



Hotter Oceans and Supercyclones

Why in News

The [supercyclone 'Amphan'](#) is likely to make landfall between the Sagar islands of West Bengal and the Hatiya islands of Bangladesh.

- Cyclone Amphan (pronounced as UM-PUN) is a tropical cyclone formed over Bay of Bengal that has turned into a **“super cyclonic storm (maximum wind speed is 120 knots)”**.
- The **higher than normal temperatures** in the Bay of Bengal (BoB) with the [countrywide lockdown](#) due to [Covid-19](#) pandemic have played a role turning a storm into a super cyclone.
- Additionally, the super cyclone Amphan is the **strongest storm** to have formed in the BoB **since the super cyclone of 1999** that ravaged Paradip in Odisha.

Key Points

▪ 'Cyclones' as a Regular Phenomenon

- The cyclones gain their **energy from the heat and moisture** generated from **warm ocean surfaces**.
- The BoB has **higher** Sea Surface Temperature (SST) compared to the Arabian Sea. Some of the reasons for higher SST of BoB are:
 - **Slow Flowing Winds:** It keeps temperatures relatively high i.e. around 28 degrees around the year.
 - **Higher Rainfall:** It provides required humidity for cyclone formation.
 - **Constant Inflow of Fresh Water:** The inflow from the Ganga and Brahmaputra rivers makes it impossible for the warm water to mix with the cooler water below, making it ideal for a cyclonic depression.
- On the other hand, the **Arabian Sea receives stronger winds** that help dissipate the heat, and the lack of constant **fresh** water supply helps the warm water mix with the cool water, reducing the **temperature**.
- Additionally, the **tropical** cyclones in these seas are a typical feature of the summer months and **play a role in aiding the arrival of the monsoon**.

▪ Unusual Higher Temperature in BoB:

- In 2020, the BoB has observed **record summer temperatures** due to the global warming from fossil fuel emissions that has been heating up oceans.
 - The [cyclone Fani](#) in 2019 was also fuelled by high temperatures in the BoB.
- For the first two weeks of May, there were **maximum surface temperatures of 32-34°C** consecutively. These are record temperatures driven by climate change observed until now.
- Such unusual warming around India is **no longer restricted** to just the BoB but also the Arabian Sea and the Indian Ocean. It makes **storm prediction less reliable** as well as **disrupting monsoon patterns**.

▪ Impact of Lockdown:

- **Reduced particulate matter emissions** during the lockdown resulted in **fewer aerosols**, such as black carbon, that are known to **reflect sunlight and heat away from the surface**.
 - Every year, the particulate pollution from the Indo-Gangetic plains is transported towards the BoB which influences the formation of clouds over the ocean.
- The **minimal presence of heat and sunlight reflecting aerosols** in BoB resulted in **fewer clouds and more heat**. Further, it raised the temperature of BoB by **1-3°C higher than normal**. Thus, the whole phenomenon has **amplified the strength** of the cyclone.

▪ **Overall Impact:**

- The higher temperatures and minimal presence of aerosols helped the cyclone Amphan to intensify itself from a **category-1 cyclone to category-5** in **18 hours** that is an unusually quick evolution.

Cyclones

- Cyclones are the formation of a very **low-pressure system** with very high-speed winds revolving around it. Factors like wind speed, wind direction, temperature and humidity contribute to the development of cyclones.
- Before cloud formation, water takes up heat from the atmosphere to change into vapour. When water vapour changes back to liquid form as raindrops, this heat is released to the atmosphere.
- The heat released to the atmosphere warms the air around. The air tends to rise and causes a drop in pressure. More air rushes to the centre of the storm. This cycle is repeated.
- Hurricanes derive their energy from heated seawater which can be prevented by presence of upper-level-winds that disrupt the storm circulation forcing it to lose its strength.

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