Marine Fungi

Source: DTE

Marine **fungi,** comprising **5% of ocean biomass,** play a crucial role in ecosystems, thriving in environments ranging from rocky seashores to deep waters.

- **About:** Marine fungi are **microscopic organisms** that live in ocean environments, playing key roles in decomposition, symbiosis, and producing bioactive compounds.
- **Types: Obligate Marine Fungi** (exclusively marine), Facultative Marine Fungi (evolved from terrestrial environments, can survive in marine habitats)..
- **Survival Strategies:** Marine fungi adapt to **feast-famine** conditions by changing cell forms for better resource handling.
    - For example, ***Paradendryphiella salina,*** found on seaweeds, produces enzymes from bacteria to digest its host.
- **Ecological Importance:** Marine fungi are crucial for **nutrient cycling, ecosystem stability**.
    - **Lichens,** which represent a symbiotic relationship (fungi and algae living together), also contribute to marine ecosystems.
- **Fungi:** These **eukaryotic organisms** are **heterotrophs** (consume other plants or animals), functioning as **saprophytes** (feeding on dead and decaying organisms) or **parasites.**
    - Fungi reproduce sexually or asexually via **spores. R.H. Whittaker** classified Fungi as a distinct multicellular eukaryotic kingdom.
    - Fungi while beneficial in **medicine (e.g., antibiotics),** food, and industry, they can also cause diseases, and produce **toxic mycotoxins.**

Read more: Funga Taxonomic Kingdom

Debate Over National Anthem

Source: TH

Why in News?

The **Governor** of Tamil Nadu left the **Legislative Assembly** without delivering his customary address on the opening day of the 2025 session citing **non-playing of the National Anthem** before his scheduled address.

- This has triggered a dispute over the ceremonial practices followed in the state legislature.

National Anthem & National Song

- The song **Jana-gana-mana (national anthem)** composed originally in Bangla by **Rabindranath Tagore (in 1911).** It was adopted in its Hindi version as the national anthem of India.
    - It was **first sung on 27th December 1911 at the Calcutta Session** of the **Indian**

National Congress (INC).

- The **National Song of India** is **“Vande Mataram",** written by **Bankim Chandra Chatterjee**.
  - The song was **first written in 1870** and later **included in his novel "Ananda" in 1882.** It was first sung at the **1896 INC session.**
  - It is a **patriotic hymn** that represents reverence for Mother India and was a source of inspiration during India's struggle for freedom.
- Both **National Song** and **National Anthem of India were adopted** by the **Constituent Assembly** on **24th January 1950.**

What are the Protocols and Conventions for Playing the National Anthem?

- **Presidential Address in Parliament:** During the **President**'s address, the **National Anthem** is played as the President reaches the dais. The President then delivers the address and then the **National Anthem is played again** as the President exits the house in a procession.
- **Governor’s Address to Sate Legislature:** Different states in India follow their own conventions regarding the playing of the National Anthem during legislative sessions.
  - **Nagaland**: The National Anthem was not played in the legislative assembly for several decades, and it was **first introduced in February 2021.**
  - **Tripura**: The National Anthem was first played in the Tripura Assembly in **March 2018,** reflecting a recent shift in its ceremonial practices.
  - **Tamil Nadu**: It follows a unique convention where the **State Anthem, *Tamil Thai Vazhthu***, is played before the Governor’s address, and the **National Anthem** is **played at the end**.
    - **This practice was introduced in 1991**, before which the Governor would simply enter, deliver the address, and leave without such ceremonial practices.

Playing National Anthem in Cinemas

- In the case of ***Shyam Narayan Chouksey vs Union of India*** **(2018)**, the **Supreme Court** had initially passed an **interim order in 2016, directing all cinema halls in India to play the National Anthem** before the start of films, with attendees required to stand.
- However, in its final judgment in January 2018, the Court modified its stance, stating that the **playing of the National Anthem in cinema halls prior to films is not mandatory, but optional.**

What are the Safeguards to Protect the Honour of the National Anthem?

