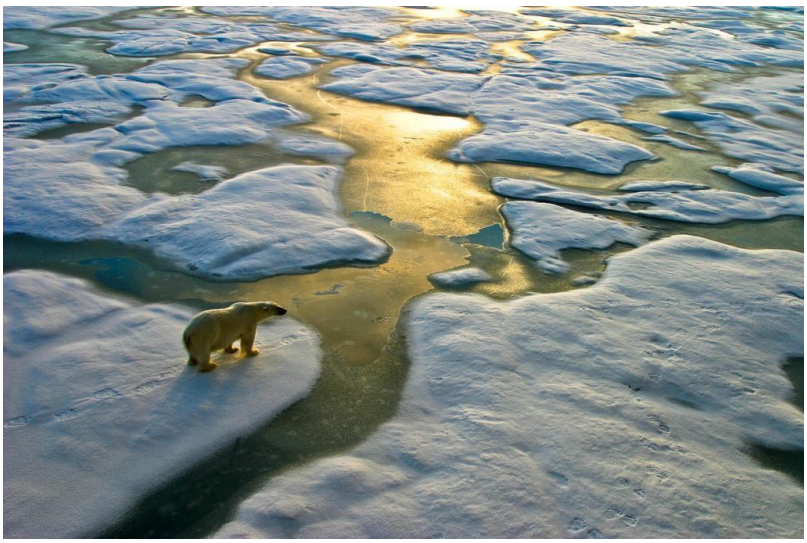
UPSC CURRENT AFFAIRS NOTES 15-02-2024

MARINE HEATWAVES



A worrying trend has emerged in the Arctic Ocean, with marine heatwaves occurring for six consecutive years from 2015 through 2021, according to a new study published in the journal.

Marine heat waves (MHWs)

A marine heat wave is an extreme weather event. A marine heatwave occurs when surface water temperatures are higher than 95 per cent (**3 or 4 degree** Celsius) of the values from the past 30 years **for at least five consecutive days**. MHWs can last for weeks, months or even years.

Impact of marine heat waves on ocean life

Although an increase of 3 or 4 degrees Celsius in average temperatures may not be much for humans, it can be catastrophic for marine life.

Instance

For instance, MHWs along the Western Australian coast during the summer of 2010 and 2011 caused some “devastating” fish kills the sudden and unexpected death of many fish or other aquatic animals over a short period and mainly within a particular area as per a 2013 study in the Journal of Marine Systems.

A different study revealed that the same MHWs destroyed kelp forests and fundamentally altered the ecosystem of the coast. Kleps usually grow in cooler waters, providing habitat and food for many marine animals.

Another example is when high ocean temperatures in the tropical Atlantic and Caribbean in 2005 led to a massive coral bleaching event.

A 2010 study showed that more than 80 per cent of surveyed corals had bleached and over 40 per cent of the total surveyed had died.

MHWs also fuel the growth of invasive alien species, which can be destructive to marine food webs. Additionally, they force species to change their behavior in a way that puts wildlife at increased risk of harm — MHWs have been linked to whale entanglements in fishing gear, according to a report by the International Union for Conservation of Nature (IUCN).

Coral bleaching

- Corals are very sensitive to the temperature of the water in which they live.
- When water gets too warm, they expel the algae known as zooxanthellae, living in their tissues, causing them to turn entirely white. This is called coral bleaching.
- When a coral bleaches, it is not dead. Corals can survive a bleaching event, but they are under more stress and are subject to mortality.
- Coral bleaching has severe consequences as it reduces the reproductivity of corals and makes them more vulnerable to fatal diseases. Not only this, thousands of marine animals depend on coral reefs for survival and damage to corals could, in turn, threaten their existence.

Marine heat waves affect humans

Stronger Hurricanes and Cyclones

- Higher ocean temperatures, which are associated with MHWs, can make storms like **hurricanes and tropical cyclones stronger**. With warmer temperatures, the rate of evaporation escalates and so does the transfer of heat from the oceans to the air.
- When storms travel across hot oceans, they gather more water vapour and heat. This results in more powerful winds, heavier rainfall and more flooding when storms reach the land — meaning heightened devastation for humans.

