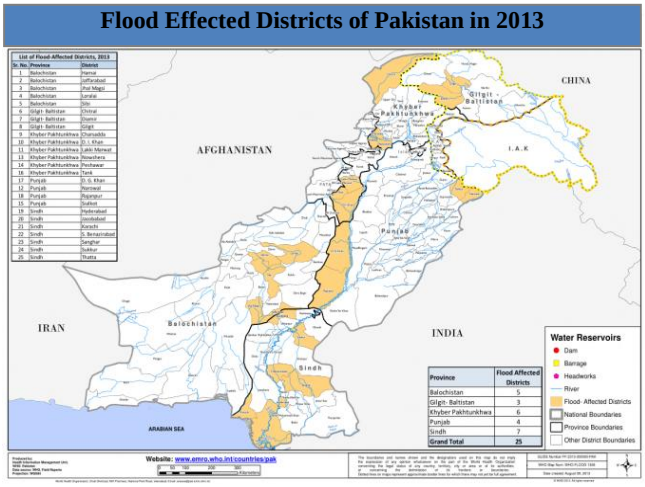
Pakistan Meteorological Department



Province	Flood Affected Districts
Balochistan	5
Gilgit- Baltistan	3
Khyber Pakhtunkhwa	6
Punjab	4
Sindh	7
Grand Total	25

2013

Climate of Pakistan (2013)

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Climate of Pakistan in 2013

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Climate of Pakistan in 2013

1. Introduction

Temperature and precipitation are two major elements which determine the climate of any region. Any persistent change in both or one with respect to the long term mean or normal values leads to the climate change of that region. Highlights of the analysis for the climate of Pakistan in 2013 are listed below.

2. Temperature

Average Monthly Temperatures of Pakistan for the year 2013 are compared with Average Monthly Normal Temperatures (1981-2010) in figure 1.

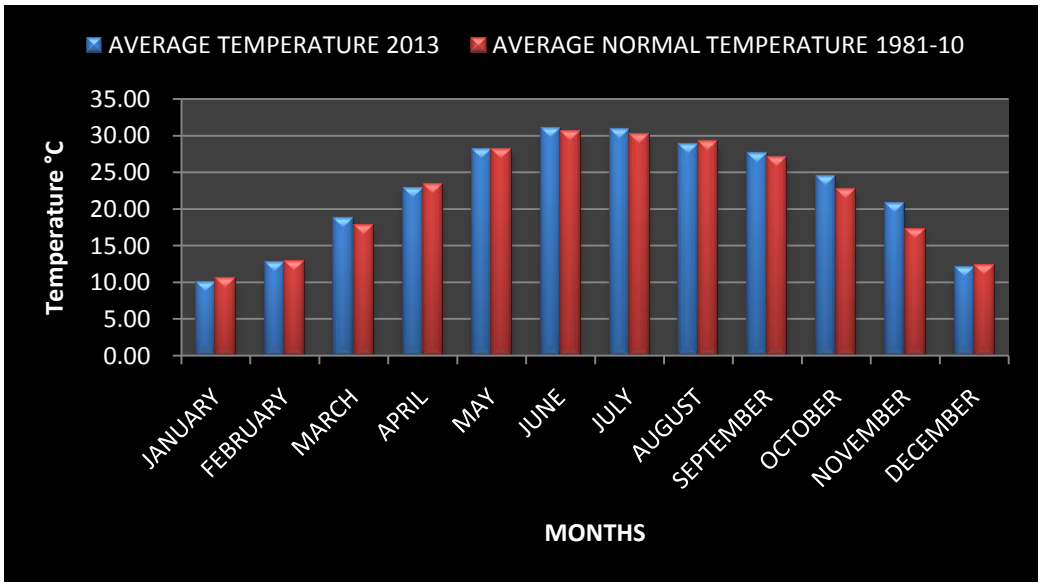

Figure 1: Departures of 2013 mean monthly temperatures from Normal (1981-2010)

Monthly mean temperatures of 2013 were above the 1981-2010's average in October and November,; while in August were slightly below it. February, May and June temperatures were equal to normal and of January, March, July, August and September were near normal (Fig. 1).

