Marine Heat Waves (MHW)

Why in news?

An increase of 3 or 4 degrees Celsius in average temperatures can be catastrophic for marine life and cause marine heat waves.

What is Marine Heat Waves (MHW)?

- **Marine Heat Waves -** *The IPCC Sixth Assessment Report* defines marine heatwave as "a period during which water temperature is abnormally warm for the time of the year relative to historical temperatures, with that extreme warmth persisting for days to months.
- If the surface temperature of sea rises to *3 or 4 degree Celsius above the average temperature for at least 5 days,* it causes MHW.
- The phenomenon can manifest in any place in the ocean and at scales of up to thousands of kilometres.

- **Occurrence-** Marine heatwaves can occur in summer or winter and are defined based on differences with expected temperatures for the location and time of year.

To know more about heat waves click here

Future Projections

- **Intensity -** MHW is 10x in intensity compared to pre- industrial times, it has increased *50% in past 10 years.*
- Sea surface temperatures have increased at a rate of nearly *0.6°C* per century since 1880 and the warming in the upper ocean is projected to be between *0.6°C and 2°.*
- **Frequency** - *20 to 50 more MHWs* is predicted by 2100.

What are the causes of MHW?

87 % of MHWs are attributable to human-induced warming.

- **Global warming**- The planet is heating up fast, with 70% of water distribution in Earth, its impact as MHWs is huge.
- **Ocean currents-** It has major influence on the ocean, it can drive MHWs by moving around warm water.

- **Winds-** Warm air (normal heatwaves) can drive MHWs by warming the ocean surface.
- **El Nino models-** It is a climate phenomenon that causes warm water to shift to Pacific Ocean.
- This regional climate pattern caused MHWs event Blob in North eastern Pacific.

What are the impacts of MHW?

- **Extreme weather events**
  - Warm water increase the tropical cyclones and hurricanes.
  - Example - *The Blob event (2013-15)* caused unseasonably warm weather in Pacific Northwest of USA and Canada.
- **Increased ocean stressors**
  - Stratification- Heatwave leading stratification due to wind mixing, anomalous sea surface temperature etc.,
  - Acidification- It leads to change in ocean water chemistry, as it absorbs increasing carbon di oxide.
  - Deoxygenation- It results in reduction of oxygen content in the oceans.
- **Biodiversity and Habitat loss**
  - Habitat destruction-In 2016, marine heatwaves across northern Australia led to severe bleaching of the Great Barrier Reef.
  - Food web disruption- MHWs fuel the growth of invasive alien species and destroy the kelp forests thereby altering the ecosystem of the coast.
  - Species migration- In 2011, Western Australia witnessed 3 degree Celsius warmer than average so seaweeds, fish and shark moved south
  - Mass mortalities- In 2003, Mediterranean Sea was 4 degree Celsius warmer than average 30 days witnessed mass mortality of marine life in rocky reefs.
- **Economic loss**
  - Industry- It impacts aquaculture and fisheries.
  - Tourism- There will be a loss of revenue to the Government due to loss of biodiversity and habitat destruction.

What lies ahead?

- Raising general awareness of MHWs among the people to foster community participation.
- Improve scientific understanding of their physical properties and ecological impacts.
- Reduce the global warming by keeping the temperature within 1.5 degree Celsius target.

References

1. Indian Express| About Marine Heat Waves
2. MHW Organisation| All About MHWs



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