DAY# 02

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An Institute for Civil Services

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## MAINS SAMPOORNA

# CONTEMPORARY ISSUES *of* ENVIRONMENT

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# Contents

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# Agro-forestry & its socio-economic impact

## Context:

In order to aid carbon-neutral growth, India needs to stress working extensively toward agroforestry in the country.

## Background

- Trees play an important role in ecosystem in all terrestrials and provide a range of products andservices to rural and urban people.
- As natural vegetation is cut for agriculture and other types of development, the benefits that trees provide are best sustained by integrating trees into agricultural system.
- Cultivating trees in combination with crops and cattle is an ancient traditional practice across South-east Asia.
- Agroforestry in India was practiced from the ancient times which provides several raw materials like timber, wood and leaves for building house, fire and other engineering activities.
- Agro forestry also has the potential to increase the farmers' income.

## Analysis

### What is agro forestry?

- Agroforestry is a low-cost integrated land management where trees are cultivated with cash crops.
- It is a process of interaction of agriculture and trees along with agricultural use of trees.

## Classification of agro forestry:

### Agro forestry can be classified into four major divisions:

- Structural
- Functional
- Socio economic
- Ecological

### Types of agroforestry in Non-Forest areas:

- **Farm forestry:** A name given to a kind to forestry where farmers grow trees for commercial purpose on their own land.
- **Extensive forestry:** It is the practice of forestry in areas devoid of tree growth and other vegetation situated in places away from conventional forest areas. Extensive forestry has three of its own kind
- **Mixed forestry:** Practice of forestry for raising fodder grass with scattered fodder trees, fruit trees and fuel wood.
- **Shelter belts:** Belt of trees or shrubs maintained for the purpose of shelter from wind, sun, drift etc.
- **Linear strip plantation:** Plantation of fast growing species on linear strips of land.
- **Rehabilitation of Degraded Forests:** Forestry by the community on a degraded forest land to meet their socio economic needs.

- **Recreation Forestry:** Practice of forestry with the objective to develop or maintain a forest of high scenic value.

## What are main benefits of agro forestry?

### ■ Agro forestry ensure benefits on various fronts:

- Bio-physical and environment
- Social benefits
- Economic benefits

**Bio-Physical and environmental front:** Agro forestry creates a significant positive impact on the environmental growth and sustainability. Various such benefits which impacts the environments are:

- Increase soil fertility
- Reduce level of soil erosion
- Increased nutrient cycle
- Higher crop yield
- Induced favorable micro climate condition
- Watershed protection
- Carbon sink

### ■ Economic benefit:

- Agroforestry in farmlands or crop lands brings significant economic benefit in the agricultural sector, which includes:
- Increment in an maintenance of outputs of food, fuelwood, fodder, fertilizer and timber
- Reduction in incidence of total crop failure, common to single-cropping or monoculture system
- Increase in levels of farm incomes due to improved and sustained productivity

### ■ Social benefits:

- Agroforestry also plays a central role in development and growth of rural households and rural society, which are as follows:
- Improvement in rural living standards from sustained employment and higher incomes
- Improvement in nutrition and health due to increased quality and diversity of food outputs
- Stabilization and improvement of upland communities through elimination of the need to shift sites of farm activities
- Increasing farmers income and sustainable growth of rural economy is one of the major objective behind Aatmanirbhar Bharat

# AIR POLLUTION IN DELHI:

## Context:

India's national capital New Delhi is known for being one of the world's most polluted cities, with the problem getting particularly severe in the winter months.

## BACKGROUND:

- India is among the most polluted countries, with most places in the country exceeding WHO defined safe air quality standards multiple times over. Nearly half of the worst 50 polluted cities in the world are in India.
- The technological advancement and speedy development since India's Independence has come at a great environmental cost. According to the global Environment Performance Index (EPI) 2018, India is ranked at 177 with an EPI of 30.57.
- An estimated 1.2 million deaths in India are caused by air pollution, both outdoors and in households, which is now the second-most serious risk factor for public health in the country after malnutrition, contributing to 6.4 per cent of all healthy years of life lost in 2016.
- It is disheartening to hear that Delhi, the national capital of the country, is being tagged as one of the most heavily polluted capital cities in the world. It is the world's worst city in terms of air pollution, with an unhealthy air quality index for the majority of the year.

## Analysis

### ■ Causes of sever air pollution in Delhi

- **Growing population of the city** -The pressure and haphazard growth of the population is deteriorating the environment.
- There has been **highly haphazard and unplanned development of industries and factor** Studies have revealed that only about 20% of the industrial units are set up in the approved industrial areas whereas the rest of them are in residential and commercial areas.
- There has been **a huge rise in the vehicular population,** despite the metro railways, aggravating traffic congestion and increasing air and noise pollution. It has also been reported that the number of vehicles plying on the roads of Delhi is more than that of the three metropolitan cities of Mumbai, Kolkata and Chennai taken together.
- There has also been an **ever-increasing number of diesel vehicles** plying on the roads, which are largely responsible for the air pollution.
- It has been reported by the National Environmental Engineering Research Institute (NEERI) that everyday almost **8,000 m tonnes of solid waste is be**ing generated in Delhi. Plus, we also have the **industrial hazardous and non-hazardous waste**. On an average, every day, the MCDs and the NDMC manage to clear about 5,000-5,500 m tonnes of garbage. This results in the accumulation of more and more garbage in the city.
- There has **been no proper technology or methods to treat solid**, liquid, waste water, industrial and hospital wastes in the city.
- There has been **too much dependence on fossil fuels** like coal-fired power plants, improper use of energy in buildings and the excessive use of biomass for cooking and heating, etc**.**

### ■ Major reasons for extremely poor Delhi air in winters

- **Burning of Crop Stubble** – Burning of crop residue by farmers in Northern states of Punjab, Haryana and Uttar Pradesh is considered as the prime reason for a spike in air pollution during the winter months in Delhi and NCR. This is a traditional practice followed by farmers in these states to prepare their fields for sowing crops after harvesting their fields.
- **Winter season** - As the winter season sets in, dust particles and pollutants in the air become unable to move. Due to stagnant winds, these pollutants get locked in the air and affect weather conditions, resulting in smog.
- **Burning crackers** - Despite the ban on cracker sales, firecrackers are usually a common sight every Diwali. It may not be the top reason for this smog, but it contributes to its build up.

## Challenges due to Air Pollution

- Air pollution leads to **low birth-weight, tuberculosis, ischemic heart disease, cataracts, asthma and nasopharyngeal a**nd laryngeal cancers
- air pollution might also affect c**ognitive development**.
- Air pollution is linked to diseases and **infections that kill around 600,000 children** under five years of age per year.
- The number of **premature deaths** due to outdoor air pollution is projected to increase from three million people globally in 2010 to a global total of six to nine million people in 2060.

# Black carbon deposits on Himalayan glaciers

## Context :

According to new research by scientists from NASA and Chinese Academy of Sciences, soot deposited on Tibetan glaciers has contributed significantly to retreat of the world's largest non-polar ice masses – the Himalayan glaciers.

