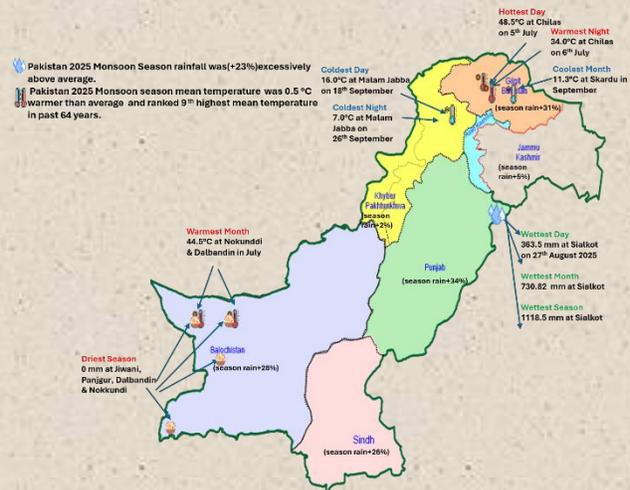




## **Monsoon 2025 (1 July - 30 September) Report**

### **1. Pakistan Monsoon (July-September) highlights in 2025**

- A well-marked low intensified into a deep depression crossed the Sindh-Makran coast, in the month of September, which is a rare occurrence for that month.
- Monsoon rainfall during 2025 was above average (+23%) with national total rainfall of 172.8mm.
- Monsoon rainfall was above average over Punjab with (+34%), Gilgit Baltistan (GB) with (+31%), Balochistan with (+28%) and Sindh with (+26%). Whereas AJK with (+5) and Khyber Pakhtunkhwa (KP) with (+2%) were near average.
- The Monsoon rainfall in 2025 over Punjab, Gilgit Baltistan, Balochistan and Sindh were above average.
- Monsoon season 2025 national mean temperature of 30.39 °C, for Pakistan, as a whole, was 0.5 °C warmer than average and ranked 9<sup>th</sup> highest mean temperature in past 64 years (the record is 30.63 °C in 2019).
- The heaviest one-day rainfall of 363.5 mm occurred at Sialkot cant (Punjab) on 27<sup>th</sup> August 2025. The same station observed the wettest month with a total of 730.8 mm in August-2024 and the wettest season with a total of 1118.5 mm rainfall.
- The hottest day of the season was observed at Chilas on 5<sup>th</sup> July 2025 (Gilgit-Baltistan) recorded a maximum temperature of 48.5 °C. Whereas the stations Dalbandin & Nokkundi recorded the warmest month temperature with highest mean monthly maximum temperature of 44.5 °C.
- The coldest night temperature (7.0 °C) of the season was recorded at Malam Jabba (Khyber Phaktunkhwa) on 26<sup>th</sup> September 2025. Whereas, the station Skardu (GB) recorded the coolest month's temperature with lowest mean monthly minimum temperature of 11.3 °C in September 2025. (**Fig-1**)



**Fig-1: Significant climate events during monsoon-2025**

## 2. Introduction

Monsoon is a vital natural source of fresh water that replenishes wells, aquifers, rivers, and stream resources crucial for irrigation, domestic use, and hydroelectric power generation. Timely and adequate monsoon rains are essential for agriculture, livestock, sustaining river and stream flows, refilling reservoirs, and recharging groundwater. A good monsoon not only supports the growth of Kharif crops but also keeps the soil sufficiently moist, which benefits the subsequent Rabi crops. As a result, overall agricultural productivity and exports receive a boost, contributing to economic growth. However, excessive rainfall such as the devastating monsoon Pakistan experienced in past 2022 and same in 2025 can lead to widespread destruction, including floods, infrastructure damage, and displacement. Conversely, deficient monsoon rains can trigger drought-like conditions, leading to food insecurity, dry vegetation, falling water levels in lakes and reservoirs, land subsidence, seawater intrusion, and damage to ecosystems.