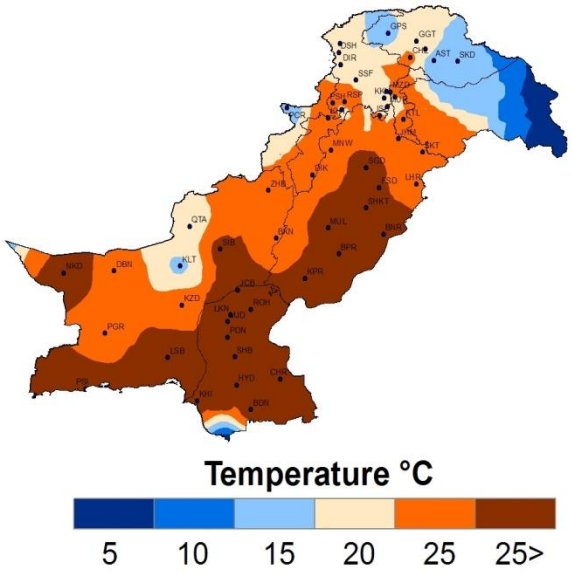

Figure 2: Spatial Distribution of Mean Annual Temperatures of Pakistan for 2013

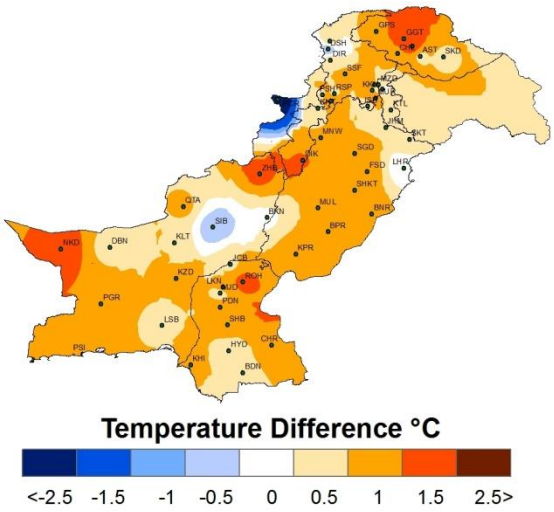

Figure 3: Mean Annual Temperatures (2013) Difference from Normal

Annual Mean Temperatures (actual) for 2013 remained on higher side in most of the country (Fig. 2). Whole Sindh, Punjab and major Portion of Baluchistan experienced temperatures ranging from 24^0C-27^0C or even higher. Only a narrow belt of Northern areas had temperatures ranging from 3^0C-10^0C. Figure 3 above shows mean annual temperature departures from Normal 19981-2010.

3. Rainfall

2013 has overall been a wet year as shown in figure 4 below. Most parts of the country received plentiful rainfall. The previous drought spell was broken. Although Jan was a bit dry but February remained near to normal (1981-2010), March quite above normal and April again near to normal. High above normal precipitation in May carried the moisture to Jun and July which experienced below normal rains. High above normal precipitation in August led to flood situation in Punjab and Sind. Overall major areas of the country experienced normal to wet conditions except small regions of southern Sind and extreme Northern parts of Pakistan.

