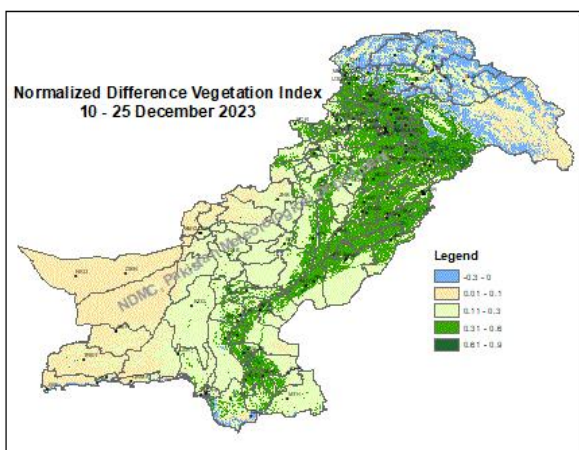


Figure 4: NDVI

Normalized Difference Vegetation Index values for December 2023 are shown in Fig.4. NDVI conditions in AJK, Punjab, Khyber Pakhtunkhwa, and along the Indus belt, depicting the wide spread vegetation in fields conditions of chlorophyll content stored in the plants and the vegetation cover in water stress areas are not good.

III. Land Surface Temperature (LST)

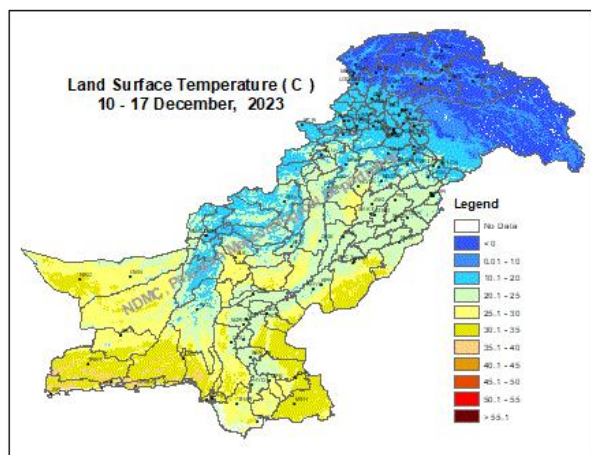


Figure 5: LST ($^{\circ}$ C)

Land Surface Temperatures (LST) for the period 10 to 17 December 2023 are represented in Fig. 5. In the central parts of the country, average daytime temperatures were below 20° C while in lower parts of the country, the temperature was reported above 25° C during the period.

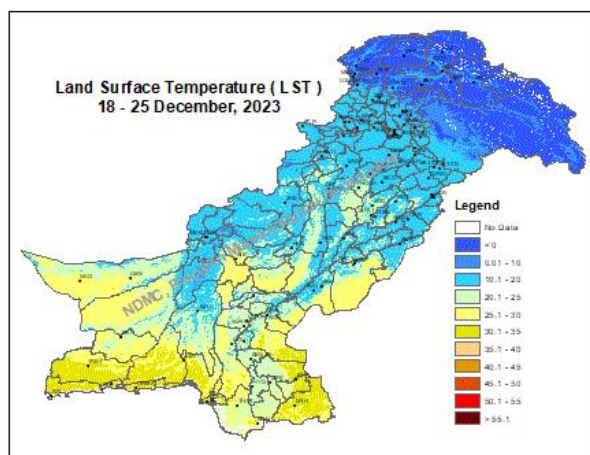


Figure 6: LST ($^{\circ}$ C)

Land Surface Temperatures during the period 18 – 25 December are shown in Fig. 6. In some areas in the north parts of the country decrease in temperatures trend has been observed and also in the south parts of country decrease in temperature has been observed.