## About

- According to research, **black carbon deposits** on Himalayan ice **threaten earth's "third pole".** Tibet's glaciers are retreating at an alarming rate.
- **The study:** To better understand the role that black soot has on glaciers, researchers trekked high into the Himalayas to collect ice cores that contain a **record of soot deposition that spans back to the 1950s.**

## Black soot/Black carbon – details

- Black soot is generated from **industrial pollution, traffic, outdoor fires, and household burning of coal and biomass fuels.**
- Soot **absorbs incoming solar radiation** and can **speed glacial melting** when deposited on snow in sufficient quantities.
- Soot includes **black carbon**, as well as **organic carbon.**
- Black carbon results from **incomplete combustion of fossil fuels and biomass.**
- It is said to be the **second-largest contributor to climate change after CO2.**
- **Black carbon is short-lived** and remains in the atmosphere only for days to weeks before it descends as rain or snow.
- **India is the second-largest emitter of black carbon** in the world

## Warming of Tibetan Plateau

- **Temperature increase:** Temperatures on the Tibetan Plateau – sometimes called Earth's "third pole" – have warmed by 0.3°C (0.5°F) per decade over the past 30 years, about **twice the rate of observed global temperature increases.**
- **The retreat of glaciers:** Fifty percent of the glaciers were retreating from 1950 to 1980 in the Tibetan region; that rose to **95 percent in the early 21st century.**
- **Black soot is the cause:** Black soot is responsible for

as much as **half of the glacial melt**, and **greenhouse gases** are responsible for the rest.

- During the last 20 years, the black soot **concentration increased two- to three-fold** relative to its concentration in 1975.

## Reason for black carbon increase:

- **Black carbon,** which is **caused by incomplete combustion**, is especially prevalent in **India and China.** The main reason for the increase in black carbon in the region is **accelerated economic activity** in India and China over the last 20 years

## Mechanism of black soot related warming:

- **Atmospheric aerosols** are tiny particles containing **nitrates, sulfates, carbon and other matter,** and can influence the climate. Unlike other aerosols, **black carbon absorbs sunlight, similar to greenhouse gases**.
- **it warms only the atmosphere.**
- **Deposition of the black carbon on a white surface**, which produces an **albedo effect that accelerates melting**. Dirty snow absorbs far more sunlight—and gets warmer faster—than pure white snow.

## Other issues caused by black carbon increase:

- It contributes to the **decrease in rainfall over central India**.
- Because black carbon heats the atmosphere, it **changes the local heating profile**, which **increases convection**, one of the primary causes of precipitation
- While this results in more intense rainfall in some regions, it leads to less in other regions.


# Carbon Capture, Utilization and Storage (CCUS)

## Context:

Experts from India and US discussed the challenges and opportunities to combat climate change through technology-led **Carbon Capture and Utilisation solutions** at the Indo-US Scoping Workshop on Carbon Capture, jointly organized by DST India and DoE USA recently.

## Carbon Capture, Utilization and Storage (CCUS)

- Carbon capture and storage, also known as CCS or carbon sequestration, describes the technologies designed to tackle global warming by capturing CO2 at power stations, industrial sites or even directly from the air and permanently storing it underground.
- Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming.
- It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels.

## There are number of technologies under investigation for sequestering carbon from the atmosphere. Some of these are:

- ***Ocean Sequestration**:* Carbon stored in oceans through direct injection or fertilization.
- ***Geologic Sequestration**:* Natural pore spaces in geologic formations serve as reservoirs for long-term carbon dioxide storage.
- ***Terrestrial Sequestration**:* A large amount of carbon is stored in soils and vegetation, which are our natural carbon sinks. Increasing carbon fixation through photosynthesis, slowing down or reducing decomposition of organic matter, and changing land use practices can enhance carbon uptake in these natural sinks.

## Geologic Sequestration trapping mechanisms

- Geologic Sequestration is thought to have the largest potential for near-term application.
- Geologic Sequestration trapping mechanisms include:
- ***Hydrodynamic Trapping**:* Carbon dioxide can be trapped as a gas under low-permeability cap rock (much like natural gas is stored in gas reservoirs).
- ***Solubility Trapping**:* Carbon dioxide can be dissolved into a liquid, such as water or oil.
- ***Mineral Carbonation**:* Carbon dioxide can react with the minerals, fluids, and organic matter in a geologic formation to form stable compounds/minerals; largely calcium, iron, and magnesium carbonates.

# CIRCULAR ECONOMY:

## Context:

- The Ministry of Electronics and Information Technology (MeitY) has formulated a policy paper on **"Circular Economy in Electronics and Electrical Sector"** to deal with e-waste.

## BACKGROUND:

### ■ Circular Economy:

- A circular economy (often referred to simply as "circularity") is an economic system aimed at eliminating waste and the continual use of resources.
- Circular systems employ reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a closed system, minimising the use of resource input and the creation of waste, pollution and emissions.

- The circular economy aims to keep products, equipment and infrastructure in use for longer, thus improving the productivity of resources.
- All 'waste' should become 'food' for another process: either a by-product or recovered resource for another industrial process, or as regenerative resources for nature, eg compost.
- This regenerative approach is in contrast to the traditional linear economy, which has a 'take, make, dispose' model of production.

## ■ Circular economy principles:

- There are *ten principles* that define how circular economy should work:
- *Waste becomes a resource:* is the main feature. All the biodegradable material returns to the nature and the not biodegradable is reused.
- **Second use:** reintroduce in the economic circuit those products that no longer correspond to the initial consumer's needs.
- *Reuse:* reuse certain products or parts of those products that still work to elaborate new artifacts.
- *Reparation:* find damage products a second life.
- *Recycle:* make use of materials founded in waste.
- *Valorization:* harness energy from waste that can't be recycled.
- *Functionality economy:* circular economy aims to eliminate the sale of products in many cases to establish a system of rental property. When the product completes its main function returns to the company, where it is dismantled for reusing the valid parts.
- *Energy from renewable sources:* elimination of fossil fuels to produce the product, reuse and recycle.
- *Eco-design:* considers and integrates in its conception the environmental impacts throughout the life cycle of a product.
- *Industrial and territorial ecology:* establishment of an industrial organizational method in a territory characterized by an optimized management of stocks and flows of materials, energy and services.

## ■ Need for Circular Economy

*Fulfills Resource needs:* The Rate of extraction of these abiotic resources for EEE manufacturing is significantly higher than the rate of their formation in nature. CE approach will thus be imperative to fulfill the resource needs for the country.

*Recycling the waste:* India is the third most electronic waste (e-waste) generated country (with 3.2 million tonnes in 2019), however, only 10 percent of the waste is collected for recycling. The collection and management of EEE waste remain a key challenge. This necessitates the shift to a more circular approach for the sector.

## ■ India's initiatives:

- With mission oriented policies such as UDAY, UJWALA, Swachh Bharat, etc in combination with government initiatives like Make in India, Digital India, Start-up India campaigns which aim to enhance competitiveness and create more jobs, India is poised for growth and it is important to disseminate information on sustainability to all stakeholders. MSMEs utilizing Lean Management cluster Scheme(LMCS), Zero-effect- zero-defect (ZED) scheme and schemes for Energy efficiency provide a comprehensive frame work to attain sustainability using the Circular Economy approach (i.e. Make -Use- Return).