- **Constitutional Perspective:**
  - **Section 51 (A) (a)** of the **Constitution of India** dealing with **Fundamental Duties** states that “It shall be the duty of every citizen of India to abide by the Constitution and **respect** its ideals and institutions, the **national flag and the national anthem.”**
- **Prevention of Insults to National Honour (PINH) Act, 1971:**
  - **PINH Act** provides for **strict punishment** for disrespecting the national anthem and breaking its restrictions with imprisonment for up to 3 years or a fine or both.
  - A person convicted under the **PINH Act, 1971**, for offences such as **preventing the singing of the National Anthem** is disqualified from contesting elections to the Parliament and State Legislatures for a period of 6 years.
- **Ministry of Home Affairs (MHA) Guidelines:**
  - The MHA mandates the playing of the **full National Anthem** during civil and military investitures, national salutes, parades, formal functions, and the arrival/departure of the President and Governor, as well as during the **National Flag's parade** **and** **Navy colour hoisting**.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Who among the following is associated with 'Songs from Prison', a translation of ancient Indian religious lyrics in English? (2021)

(a) Bal Gangadhar Tilak

(b) Jawaharlal Nehru

(c) Mohandas Karamchand Gandhi

(d) Sarojini Naidu

Ans: (c)

Q. What is the number of spokes in the Dharmachakra in the National Flag of India? (2008)

(a) 16

(b) 18

(c) 22

(d) 24

Ans: (d)

India's Progress Under NCAP

Source: DTE

India achieved a 26.84% reduction in nationwide **Particulate Matter (PM)** levels from 2019 to 2024, with **National Clean Air Programme (NCAP)** cities showing a **24.45%** improvement due to targeted interventions.

- **Top Performers: Varanasi** led with a 76.4% reduction in pollution, followed by **Moradabad** (58%) and **Kanpur** (51.2%).
  - Among the major cities, **Kolkata** saw a **21.5% reduction in pollution,** driven by stricter industrial regulations and improved public transport.
  - Southern and western cities, like Bengaluru (**8%**) and Chennai (**9.2%**), steadily reduced pollution levels.
- **Challenges: Cities like** Delhi (**PM 2.5** at 107 µg/m³) and Byrnihat in Assam (PM 2.5 at 127.3 µg/m³) remain the most polluted cities.
  - Cities like Gurugram, Faridabad, and Ghaziabad require urgent interventions.
- **Key Contributors:** Industrial emissions, vehicular pollution, and **stubble burning** exacerbate pollution in northern states.
- **NCAP:** Launched in January 2019 by the **Ministry of Environment, Forest and Climate Change (MoEFCC),** aims to reduce **PM10 and PM2.5 levels** by 20% by 2024-25, with 2017 as the baseline.
  - The target has been revised to 4**0% reduction in PM10 levels or meeting national**

standards (60 µg/m³) by 2025-26.

//

Air Pollutants

Sulphur Dioxide (SO_2)

It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

Impact: Causes respiratory problems.

Ozone (O_3)

Secondary pollutant formed from other pollutants (NOx and VOC) under the action of the sun.

Impact: Irritation of the eye and respiratory mucous membranes, asthma attacks.

Nitrogen Dioxide (NO_2)

Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

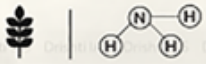
Impact: Chronic lung disease.

Carbon Monoxide (CO)

It is a product of the incomplete combustion of carbon-containing compounds.

Impact: Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

Ammonia (NH_3)



Produced by the metabolism of amino acids and other compounds which contain nitrogen.

Impact: Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

Lead (Pb)

Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

Impact: Anemia, weakness, and kidney and brain damage.

Particulate Matter (PM)

PM10: Inhalable particles, with diameters that are generally 10 micrometers and smaller.

PM2.5: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

Source: Emitted from construction sites, unpaved roads, fields, fires.

Impact: Irregular heartbeat, aggravated asthma, decreased lung function.

