TARGET PRELIMS 2024
BOOKLET-15; ENVIRONMENT-5
CA UPDATES ON POLLUTION

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2. AIR UPDATES

1) DUST SUPPRESSANTS AND AIR POLLUTION MITIGATION

- **What are Dust Suppressants?**
  - » These are salts of calcium or magnesium that can absorb moisture.
  - » **Delhi government used** Dust suppressants on roads to control pollution. Environment Minister Gopal Rai had said "the Dust Suppressant powder would be mixed with water and sprayed on roads to keep the dust down for longer."

- **In 2019**, the CPCB told the NCR states that they may consider using dust suppressants on excavated earth surfaces, piles of construction and demolition waste, and access roads in construction areas.
  - » **One of the CPCB study** had found that dust suppressants along with water is relatively more effective in control of pollution than conventional methods of dust control i.e. **water spraying**.

- **In 2019**, the Delhi Pollution Control Committee had also issued directions that all construction agencies will use dust suppressants to control dust emissions and road-owning agencies with use it in dusty patches.

3. WATER UPDATES

1) 'WATER TRADING MECHANISM TO PROMOTE THE REUSE OF TREATED WATER': NITI AAYOG REPORT

- **What is water trading?**
  - » This is a water market mechanism that considers water as a commodity that can be traded among users according to their needs. Under this, water rights are allocated to each sector, and they use it according to their needs – Buy when they need mor water and sell when they need less.
  - » In many countries water trading has promoted water use efficiency.
- **NITI Aayog Report**:
  - » Though it may not be advisable to introduce a full-fledged water trading in India for various socio-economic reasons, **trading of treated wastewater among industrial users could be tried**.

- **Advantages of trading:**
  - » Increased treatment (currently only 40% of India's wastewater is treated).

2) GROUNDWATER EXTRACTION HAS SHIFTED THE EARTH'S AXIS: A NEW STUDY (JUNE 2023: IE)

- **Background: Earth's Axis Keep Shifting**:
  - » Earths spins around an imaginary axis which passes through the north pole, its centre of mass and the south pole – just like a top spin around its spindle.
  - » The poles and axis keep shifting naturally as the mass distribution in and on the planet changes. The phenomenon is known as "Polar Motion".
  - » For e.g., rocks slowly circulating inside Earth's mantle causes the Planet's mass to shift, leading to a change in the position of the rotational axis.

- The study – "**Drift of Earth's Pole Confirms Groundwater Depletion as a Significant contributor to Global Sea Level Rise 1993-2010",** was published in the journal **Geophysical Research Letters**.

- The study noted that humans pumped out around 2150 gigatons of ground water between 1993 and 2010. This has led to planet's axis drifting at a rate of **4.36** cm per year towards the east. Although the shift isn't significant enough to have real-life consequences, but the study shows shift in planet's axis and **rise in global sea level**.

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3) NIT WARANGAL FACULTY MEMBERS DEVELOP INNOVATIVE WASTEWATER TREATMENT SYSTEM FOR TEXTILE INDUSTRY EFFLUENTS

- **Textile Effluents:**
- A team of faculty members at **NIT-Warangal** has developed an environment friendly **hybrid wastewater treatment system** for textile industry effluents.
  - » **Traditional methods** use a lot of chemicals**.**
  - » However, in the new method, in order to reduce pollution levels to permissible limits of discharge, the team put forward a combination of coagulation, hydrodynamic cavitation (HC) – based oxidation system and ceramic membrane (CM) – based filtration process.
  - » In the coagulation process – turbidity of the effluents is removed.
  - » HC, a process involving generation and collapse of microbubbles in a liquid, is employed afterwards to initiate the breakdown/mineralization of complex organic compounds.
  - » In place of polymeric membrane, the novel methodology uses ceramic membranes. After two years, polymeric membranes need to be discarded. It becomes a solid waste.
    - The surface modified ceramic membrane further improves filtration efficiency, ensuring the removal of even finer particles and impurities.
  - » This integrated method achieved an 80% reduction in **organic pollutants**.

4) COASTAL AQUACULTURE AUTHORITY

- Why in news?
  - » Coastal Aquaculture Authority (Amendment) Act, 2023 passed by both houses of the Parliament.

- **Background**:
  - » The Coastal Aquaculture Authority Act 2005 was enacted with an aim to protect coastal environment, while promoting orderly growth of coastal aquaculture farming in coastal areas.
  - » The act has established **Coastal Aquaculture Authority** which regulates activities connected with coastal aquaculture in the coastal areas.
  - » The act has also **defined coastal aquaculture** to include culturing under controlled conditions in ponds, pens, enclosures or otherwise, in coastal areas of shrimp, prawns, fish or any other aquatic life in saline or brackish water, but **doesn't include freshwater aquaculture**.
  - » The act also ensures **continued operation of coastal aquaculture** within **CRZ area** subject to restrictions imposed by the Authority.
  - » It also penalizes unregistered farms in prohibited areas.