# CLIMATE INDUCED MIGRATION

## CONTEXT:

Recently, **International Institute for Environment and Development (IIED)** and A**nti-Slavery International** released a report named **Climate-Induced Migration and Modern Slavery.**

## Increased Migration:

- People are being driven to migrate within and across borders in search of resources and income.
- As many as 55 million people were internally displaced within their countries due to extreme weather events in 2020.
- The World Bank estimates that, by 2050, the impact of the climate crisis, such as poor crop yields, a lack of water and rising sea levels, will force more than 216 million people across six regions, including sub-Saharan Africa, south Asia and Latin America, from their homes (Groundswell Report).

## Modern Slavery:

- Climate change-induced extreme weather events put women, children and minorities at risk of modern slavery and human trafficking. The phenomenon is on the rise in India, among other countries.
- 40.3 million People are living under slavery in the world.
- Drivers of vulnerability to modern slavery are complex and impacted by many layers of risk. While several socio-economic, political, cultural and institutional risks shape vulnerability, they are increasingly considered to be made worse by climate change impacts and environmental degradation.

## Plight of Sundarban:

- The **Sundarban** region is characterised by intense, **recurrent and sudden onset disasters**, therefore millions of people across the Sundarbans are unable to work for most of the year.
- Severe **cyclones** and flooding in Sundarbans delta had also **reduced the land for agriculture, which is the major source of livelihood.**
- While restrictions were imposed by bordering countries, **smugglers and traffickers operating in the affected region** targeted widows and men desperate to cross the border to India to find employment.
- **Women were trafficked** and often forced into hard labour and prostitution, with some working in sweatshops along the border.
- **People** displaced and migrating from rural to urban areas **with no resources, skills or social networks** at their destination, are **targeted by agents and / or traffickers.**

## Increasing Inequality:

- **Climate change** is devastating the planet, leading to **intensifying global inequality** as well as **disputes over land, water and scarce resources.**

## SUGGESTIONS:

- **Recognise the Impact of Climate Change:**
  - Climate and development policy-makers urgently need to recognise that millions of people displaced by climate change are being, and will be, exposed to slavery in the coming decades.
- **Committed Funding:**
  - G 20 should commit to providing long-term funding to address anti-slavery efforts in the context of recurring displacement due to climate impacts.
- **Coordination of Ongoing Initiatives:**
  - Several ongoing initiatives — including the Warsaw International Mechanism Task Force on Displacement (WIM TFD), the Sendai Framework, etc. — should be coordinated to increase understanding of, and response to, growing risks of climate-induced migration / displacement and exposure to modern slavery.

# Climate Smart Agriculture

## Context:

In the backdrop of the 2070 carbon neutrality target set by India at the CoP26 in Glasgow, the Union Budget for 2022-23 has listed "climate action" and "energy transition" as one of the four priorities for the Amrit Kaal.

## Announcements made in this context:

- Additional allocation of Rs 19,500 crore for solar PV modules.
- Co-firing of 5-7 per cent of biomass pellets in thermal power plants
- Sovereign green bonds
- Battery-swapping policy
- Chemical-free natural farming
- Support for millets
- Increased domestic production of oilseeds
- kisan drones

## Analysis

These are welcome steps. But they do not assure us that the environmental damage already brought by the agriculture sector can be undone.

## The damage is largely a result of the various kinds of subsidies:

- On urea
- Canal irrigation
- Power for irrigation
- As well as the minimum support prices (MSP)
- Procurement policies concentrated on a few states and largely on two crops, rice, and wheat
- Issue of over stocking of grains:

- The stocks of wheat and rice in the country's central pool were four times higher than the buffer stocking requirement.
- In fact, rice stocks with the Food Corporation of India (FCI) are seven times the buffer norms for rice.
- This is despite the record distribution of rice in the PDS and record exports of rice (17.7MMT) in 2020-21.
- The financial value of these excessive grain stocks is Rs 2.14 lakh crore, of which Rs 1.66 lakh crore is because of excess rice stocks — as per the economic cost of rice and wheat given by the FCI.
- Interestingly, the Economic Survey 2021-22 gives an economic cost of rice and wheat higher than that reported by FCI. If one uses the survey's figures, the value of excess stocks jumps to Rs 2.56 lakh crore, with rice accounting for approximately Rs 2 lakh crore.

## Issue of GHG embedded in these stocks:

- All this does not just reflect inefficient use of scarce capital, the amount of greenhouse gases (GHG) embedded in these stocks is also large.
- As per the national GHG inventory, the agriculture sector emits 408 MMT of carbon-dioxide equivalent
- Rice cultivation is the third highest source (17.5 per cent) of GHG emissions in Indian agriculture after enteric fermentation (54.6 per cent) and fertilizer use (19 per cent).
- Paddy fields are anthropogenic sources of atmospheric nitrous oxide and methane, which have been reckoned as 273 and 80-83 times more powerful than carbon dioxide in driving temperature increase in 20 years' (Sixth Assessment Report IPCC 2021).
- The amount of methane emitted from paddy fields of India is 3.396 teragram per year or 71.32 MMT carbon dioxide equivalent.

## Lowering Methane emission is not enough:

- India does not report nitrous oxide emissions in its national GHG inventories.
- There is scientific evidence that intermittent flooding reduces water and methane emissions but increases nitrous oxide emissions.
- Thus, lowering of methane emissions through controlled irrigation does not necessarily mean net low emissions.
- Components not accounted for in the GHG emissions in rice production
- Emissions due to burning rice residues,
- application of fertilisers,
- production of fertilisers for rice,
- energy operations like harvesting, pumps, processing, transportation

## Need of Carbon Tax:

- According to the IMF, the world needs a carbon tax of $ 75 per tonne by 2030 to reduce emissions to a level consistent with a 2 degree Celsius warming target.
- India does not have an explicit carbon-price yet, but many countries have begun to implement carbon pricing.
- Sweden leads the pack with a carbon price as high as $137 per tonne of carbon dioxide equivalent while EU is at $50/tonne of carbon dioxide equivalent.
- It is high time for India to announce indicative carbon pricing and create a vibrant carbon market to incentivise green growth in Amrit Kaal.

# CLIMATE SMART PUBLIC PRIVATE PARTNERSHIP

## Context:

According to the World Bank, there is an urgent need for the development and finance of climate-smart infrastructure solutions.

## BACKGROUND:

- The majority of greenhouse gas ("**GHG**") emissions today is associated with carbon-intense infrastructure construction and operation, particularly in the energy, public transport, and water supply and sanitation sectors.
- At the same time, it is expected that economies will need to make significant investments over the next 10 - 15 years to build new or to rehabilitate ageing infrastructure to meet the increasing global demand, emerging economies and developing countries accounting for roughly two thirds of global infrastructure investment.
- Many risks associated with climate change will be felt hardest by lower income countries, as their ability to prevent and respond to the impacts of climate change is limited.

