



ENVIS CENTRE, CHANDIGARH

# NewsLetter

P a r y a v a r a n - P a t r a

## Chandigarh State of Environment

### Climate of Chandigarh

#### EDITORIAL

Climate change is topic of everyone's curiosity. From kids studying in schools to elders retired are aware of several climatic issues including global warming, change in patterns of rainfall, and extreme weather etc. Monsoon in Chandigarh is commenced from late June and be continued till September. October and November are transit month.

Chandigarh city is getting warmer in term of minimum temperature while Mean maximum temperatures shows decreasing trends in almost all months and seasons. Extreme weather events i.e. precipitation days, hot days, thunderstorms days, shows decreasing trends except for foggy days which show significant increasing trends. Significant decreasing trends have been observed in monthly rainfall of Chandigarh in all

months except for the month of June, September and December which shows increasing trend.

India Meteorological Department (IMD), Chandigarh has taken a step forward to aware the people of Chandigarh with research and analysis of climate of Chandigarh. Director General and Deputy Director General of Meteorology India Meteorological Deptt, New Delhi deserves applause for the initiatives. Sh. Surender Paul, Director, IMD, Chandigarh is the man, who has made this issue possible. I hope readers would be able to appreciate his efforts to put climate on picture of concern.

Director, Environment



Event related to Climate of Chanidgarh, sponsored by Chandigarh Administration and hosted by IMD, Chandigarh.

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## Climate

Climate is a measure of the average pattern of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time. Climate is different from weather, in that weather only describes the short-term conditions of these variables in a given region (wikipedia.org).

Hence, climate has long terms affects on water supply, agricultural, transportation, and economy of any region. Climate change and its effects have been focal points of research recently.

Changing precipitation trends have been observed in many regions of the world (Easterling et al., 2000; Osborn et al., 2000; Alexander et al., 2006). As per IPCC latest report the average global temperatures have increased by 0.74 °C during the period 1901-2005 which are likely to be increase by an additional 1 to 6°C by 2100 (IPCC, 2007). This has also influenced the precipitation patterns and it is observed that there is an average annual increase up to 20% in high-latitude regions while in the mid- and low-latitudinal areas has shown a decrease up to 20% in the precipitation (Simard and Austin, 2010).

### Climate of Chandigarh

The climate of Chandigarh is subtropical monsoonal type with hot summer and cold winter. The year could be divided into four seasons. The cold period season spreads over middle of November till February that is followed by summer season from mid-March till end of June. The Southwest monsoons start in late June and continue upto middle of September. Middle of September to the middle of November comprise the transition season. The Average annual rainfall is about 1107.2 mm. About 80%, of this average annual rainfall, is received during June to September. The rainiest months are July and August. Year to year rainfall variability is very large in the city with deviation of 160% from normal for maximum and 52% of normal for minimum rainfall. The hottest months in the year are May and June with mean daily maximum temperatures at about 39°C and mean daily minimum temperatures at about 24-26°C. The coldest month generally is January with mean daily maximum temperatures at about 20°C and mean daily minimum temperatures at about 7°C. Minimum temperatures drop down occasionally to about freezing point.

## Temperature and Rainfall

Chandigarh received average annual rainfall of the order of 1107.2 mm during 1971-2011. About 80% of total rainfall is received in monsoon season, 5% in post monsoon, 7% in winter and 8% in summers. Rainfall starts increasing from June till September and then decreases. July and August are the rainiest months while November is driest month.

- **Mean maximum temperatures:** Mean maximum temperatures of Chandigarh city shows a decreasing trend for all months except for February, March, July and August.
- **Mean Minimum temperature:** Analysis of mean minimum temperatures of Chandigarh city shows significant rising trends in all months except for month of June.
- **Diurnal Range of temperatures:** Diurnal range of temperatures i.e. difference of maximum and minimum temperatures, shows decreasing trends in all months and seasons which is attributed to rise in minimum temperatures respectively.

**Rainfall:** Trend analysis of total rainfall for individual months, seasons and the year as whole in Chandigarh shows decreasing trends in all months except for the months of June and September. Among the seasons summer, winter and post-monsoon shows decreasing trends whereas winter season shows increasing trends. Annual rainfall also shows increasing trends.