## 3. Monsoon 2025

This year, the monsoon season set in Pakistan on **June 26, 2025**, four days earlier than its usual start date of July 1<sup>st</sup>. However, keeping in view of the normal Monsoon climatology of this region, this report focused on July, August September only. **July 2025** experienced slightly above average rainfall, however Flash Flood situations seen in Kashmir, Khyber Pakhtunkhwa, Punjab, and low-lying areas of Balochistan and Sindh. In **August 2025**, it exhibited above average rainfall and caused extremely high-level floods in Punjab and GLOF situation along with flash floods occurred in Khyber Pakhtunkhwa, Gilgit-Baltistan & Kashmir. **September 2025** can be recognized as largely above average rainfall. In this month, a monsoon low developed over Bay of Bengal on 4<sup>th</sup>, converted into a well-marked low on next day then further intensified into a depression over southwest Rajasthan (India) on 7<sup>th</sup>, became more strengthened into deep depression, moved towards Southeast Sindh and adjoining Indian Rajasthan on 8<sup>th</sup>, weakened into a depression over southern Sindh then weakened into a low pressure over Balochistan Coast and finally became less marked on 12<sup>th</sup>. This formation of deep depression, crossing Sindh and effecting Balochistan Coast was a rare phenomenon of its kind in the month of September. Resultant widespread Rain/Thunderstorms with heavy to extremely heavy falls in Khyber Pakhtunkhwa, Punjab, Gilgit- Baltistan, Kashmir, Sindh and moderate to heavy rainfall occurred in Balochistan during the month.

To sum it up, Pakistan experienced an above-average rainfall during the entire monsoon season with a +23% deviation from the normal. On a regional scale, Punjab with 310.1 mm (+34%), Gilgit-Baltistan with 51.9mm (+31%), Balochistan with 74.8mm (+28%) and Sindh with 168.8 mm (+26%) all recorded above- average rainfall. In contrast with the Azad Jammu and Kashmir (AJ&K) with 407.8mm (+5%) and Khyber Pakhtunkhwa (KP) with 260.7mm (+2%) received near-average rainfall. (**Fig. 2a & Table-1**). **Fig. 2b** shows the spatial distribution seasonal (JAS) rainfall and **Fig-3** gives the cumulative monsoon rains of during this season.

#### 4. The Climate drivers and Synoptic Features during Monsoon 2025:

- The Niño Indices with a slightly negative tilt remained in neutral phase during the JAS monsoon season. i.e. neither La Niña nor El Niño with sea surface temperatures (SST) anomaly around  $-0.37^{\circ}\text{C}$  over the central equatorial Pacific Ocean.
- Madden-Julian Oscillation (MJO) being in phases 2,3 over the Indian Ocean during 13-23 August caused widespread rainfall in Sindh and adjoining Balochistan and also during first 10 days of September 2025 led to largely above-average rainfall across Pakistan.
- Indian Ocean Dipole (IOD) changed into negative phase in August and September.
- The monsoon axis remained northward from its mean position during July caused widespread heavy to very heavy rainfall and (extremely heavy at few places) occurred in Khyber Pakhtunkhwa, Gilgit-Baltistan, Kashmir, Punjab and at scattered places in Balochistan & Sindh during first half of the month. During mid of August, the Monsoon axis was shifted toward south of its normal position resultant widespread rainfall in Sindh and adjoining Balochistan. Whereas in September the Monsoon axis shifted again toward south during first ten days of the month caused widespread heavy rainfall in Sindh and adjoining Balochistan.
- Three low-pressure areas (LPAs) moved over Pakistan during July-2025 with heat-low (average pressure 991 hPa) persisted over Northwest Balochistan/West Balochistan. During August-2025, Two LPAs moved over the country with heat-low (average pressure 995 hPa) persisted over Northwest Balochistan. Whereas A well-marked LPA approached in September became a deep depression (average pressure value 1000.2 hPa). The tracks of LPAs are depicted in **Fig-4**.

These factors played a significant role in final shape up of the Monsoon 2025.

##### **July 2025:**

- Monsoon currents converged over the country at regular intervals (1-2, 8-17, 18-20 and 25-31 of July) during the month pouring light to moderate rainfall spell (**Fig-5**).
- National rainfall was above average (+22.8%) across Pakistan.
- Regions experienced more or less a similar situation i.e. Punjab (+57.3%), GB (+52%) recorded largely above-average rainfall, Balochistan (+32.5%) and AJ&K (+13.7%) an above average rainfall and KP (+4%) recorded a near average rainfall. In contrast, Sindh (-47.5%) was the only region to have a well below average rainfall (**Table-1**).
- Flash Flood situations seen in Kashmir, Khyber Pakhtunkhwa, Punjab, and low-lying areas of Balochistan and Sindh.