## Analysis:

- Private investment and expertise, including **infrastructure finance through public-private partnership (PPP)** models is essential for the delivery of climate-smart infrastructure.
- The application of PPP models presents both challenges and opportunities.
- Given the massive capital requirements and need for innovation (both in terms of technological solutions and funding structures), PPPs potentially provide a useful framework under which the public and private sectors can pool and coordinate their financial and technological resources more efficiently.
- At the same time, climate change creates novel forms of risk which are difficult to quantify and will present unique challenges to public and private sector parties seeking to negotiate an appropriate allocation of risk between themselves.

## Climate-smart infrastructure refers to infrastructure solutions that:

- **Mitigate climate change**, e.g., through reduction of GHG emissions and improved energy efficiency;
- Increase the resilience of infrastructure assets to climate change, i.e., ensure that infrastructure is planned, designed, built and operated in a way that anticipates, prepares for and adapts to uncertain and potentially permanent effects of climate change (e.g. hydropower project that takes into account changes in average and extreme flows in the future, to ensure that financial models that stem from hydrological analyses are correct, or that spillways are correctly sized to avoid dam breaches).
- **Ensure resilience through infrastructure**, i.e., ensure that the new or improved infrastructure does not harm and delivers related benefits to wider systems, communities, households and individuals (e.g., sea barriers, flood protection).
- While infrastructure, such as roads, hydropower projects and water treatment plants, contributes to a large extent to climate change, infrastructure and its services may also become increasingly affected by climate change-related extreme weather events as well as by gradual, longer-term incremental changes. It is therefore essential to incentivize investment in low-carbon PPPs and to ensure that changing climate conditions, disaster risk and potential climate change mitigation and adaptation measures are identified and considered during the development, design and implementation of each individual PPP project.

# Desertification: 'Droughts reduced India's GDP by up to 5% in 20 years'

## Context:

According to the Drought in Numbers, 2022 report released at the 15th Conference of Parties (CoP15) to the United Nations Convention to Combat Desertification (UNCCD), the frequency and duration of drought is increasing at an alarming rate across the world since the onset of the 21st century.

## Background:

- According to Desertification and Land Degradation Atlas of India, released by the Space Applications Centre of the Indian Space Research Organisation, some 97.85 million hectares (mha) — nearly 30 per cent of India's total geographical area (TGA) — underwent land degradation during 2018-19.
- In 2003-05, 94.53 mha (28.76% of the TGA) underwent land degradation. This number increased to 96.40 mha (29.32% of the TGA) in 2011-13.
- The level of desertification increased in 28 of 31 states and Union territories between 2011-13 and 2018-19.
- In eight states—Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura, and Himachal Pradesh—around 40 to 70 per cent of land has undergone desertification.
- Around 23.79% of the area undergoing desertification/land degradation in the country was contributed by Rajasthan, Maharashtra, Gujarat, Karnataka, Ladakh, Jharkhand, Odisha, Madhya Pradesh and Telangana.

## What is Land degradation/Desertification?

UNCCD defines desertification as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities".

## What are the causes of Land degradation/Desertification?

Factors like deforestation, wetland drainage, overgrazing, unsustainable land-use practices, and the expansion of agricultural, industrial, and urban areas are the other significant causes of land degradation.

## What are the impacts of land degradation?

- Loss of soil fertility
- Erosion
- Impacting vegetation, soil quality & water table
- Destructing the ecosystems
- Economic loss
- Leading to climate crisis
- Impact on human health

## How to combat desertification?

- Terracing on hill slopes
- Drip Irrigation
- Contour binding

- Dune stabilization
- Cover crops
- Climate-smart agriculture
- Windbreaks

### United Nations Convention to Combat Desertification (UNCCD)

- Established in 1994, UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management.
- The Convention addresses specifically the arid, semi-arid, and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.

## Centre extends tenure of environmental clearances

### Context:

Easing norms for infrastructure projects, the Union environment ministry has extended the tenure of environmental clearances (EC) granted for existing or new projects.

### Analysis

- The extended period
- River valley projects: The EC for river valley projects will now have a 13 year validity.
- Nuclear power projects: Nuclear power projects, or those involving the processing of nuclear fuel 15 years.
- Others: Projects and activities other than the mining and river valley projects will have their EC valid for 10 years.

### Rationale behind the move:

Explaining its rationale, the Ministry said in its gazette notification that nuclear power projects and hydropower projects had:

- "High gestation" period due to "geological surprises
- Delays in forest clearance
- Land acquisition
- Local issues
- Rehabilitation and resettlement, etc

The above mentioned issues are often beyond the control of project proponents and in this context, the Central Government "deems it necessary" to extend the validity of Environmental Clearance (EC) for such projects.

### What is an Environmental Clearance (EC)?

- An EC is a long-drawn process that is mandatory for projects beyond a certain size and often involves an environment impact assessment of a potential project and sometimes public hearings involving

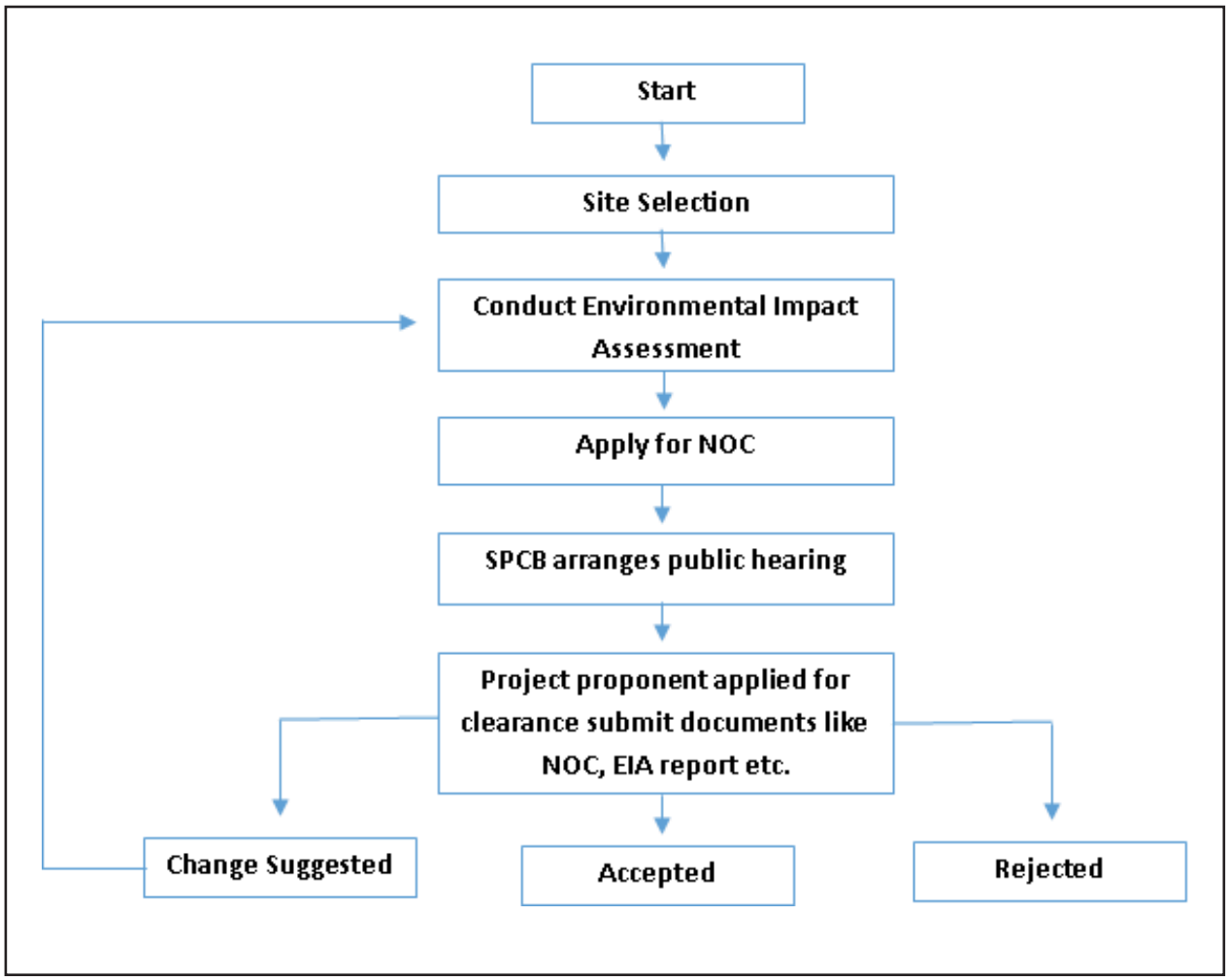
the local populace who might be affected by the project.