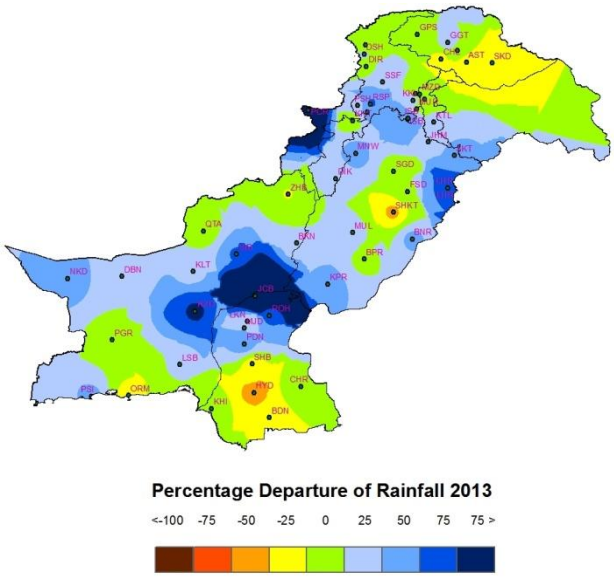

Figure 4: Percentage departure of 2013 Rainfall from Normal 1981-2010

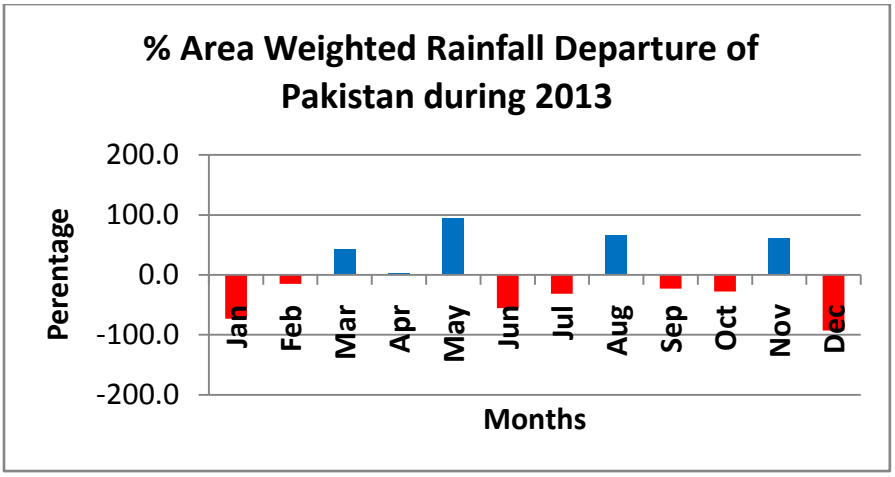

Figure 5: Percentage Departures from Normal of Rainfall 2013

In figure 5, percentage area weighted departure of monthly rainfall of 2013 from normal monthly rainfall of 1981-2010 has been shown. January, February, Jun, July, September, October and December seen below normal precipitation whereas in the months of March, May, August and November rainfall was above normal. It was near normal in April and abnormally high above normal in May. December remained driest month of the year.

The northern half of the country received heavy rains during monsoon (July– September), which not only fulfill the water requirement of kharif season but also provide the better conditions of soil moisture for sowing of Rabi crops. Therefore, the initial demand (November) of water was met through post monsoon conserved soil moisture. Afterwards rains also satisfy the crop water requirement to some extent up to wax maturity (reproductive stage of Rabi crops). After this stage hot and dry weather conditions are the pre-requisite for attaining rapid maturity.

In 2013, the heavy rainfall caused a lot of damage to standing crops in southern parts of Pakistan especially the Sindh region during monsoon. But this rainfall brought a positive change in the dry areas of Sindh and proved too beneficial for holding the soil moisture for the cultivation of for Rabi season. This rainfall proved to be helpful to eliminate the moisture stress conditions in the country. The winter rainfall also proved to be very helpful for the Rabi crops when it was on flowering stage in most of the rainfed areas. The long spell of rainfall not only fulfilled the water requirement of the crops but also play a role to reduce the drought intensity in the country.

Spatial distribution of total annual rain fall over Pakistan for 2013 depicts extreme rainfall over northwestern Punjab and Eastern KPK which exceeded 1000mm (Fig.6). It is obvious from fig. 5 that it happened in the months of August and November. August rainfall led to flood 2013 in Punjab (Sheikupura, Naroval and Sialkot). Lower half of Baluchistan received very little rainfall ranging from 25 to 200 mm which is leading most of the areas there towards meteorological drought conditions.

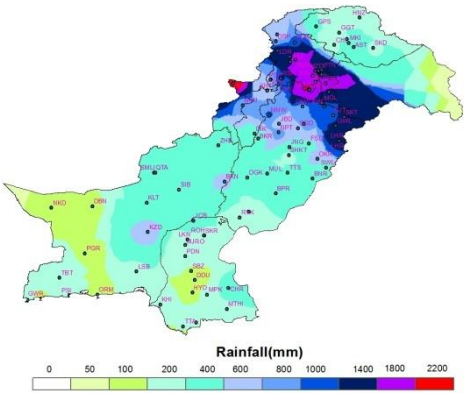

Figure 6: Spatial Distribution of Annual total Rainfall over Pakistan for 2013

4. Extreme Events

Highest Maximum and lowest Minimum Temperatures of Province-wise cities of Pakistan during 2013 are shown in Figure 7(a-e).