- **Impact**:

» **Facilitated millions of jobs, self employment opportunities, businesss** and environment protection.
» **Increased production of fishery sector**.

- **Need of Amendment**:
  » Some ambiguities related to the provisions of CRZ notifications - like that of "**No Development Zone**" has been misinterpreted to be applicable in the hatcheries as well. Hence, aquaculture farmers and stakeholders have been requesting to remove the ambiguities and amend some of the provision of the act to make this legislation progressive and decrease the regulatory burden.

- **2023 Amendment**:
  » **Broadens the definition** of Coastal aquaculture to include things like cage culture, sea-weed culture, bivalve culture, marine ornamental fish culture etc.
  » **Registration given** under the Coastal Aquaculture Authority Act will be considered a valid permission under CRZ notification. This will enable lakhs of small marginal aquaculture farmers to avoid the possible need for obtaining CRZ clearances from multiple agencies.
  » **Some Aquaculture activities** like hatcheries, nucleus breeding centres, and broodstock multiplication centres can be established in NDZ [200 m from HTL] of seas and buffer zones of creeks/rivers/backwaters.
  » **Decriminalization** of cases of illegal coastal aquaculture and fixed penalties.
    ▪ The original act provided for imprisonment for a period of 3 years for carrying out coastal aquaculture without registration. This was a very harsh punishment for an offence of purely civil nature.
  » **Increase in role of the Authority**:
    ▪ Fix standards of input and discharge of effluents from aquaculture units.
    ▪ Prohibition of certain harmful inputs
    ▪ Monitor and regulate various aquaculture units, inputs and outputs.
  » The act also **prohibits the use of insecticides** and other pharmacologically active substances that can harm human health in coastal aquaculture.

4. PLASTIC UPDATES

1) PLASTIC OVERSHOOT DAY: BY EARTH ACTION (EA) (JULY 2023)

- On July 28, 2023, the Earth saw its first Plastic Overshoot Day: The point at which the amount of plastics exceed the global waste management capacity - As per Swiss based research consultancy **Earth Action** (EA).
  » **Nearly** 68 million tonnes of additional plastic waste will end up in nature in 2023.
  » **India** is among the 12 countries of the world including China, Brazil, Indonesia, Thailand, Russia, Mexico, USA, Saudi Arabia, the DRC, Iran and Kazakhstan, which are responsible for 52% of the world's mismanaged plastics.
  » Under current scenario, despite pledges and increased waste management capacity, increased production of plastics will lead to global plastic pollution tripling by 2040.

- Plastic Overshoot Day is determined on the basis of country's **Mismanaged Waste Index** (MWI).

» The imbalance between the volumes of plastic that are produced and used, as well as the world's ability to manage those volumes when they become waste, is the root cause of plastic pollution. The gap in waste management capacity and plastic consumption is called MWI.
» India ranks fourth (after Mozambique, Nigeria, and Kenya) in terms of highest mismanaged waste with 98.55% of generated waste being mismanaged.

2) US STUDY FINDS HUNDREDS OF THOUSANDS OF NANOPLASTIC PARTICLES IN BOTTLED DRINKING WATER (JAN 2024)

- **About the Study**:
  » The research was published in journal - *Proceedings of the National Academy of Sciences.*
  » The study analysed micro and nanoplastics in three popular brands and daily consumed bottles of water using a technique called stimulated Raman scattering microscopy. The technique passes two lasers through the sample. It is particularly suitable for the identification of microplastics due to its ability to distinguish different types of plastics based on their molecular fingerprints.
    ▪ The team looked for **seven common types of plastics**: Polyamide, polypropylene, polyethylene, polymethyl methacrylate, polyvinyl chloride, polystyrene, and polyethylene terephthalate.

- **Key Findings**:
  » **Each litre of bottled water** contains **110,000 to 370,000 plastic particles** — and about 90 per cent of them are nanosized (less than 1 micrometer in size), a new study has found.
  » These nanoplastics are even smaller than microplastics and **pose a greater risk to human health**. Unlike microplastics, nanoplastics can move from the intestine and lungs directly into bloodstream before reaching the heart and brain.

3) PET46: NEWLY DISCOVERED DEEP-SEA ENZYME BREAKS DOWN PET PLASTIC (SEP 2023)

- A new study involving scientists from Professor Ruth Schmitz-Streit's research group at Kiel University has shown for the first time, **using microorganisms from the deep sea, that polymers such as PET are continuously degraded by an enzyme called PET46**.
  » The results fundamentally expand the knowledge of PET degrading enzymes, the underlying mechanisms and the evolutionary understanding of the diversity of putative PET-degrading enzymes throughout the global ocean.