- One of the conditions of an EC is that a project must begin construction in the period that it has been granted an EC and if unable, a fresh process must begin.
- This leads to projects being financially unviable.

## What is the process of granting EC?

**The process of granting of environment clearance includes:**

- Specifying Terms of Reference (ToR)
- Preparing Environmental Impact Assessment (EIA) report
- Holding Public Consultation




## Importance of EIA:

- EIA links environment with development for environmentally safe and sustainable development.
- EIA provides a cost effective method to eliminate or minimize the adverse impact of developmental projects.
- EIA enables the decision makers to analyse the effect of developmental activities on the environment well before the developmental project is implemented.
- EIA encourages the adaptation of mitigation strategies in the developmental plan.

- EIA makes sure that the developmental plan is environmentally sound and within the limits of the capacity of assimilation and regeneration of the ecosystem.

# Mine e-waste, not the Earth

## Context:

According to scientists, the recycling of e-waste must urgently be ramped up because mining the Earth for precious metals to make new gadgets is unsustainable.

## Background

### ■ What is E-Waste?

- E-Waste is short for Electronic-Waste and the term is used to describe old, end-of-life or discarded electronic appliances. It includes their components, consumables, parts and spares.
- It is categorised into 21 types under two broad categories:
- Information technology and communication equipment.
- Consumer electrical and electronics.
- Laws to manage e-waste have been in place in India since 2011, mandating that only authorised dismantlers and recyclers collect e-waste. E-waste (Management) Rules, 2016 was enacted in 2017.
- India's first e-waste clinic for segregating, processing and disposal of waste from household and commercial units has been be set-up in Bhopal, Madhya Pradesh.

### ■ Recent estimates:

- The "mountain" of waste electronic and electrical equipment discarded in 2021 will weigh more than 57 million tonnes.
- This is heavier than the Great Wall of China - the planet's heaviest artificial object.
- Globally, the amount of so called e-waste generation is growing by two million tonnes every year.
- It is estimated that less than 20% is collected and recycled.

### ■ Growing demand:

- Geopolitical unrest, including the war in Ukraine, has caused huge spikes in the price of materials like nickel, a key element in electric vehicle batteries.
- Volatility in the market for elements is causing "chaos in supply chains" that enables the production of electronics.
- Combined with the surge in demand, this caused the price of **lithium**- another important component in battery technology - to increase by almost 500% between 2021 and 2022.

### ■ Elements in smartphones that could run out in the next century:

- **Gallium:**Used in medical thermometers, LEDs, solar panels, telescopes and has possible anti-cancer properties

- **Arsenic:**Used in fireworks, as a wood preserver
- **Silver:**Used in mirrors, reactive lenses that darken in sunlight, antibacterial clothing and gloves for use with touch-screens
- **Indium:**Used in transistors, microchips, fire-sprinkler systems, as a coating for ball-bearings in Formula One cars and solar panels
- **Yttrium:**Used in white LED lights, camera lenses and can be used to treat some cancers
- **Tantalum:**Used in surgical implants, electrodes for neon lights, turbine blades, rocket nozzles and nose caps for supersonic aircraft, hearing aids and pacemakers

# FLY ASH:

## ABOUT:

**It is a fine powder,** which is the **by-product of burning coal** in **thermal power plants.** Its Composition: - Fly ash includes substantial **amounts of oxides of silica, aluminum and calcium.** Element like Arsenic, Boron, Chromium, lead etc. are also found in trace concentrations.

## BACKGROUND:

- **In the past, fly ash was generally released into the atmosphere,** but air pollution control standards **now require that it be captured prior to release by fitting pollution control equipment.**
- In the United States, fly ash is generally stored at **coal power plants or placed in landfills.**

## USES:

About 43% is recycled, often used as a pozzolan to produce hydraulic cement or hydraulic plaster and a replacement or partial replacement for Portland cement in concrete production**.**

- **Pozzolans ensure the setting of concrete and plaster and provide concrete with more protection from wet conditions and chemical attack.**

## CASE OF INDIA:

In 2019-'20, 197 thermal plants in India generated 226 million tonnes of fly ash. And nearly 1.6 billion tonnes of it are scattered over 65,000 acres of land, as of 2019.

The Ministry of Environment and Forest of Government of India **first published** a gazette notification in the year **1999 specifying use of fly ash** and mandating a target date for all thermal power plants to comply by ensuring 100% utilisation. Subsequent **amendments** to the notification in **2003 and 2009** had **fixed the deadline to be 2014** which as per figures reported in was **missed by almost 40%.** This has **resulted in the latest notification in 2015 which has set December 31st 2017** as the revised deadline **to achieve 100% utilisation.**

- Out of the **approximately 55.7% fly ash utilised,** bulk of it **(42.3%) goes into cement production** whereas only **about 0.74% is used as an additive in concrete**
- **Researchers in India are actively addressing this challenge by working on fly ash** as an admixture for concrete and activated **pozzolanic cement such as geopolymer** to help achieve the target of 100% utilisation. The **biggest scope clearly lies in the area of increasing the quantity of fly ash** being incorporated in concrete.

- **India produced 280 Million Tonnes of Cement in 2016**. With housing sector consuming **67% of the cement,** there is a huge scope for incorporating fly ash in both the increasing share of Portland Pozzolana Cement (PPC) and low to moderate strength concrete.
- **There is a misconception that** the Indian codes IS 456:2000 for Concrete and Reinforced Concrete and IS 3812.1:2013 for **Fly Ash restrict the use of Fly Ash to less than 35%.**
- **Similar misconceptions exists in countries like USA** but evidence to the contrary is the use of HVFA in many large projects where design mixes have been used under strict quality control.
- **It is suggested that in order to make the most of the research results presented in the paper,** Ultra High Volume Fly ash Concrete (UHVFA) concrete is **urgently developed for widespread use in India using local fly ash.** Urgent steps are also required to promote **alkali activated pozzolan or geopolymer cement based concretes**.