Note: *These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.*

Read more: [Advancing Air Pollution Control in India]

Anji Khad Bridge

Source: FE

Indian Railways has successfully completed a **trial run** on the Anji Khad Bridge for enhancing railway connectivity in **Jammu and Kashmir.**

- **About Anji Khad Bridge:**
  - It is **India's first** **cable-stayed rail bridge** located in Jammu and Kashmir's **Reasi district.** It is part of the **Udhampur-Srinagar-Baramulla Rail Link (USBRL)** project.
  - The bridge spans **725.5 meter**s with a **331-meter-high pylon**, built to withstand winds up to **213 km/h** and support trains traveling at **100 km/h.**
  - It utilizes **96 cables** of varying lengths (82 to 295 meters) and an **innovative hybrid foundation** to stabilize the mountain slopes.
  - It used **DOKA Jump Form Shuttering, Pump Concreting, and a Tower Crane Technique** to improve efficiency, reducing construction time **by 30%.**
    - The DOKA Jump Form Shuttering Technique is used for **constructing vertical concrete structures** like high-rises, bridges, and towers.

Read More: **First Cable-Stayed Railway Bridge of India**

Eruptions in Kilauea Volcano

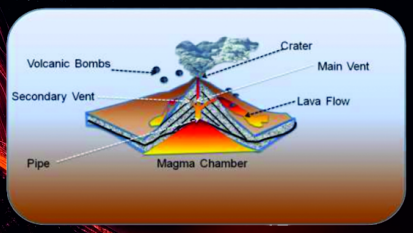
Source: USGS

Hawaii's Kilauea Volcano, one of the world's most active, has started **erupting once again**.

- **Kilauea Volcano:**
  - It is situated in **Hawaii Volcanoes National Park** in **Hawaii Island, USA.**
  - **It is the youngest and most active** Hawaiian **Shield Volcano**, renowned for **frequent eruptions**, with **more than 30 times eruptions since 1952,**
  - Kilauea's slopes merge with those of **Mauna Loa**, another active volcano, to its west and north.
- **Volcano:**
  - A **volcano** is an **opening on the surface** that allows material warmer than its surroundings to escape from its interior.
  - **Volcanoes in India: Barren Island (Andaman Islands),** India's **only active volcano.**