Livelihood and socio-economic impacts

- Moreover, only marine wildlife isn't dependent on coral reefs. Half a billion people depend on **reefs for food, income, and protection**. So

when MHWs destroy these reefs, humans relying on them also bear the brunt.

- The IUCN report pointed out that MHWs have "profound socio-economic impacts for coastal communities." For example, in 2012, an MHW over the northwest Atlantic Ocean caused marine species that like warm water to move northwards and migrate earlier than they usually did, affecting fisheries targeting those species in the United States. All of these disastrous consequences are set to become even worse as the world continues to get warmer, making MHWs more intense and longer.

Marine heatwaves under global warming

- With the soaring global temperatures, MHWs have become longer-lasting, more frequent and intense in the past few decades.
- Between 1982 and 2016, detect a doubling in the number of MHW days, and this number is projected to further increase on average by a factor of 16 for global warming of 1.5 degrees Celsius relative to preindustrial levels and by a factor of 23 for global warming of 2.0 degrees Celsius.
- More significantly, it stated that 87 per cent of MHWs are attributable to human-induced warming.
- Research suggests that the oceans have absorbed 90 per cent of the additional heat caused by the release of greenhouse gases into the atmosphere from burning fossil fuels and deforestation in recent decades. This has increased the global mean sea surface temperature by close to 0.9 degree Celsius since 1850 and the increase over the last four decades is around 0.6 degree Celsius, according to Copernicus Climate Change Service.
- Therefore, as global air temperatures increase, so will ocean temperatures, leading to more MHWs.
- To make matters worse, El Nino — a weather pattern that refers to an abnormal warming of surface waters in the equatorial Pacific Ocean — conditions have set in for the first time in seven years.
- Scientists and experts suggest that El Nino will trigger extreme heat and increase the likelihood of breaking more temperature records in different regions of the world.

Marine heat waves in Arctic

Key Findings

- Since 2007, 11 marine heatwaves have occurred in the Arctic Ocean, with the average temperature rising 2.2 degrees Celsius above the seasonal average.
- In 2022, the Arctic saw severe and extreme marine heatwaves in the Laptev and Beaufort seas from spring to autumn.
- The Arctic has warmed by nearly four times faster than the globe since 1979.
- Further, the perennial sea ice cover over the Arctic Ocean, known to reflect solar radiation, has seen a marked decrease in both summer and winter since the mid-1990s.
- There is less and less of the thicker, several-year-old ice, while the percentage of thin, seasonal ice is consistently increasing.
- The thin ice, is less durable and melts more quickly, allowing incoming solar radiation to warm the water's surface.
- Arctic marine heatwave events have been accompanied by a record decline in Arctic Sea ice, especially in the years 2007, 2012 and 2020.
- The marine heatwaves primarily gripped the Arctic marginal seas, including the Kara, Laptev, East Siberian, Chukchi and part of Beaufort Seas.
- These marginal seas are predominantly covered by **first-year ice**, floating ice of no more than a year's growth developing from young ice. Its thickness ranges from 0.3-2 metres.
- The recent prevalence of **first-year ice phenomena** creates extensive areas where marine heatwave events can occur and develop.

First-year ice refers to sea ice that has formed during the current freezing season and has not survived a melting season. It typically forms in autumn and winter when seawater freezes, creating a layer of ice on the ocean surface. First-year ice is generally thinner and more vulnerable to melting compared to multi-year ice, which has survived at least one melting season. This distinction is significant for understanding the dynamics of Arctic and Antarctic sea ice, as first-year ice tends to be more responsive to changes in temperature and ocean conditions, making it an important indicator of climate change impacts on Polar Regions.