## Amendments And Notification on Fly Ash Utilisation

| Notification Year | Summary of the Notification |
|---|---|
| 1999 | Stipulated targets for utilisation of fly ash produced at thermal plants |
| 2003 | Mandated the use of 100% fly ash by construction agencies in phased manner in five years until August 2007 |
| 2009 | Revised and extended the timelines and period of implementation for achieving 100% utilisation in a phased manner by 2014 |
| 2014 | Mandated all thermal plants located more than 500 km away from a coal mine to use coal with ash content not exceeding 34% |
| 2016 | Extended the area within which fly ash can be utilised from 100 km to 300 km. The time period to comply with 100% utilisation was again extended to 2017 |
| 2019 | Certain fly ash uses like mine filling, reclamation of low-lying areas and as soil conditioner in agriculture were prohibited under the environmental clearance (EC) conditions for thermal power plants. The 2019 amendment reverses such EC conditions in order to enhance utilisation. |
| 2020 | Did away with mandatory 34% ash content cap stipulated in 2014 notification |
| 2021 | Mandated 100% utilisation of ash in "eco-friendly purposes" in a three-year cycle |

Source: Government notifications in the years 1999, 2003, 2009, 2014, 2016, 2019, 2020 and 2021

**Another government notification, released in February 2019 states that-**

- **The existing red clay brick kilns located within 300 km shall be converted into fly ash-based bricks or blocks** or tiles manufacturing unit within one year from the date of publication of this notification.
- **In order to encourage the conversion, Thermal Power Station (TPS) should provide fly ash** at the rate **of Re 1 per tonne and bear** the full transportation cost up to 300 km to such units.

# Green Hydrogen Policy

## Context:

The launch of the green hydrogen policy puts in place a sturdy foundation for developing a competitive green hydrogen sector in India.

India has become the 18th country to release a comprehensive green hydrogen policy, a watershed moment in India's energy transition journey.

The policy — envisaging a tangible strategy for developing a green hydrogen economy — sets in motion the process of decarbonization of 'hard to abate' sectors such as steel, cement industries, and long-haul transportation.

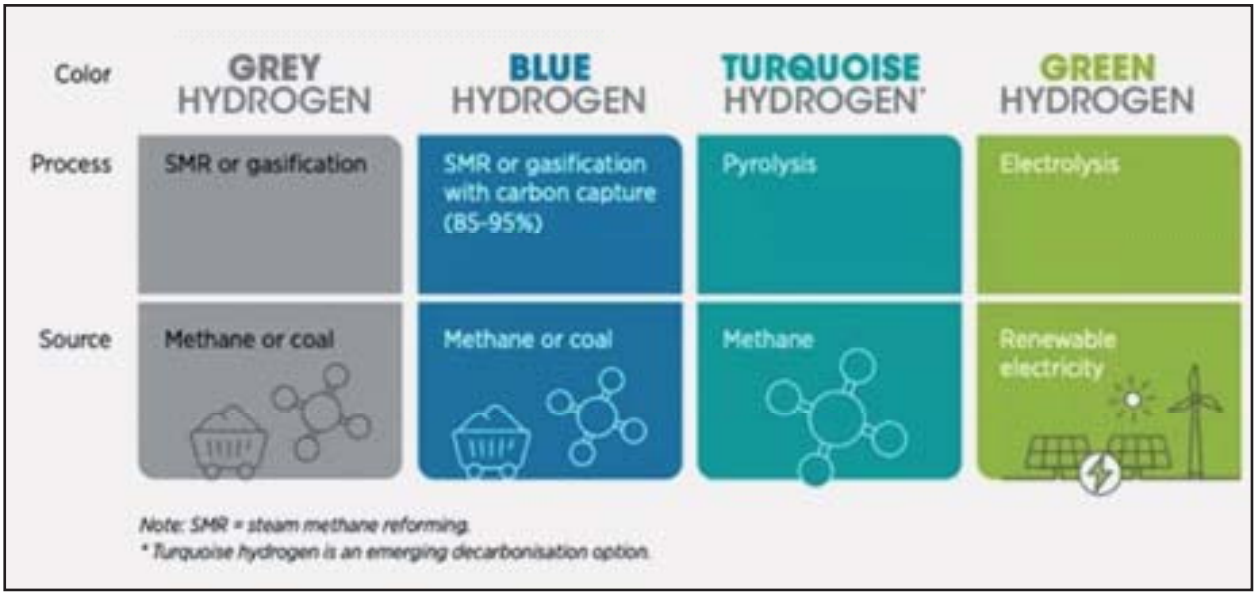
## Background

- India has its commitment to achieve net zero carbon emissions by 2070
- Revised renewable energy addition target of 500 GW which primarily aims at decarbonisation of the power sector.
- With its cross-sectoral applications and decarbonisation potential, green hydrogen is poised to become one of the most disruptive feedstock-cum-fuels that can catalyze India's transition from oil and coal.

## Analysis

### ■ What is Green Hydrogen?

The definition for green hydrogen/green ammonia as products obtained through electrolysis of water using renewable electricity or electricity from biomass is an essential step in categorizing a low carbon pathway for their production.



## ■ Incentives for a Green Hydrogen Economy:

- Besides the capital investment required for electrolysers, purchase of renewable energy (RE) accounts for a significant share in its total cost of production.
- Acknowledging this, the policy focuses on enabling access to low cost RE power for green hydrogen/ammonia production.

**The policy offers a bouquet of incentives to green hydrogen producers for RE power procurement:**

- Wavier of interstate transmission system (ISTS) charges for 25 years for projects commissioned before June 30, 2025
- Access to renewable energy through State utilities with 30 days of banking facility (mechanism to store and withdraw surplus renewable power)
- Priority access to connectivity with the ISTS network.
- Multiple modes for procuring RE for green hydrogen production have also been announced, including purchase of RE from power exchanges, and expedited access to open access mechanism.
- Distribution utilities have also been directed to procure and supply RE power to hydrogen and ammonia producers at nominal wheeling charges.
- The policy also states that green hydrogen producers can avail land in solar parks across states for establishing their production units.
- They would also be allowed to establish bunkers near ports for use by the maritime sector and export.
- To streamline the procurement process and ensure competitive pricing, the Ministry of New and Renewable Energy (MNRE) has been directed to consolidate demand from various sectors, and procure green hydrogen through the competitive bidding route.

## ■ Issues Left Unaddressed:

- While most of the incentives announced in the policy cater to the supply side, the policy does not specify mechanisms or incentives for demand creation.
- Currently, the cost of grey hydrogen produced from natural gas is nearly one-fourth the cost of green hydrogen.
- Bulk consumers of hydrogen, especially industrial sectors including fertilizers, steel, chemicals, and refineries are unlikely to transition to low carbon alternatives because of the higher associated costs.
- With no incentives to reduce emissions, such industries might not find the transition viable for themselves.
- Federal issues: some of the measures announced under the policy such as renewable electricity through open access, banking, and wheeling are concurrent subjects that necessitate consensus and buy in from the states and Centre.
- For instance, the open access mechanism for RE procurement is already facing issues across certain states, where public sector electricity utilities are unwilling to let go of their monopoly in power distribution.