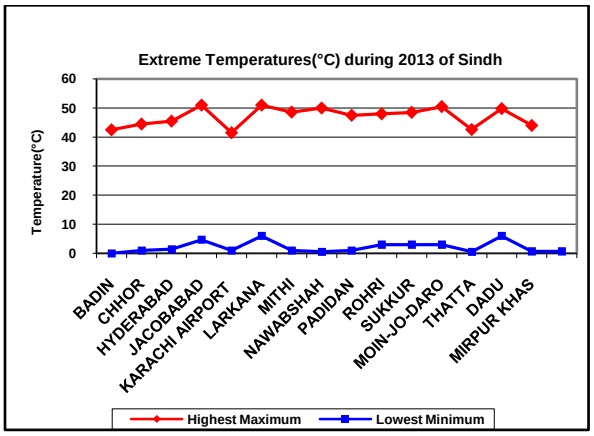

Figure 7 (a): Extreme Temperatures of Sindh

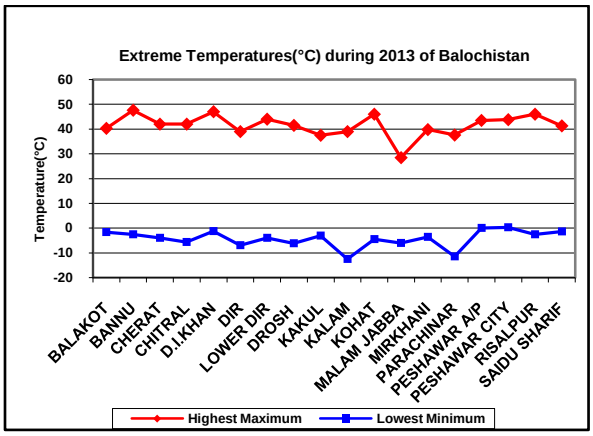

Figure 7(b): Extreme Temperatures of Balochistan

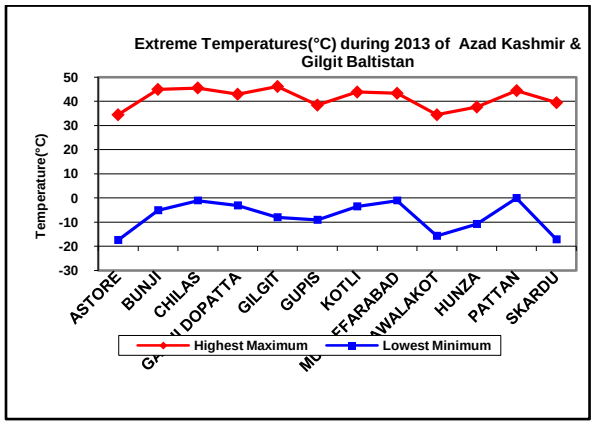

Figure 7 (c): Extreme Temperatures of AK & GB

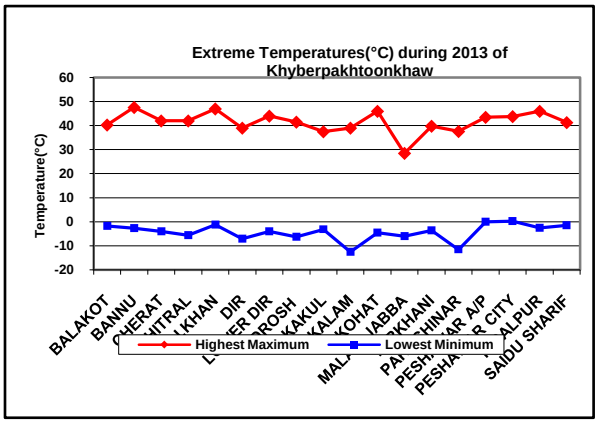

Figure 7 (d): Extreme Temperatures of KPK

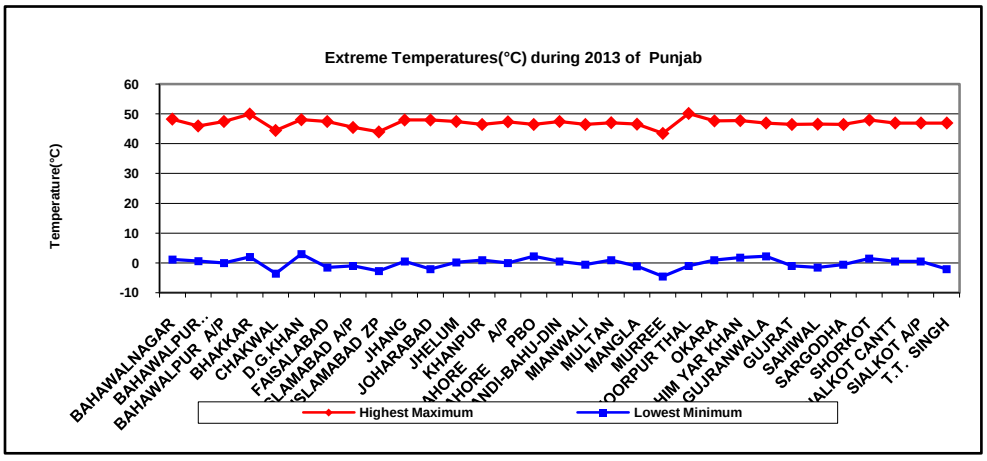

Figure 7 (e): Extreme Temperatures of Punjab

Highest daily Rainfall in 2013 for different cities of Pakistan Province-wise is given in Figure 8(a-e).