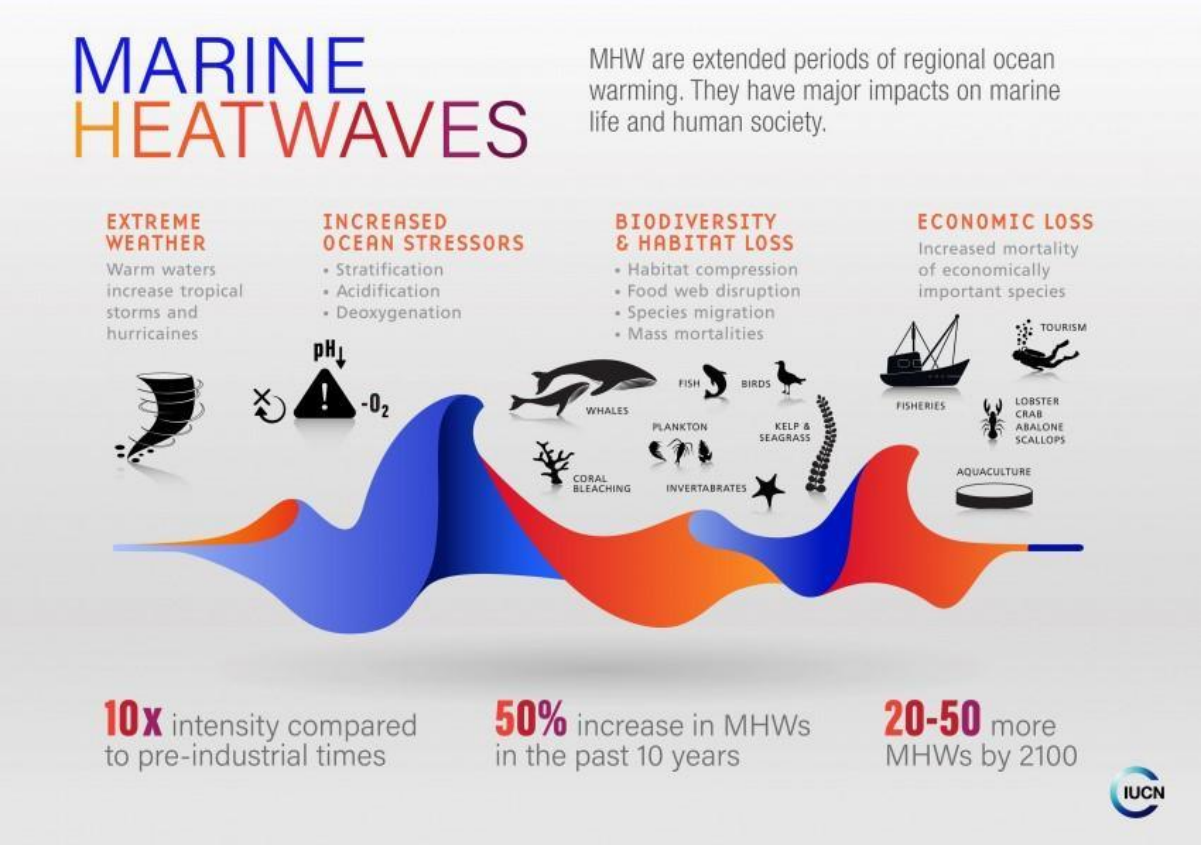
- The first-year ice regions hinder the thorough mixing between the different layers of the sea. This **prevents solar radiation** from reaching the lower parts of the sea, leading to unusually high sea surface temperatures, creating conditions ripe for a marine heatwave event.
- For example, during the 2007 and 2020 events, the **annual cumulative solar energy** absorbed was 110 per cent and 120 per cent higher than the average rate observed during 1983-2012.
- Abrupt sea ice retreat is another concern as it could trigger marine heatwave events. The rate of sea ice melt in June-July has increased from 18×102 square kilometres per day in 1996 to 25×103 square km per day in 2021 at a speed of 38 per cent in 25 years.
- Without the involvement of greenhouse gases, marine heatwaves with intensity greater than 1.5°C could not occur. The observed 2007, 2012 and 2020 events recorded a 3.5°C, 2.1°C and 4°C intensity, respectively.