##### **August 2025:**

- August saw the two monsoon LPAs (18-27 and 28Aug-01Sep) with few widespread heavy to extremely heavy falls (**Fig. 6**).
- In contrast to July, however slightly above-average rainfall was experienced in August with National rainfall being +11%.

- GB (+44%) has recorded well above average rainfall, Balochistan (+24%) was above average, AJK and Punjab (+11%) slightly above average, KP (+7%) and Sindh (+1%) recorded near average rainfall (**Table-1**).
- Heavy to very heavy rainfall events in later half of the month caused extremely high-level floods in Punjab and GLOF situation along with flash floods occurred in Khyber Pakhtunkhwa, Gilgit-Baltistan & Kashmir.
- New record for heaviest one-day rainfall was set at Sialkot Cant with 363.5 mm on 27<sup>th</sup> August 2025.

### September 2025:

- September also saw three rainy spells (1-4, 6-10 and 16-20) of heavy to extremely heavy intensity which rendered it largely above average by +52% (**Fig. 7**).
- Sindh (+315%) experienced excessively above-average rainfall, Punjab (+25.1%), Balochistan (+23.7%) exhibited above average rainfall, While AJ&K (-33.6%), GB (-21.7%) and KP (-17.7%) exhibited below average rainfall (**Table-1**).
- The record-breaking wettest month rainfall was recorded at Thatta 197.0 mm.
- Whereas new record for one day rainfall also recorded at Thatta 110.0 mm (10Sep2025), Ormara 30.0 mm (11Sep2025) and Gwadar 5.4 mm (11Sep2025).

These variations in rainfall are indicative of the dynamic nature of the monsoon season in Pakistan.

### 5. Minimum and Maximum Temperature Trends during Monsoon-2025:

The mean minimum temperature anomalies (-1.0°C to +5.3°C) for the monsoon 2025 season were considerably higher over the western Balochistan (**Fig. 8**). The mean maximum temperature anomalies were in the range of -2.4°C to +2.8°C and found higher western Balochistan and Gilgit-Baltistan. (**Fig. 9**).

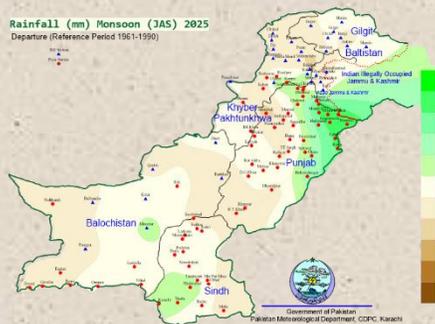


Fig. 2(a). Rainfall departure during monsoon 2025

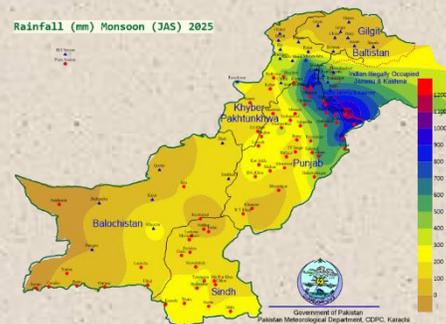


Fig. 2(b). Monsoon-2025 rains' spatial distribution

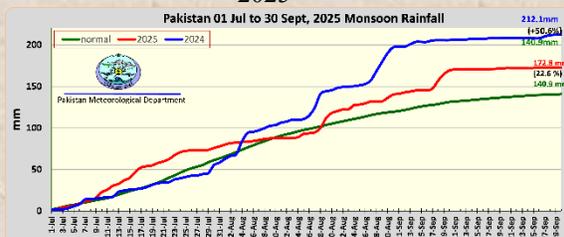


Fig. 3. Comparative cumulative rainfall (2024, 2025)