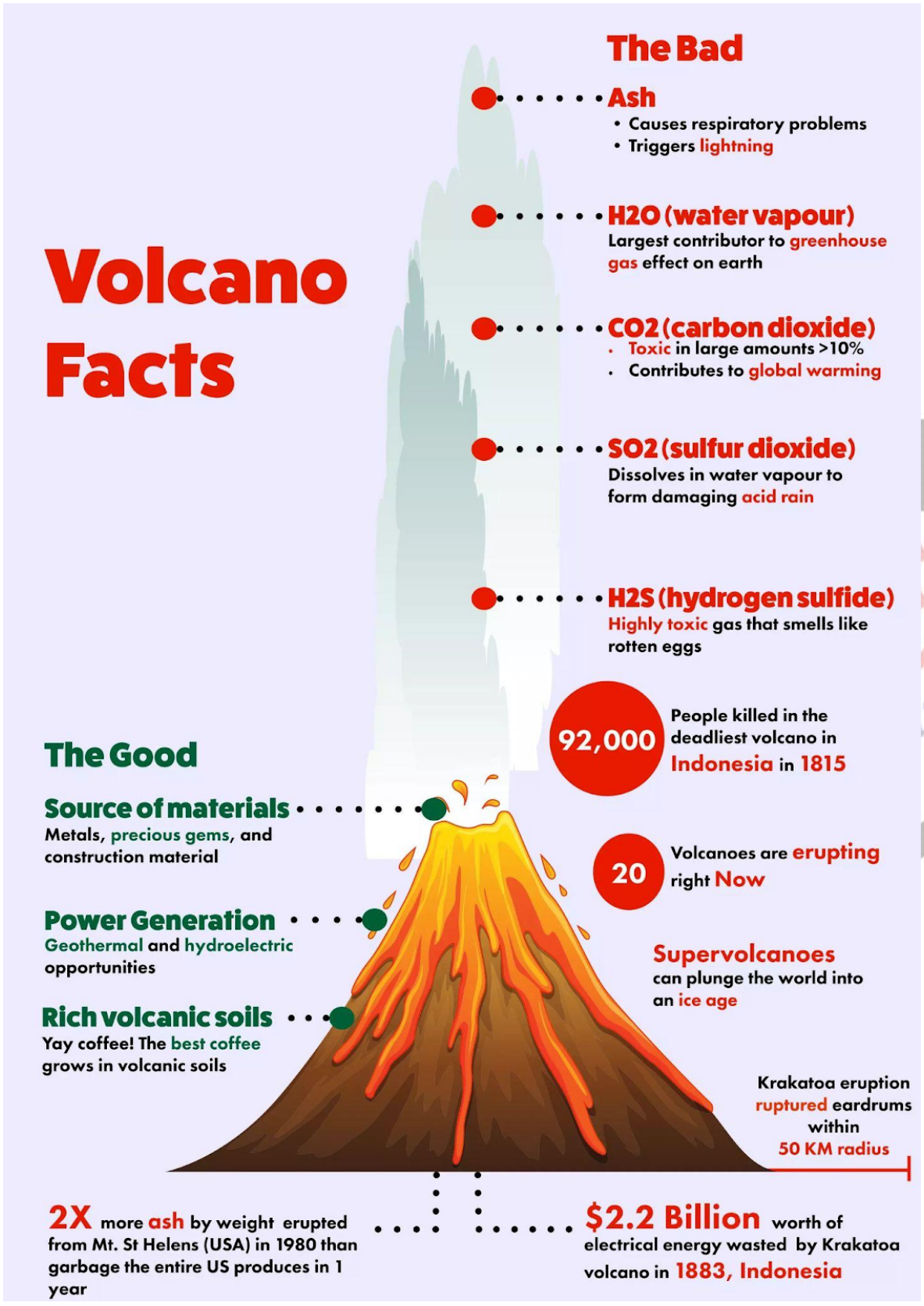
VOLCANOES

A volcano is a vent or a fissure in the crust from which lava (molten rock), ash, gases, rock fragments erupt from a magma chamber below the surface



- **Types: On basis of -**
  - **Periodicity of Eruption:**
    - **Active volcano:** Recently Erupted
    - **Dormant Volcano:** Potential for eruption, no imminent signs
    - **Extinct:** No recent eruptions, low possibility in future
  - **Nature of Eruption:**
    - **Hawaiian:** Calmest types (low gaseous content)
    - **Strombolian:** Formation of large gas bubbles in magma
    - **Vulcanian:** More explosive
    - **Plinian eruptions:** Magma's volatile gases rise via a narrow conduit
    - **Icelandic:** Often build lava plateaus
  - **Shape of Volcanoes:**
    - Shield volcanoes: Composed of basaltic lava, low slope
    - Cone volcanoes (Cinder Cones): Most abundant
    - Composite cones (stratovolcanoes): Formed by layers of diverse materials.
- **Volcanic Features:**
  - **Extrusive :**
    - **Crater:** Cone-shaped vent for magma
    - **Caldera:** Large, crater-like depression
    - **Volcanic Plateaus:** Leveled areas from fissure eruptions
  - **Intrusive:**
    - **Batholiths:** Central core of a volcanic mountain.
    - **Dyke:** Vertical intrusion cutting across country rock bedding.
    - **Sills:** Tabular intrusions along sedimentary bedding.
    - **Laccoliths:** Magma injection along horizontal sedimentary bedding.
  - **Minor:**
    - **Geysers:** Underground water above 100°C, powered by magma, results in powerful eruptions with steam and diluted minerals.
    - **Hot Springs:** Heated water flows quietly along fault zones.
- **Distribution of Volcanoes:**
  - Subduction zones (Circum Pacific Belt)
  - Divergence zones (Mid Atlantic Ridge)
  - Intra-plate oceanic volcanism (Hawaiian chain)
  - Mid-continental belt and volcanoes in Mediterranean region
- **Volcanoes in India:**
  - No volcanoes in Himalayans
  - Barren Island (Only active volcano)
- **Products of Volcanic Eruption:**
  - **Gases:** H, C, O, S, N, CH4, NH3
  - **Solid:** Pyroclastic materials
  - **Liquid:** Lava

Drishti IAS



Read More: [Kilauea Volcano: Hawaii]

Strengthening India-Maldives Defence Cooperation

For Prelims: SAGAR, Coastal radar system, Ekuverin, Ekatha, Dosti, South Asian Association for Regional Cooperation, Gulf of Aden, Strait of Hormuz, Belt and Road Initiative, Great Male Connectivity Project

For Mains: India’s Foreign Policy and Security, India’s Strategic Initiatives in the Indian Ocean, Major Aspects of India and Maldives Relations

Source: TH

Why in News?