2020 marine heatwave

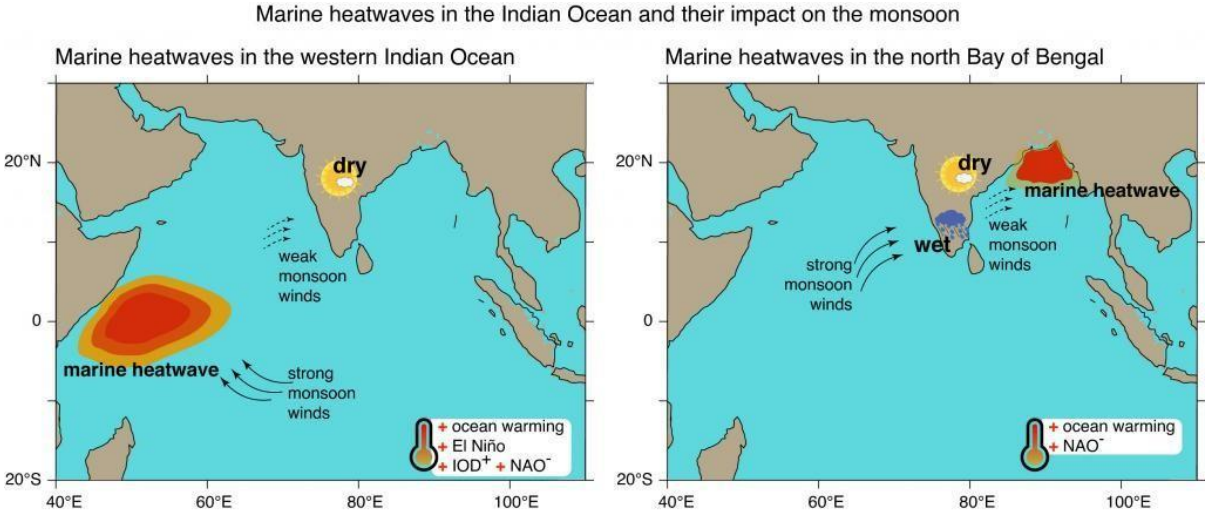
- The 2020 marine heatwave was the most severe in terms of intensity and duration. It lasted 103 days, with peak temperature intensity **reaching 4°C over the long-term average**. The probability of this occurring without human-induced warming was less than 1 per cent, the researchers highlighted.
- However, for moderate marine heatwave events, whose intensity ranges between 0.5-1°C, greenhouse gas forcing emerges as a sufficient cause (with 66-99 per cent probability). This implies that if greenhouse gas forcing continues to rise, events with moderate intensity will persistently recur.

Consequences

- Marine heatwaves in the Arctic have raised concerns over what they could mean for the fragile ecosystem. **Food chains could collapse, fish stocks could be reduced and overall biodiversity could decline.**



Marine heatwaves in Indian Ocean disrupt India‘s monsoon patterns



- Marine heatwaves in the tropical Indian Ocean are the least understood, though recent studies have reported their occurrence and impacts in the world’s oceans.
- In the Indian Ocean, the worst-affected were its western part and northern Bay of Bengal.

- The number of MHWs in the west Indian ocean increased by around 1.5 events per decade between 1982 and 2018. The occurrences went up by around 0.5 events per decade in north Bay of Bengal in the same period.
- There were a total of 66 events in west Indian Ocean and 94 in north Bay of Bengal in the 36 years.
- The marine heat waves in the Indian Ocean are also **majorly impacting the southwest monsoon** — the main rain-bearing system over the Indian subcontinent.
- The MHWs in the two worst-hit regions reduce monsoon rainfall over central India. **The occurrence in north Bay of Bengal increases rainfall over the southern peninsular area.**

Way Ahead

- Marine heat waves pose significant threats to marine ecosystems, biodiversity, fisheries, and coastal communities. Urgent action is needed to mitigate their impacts through robust monitoring, **adaptive management strategies,** and global efforts to address climate change and ocean warming.
- If current human carbon emissions are not reduced, a one-in-hundred-days event (at pre-industrial carbon dioxide levels) is projected to become a one-in-four-days event by 2031–2050 and a one-in-two-days event by 2081–2100.

FARMER'S PROTEST AND MSP DEMAND

The 'Delhi Chalo' protest, in full swing since February 13, has seen farmers from Punjab, Haryana, and western Uttar Pradesh marching towards Delhi to assert their demands.

