More Cyclones in Arabian Sea

Why in news?

According to a new study, human induced climate change is causing more frequent and intense cyclones in the Eastern Arabian Sea.

What is a cyclone?

- **Cyclone** - Any large system of winds that circulates about a centre of low atmospheric pressure in a counter-clockwise direction north of the Equator and in a clockwise direction to the south.
- **Occurrence** - Cyclonic winds move across nearly all regions of the Earth except the equatorial belt.
- **Cause** - By atmospheric disturbances around a low-pressure area distinguished by swift and often destructive air circulation.
- **Eye of the cyclone** - Low-pressure center of the cyclone
    - The lower the pressure in the eye, the more intense is the cyclone.
- **Eye-wall -** Surrounds the eye with the strongest winds and heaviest rain and is the most destructive part of the cyclone.

What about the cyclones in Arabian Sea?

- The Bay of Bengal and Arabian Sea which make up the North Indian Ocean, accounts for *6% of all global tropical cyclones* annually.
- In 2021, a research paper in Nature journal said that there is a significant increasing trend in the intensity, frequency, and duration of cyclones observed over Arabian Sea during 1982 to 2019.
- According to a 2022 paper in Elsevier's Earth Science Reviews, the sea surface temperatures over the Arabian Sea increased by *1.2°C to 1.4°C* in recent decades.
- The paper highlighted that there is a *52% increase in the frequency* of cyclones during 2001–2019 in the Arabian Sea, while there is a decrease of 8% in the Bay of Bengal.
- There has been an *80% increase in the total duration* of cyclones in the Arabian Sea during the last two decades.

- **Important cyclones in Arabian Sea**
    - Cyclone Tej - 2023
    - Cyclone Biparjoy - 2023
    - Cyclone Tauktae – 2021
    - Cyclone Nisarga – 2020
    - Cyclone Kyarr- 2019
    - Cyclone Maha
    - Cyclone Maha

- Cyclone Vayu

What reasons are attributed to increasing cyclones in Arabian Sea?

- **Global warming** - It is causing surface sea temperatures to rise and causing a change in the Arabian Sea's character.
- This is leading to more severe cyclones forming and sustaining over it.
- **Vertical shear** - It refers to how strongly the winds can change from the surface to the top of the atmosphere.
- Weak vertical shear promotes the formation of cyclones.
- **Positive Indian Ocean dipole (IOD) phase** – It refers to warmer sea surface temperatures in the western Indian Ocean relative to the east.
- Warming of Arabian Sea can increase the frequency and intensity of tropical cyclones in the North Indian Ocean.

What are the impacts?

- **West India-** As the eastern Arabian Sea changes, the coastlines of western India are increasingly at risk.
- **Intensity-** Increase in intensity of cyclones increases their potential to cause high wind, storm surges, severe rainfall, etc.
- **Population-** The cyclones could pose more and more of a threat to all densely populated coastal regions along the western coast, from *Thiruvananthapuram to the coast of Gujarat*.
- **Impact on fishers-** It will affect the lives and livelihood of the indigenous coastal communities and artisanal fishers.
- **Impact on southwest monsoon** – Its impact on southwest monsoon is concerning which as the country relies upon heavily for its drinking water and agricultural needs.

What lies ahead?

- This report calls for changes to development strategies to account for the dangers posed by more intense and frequent cyclones.
- There is also a need to develop new policy and technology initiatives in the areas of storm warning, impact-based local weather services and reliable localised weather services.

Related links- Monsoon Mayhem

Quick facts

Indian Metrological Department

• It is the national meteorological service of the country and the principal government agency in all matters relating to meteorology and allied subjects.
• **Established-** 1875
• **Headquarters-** New Delhi
• **Aegis-** Ministry of Earth Science
• **Mandate-**
- To take *meteorological observations* and to provide current and *forecast meteorological information* for optimum operation of weather-sensitive activities like agriculture, irrigation, shipping, aviation, offshore oil explorations, etc.
- To *warn against severe weather phenomena* like tropical cyclones, norwesters, duststorms, heavy rains and snow, cold and heat waves, etc., which cause destruction of life and property.
- To *provide meteorological statistics* required for agriculture, water resource management, industries, oil exploration and other nation-building activities.
- To conduct and promote *research in meteorology* and allied disciplines.

References

1. Indian Express- Frequent intense cyclones in west coast
2. IMD- Indian Metrological Department

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