India’s Defence Minister Rajnath Singh, during talks with the Maldivian Defence Minister, reaffirmed **India's commitment to enhancing the Maldives' defence** capabilities by providing defence equipment and platforms.

- This move reflects India's **"Neighborhood First" policy** and strengthening bilateral security and defence cooperation between the two nations.

How are India-Maldives Defence Cooperation?

- **Historical Context:** India has been a key defense partner of the Maldives, **often acting as the first responder in times of crisis.** This was demonstrated by **Operation Cactus in 1988,** where India intervened to prevent a coup attempt in the Maldives, and during the **2004**

tsunami.

- The **"Neighborhood First" policy** and **SAGAR (Security and Growth for All in the Region)** vision underline India's proactive approach to fostering regional security.

- **Defence Projects:** India has played a key role in infrastructure projects like the **Composite Training Centre (CTC) for Maldives National Defence Force (MNDF)** and the construction of the **Coast Guard "Ektha" MNDF Harbour** and repair facility at **Sifavaru in Uthuru Thila Falhu (UTF) atoll**.
  - In October 2023, India announced the free refit of the **Maldivian Coast Guard Ship Huravee,** signifying mutual trust.
  - India has handed over a **coastal radar system to the Maldives**, comprising 10 radar stations built with a USD 15.8 million Indian grant.
- **Training and Capacity Building:** India provides about **70% of the MNDF** training needs, with over **1,500 MNDF personnel trained** in various Indian defence academies.
  - Key bilateral exercises like **"Ekuverin" and "Ekatha,"** along with trilateral exercises such as **"Dosti" (including India, Sri Lanka, and the Maldives)** are conducted to enhance operational synergy and interoperability.
- **Institutional Mechanisms:** The **Annual Defence Cooperation Dialogue (DCD)** was initiated in 2016 at the **Defence Secretary level** to discuss and review defence cooperation.
  - The **5th Defence Cooperation Dialogue (DCD)** between India and the Maldives was held in New Delhi in September 2024.

India-Maldives Bilateral Relations

- **Political Relations:** India was one of the first countries to recognize the Maldives post-independence in 1965 and established its **diplomatic mission in Malé in 1972.**
  - They are founding members of **South Asian Association for Regional Cooperation (SAARC)** and signatories to the **South Asian Free Trade Area (SAFTA)**.
- **Trade and Economy:** India and Maldives signed a trade agreement in 1981, boosting bilateral trade.
  - In 2024, India extended **USD 400 million in support** and a **bilateral currency swap of Rs 3,000 crore to the Maldives,** reinforcing its economic assistance. Additionally, the **State Bank of India rolled over USD 100 million** of **Treasury Bills for the Maldives.**
  - India became the **Maldives' 2nd largest trade partner in 2022 and the largest in 2023.**
  - Indian imports mainly include **scrap metals,** while exports cover engineering goods, pharmaceuticals, cement, and agricultural products.
  - **Visa-free entry for Indian business travelers in 2022** further enhanced commercial relations.
  - In 2024, India and the Maldives have finalized a **framework to promote the use of local currencies** for cross-border trade.
- **Tourism: Tourism is crucial to the Maldivian economy,** contributing about a quarter of GDP and nearly **70% of total employment (direct and indirect).**
  - India became the **largest source of tourists to the Maldives,** with Indians leading tourism contributions for three consecutive years (2020, 2021, and 2022).
  - In March 2022, **India and Maldives agreed to an open skies arrangement** to enhance connectivity between the two countries.

What is the Significance of India-Maldives Cooperation?

- **Geographical Significance:** The Maldives sits at a critical position in the Indian Ocean, acting as a "toll gate" between the western chokepoints **(Gulf of Aden and Strait of Hormuz)** and the eastern chokepoint **(Strait of Malacca).**
  - This proximity to major international shipping lanes makes it a crucial partner for India, as around **50% of its external trade and 80% of its energy imports transit through these routes.**

    - The Maldives, located south of India, is crucial for **monitoring maritime traffic and enhancing regional security**.
- **Economic and Social Benefits**: India is a key supplier of essential goods **like rice, medicines, and infrastructure materials.**
    - **India's Operation Neer** delivered around 2000 tonnes of water via **INS Deepak** and **INS Shukanya**, during the **2014 Male Water Crisis.**
    - India's aid during crises, such as **tsunamis and Covid-19,** has reinforced its role as a reliable partner.
- **Countering External Influence**: India's cooperation with the Maldives **counterbalances the growing influence of external powers,** particularly China, in the region, and strengthens India's leadership role in maintaining regional peace.

