Cyclone Michaung

Why in news?

Recently the Cyclone Michaung made landfall over Nellore in Andhra Pradesh as a super-cyclonic storm.

Cyclone
• As per National Disaster Management Authority (NDMA), cyclones result from *atmospheric disturbances* surrounding a low-pressure area characterised by rapid and often destructive air circulation • **Air circulation**- The air circulates inward in an anticlockwise direction in the Northern Hemisphere and clockwise in the Southern Hemisphere. • **Occurrence**- Cyclonic winds move across nearly all regions of the Earth except the equatorial belt. • **Conditions of the cyclone**- - Large and continuous supply of warm and moist air that can release enormous latent heat. - Strong *Coriolis force* that can prevent filling of low pressure at the centre (absence of Coriolis force near the equator prohibits the formation of tropical cyclone between 0 -5 latitude). - Unstable condition through the troposphere that creates local disturbances around which a cyclone develops. - Absence of strong vertical wind wedge, which disturbs the vertical transport of latent heat • **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. • **Storm surge-** The abnormal rise in sea level due to cyclonic storms. • **Cyclone prone areas-** India's east and west coasts are affected by cyclones annually, mostly in pre-monsoon and post-monsoon seasons. • **Indian tropical storms-** Climatologically, about 5 cyclones develop in the North Indian Ocean basin comprising the Bay of Bengal and the Arabian Sea every year.

How the Cyclone Michaung formed?

- **Origin-** The cyclone developed from a *low pressure area* in the southwest Bay of Bengal. It gradually intensified into a deep depression, a cyclonic storm, and finally a super-cyclonic storm.
- **Intensification-** They were aided by warm sea surface temperatures and the *Madden-Julian oscillation*, a weather anomaly that influences rainfall patterns.
- **Course of action**- It moved northward towards the Andhra Pradesh coast, while

bringing heavy rain and strong winds to north Tamil Nadu. It made landfall near Bapatla district, and weakened into a depression over land.

- **Naming convention**-The name Michaung was suggested by Myanmar symbolises *strength and resilience* following the list of names prepared by *World Metrological Organisation* and the United Nations Economic and Social Commission for the Bay of Bengal and the Arabian Sea.
- The name of each cyclone is picked from this list and cycles through each country's suggestion.
- **Super-cyclonic storm**- It was the 4th tropical cyclone of the year over the Bay of Bengal, and the *first super-cyclonic storm since 1999*. It reached a peak intensity of 90-100 km/hr winds gusting to 110 km/hr at the time of landfall.

Severe Tropical Cyclones in 2023	
Name of the cyclone	**Location**
Mawar and Bolaven	Western Pacific Ocean
Hurricane Lee	Atlantic Ocean
Hurricane Jova and Otis	Eastern Pacific Ocean
Cyclone Mocha	North Indian Ocean
Cyclone Freddy	Southern Indian Ocean

Why did the Cyclone intensify?

Cyclogenesis, is the development or strengthening of cyclonic circulation in the atmosphere

- **Cyclone intensification events-** They are a source of uncertainty in cyclone models because they alter the storm's future course. They depend on several factors, such as sea surface temperature, vertical wind shear, upper-level divergence, etc.,
- **Global warming**- It has already resulted in a detectable increase in the number of higher intensity cyclones as well as their intensification.
- **Climate change**- It has increased the sea surface temperature, which is conducive to cyclone intensification. A study found that tropical cyclones with wind speeds above 185 km/hr had become 15% more likely since 1979.
- **Cyclone engine**-Cyclones are like engines that convert the heat and moisture from the ocean into kinetic energy of winds.
- The rising air cools and condenses, forming clouds and releasing latent heat, which makes the air lighter and causes it to rise further. The surrounding air moves in to fill the low pressure, creating surface winds.
- **Madden-Julian oscillation**- It throw seeds of rotational low-pressure systems over the Indian and the Pacific Oceans, this indicated favourable conditions for the cyclone.
- **Rapid intensification**- It is defined as an increase in maximum sustained winds by at least 55 kilometre / hour in a 24-hour period.
- **Unpredictable**- The cyclone spent more time over the water before landfall, as Cyclone Michaung did off the coast of north Tamil Nadu.

What is the consequences of the intensification?

- **Complicated forecast models**-Due to rapid intensification, the cyclone deviated from its expected track and speed increased the uncertainty and complexity of cyclone preparedness.
- **Prolonged rains**- It allows storms to make landfall with more energy, move further inland, survive longer, and extend their on-ground devastation to previously 'inaccessible' areas.
- **Heavy damage**- It brought heavy rain and winds with a sustained speed of 90-100 km/hr, in the process uprooting trees and electric poles. It caused heavy to extremely heavy rain in several parts of Andhra Pradesh, Tamil Nadu and southern Odisha.
- **Stronger winds -**The wind speed of a cyclone is related to its central pressure, the lower the pressure, the stronger the wind.
- Cyclone Michaung reached a peak intensity of 90-100 km/hr winds gusting to 110 km/hr at the time of landfall.
- **Higher storm surge**- The cyclone generated storm surge and tidal waves up to 1.5 metres, along with flash floods in low lying areas.
- **Human impact**- It affected around 40 lakh people, many people stranded in flood without access to basic amenities like food, water etc.,
- **Economic impact**-It resulted in widespread damage to infrastructure, crops and livelihoods.

References

1. The Hindu- How Cyclone Michayung formed
2. Indian Express- Unusual storm

SHANKAR IAS PARLIAMENT
Information is Empowering