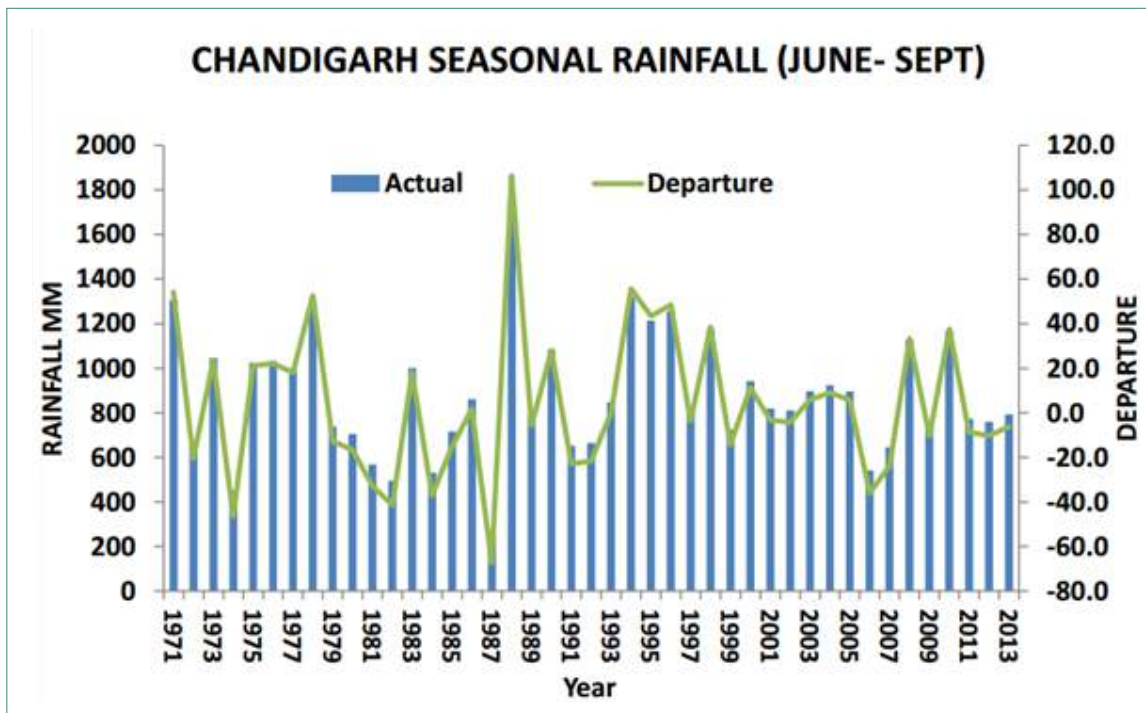
## Rain Drops: Decorates Too



### Monsoon in Chandigarh

During South West Monsoon 2013, the city of Chandigarh received 792.7 mm of rainfall against the normal seasonal rainfall of 844.2 mm with an overall deficiency of 6%, the rainfall lies in normal category.

During the period 1971-2013 city received excess rainfall in 13 years, normal in 20 years and deficient in 9 years. Rainfall was scanty only in 1987.

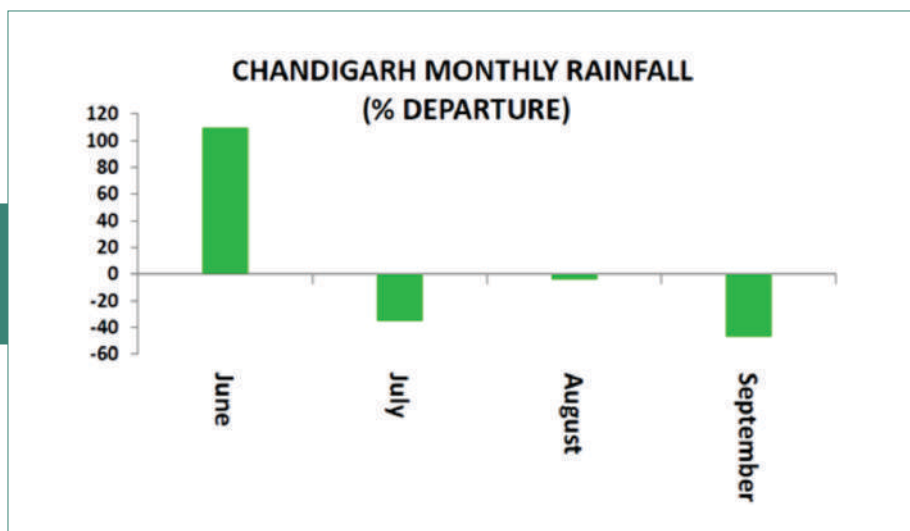


City received highest rainfall in 1988 (106.5%) followed by 1994 (55.7%) and 1971 (54.2%). During the preceding decade i.e. 2004 – 2013, rainfall was excess in two, normal in six and deficient in two seasons. The wettest season was 2010 (377.9 %) and the driest was in 2006 (-36 %)