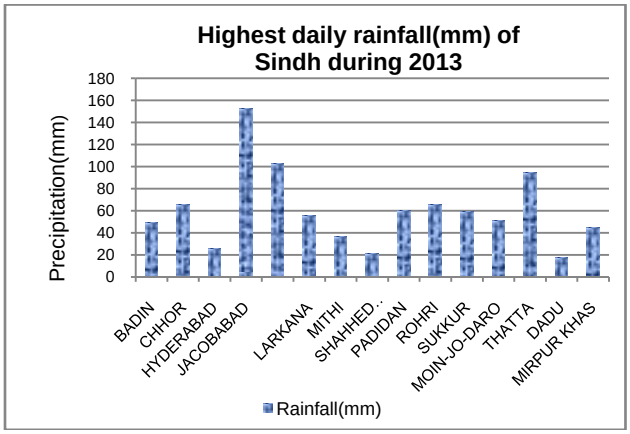

Figure 8 (a): Highest daily Rainfall of Sindh

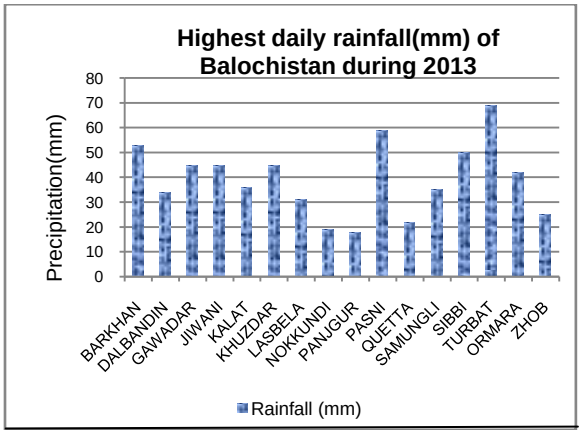

Figure 8 (b): Highest daily Rainfall of Balochistan

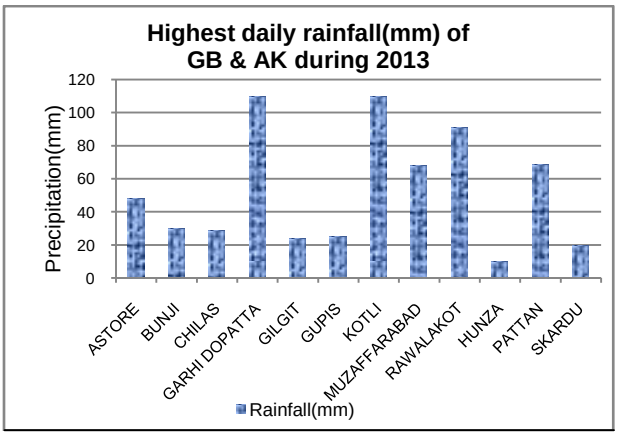

Figure 8 (c): Highest daily Rainfall of AK & GB

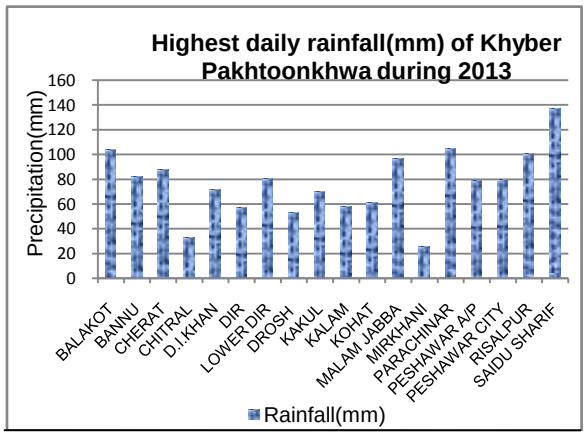

Figure 8 (d): Highest daily Rainfall of KPK

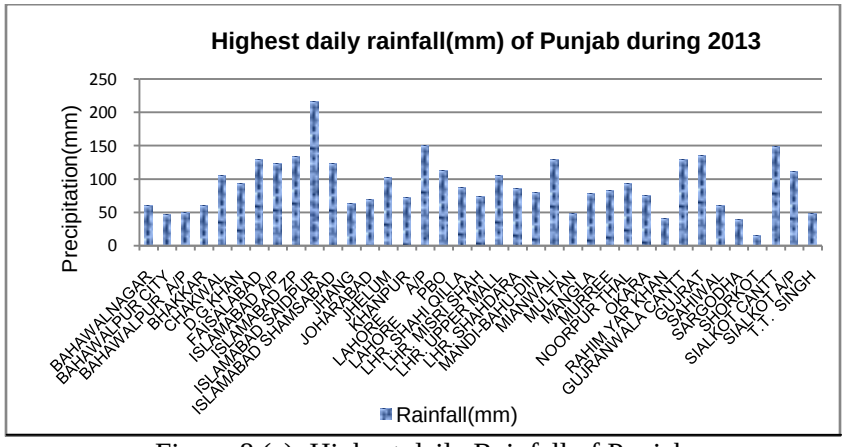

Figure 8 (e): Highest daily Rainfall of Punjab

5. Other extreme Events of 2013

(a) Heat Wave / Highest Temperature at Larkana during May, 2013

The definition of heat wave recommended by the World Meteorological Organization is when the daily temperature of more than five consecutive days exceeds the average maximum temperature by 5°C (9 F), the normal period being 1971-2000. An analysis of extreme temperatures during 1965-2009 shows that major parts of the country have been experiencing a warming trend. The frequency of extreme maximum temperature events are increasing significantly in Northern Areas, Southern Punjab, Sindh and Baluchistan.

Although there was no reported instance of heat wave in the country during 2013, as this remained a cool year. Yet Larkana touched 51 degrees Celsius of mercury on 19th May, which is the record highest temperature since 1998.

