Record-breaking Monsoon Rainfall

What is the issue?

- The record-breaking rainfall this monsoon season has left weather scientists confounded.
- After a more than 30% shortfall in June 2019, the season ended with 10% excess rainfall, the first time such a thing has happened since 1931.

Whatis the reason for this?

- The September 2019 rainfall (152% of long period average, or LPA) was the highest since 1917 and the overall seasonal rainfall (110% of LPA) was the highest since 1994.
- Till the first week of September, the India Meteorological Department (IMD) maintained that the seasonal rainfall was going to be normal (96-104% range).
- The influencer like El Niño Southern Oscillation (**ENSO**) in the Pacific is remaining largely neutral in 2019.
- So, the scientists are trying to pin down the exact reason for the unusual rainfall.
- In the search for answers, one phenomenon attracting some attention is the**Indian Ocean Dipole (IOD)**.

What is IOD?

- IOD is an ocean-atmosphere interaction similar to El Niño, but in the **Indian Ocean**.
- It is a measure of the **difference in the sea-surface temperatures** of the western Indian Ocean (Arabian Sea) and the eastern Indian Ocean, south of the Indonesian coast.

How IOD impacts monsoon?

- When the **western waters are warmer** than the eastern, **IOD is positive**; in the opposite state, IOD is negative.
- Like ENSO in the equatorial Pacific Ocean, IOD too influences weather and climate events, though its impact is weaker because the Indian Ocean is considerably smaller, and shallower, than the Pacific.
- The IOD has an impact on the Indian monsoon: a **positive IOD is known to**

aid monsoon rainfall while negative IOD is known to suppress it.

Why thisis the strongest ever?

- 2019's IOD began developing around June and grew strong after August, has been one of the strongest on record.
- IOD records are not very old. Accurate measurements are available only since 1960, according to the Australian Bureau of Meteorology (ACB).
- As per ACB, the current positive IOD event has strengthened significantly over the September month.
- The latest weekly valueof +2.15°C is the strongest positive weekly value since 2001, when strong monthly values were recorded.
- This has led to scientists looking at IOD for possible clues to this year's bumper rainfall, especially since such strong IOD events in previous yearswere associated with high monsoon rainfall.
- There is very strong IOD events in 1997 and 2006. In both those years, the southwest monsoon rainfall over India was around 100% of normal.
- 1997 also happened to be a strong El Niño year (El Niño suppresses monsoon rainfall), but due to the positive IOD, the monsoon rainfall was normal that year.

What is the tenuouslink?

- Beyond the correlation, scientists are careful not to directly blame the IOD for this year's rains.
- That is because IOD's link with the Indian summer monsoon is tenuous at best. It is only one of several factors that impact the monsoon, and not the most dominant.
- In fact, the IOD's influence on the monsoon is not fully understood. It is known to have a much weaker influence than ENSO, though.
- IOD's relationship with the Indian summer monsoon is also much less studied compared to that of ENSO.
- Besides, it is not clear if the IOD influences the monsoon or if it is the other way round.
- The IOD generally takes shape towards the latter half of the summer monsoon, in August and September, and scientists do not rule out the possibility that the monsoon could play some role in its emergence.

How can this yearbe compared with the earlier years?

- This absence of 'action' in the western Indian Ocean was evident this year too.
- This year there was strong cooling south of Sumatra (in the east Indian

Ocean) but the western Indian Ocean did not show a large warming.

- Data from the Australian Bureau of Meteorology show that since 1960, there have been only 10 strongly positive IOD events before this year.
- Summer monsoon rainfall was deficient on four of those occasions, more 100% on four others, and normal on the remaining two.
- The fact that IOD could have played a role in bringing excess rains in August and September cannot be ruled out, but the extent of its influence is something that still needs to be studied.

Source: The Indian Express

SHANKAR IAS PARLIAMENT
Information is Empowering