# UNSUSTAINABLE GROUNDWATER EXTRACTION:

## CONTEXT:

- If current trends continue, in 20 years about 60% of all India's aquifers will be in a critical condition.

- India is the largest user of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year - over a quarter of the global total.
- More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on ***groundwater.***

## BACKGROUND:

**Groundwater** is the largest **single source of water supply** amounts to more than 1 million cubic miles compared to the 30, 000 cubic miles of world's streams, rivers and fresh water lakes and moreover this huge expanse of water is available at depths of less than half-mile in an average.

**India is the largest user of groundwater in the world.**

More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on **groundwater**.

## KEY ISSUES:

- India is the largest user of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year - over a quarter of the global total.
- More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater. Urban residents increasingly rely on groundwater due to unreliable and inadequate municipal water supplies.
- Groundwater acts a critical buffer against the variability of monsoon rains. For example, a rainfall deficit in 1963-66 decreased India's food production by 20% but a similar drought in 1987-88 had very small impact on food production largely due to the widespread use of groundwater by that time.
- Farms irrigated with groundwater have twice the crop water productivity of those that rely on surface-water alone. This is largely because the resource allows farmers greater control over when to irrigate their fields and how much water to use each time.
- Despite the valuable nature of the resource, 29% of groundwater blocks are semi-critical, critical, or overexploited, and the situation is deteriorating rapidly (2004 nationwide assessment.) Moreover, aquifers are depleting in the most populated and economically productive areas. Climate change will further strain groundwater resources.
- This will have serious implications for the sustainability of agriculture, long-term food security, livelihoods, and economic growth. It is estimated that over a quarter of the country's harvest will be at risk.
- A complex web of factors determines groundwater extraction: the size of landholdings, density of population, water-intensity of crops planted, water users' behavior, legislation and administration of groundwater, power subsidies for pumping irrigation water, and economic policies.
- India has both hard-rock and alluvial aquifers which differ considerably in their physical and socioeconomic profiles and require very different sets of solutions at both the macro and micro levels. As global experience offers few comparable models, home grown solutions are needed.

# GUIDING PERI-URBAN TRANSFORMATION

## Context:

- The rural characteristics of many **peri-urban areas (PUAs)** adjoining large cities are undergoing a transformation with in-migration of population.

- The rapid urbanization of peri-urban areas across India requires targeted and planned intervention to allow cities to grow in a sustainable manner.

## Analysis

### ■ What are peri-urban areas (PUAs)?

- As the name indicates, peri-urban areas (PUAs) are areas at the periphery of cities.
- In India's PUAs, different forms of settlement structures can be found, such as hamlets, villages, urban villages, slums, unauthorized colonies, and census towns.
- In addition, numerous planned housing colonies and townships have come up in PUAs due to availability of vacant land.
- People who are unable to live in cities due to high living costs or non-availability of houses reside here.
- PUAs are inhabited by the native population that is engaged in agro-based activities, as well as migrants, who pursue non-farm interests.

### ■ How PUAs are transforming the region?

- The transformation occurring in PUAs is seen in the form of:
- Increasing population densities
- Changes in land use and occupational patterns
- Reduced farmlands
- Growth of built structures (residential, commercial, institutional, and industrial)
- Many people living in PUAs benefit from this transformation
- There is exchange of knowledge and ideas
- New income generating activities come up

### ■ Fundamental problems observed in peri-urban areas:

When an **ecosystem's carrying capacity** is pushed to the limits, it is bound to be affected. This is exactly what is happening in several peri-urban areas of India. These areas are under tremendous stress due to pressures created by urbanization.

- **Indiscriminate conversion of land use:** Open spaces, green areas, and farmlands are reducing, with the coming up of built structures and non-farm economic activities.
- **Occurrence of unregulated development:** There is haphazard growth of built structures due to high demand. Many buildings do not meet safety norms.
- **Emergence of informal/unplanned slums in PUAs:**
- **Inferior quality of life:** In view of their illegal status, slums and unauthorized colonies remain uncovered by formal service delivery systems, such as water and sanitation.
- **Issue of drainage and Waste disposal:** While there is uncontrolled construction of built structures, no provision is made for drainage.
- **Women safety:** Frequent incidents of harassment reduce their ability to contribute to city life and limits opportunities available to them.
- **Population displacement::** At times, the so called 'unauthorized occupants' living in slums and unauthorized colonies are evicted due to implementation of government infrastructure projects, such as regional road/rail corridors.
- **Lack of access to good and reliable public transport:** Due to their peripheral location, many PUAs are not served properly by public transport.

### ■ Government Initiatives at state levels:

- In **Delhi**, the Development Authority's land pooling policy aims to ensure planned development in PUAs. At the regional level, some metropolitan regions have formulated spatial plans for PUAs.
- Amongst the states, the government of **Uttarakhand**, with support from the World Bank, has launched a water supply programme to improve access for peri-urban residents.
- Projects have been initiated in PUAs of Dehradun, Roorkee, Haridwar, Haldwani, etc.
- In **Haryana**, the government aims to introduce the concept of peri-urban agriculture for supplying essential commodities, such as fresh vegetables, fruits, milk, and fish, to residents in neighbouring cities. For this purpose, the Russian government has sought cooperation from Haryana.

### ■ At the national level:

- **Metropolitan Planning Committees** (MPCs) proposed under the Constitution (74thAmendment Act) are required to look into matters of common interest between municipalities and panchayats, including coordinated spatial plans of the metropolitan area, which includes PUAs.
- **The Ministry of Housing and Urban Affairs** (MoHUA) has requested state governments to take steps towards constituting municipalities in census towns, which are presently governed by rural governments to ensure better governance.
- **The Union Ministry of Agriculture and Farmers Welfare** (MoAFW) has taken steps to promote food production and diversification in PUAs to improve supply of food to cities.
- Under the **National Rurban Mission**, in the PUAs of Chhattisgarh, women have been empowered by way of training in activities such as handloom, bee keeping, poultry/pig rearing, amongst others. This has helped in employment generation.

# Recycling heat generated by datacentres

## Context:

Global cybersecurity firm Kaspersky estimated that in winter, a datacentre can provide heating up to 85 degrees Fahrenheit, similar to a gas boiler, with better energy efficiency than a heat pump in a new house.

## Background

- Microsoft has partnered with Fortum, a Finnish energy company to heat homes, services and businesses in Finland with sustainable waste heat from a new datacentre region that Microsoft has planned to build.
- The software giant claims the waste heat recycling concept from the datacentre region to be the world's largest scheme to recycle waste heat from data centres.
- The joint project takes place at the intersection of two megatrends: digitalisation and energy transition.