What are the Challenges in India-Maldives Defence Ties?

- **Geopolitical Rivalries**: China's growing influence through initiatives like the **Belt and Road Initiative (BRI)** and the **'String of Pearls'** raises concerns for India.
    - Chinese investments in Maldivian infrastructure, such as the **Sinamale Bridge**, and military agreements challenge India's strategic dominance in the region.
- **Internal Political Changes**: The **"India Out" campaign** in 2023 highlighted rising anti-Indian sentiments in the Maldives, with demands for the **withdrawal of Indian military personnel** and the halting of Indian infrastructural developments.
    - These shifts in Maldivian political leadership have impacted defense priorities and foreign policy alignment with India.
- **Security Threat:** The increasing presence of **radical Islamist groups, including Pakistan-backed jihadi** factions and **ISIS (Islamic State of Iraq and Syria),** in the Maldives poses a direct security threat to India, as these groups may use the Maldives as a base to target Indian assets.

Way Forward

- **Multilateral Collaboration:** Encouraging Maldives' participation in regional frameworks like the **Indian Ocean Rim Association (IORA).**
    - Strengthening **trilateral cooperation between India, Maldives, and Sri Lanka** for enhanced maritime security.
- **Infrastructure Projects:** India should prioritize and expedite the completion of crucial infrastructure projects, such as the **Great Male Connectivity Project,** to offer viable alternatives to Chinese investments.
- **People-Centric Initiatives:** Promoting **goodwill by focusing on civil-military projects,** such as **medical aid and community infrastructure development.**
    - Fostering cultural and educational exchanges between the two nations to strengthen public diplomacy.

Drishti Mains Question:

Discuss the significance of India-Maldives defence cooperation in the context of regional security in the Indian Ocean?

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Mains

Q. Discuss the political developments in the Maldives in the last two years. Should they be of any cause for concern to India? **(2013)**

Polar Vortex

Source: IE

Why in News?

A severe **winter storm** has affected a large part of the US, impacting over 60 million people across 30 states.

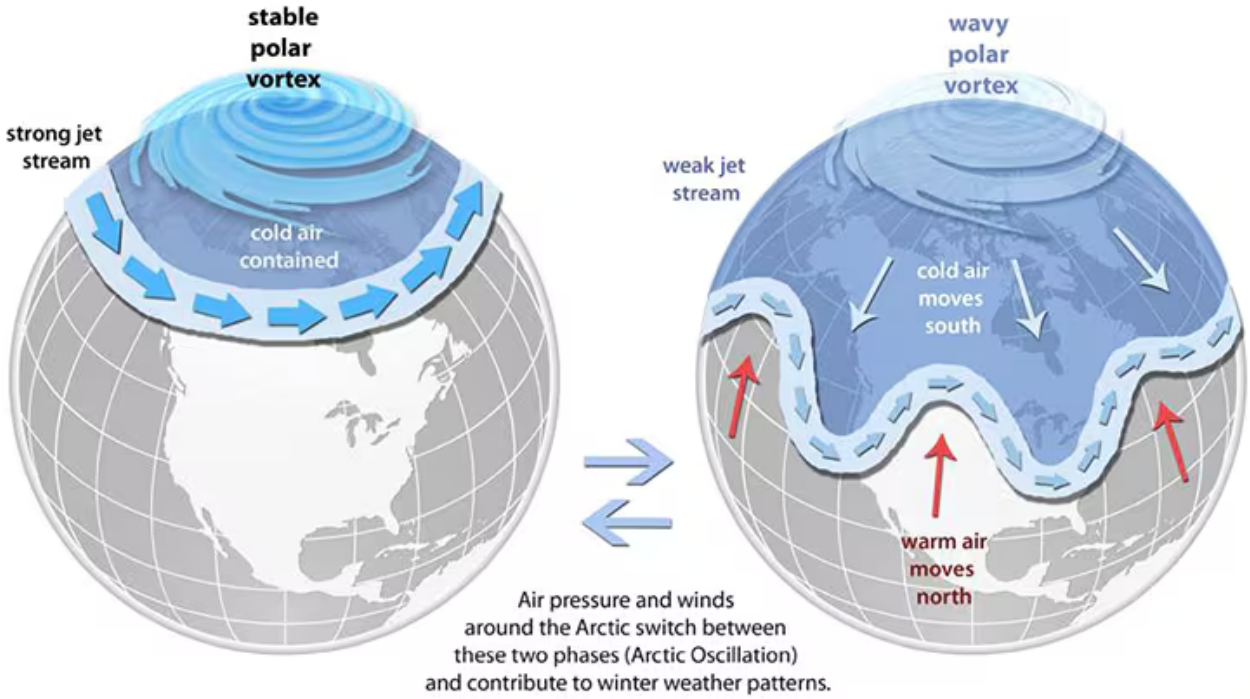
- This extreme weather is attributed to the **southward expansion of the polar vortex,** highlighting its role in causing frigid temperatures and severe storms.