The primary demand is for MSP,a safety net ensuring farmers a minimum income for their crops, lies at the heart of their agitation.

What is Minimum Support Price (MSP)?

- Minimum Support Price (MSP) is the lowest rate at which government procurement agencies buy crops from farmers. It shields farmers from market fluctuations, offering stability and income security.
- MSP is crucial for ensuring fair prices for farmers and is determined by the **Commission for Agricultural Costs and Prices (CACP)**, considering factors like production costs, market trends, and demand-supply dynamics.
- Established in 1965, CACP operates under the Ministry of Agriculture and Farmers Welfare.
- After the CACP submits its recommendations, the Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister of India, makes the final decision on MSP levels.

How is MSP calculated?

- The Minimum Support Price(MSP) is calculated by considering both the explicit and implicit costs incurred by farmers.
- Explicit costs cover expenses like chemicals, fertilizers, seeds, and hired labor, while implicit costs include factors such as family labour and rent. These variables are represented by A2, FL, and C2.
- A2 refers to the expenses for inputs like chemicals, fertilizers, seeds, and hired labor for crop growth, production, and maintenance.
- A2 + FL includes both actual and implicit costs, such as family labor.
- C2 incorporates A2 + FL along with fixed capital assets and rent paid by farmers.
- **Additionally, the Commission for Agricultural Costs and Prices (CACP) takes into account various other factors:**
- Cost of cultivation per hectare and crop costs in different regions.
- Cost of production per quintal and regional differences.

- Market prices of relevant crops and their fluctuations.
- Other production and labour costs, along with associated changes.
- Prices of commodities bought or sold by farmers and any fluctuations.
- Information on product supply, including area, yield, production, imports, exports, and stocks with public agencies or industries.
- Demand information across regions, including total and per capita consumption, processing industry trends, and capacity.

Why are farmers protesting?

- Farmers have demanded MSP assurance across all crops, implementing **Swaminathan Commission recommendations**, debt relief, pensions for farmers, and withdrawing cases against past protestors.
- Advocacy for India's exit from WTO and free-trade agreements are also demands that have been put forth by the farmers.

Baltic Sea

A Stone Age wall has been discovered beneath the Baltic Sea in Germany, believed to be the oldest megastructure built by humans in Europe.

About Baltic Sea

It is a semi-enclosed inland sea located in Northern Europe.

It is an arm of the North Atlantic Ocean, extending northward from the latitude of southern Denmark almost to the Arctic Circle and separating the Scandinavian Peninsula from the rest of continental Europe.

It has a coastline of approximately 8,000 km, shared by several countries, including Sweden, Poland, Lithuania, Latvia, Finland, Estonia, Germany, Denmark, and Russia.

It covers an area of approximately 377,000 sq.km. The sea is approximately 1,600 km long and 193 km wide.

It is connected to the White Sea via the White Sea Canal and to the North Sea's German Bight via the Kiel Canal.

It connects to the Atlantic Ocean through the Danish Straits.

The Baltic Sea contains three major gulfs: the **Gulf of Bothnia to the north,** the **Gulf of Finland to the east**, and the **Gulf of Riga slightly to the south** of that.

It is often cited as the world's largest brackish inland water body.

Its water salinity levels are lower than that of the World Oceans due to the inflow of fresh water from the surrounding land and the sea's shallowness.

More than 250 rivers and streams empty their waters into the Baltic Sea. Neva is the largest river that drains into the Baltic Sea.

Islands: It is home to over 20 islands and archipelagos. Gotland, located off the coast of Sweden, is the largest island in the Baltic Sea.

Baltic Nations

These are three countries of north-eastern Europe, on the eastern shore of the Baltic Sea**. <u>The Baltic Nations are Estonia, Latvia and Lithuania.</u>** They are bounded on the west and north by the Baltic Sea, on the east by Russia, on the southeast by Belarus, and on the southwest by Poland and an exclave of Russia.

Electoral Bonds (EBs)

The Supreme Court recently directed the State Bank of India to stop issuing electoral bonds immediately.

