

"The day the southwest monsoon finally withdrew, the northeast monsoon arrived. The winter monsoon brings much less rain than the summer monsoon, but it is important for the South, especially Tamil Nadu."

This Wednesday witnessed a rare meteorological coincidence. The southwest, or summer, monsoon, finally withdrew from the country, having overstayed and delayed its retreat by a record time. The same day, the northeast, or winter, monsoon made its onset, on time. The two events rarely happen simultaneously, though the three month-winter monsoon season is supposed to begin almost immediately after the end of the June-September summer monsoon season.

In common vocabulary, a reference to the monsoon usually means the southwest summer monsoon. That is because it is the main monsoon season that brings widespread rain all across the country. For many parts of India, this is the only time they receive rainfall. These four months bring about 75 per cent of India's annual rainfall.

However, for some regions of south India, it is the winter monsoon that is much more important. Though much less heard of, the northeast monsoon is as permanent a feature of the Indian subcontinent's climate system as is the summer monsoon.

| Region | Annual Rainfall | NE Monsoon | Percentage |
|--------------------------|-----------------|------------|------------|
| Kerala | 2924 | 481 | 16.4 |
| Tamil Nadu | 914 | 438 | 47.92 |
| South Interior Karnataka | 1019 | 210 | 20.6 |
| Rayalaseema | 706 | 219 | 31 |
| Coastal Andhra Pradesh | 1024 | 327 | 31.93 |

Source: IMD

All India average annual: 1,187 mm (SW monsoon 887 mm, NE monsoon 127 mm)

Direction gives the name

The northeast monsoon does not have anything to do with the Northeast region of the country, though a part of the system does originate from the area above it. The northeast monsoon derives its name from the direction in which it travels – from the northeast to the southwest. On the other hand, the summer monsoon, at least the Arabian Sea branch of it, moves in exactly the opposite direction – from the southwest to the northeast. That is why it is also called the southwest monsoon. Of course, the summer has another branch that swerves in an anticlockwise direction in the Bay of Bengal before entering the Indian landmass and bringing rains to the eastern, northeastern and northern parts of the country.

The reversal of direction in the lower-atmosphere moisture-laden winds happens primarily due to the southward movement of Inter Tropical Convergence Zone (ITCZ) during the withdrawal phase. The ITCZ is a dynamic region near the Equator where the trade winds of the northern and southern hemispheres come together. The intense sun and warm waters of the ocean heat up the air in this region and increase its moisture content. As the air rises, it cools, and releases the accumulated moisture, thus bringing rainfall.

During the monsoon season, this ITCZ is located over the Indian landmass. By September, as the temperature in the northern hemisphere begins to go down, the ITCZ starts moving southwards, towards the Equator, and further into the southern hemisphere where the summer season begins to take shape.

Rain over Southern Peninsula

The months of October, November and December are supposed to comprise the northeast monsoon season, though the normal date for the onset of this monsoon is only around October 20. The southern peninsular region receives rains in the first half of October as well, but that is attributable to the retreating summer monsoon. The summer monsoon season ends on September 30 but the withdrawal does not happen overnight. From the beginning of the season, as it starts its northward journey over the Indian landmass, the monsoon takes a month and a half to cover the entire country. The southward withdrawal takes place over a period of three to four weeks. It usually starts around the second week of September and continues till about the second week of October, bringing rain as it retreats. This year, the withdrawal was completed in just eight days, beginning on October 9.

The northeast monsoon season brings rainfall to just five of the 36 meteorological divisions in the country — Tamil Nadu (which includes Puducherry), Kerala, Coastal Andhra Pradesh, Rayalaseema and South Interior Karnataka. As such, this season contributes only 11 per cent to India's annual rainfall of 1,187 mm, compared to about 75 per cent in the summer monsoon season (the remaining rain comes in other non-monsoon months).

Many other parts of the country, like the Gangetic plains and northern states, also receive some rain in November and December but this is not due to the northeast monsoon. It is caused mainly by the Western Disturbances, an eastward-moving rain-bearing wind system that originates beyond Afghanistan and Iran, picking up moisture from as far as the Mediterranean Sea, even the Atlantic Ocean.

The northeast monsoon is particularly important for Tamil Nadu, which receives almost half its annual rainfall (438 mm of the annual 914.4 mm) during this season. The southwest monsoon contributes just 35 per cent to Tamil Nadu's annual rainfall (the rest comes in other non-monsoon months). Within the state, some districts get up to 60 per cent of their annual rainfall during this time. Similarly, Rayalaseema region and Coastal Andhra Pradesh both about 30 per cent, and South Interior Karnataka receives about 20 per cent of its annual rainfall during the northeast monsoon season (see chart).

El Niño impact

Like the southwest monsoon, the northeast monsoon is also impacted by the warming and cooling of sea surface waters in the central Pacific Ocean. But the impact is the opposite. The northeast monsoon is known to receive a boost from El Niño, when the sea surface temperatures in the equatorial Pacific Ocean, off the western coast of South America, are warmer than usual. And, when the opposite phenomena La Niña

happens, rainfall during the northeast monsoon is known to get depressed. This year the El Niño Southern Oscillation, or ENSO, is in neutral state and is likely to remain like that for the rest of the year.

Unlike for the southwest monsoon, the India Meteorological Department does not come out with a long-range forecast for the winter monsoon. But after unusually high rainfall during the southwest monsoon, the northeast monsoon is also expected to deliver good rainfall. According to an analysis by Sridhar Balasubramanian, an associate professor of mechanical engineering and an adjunct faculty member at IDP Climate Studies at IIT Bombay, this year's northeast monsoon is likely to be normal, and likely to result in rainfall that is 100-102 per cent of the long period average. November is likely to be the wettest month of the season.

Expected Questions (Prelims Exams)

1. Consider the following statements and choose the correct statement.

1. Northeast monsoon travels from Northeast to Southwest.
2. The normal date for the onset of Northeast monsoon is around 20 October.
3. The normal date for the onset of Northeast monsoon is around 20 October.
4. Southwest monsoon contributes only 35% to Tamil Nadu's annual rainfall.

Coode:

- (a) 1, 2 and 4
- (b) 2, 4 and 3
- (c) 1, 3 and 2
- (d) 1, 2, 3 and 4

Expected Questions (Mains Exams)

Q. Why the regional impact of northeast monsoon is lesser than that of southwest monsoon? How is the rainfall in winter in the plains of North India different from this? Discuss. (250 Words)

Note: Answer of Prelims Expected Question given on 18 Oct., is 1 (d).