Note: Winter storms are weather events characterized by **extreme cold, snow, sleet, or freezing rain,** often accompanied by strong winds.

- They form when **moist air rises, cools, and condenses into precipitation,** with cold temperatures ensuring it falls as snow or ice.

What is the Polar Vortex?

- **About:** The polar vortex is a large **area of low-pressure and cold air** that rotates around the **Earth's polar regions.**
  - The term **"vortex" describes the counter-clockwise flow of air** that confines colder air near the poles.
  - Polar Vortex exists year-round, but it weakens in summer and strengthens in winter.
- **Types:**
  - **Tropospheric Polar Vortex**: Located at the lowest layer of the atmosphere, from the **surface up to 10-15 km**, where most weather phenomena occur.
  - **Stratospheric Polar Vortex**: Occurs higher up, between **15 km to 50 km**, and is **strongest during autumn**, disappearing in the summer.
    - Its changes are influenced by **air movement and heat transfer in the polar region.** During autumn, circumpolar winds accelerate, strengthening the vortex and forming a unified, rotating mass of polar air in the **stratosphere.**
- **Mechanism of Extreme Cold:** When the **polar vortex is strong,** it keeps the jet **stream stable,** preventing cold air from moving south.
  - However, when the **vortex weakens,** a disrupted jet stream (a narrow band of strong winds), which usually moves in a straight line, becomes wavy, allowing Arctic air to flow farther south.
    - This disruption leads to **extremely low temperatures, severe storms, and extreme weather,** including snowfall and freezing rain.
- **Global Warming and Polar Vortex:** Researchers state that the Arctic is warming faster than the rest of the planet, a phenomenon known as **Arctic amplification.**
  - This reduces the **temperature gradient** (rate of change of temperature) **between the poles and the mid-latitudes**, weakening the **polar vortex.**

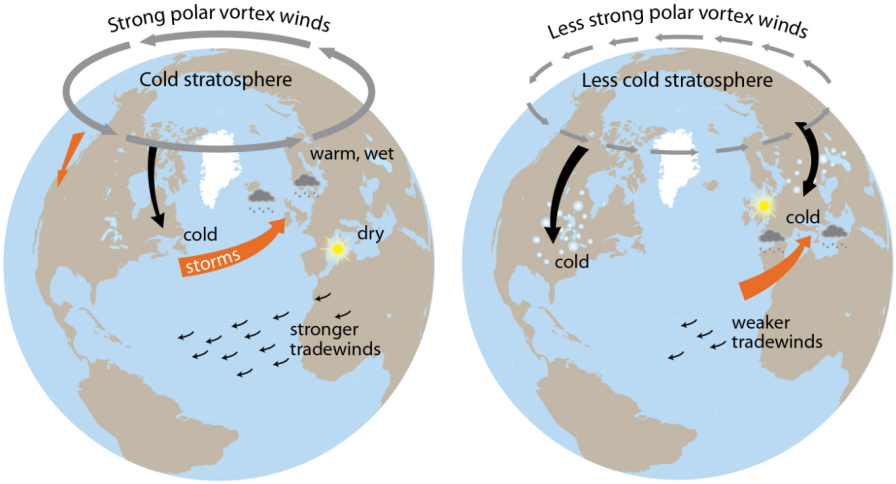


Other Geophysical Phenomenon Similar to Polar Vortex

- **Arctic Oscillation (AO):** It is a climate pattern affecting **winter weather in the Northern Hemisphere.** When the **Arctic Oscillation (AO) is positive,** a strong jet stream directs storms north, **limiting cold air outbreaks in the mid-latitudes**, while the **negative phase shifts the jet stream south, causing cold outbreaks and storms.**