Electoral bonds are interest-free bearer bonds or money instruments that can be purchased by companies and individuals in India from authorised branches of the State Bank of India (SBI).

The bonds are similar to bank notes that are payable to the bearer on demand and are free of interest.

These bonds are sold in multiples of Rs 1,000, Rs 10,000, Rs 1 lakh, Rs 10 lakh, and Rs 1 crore.

They can be purchased through a KYC-compliant account to make donations to a political party.

EBs have a life of only 15 days during which it can be used for making donations to political parties.

The name and other information of the donor are not entered on the instrument and thus electoral bonds are said to be anonymous.

There is no cap on the number of electoral bonds that a person or company can purchase.

Under the Income Tax act, one's electoral bond donations are considered tax-exempt under Section 80 GG and Section 80 GGB.

Only political parties registered under Section 29A of the Representation of the People Act, 1951 and which secured not less than 1% of votes polled in the last general election to the House of the People or the Legislative Assembly of the State, are eligible to receive electoral bonds.

The political parties have to encash them within a stipulated time.

The bond can be encashed by an eligible political party only through a designated bank account with the authorized bank.

The political parties have to disclose the amount to the Election Commission.

Election Commission of India (ECI)

The Election Commission of India (ECI) is an autonomous and permanent constitutional body responsible for organizing free and fair elections in the Union and States of India. The Constitution grants the ECI with the power of direction, superintendence, and control of elections to Parliament, state

legislatures, the office of president of India and the office of vice-president of India. The ECI does not deal with the elections to the urban bodies such as Municipalities and Panchayats in the states and hence, a separate State Election Commission.

125 of the Criminal Procedure Code (CrPC)

The Supreme Court recently decided to examine a plea on whether a divorced Muslim woman can seek maintenance under Section 125 of the Criminal Procedure Code.

About Section 125 of the Criminal Procedure Code (CrPC)

It deals with the maintenance of wives, children, and parents.

It is a legal provision that allows certain categories of individuals to claim financial support from their spouses or children, as the case may be, in the event they are unable to maintain themselves.

Claim Maintenance

- Wife: A wife who is unable to maintain herself can claim maintenance from her husband. The wife is entitled to maintenance if she is unable to support herself. The word "wife" refers to a woman who has been divorced or sought divorce from her spouse and has not remarried.
- Children: Children, whether legitimate or illegitimate, who are unable to maintain themselves and are below a certain age or mentally/physically disabled can claim maintenance from their parents.
- Parents: Under this, both father and mother are entitled to be maintained equally by son and daughter, but the court must be satisfied that the daughter has the means to support herself. Parents also include “Adoptive father” and “Adoptive mother.”

To successfully claim maintenance under Section 125 CrPC, certain conditions must be met:

- Neglect or Refusal: The person seeking maintenance must demonstrate that the respondent (the person from whom maintenance is sought) has neglected or refused to provide financial support.
- Dependency: The claimant must establish their inability to maintain themselves and their dependency on the respondent for financial assistance.

- Sufficient Means: The person from whom maintenance is claimed must have sufficient means to maintain the person claiming.
- Quantum of Maintenance: The court will determine the amount of maintenance based on various factors like the income and financial capacity of the person liable to pay, the needs of the claimant, and other relevant circumstances. The objective is to ensure that the claimant gets a reasonable and fair amount for their maintenance.
- Duration: Maintenance can be awarded on a monthly basis, and the court can specify a duration for which it should be paid. It can be a temporary or permanent arrangement, depending on the circumstances.
- Enforcement: If the person ordered to pay maintenance does not comply with the court's order, the person seeking maintenance can file an application for the enforcement of the order. The defaulter may face legal consequences for non-compliance.

The wife is not entitled to receive an allowance from her husband in three cases,

- if she is living in adultery
- if she refuses to live with her husband and without any sufficient cause
- if they are living separately by mutual consent

Criminal Procedure Code (CrPC)

Enacted in 1973 (came into force on 1 April 1974), CrPC is the main legislation on procedure for administration of substantive criminal law in India. It provides a procedure for the investigation of crime, the collection of evidence, and the determination of guilt or innocence. The CrPC also covers the arrest and detention of suspects, the conduct of trials, and the sentencing of convicted individuals.