Monthly rainfall

| Month     | Actual | Normal | % Departure |
|-----------|--------|--------|-------------|
| June      | 251.5  | 120    | 110         |
| July      | 182.7  | 282.4  | -35         |
| August    | 276.1  | 287.5  | -4          |
| September | 82.5   | 154.3  | -47         |
| Season    | 792.7  | 844.2  | 6           |



City received 251.5 mm rainfall in the month of June against its normal value of 120 mm with an overall excess of 110%. Rainfall was 35% deficient in July when Chandigarh received only 182.7 mm against the normal monthly rainfall of 282.4 mm. In August rainfall was normal with a deviation of 4%, the rainfall received in this month was 276.1 mm against its normal value of 287.5 mm. September was deficient in rainfall with an overall deficiency of 47%, 82.5 mm rainfall was received against normal of 154.3 mm.



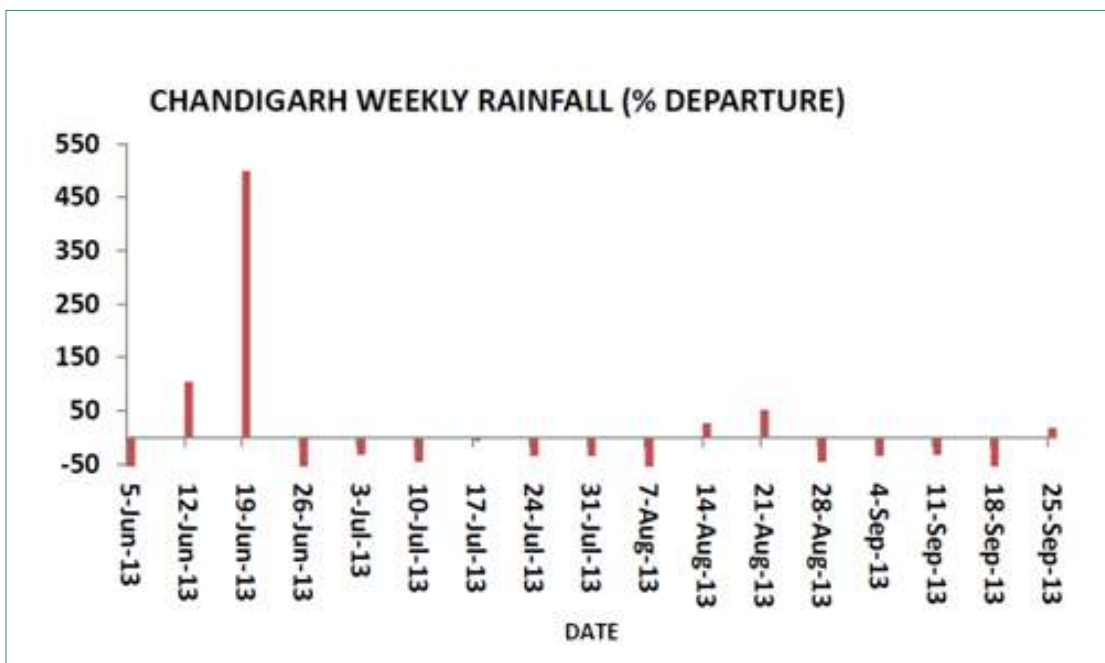
Beauty of Rain Drops

Plantation Drive



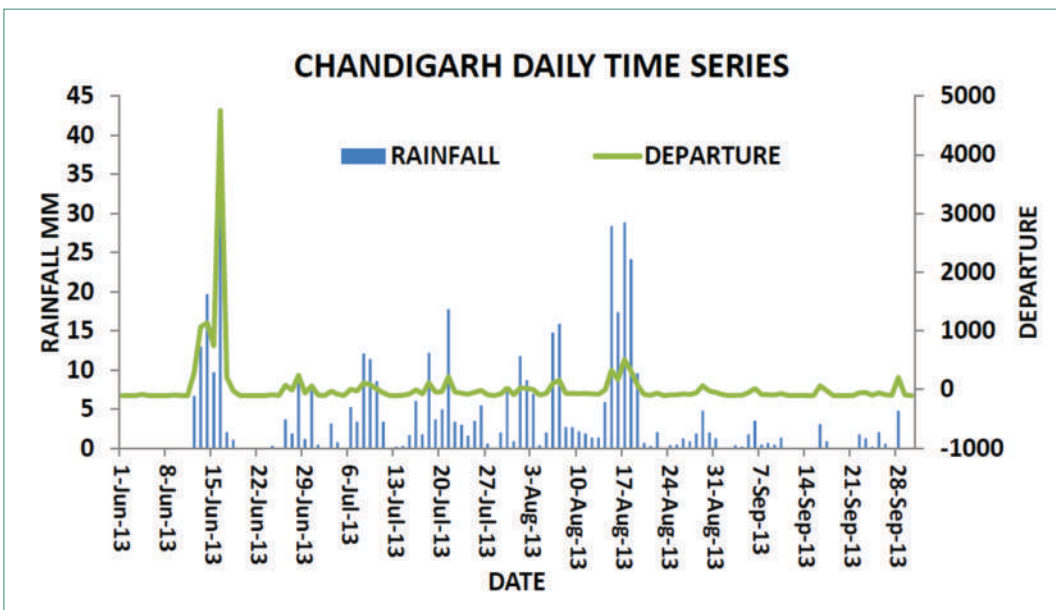
### Weekly Rainfall

During the month of June 2013 rainfall was excess in 2nd and 3rd week and scanty in 1st and 4th week. In July rainfall was normal in third week and deficient in the remaining weeks. City received excess rainfall in 2nd & 3rd week of August and deficient in 1st and 4th week. In September rainfall was deficient in the 1st, 2nd week, scanty in 3rd week and Normal in the last week.



### Daily rainfall

During South-west monsoon 2013, city received excess rainfall on 26 days, normal rainfall on 9 days and deficient on 18 days. During the remaining days of the season rainfall was either scanty or there was no rain. During the season rainfall of 2 cm or more in a day was on 8 occasions.



Highest rainfall in a single day was received on 16th June, followed by 17th August with rainfall of 41.9 mm and 28.9 mm respectively.

Total number of rainy days in June, July, August, September 2013 were 15, 29, 31 and 21 respectively.