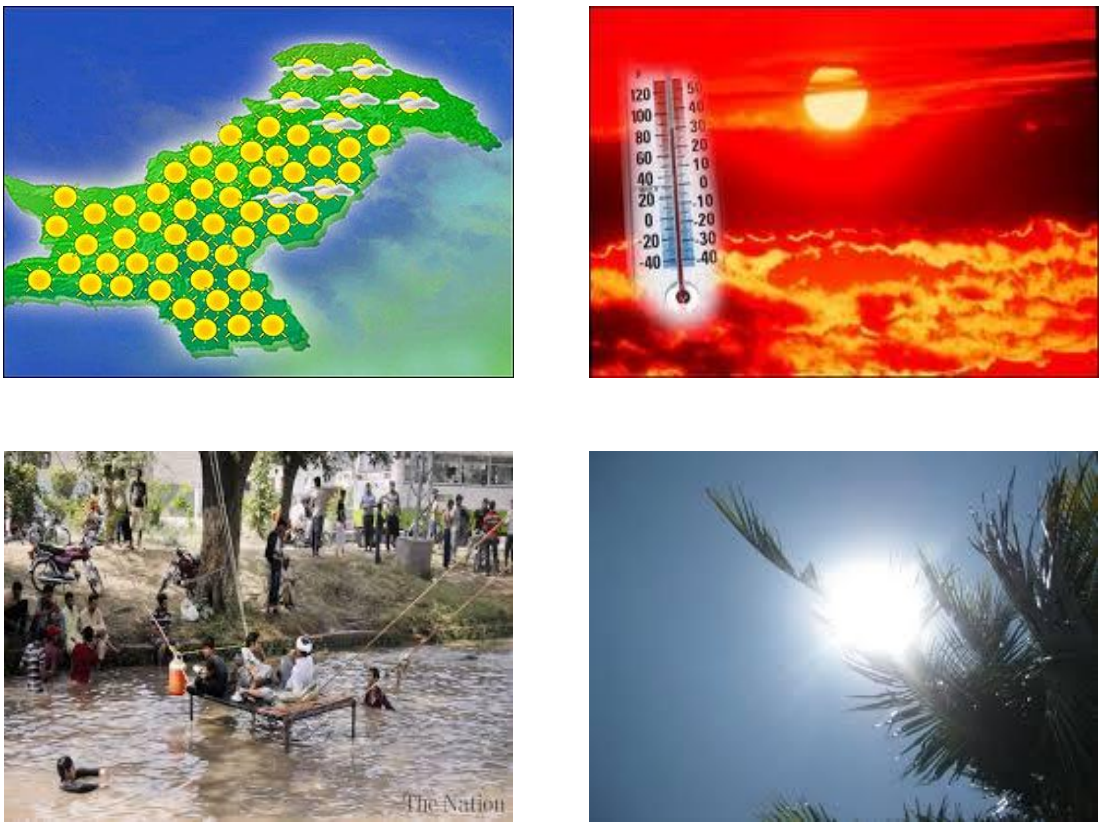

Figure 11: Scenes of hot summer in Pakistan during 2013

(b) Flash Flood / Flood in Punjab and Sind in August / September, 2013

The monsoon this year gave abnormally high rainfalls in Punjab and Sindh affecting a vast area with prolonged flood activity.

A few stations of Punjab experienced flood from 8th August to 1st September due to heavy rainfalls in August 2013. Among these Islamabad received 670 mm in August and 336 mm in September, Lahore received 513 mm in August and 168mm in September and Murree received 428 mm in August and 203 mm in September. Other above Normal rains of August are: Faisalabad 159 mm, Mianwali 150 mm and Sialkot 670 mm.

Sindh received its major rainfall on August 3th and 4th due to a monsoon weather system. Most of the stations received high above Normal August rainfall Chhor received 127mm rainfall whereas Jacobabad, Karachi, Larkana, Moenjodaro, Rohri and Thatta received 295, 106, 91, 66, 85 and 104 millimeter of rainfall respectively in August 2013.
Figure 12 is the pictorial show of the event.

Figure 12: Scenes of flash flood/flooding in Punjab and Sindh during 2013

6. Drought Monitor

National Drought Monitoring Centre of PMD monitors drought events on fortnightly basis; according to which 2013 has seen mostly normal to wet conditions in most parts of Pakistan except parts of central Punjab and southrn Sindh which had Mild to Moderate Drought. Western parts of KPK received very good rainfall throughout 2013 and Northern Sindh experienced Moderate to Extreme wet conditions due to flood water accumulation there. Figure 13 below shows the drought conditions of whole Pakistan for 2013.