UN World Restoration Flagships

The United Nations named seven initiatives from across Africa, Latin America, the Mediterranean and Southeast Asia as the intergovernmental organisation’s World Restoration Flagships.

About UN World Restoration Flagships

- The World Restoration Flagship is part of the UN Decade on Ecosystem Restoration – led by the UN Environment Programme (UNEP) and the Food and Agriculture Organization.
- It aims to prevent, halt, and reverse the degradation of ecosystems on every continent and in every ocean.
- The award conferred by the UNEP and FAO of the UN makes the initiatives eligible for technical and financial support from the organisation.
- The awards track notable initiatives that provide support to global commitments in order to restore one billion hectares.

The seven initiatives are

- The Restoring **Mediterranean Forests Initiative**: It involves the countries of Lebanon, Morocco, Tunisia and Türkiye.
- It consists of a novel approach said to have protected and restored natural habitats and vulnerable ecosystems. It is also said to have led to around two million hectares of forests restored across the region since 2017.
- The Living Indus initiative received approval from the Pakistan parliament in the wake of the devastating 2022 climate change-induced floods.
- Its official launch took place at the 27th Conference of Parties to the UN Framework Convention on Climate Change in Sharm el-Sheikh.
- It designates the Indus River as a living entity with rights — a measure taken to protect rivers elsewhere as well.
- The Acción Andina social movement led by Peruvian conservation non-profit ECOAN aims to protect and restore a forest area of one million hectares.
- **The Sri Lanka Mangrove Regeneration initiative**: It is a science-driven programme co-led by local communities. It focuses on the restoration of natural balance in the ecosystem
- **The Terai Arc Landscape initiative**: It is aimed to restore the forests of critical corridors of the Terai Arc Landscape in collaboration with local communities working as citizen scientists, community-based anti-poaching units, forest guards, among others.

- "**<u>It also supported the tiger population in the landscape shared by India and Nepal,</u>** which increased today to 1,174.
- **Regreening Africa's agriculture**: It is expected to benefit over 6,00,000 households.
- **Growing forests in Africa's drylands initiative**: It aims to expand from 41,000 restored hectares today to 229,000 hectares by 2030.

Food and Agriculture Organization (FAO)

It is a specialized agency of the United Nations that leads international efforts to defeat hunger and improve nutrition and food security. Its goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.

Mohammed Quli Qutb Shah's tomb

Recently, Reality tech firm unveils digital twin of Mohammed Quli Qutb Shah's tomb in Hyderabad.

About Mohammed Quli Qutb Shah's tomb

- It is one the grandest monuments in the Qutb Shah's tombs complex at the foothill of Golconda, Hyderabad.
- The majestic tomb built in 1602, is one of the largest tombs at the Qutb Shahi heritage park complex reaching a total height of 60 m.

Who is Mohammed Quli Qutb Shah?

- He was the fifth king of the Qutb Shahi dynasty who laid the foundation of Hyderabad.
- Shah who wrote in Persian, Telugu, and Deccani—a variant of Urdu--is justifiably the first poet in Deccani Urdu with at least fifty thousand shers to his credit.
- He wrote on a variety of issues concerning communal life and the sentiments of the common man, their festivals and faiths, love and the pleasures of union, in a frank and disarming manner.
- A contemporary of Tulsidas, he blended the best traditions of the two streams of thought and life to impart a new halo to his poetry.

Key facts about Qutub Shahi Tombs

- These are erected in the memory of the departed kings of Golconda.
- They are located one kilometer north of Golconda Fort's called Banjara Darwaza.
- Built by the Qutub Shahis, these tombs are considered to be among the oldest historical monuments of Hyderabad.
- These tombs are present in a large group on a raised platform.
- Architectural style: They resemble Persian, Pathan and Hindu architectural styles that make use of grey granite, with stucco ornamentation and is a one-of-its-kind place in the world where the whole dynasty is buried at a single spot.

What is a digital twin?

- It is a digital model of an object, system or a process that acts the same as its real world counterpart.
- It helps companies and organisations to understand a physical object or a process well.