### Climate of over the time (1971-2011) in Chandigarh

IMD, Chandigarh has studied the climate of Chandigarh on time series to conclude the following:

1. Chandigarh city is getting warmer in terms of minimum temperature. Significant rising trends have been observed in minimum temperatures in all months and seasons. Rate of warming is higher in the month of March followed by May and February than rest of months. In seasons, summer season is getting warmer followed by annual and post monsoon seasons.
2. Mean maximum temperatures shows decreasing trends in almost all months and seasons. Trends are however not significant except for winter season which shows significant decreasing trends.
3. Diurnal range of temperatures shows decreasing trends in all months and seasons. Significant negative value has been observed for all months and seasons. This is primarily due to increase in minimum temperatures among other factors
4. Extreme weather events i.e. precipitation days, hot days, thunderstorms days, shows decreasing trends except for foggy days which show significant increasing trends.
5. Significant decreasing trends have been observed in monthly rainfall of Chandigarh in all months except for the month of June, September and December which shows increasing trend. Decreasing trends have also been observed in rainfall for all seasons viz winter, summer, and post monsoon seasons where in significant increasing trends have been observed for principal rainy season i.e monsoon season. Annual rainfall also shows increasing trends.

#### Tourist Guide

Chandigarh has well defined seasons and its climate varies widely. Temperatures in and around Chandigarh can vary from near freezing in mid-winter to above 40°C in summer. The summer season from April to June is quite hot, and during the peak summer temperature can shoot above 40°C.