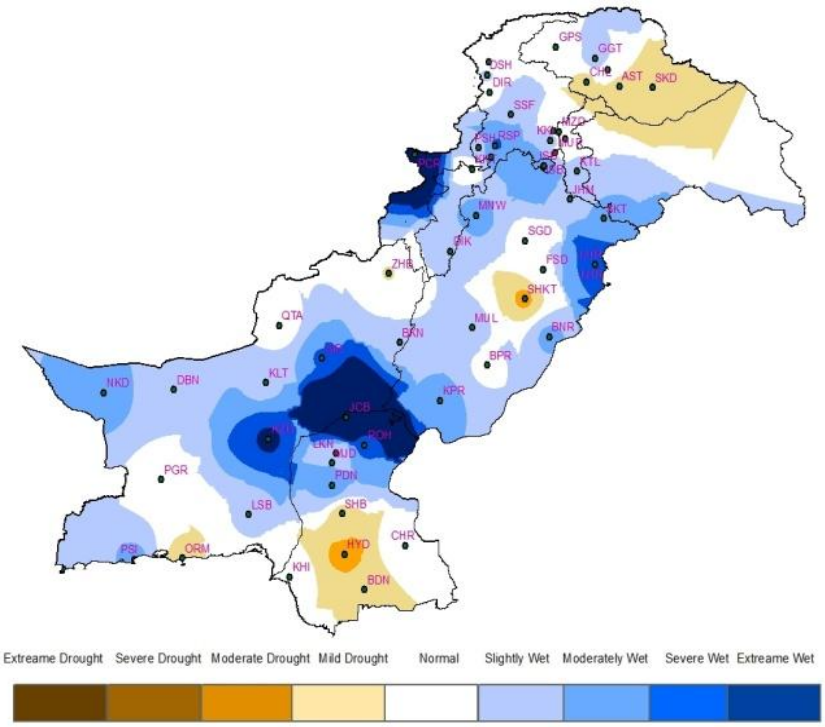

Figure 13: Drought analysis for Pakistan for the year 2013

7. **Fog Days**

Table 1. below shows number of Foggy days for different stations of Pakistan during 2013.

S.No.	Stations	Jan 2013 Number of Days	Feb 2013 Number of Days	Mar 2013 Number of Days	Nov 2013 Number of Days	Dec 2013 Number of Days	Total Days
1	Karachi	---	---	---	02	---	02
2	Hyderabad	---	02	---	---	---	02
3	Badin	---	---	---	01	02	03
4	Chhor	---	02	---	---	---	02
5	Rohri	02	---	---	---	04	06
6	Jacobabad	02	---	---	---	02	04
7	Padidan	03	02	---	---	04	09
8	Nawabshah	03	02	---	---	08	13
9	Sukkur	11	05	---	03	14	33
10	Moenjodaro	09	03	---	---	15	27
11	Larkana	04	02	---	---	05	11
12	Thatha	---	---	---	01	01	02
13	Mithi	02		---	01	---	03
14	Dadu	02	---	---	---	---	02
15	Mirpur Khas	---	---	---	---	06	06
16	Tandojam	---	---	---	---	04	07
17	Jiwani	05	03	---	---	---	08
18	Ormara	---	---	---	01	---	01
19	Quetta	---	02	---	---	---	02
20	Turbat	02	---	---	---	---	02
21	Gawadar	---	04	---	02	05	11
22	Peshawar	05	---	---	03	03	11
23	Bannu	04	---	---	---	01	05
24	Balakot	---	---	---	---	01	01
25	Islamabad	08	---	---	---	---	---
26	Mangla	03	---	---	---	---	05
27	Jhelum	09	02	---	---	---	06
28	Sialkot	14	08	01	---	---	08
29	Chakwal	---	---	---	---	---	---
30	Sargodha	11	---	---	---	---	09
31	Mandibahauddin	10	02	---	---	---	06
32	Gujranwala	11	---	---	---	---	05
33	Multan	08	02	01	---	---	09
34	Faisalabad	11	04	---	---	---	08
35	Joharabad	05	---	---	---	---	04
36	Noorpurthal	04	---	---	---	---	08
37	Toba Tek Singh	11	---	---	---	---	06
38	Jhang	07	---	---	---	---	---

39	Lahore City	03	---	---	---	---	06
40	Lahore AP	09	---	---	---	---	06
41	Okara	08	03	---	---	---	07
42	Sahiwal	10	---	---	---	---	06
43	Bahawalnagar	09	04	---	---	---	02
44	Bahawalpur	04	02	---	---	---	08
45	Khanpur	06	---	---	---	---	06
46	DG Khan	01	01	---	---	---	09
47	Rahim Yar Khan	05	---	---	---	---	05
48	DI Khan	07	---	---	---	---	---
49	Murree	---	---	---	---	---	---

Table 1. Number of Foggy days for different stations of Pakistan during 2013