Rainfall Pattern in Assam

What is the issue?

This monsoon, some areas received deficit rainfall while Assam received excess rainfall.

How about the arrival of monsoon this year?

- In India, June 1 is regarded as the date of arrival of the monsoon, which accounts for about 80% of the rainfall in the country.
- The monsoon landed three days ahead of the normal date in Kerala this year, but it turned sluggish on its western branch's upward journey.
- The central India suffered a deficit while the east and north-eastern parts battled excess rain leading to widespread floods in Assam and Meghalaya.
- The key monsoon months are July and August and they bring nearly two-thirds of the monsoon rains.

How has the monsoon been so far this year?

- The country received 2% less rain this year than it usually does between June 1 and June 23 every year.
- The total rainfall was brought down by 34% over central India and 15% over peninsular India compared to the 32% more received by the east and northeast and 7% more by northwest India.
- Meteorologists said the recent episode of heavy rainfall underlined the
    - Presence of the east-west trough in the lower levels of the atmosphere over the region
    - Incursion of large-scale moisture due to strong southerly and south-westerly winds from the Bay of Bengal
- According to the IMD, Assam received 41% above normal rainfall during the pre-monsoon season (March to May), received 71% more than normal rainfall up to June 25.
- A 2018 study by Indian Institute of Tropical Meteorology revealed that Assam had been witnessing a decreasing trend in the average monsoon rainfall since 1870 while experiencing sudden downpour days leading to frequent flooding.

What are the factors determining rainfall pattern?

- **Ecological and climate difference**- Assam's valleys experience both excessive and insufficient rainfall from time to time due to ecological and climate difference from one place to another.
- **Climate change**- Climate change increases the water and surface temperature of Arabian Sea and Bay of Bengal by up to 2 degrees, forming low-pressure areas resulting in heavy rains.
- **Black carbon emissions**- Aerosols, including black carbon, released by biomass burning, leads to a decrease in low-intensity rainfall while pushing up severe rain in the pre-monsoon season in northeast India.

What are the disturbances to monsoon in India?

- **Depressions**- The important synoptic disturbances during the monsoons over India are lows, depressions, etc. that form mostly over the Bay of Bengal and produce a large volume of rainfall.
- **Position of offshore trough**- The other synoptic disturbance which affects monsoon rainfall significantly is the position of offshore trough or vortex along the west coast of India.
- **Global phenomena**- Monsoon rainfall in India is known to be affected by global phenomena such as El Nino or La Nina.
- Other factors such as the Indian Ocean Dipole and Madden-Julian Oscillation also influence monsoon rainfall.

References

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2. http://www.bom.gov.au/climate/enso/history/ln-2010-12/IOD-what.shtml
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Quick facts

- **El Niño**- El Niño is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean.
    - In India, El Nino has been found to have strong links in suppressing the monsoon rainfall.
- **La Nina**- La Nina refers to the periodic cooling of ocean surface temperatures in the central and east-central equatorial Pacific.
    - La Nina has been found to be helpful in bringing good rainfall to India.
- **Indian Ocean Dipole**- IOD is defined by the difference in sea surface temperature between two areas (or poles) – a western pole in the Arabian Sea (western Indian Ocean) and an eastern pole in the eastern Indian Ocean south of Indonesia.
    - **Positive event**- warmer sea surface temperatures in the western Indian Ocean relative to the east bringing more rainfall to India
    - **Negative event-** cooler sea surface temperatures in the western Indian Ocean relative to the east bringing less rainfall to India
- **Madden-Julian Oscillation (MJO)**- The MJO is a moving system of wind, cloud and pressure that brings rain as it circles around the equator.
    - MJO goes around the globe in 30-60 days on average. Sometimes, it can take 90 days.
    - In the active phase, MJO results in more than average rainfall for that time of the year, while in the suppressed phase, the area receives less than average rainfall.



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