Arctic Oscillation Positive Phase

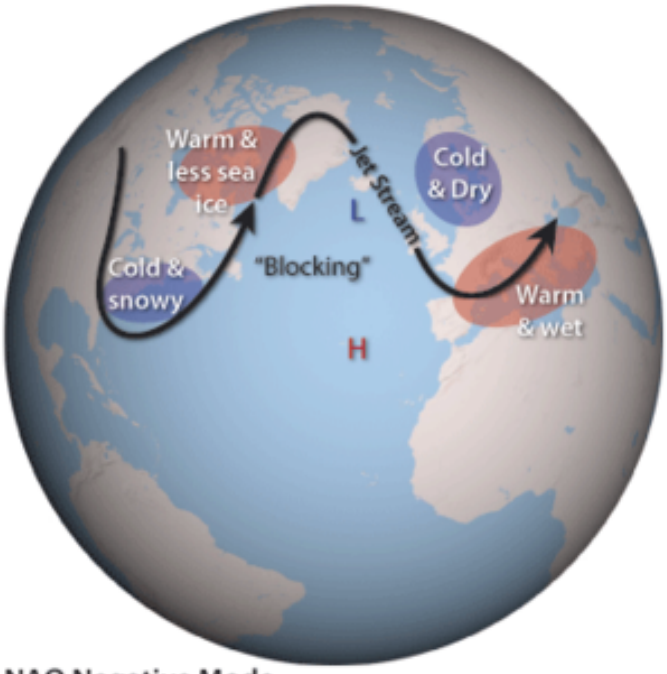
Higher-pressure air mass over North America, Europe and Asia confines extremely cold air to Arctic.



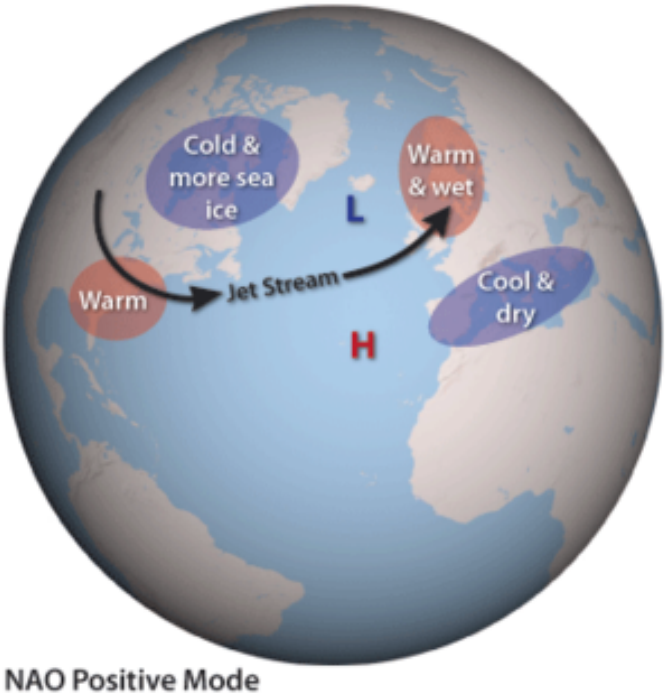
Arctic Oscillation Negative Phase

Air pressure systems weaken allowing colder air to move south and warmer air to move north.

- **North Atlantic Oscillation (NAO):** The **NAO** measures pressure differences between the **Azores High and Subpolar Low**, affecting weather patterns in North America and Europe.
  - The positive phase of NAO brings warmer, wetter conditions in the US and northern Europe, while the negative phase causes cooler, drier conditions.



NAO Negative Mode



NAO Positive Mode