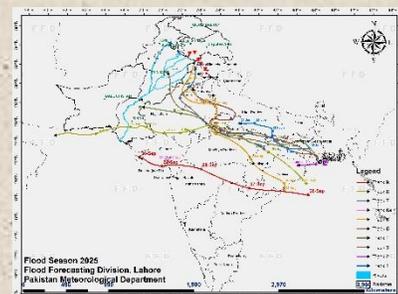


Fig. 4. Monsoon LPAs tracks during Jun-Sep 2025

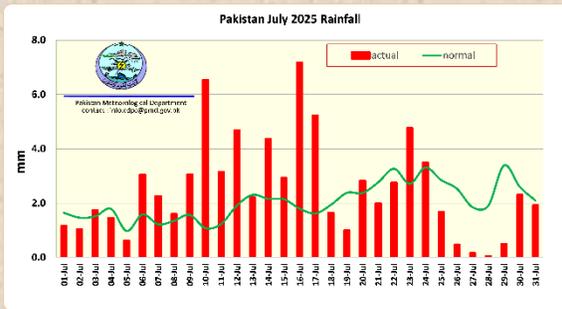


Fig. 5. July 2025 daily rainfall

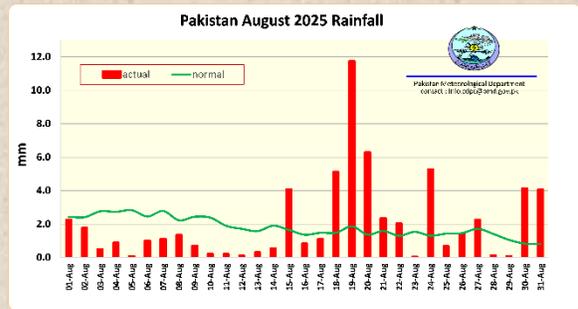


Fig. 6. August 2025 daily rainfall

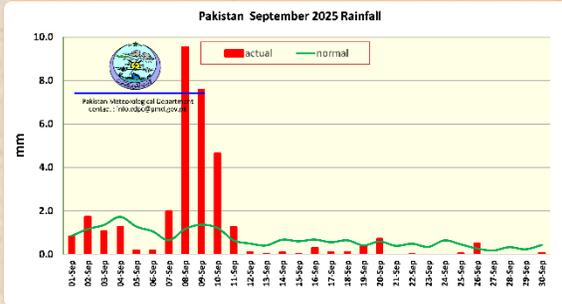


Fig. 7. September 2025 daily rainfall

Monsoon Rainfall Monthly Deviations (%)				
Regions	Jul	Aug	Sep	Jul to Sep
Pakistan	23	11	52	23
Azad J&K	14	11	-34	5
Balochistan	33	24	24	28
Gilgit-B	52	44	-22	31
Khyber-PK	4	7	-18	2
Punjab	57	11	25	34
Sindh	-47	1	316	26

Table 1. Monthly & seasonal rains departures

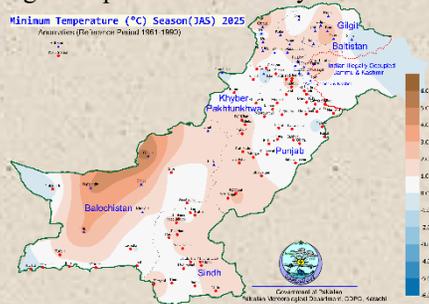


Fig. 8. Minimum Temperature Anomaly Monsoon 2025

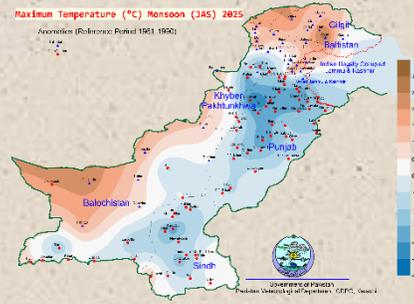


Fig. 9. Maximum temperature Anomaly Monsoon 2025

## 6. Damages reported during the Monsoon-2025

According to the National Disaster Management Authority<sup>1</sup>, about 949 people have been died, 964 people have been injured, about 1981.37km of roads, 239 bridges, 12447 houses and 6452 livestock have been affected/damaged during Monsoon from 1<sup>st</sup> July to 20<sup>th</sup> September 2025.

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### Reference

1. NDMA <https://www.ndma.gov.pk/sitrepm>