By the end of June city receives pre- monsoon showers and the monsoon season lasts up to Second week of September. During this period weather is hot and sultry. The onset of autumn after mid September makes the weather cool, pleasant and Sunny, it remained like this till November end. The mid-winter period, i.e. December and January is generally bitterly cold with minimum temperature hovering around 4°-6°C.

Late December and early January also experience dense fog in and around the city. March onward weather remains quite pleasant with comfortable temperature and humidity levels till the beginning of summers.

Best Time to Visit:

September - November

March – April

#### Tourist Guide



Dear Information Seeker,

ENVIS CENTRE, Chandigarh furnishes you with the services to collect and disseminate information related to environment of Chandigarh. To share information with us you are requested to fill up the form given below.

Your feedback is valuable to us and will be highly appreciated



- Name \_\_\_\_\_
- Designation \_\_\_\_\_
- Department \_\_\_\_\_
- Address \_\_\_\_\_  
 \_\_\_\_\_ City \_\_\_\_\_
- State \_\_\_\_\_ Country \_\_\_\_\_ Pin \_\_\_\_\_
- Phone \_\_\_\_\_ Fax \_\_\_\_\_
- Email \_\_\_\_\_

Your views on scope of improvement :

- Interest Area \_\_\_\_\_

I would like to have information on following :





**ENVIS CENTRE TEAM**

**Mr. Santosh Kumar**  
(Director, Environment)

**Mr. P.J.S. Dadhwal**  
(Project Coordinator)

**Er. Arun Bansal**  
(Consultant)

**Mr. Surinder Kumar**  
(Data Entry Operator)

**Rain Facts For Kids**

- ☉ Rain falls from clouds in the sky in the form of water droplets, this is called precipitation.
- ☉ Water can also fall from the sky in the form of hail, sleet or snow.
- ☉ Rain is an important part of the water cycle.
- ☉ Rain occurs on other planets in our Solar System but it is different to the rain we experience here on Earth. For example, rain on Venus is made of sulfuric acid and due to the intense heat it evaporates before it even reaches the surface!
- ☉ Weather radar is used to detect and monitor rain.
- ☉ Rain gauges are used to measure the amount of rain over a certain period of time.
- ☉ Antarctica is the driest continent on Earth.
- ☉ Forests that experience high levels of rainfall are called rainforests.

**Rain with high levels of acid (a low pH) is called acid rain. Caused by the release of sulphur dioxide and nitrogen oxides into the air (often from factories and power stations), it can be harmful to plants and animals.**

sciencekids.co.nz

**Rain: Facts from Wikipedia.org**

Most in one minute: 38 mm (1.5 in); Barot, Guadeloupe, 26 November 1970.

Most in one hour: 305 mm (12.0 in) in 42 minutes. Holt, Missouri, United States, 22 June 1947.

Most in 12 hours: 1,144 mm (45.0 in); Foc-Foc, Réunion, 8 January 1966, during tropical cyclone Denise.

Most in 24 hours: 1,825 mm (71.9 in); Foc-Foc, Réunion, 7–8 January 1966

Most in 48 hours: 2,467 mm (97.1 in); Aurère, Réunion, 8–10 January 1958.

Most in 72 hours: 3,929 mm (154.7 in); Commerson, Réunion, 24–26 February 2007.

Most in 96 hours: 4,869 mm (191.7 in); Commerson, Réunion, 24–27 February 2007.

Most in one year: 26,470 mm (1,042 in); Cherrapunji, India, 1860–1861.

Highest average annual total: 11,872 mm (467.4 in); Mawsynram, East Khasi Hills district, India.

**Surender Paul**

**Arun Bansal**

**FROM :**

ENVIS Centre  
Department of Environment  
Chandigarh Administration  
3rd Floor, Paryavaran Bhawan,  
Madhya Marg  
Sector 19 B,  
Chandigarh- 160019

Phone: 0172-2700065, 0172-2770998

email: [ch@envis.nic.in](mailto:ch@envis.nic.in)

website: [www.chandigarhenvis.gov.in](http://www.chandigarhenvis.gov.in)

**To,**

**Book Post**

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Reviewed By Mr. Surender Paul, Director, IMD, Chandigarh

Note : While every care has been taken in compilation of the information available for this newsletter. However, readers must make thorough confirmation/enquiries at their own level before acting upon any data/information provided to the readers. Any discrepancy brought in the notice of ENVIS CENTRE, Chandigarh will be highly appreciated.