IV. Temperature Vegetation Dryness Index (TVDI)

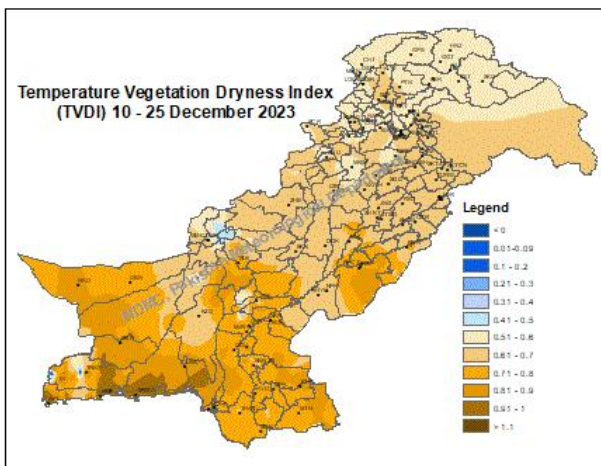
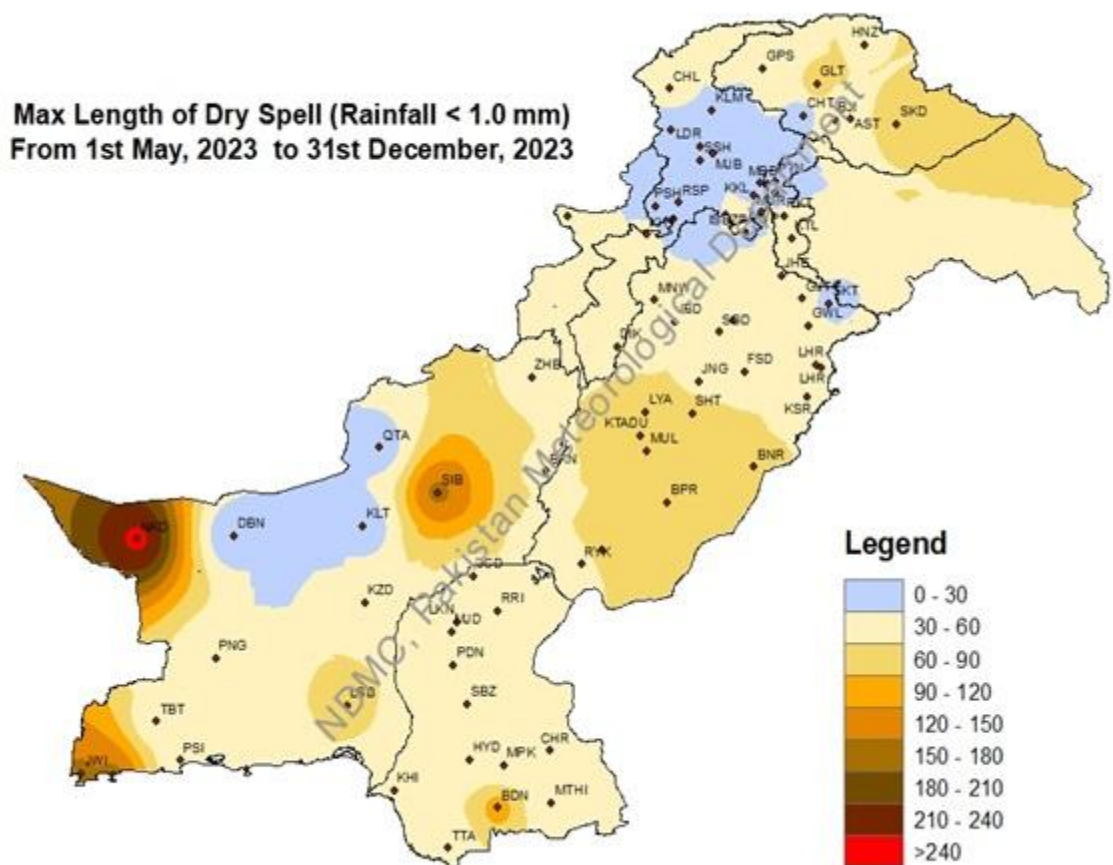


Figure 7: TVDI

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 December 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 January, 2024

Overall near normal rainfall is expected in most parts of the country. Mainly dry conditions are expected over the country for the forecasted month. Warmer daytime temperatures and colder nighttime temperature are expected in Upper Khyber Pakhtunkhwa, Gilgit-Baltistan, adjoining areas of Kashmir and Potohar region. Thick Fog is likely to persist in the plains of Punjab and Upper Sindh during the month of January 2024. A moderate amount of water would be available for standing crops and vegetables having positive impact on Rabi crops. Farmers in Barani areas may plan scheduled watering. Seasonal illnesses may prevail due to dry spell.

5. Drought Outlook for January, 2024

Keeping in view the forecast for January 2024, 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:

The sowing of Rabi crops in Pakistan stretches from mid September to the end of December. The night temperatures possesses a special significance, when they drop below freezing level (0°C) that would result in drop of temperatures in agricultural plains and produce frost, if protection measures are not taken, the frost may kill the crop plants and even sometimes badly affects their yield.

Advice for Farmers:

- I. In the rain-fed plains of Balochistan and Potohar Plateau, the farmers have to show an efficient rain water harvest skill for their crops.
- II. Farmers of rain-fed areas, obtaining crop water through tube wells are advised to schedule the irrigation according to the expected weather.
- III. Removing weeds from standing crops is very important as weeds utilize moisture, which should be utilized by the crop.
- IV. Due to further drop of temperatures, especially farmers of upper areas of the country are advised to protect their crops from the coming season of frost.

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