## Analysis

### ■ What is a datacentre?

A datacentre is a physical facility that organizations use to

- Store their critical applications and data
- Process data

- Disseminate them to users
  - It is designed based on a network of computing and storage resources that enables delivery of shared applications and data.
  - The key components of a datacentre are routers, switches, firewalls, storage systems, servers, and application-delivery controllers.
  - Many large datacentres are located in dedicated buildings. Smaller datacentres may be situated in specially designed rooms within buildings constructed to serve multiple functions.
  - Since datacentres consume large amounts of energy, it's important to ensure the physical structures that house them are well-designed and insulated to optimize temperature controls and energy efficiency.

### ■ How much heat datacentres generate?

- The temperatures recorded in the hot aisles of a datacentre hover between 80 and 115 degrees Fahrenheit.
- Global cybersecurity firm Kaspersky estimates over 75% of a datacentre's electricity becomes waste heat.
- It noted that in winter, a datacentre can provide heating up to 85 degrees Fahrenheit, similar to a gas boiler, with better energy efficiency than a heat pump in a new house.

### ■ How will this recycling work?

- Fortum will capture the excess heat generated by the new datacentre region and transfer the clean heat from the server cooling process to homes, services and business premises that are connected to the district heating system.
- The new generation of district heating is based on replacing fossil fuels with flexible solutions like renewable electricity, heat pumps and waste heat utilization.
- Artificial intelligence will help optimize operations of the entire system.
- Which other countries recycle waste heat from datacentres?
- District heating is popular in the Nordic and Baltic countries, as well as in Russia and China, which have high heat demands during winters.
- Datacentres thrive in cold climates. Their location in cold climates helps to cut down on the need to cool server rooms.
- Cold weather is also an asset as technology companies shift to selling their heat which doesn't have a lot of demand in hot weather.

# HUMAN WILDLIFE CONFLICT

## Context:

Recently, a Standing Committee suggested that the Environment Ministry must constitute an advisory body of experts to tackle growing instances of human-animal conflict.

## BACKGROUND:

- The report analysed the Wildlife (Protection) Amendment Bill, 2021 tabled in the Lok Sabha in December 2021.
- The report recommends an HAC Advisory Committee to be headed by the Chief WildLife Warden,

who can consult the committee to act appropriately.

- Advisory body would be packed with official members, exercise all powers of the SBWL and take decisions independent of the SBWL itself and end up being a rubber stamp for faster clearances of projects.
- Standing Committee of the State Board for Wild Life (SBWL): One of the clauses proposed by the Ministry was to have a SBWL to make the functioning of the advisory body "more purposive".
- A wildlife standing committee is usually a subset of members that reports to a wider Wildlife Board, in the case of States headed by the Chief Minister, and in charge of executing day-to-day matters.

## Human-animal Conflict

### About:

- It refers to the interaction between wild animals and humans which results in a negative impact on people, animals, resources, and habitats.
- It occurs when growing human populations overlap with established wildlife territory which creates competition for space and resources.
- Conflicts between the man and animal have occurred since the dawn of humanity. However, it has come to light ever more frequently in recent times.

### Causes of Man-animal conflict:

- In modern times rapid urbanization and industrialisation have led to the diversion of forest land to non-forest purposes, as a result, the wildlife habitat is shrinking.
- The expansion of road and rail network through forest ranges has resulted in animals getting killed or injured in accidents on roads or railway tracks.
- The increasing population has also led to many human settlements coming up near the peripheries of protected areas and encroachment in the forest lands by local people for cultivation and collection of food and fodder etc. therefore increasing pressure on limited natural resources in the forests.

### Repercussions of this conflict:

Injury and loss of life of humans and wildlife, crop damage, livestock depredation, predation of managed wildlife stock, damage to human property, destruction of habitat, the collapse of wildlife populations and reduction of geographic range.

### Preventive Measures

- *Surveillance:* Increased vigilance and protection of identified locations using hi-tech surveillance tools like sensors can help in tracking the movement of animals and warn the local population.
- Improvement of habitat-:In-situ and ex-situ habitat conservation measures will help in securing animals their survival.
- Re-locating of animal habitats away from residential and commercial centres will serve to minimize animal-man conflict for illegal and self-interested motives
- Awareness Programmes: To create awareness among people and sensitize them about the Do's and Don'ts in the forest areas to minimize the conflicts between man and animal.
- Training programs: Training to the police offices and local people should be provided for this purpose and the forest department should frame guidelines.
- Boundary walls: The construction of boundary walls and solar fences around the sensitive areas to prevent the wild animal attacks.
- Technical and financial support: For the development of necessary infrastructure and support facilities for immobilization of problematic animals through tranquilization, their translocation.

- Crop insurance should be provided in the event of destruction by wild animals.
- Part of CSR: Safeguarding Tiger corridors, building eco-bridges and such conservation measures can be part of corporate social responsibility.

# Hydropower in India: Balancing global carbon benefits with local environmental costs

## Context:

The large number of researchers criticizing the construction of hydro-projects in the Himalayan mountains highlight environmental damage imposed on local populations.

It is hard to deny the benefits acquired from hydropower, however, the local environmental compromises cannot be dismissed.

## Background

- In 1947, hydropower capacity in India was about 37 percent of the total power generating capacity.
- In the late 1960s, growth in coal-based power generation initiated the decline in hydropower's share in both capacity and generation.
- In 2022, hydropower capacity accounted for roughly 7 percent of total capacity.

## Analysis

### ■ What is Hydropower?

Hydro electricity is the conversion of the mechanical energy in flowing water into electricity. Hydro electricity is generated when the force of falling water from dams, rivers or waterfalls is used to turn turbines, which then drives generators that produce electricity. The energy produced is directed to a substation, where transformers "step up" the voltage before its transmission to the electricity grid.

### ■ Declining Growth in Power generation from Hydro Station in past:

- 1947-1967: Power generation from hydro stations grew by 11.8%
- 1967-1987: Power generation from hydro stations grew by 5.6%
- 1987-2007: Power generation from hydro stations grew by around 3%
- 2007-2019: Power generation from hydro stations grew by under 1%

### ■ Push for Hydropower:

- In March 2019, the government approved targeted measures to promote hydropower development in India. This included
- Inclusion of large hydro power projects as RE sources.
- Hydro-purchase obligation (HPO) as a separate category in the non-solar renewable purchase obligation (RPO).
- Tariff rationalization measures including providing flexibility to the developers to determine tariff.
- Increasing debt repayment period to 18 years, and introduction of escalating tariff of 2 percent.
- Budgetary support for funding flood moderation component of hydropower projects on case-to-case basis for enabling infrastructure

# India State of Forest Report (ISFR) 2021

## About:

It is the 17th biennial assessment of **India's forests by the** Forest Survey of India, an organisation under the **Ministry of Environment, Forest and Climate Change** (MoEFCC).

The ISFR 2021 presents the latest status of the **'Forest cover' and 'Tree cover'** of the country, estimates of growing stock, the extent of trees outside forests, **mangrove cover,** bamboo resources, and assessment of forest carbon stock.

A special chapter on **"Forest Cover assessment in Tiger reserves and Tiger corridor areas of the country and decadal change in Forest Cover"** has also been included.

India's progress towards achieving the Nationally Determined Contribution commitments are also included as part of the chapter on Forest carbon assessment.

## Key Findings

- The **Total Forest and Tree cover** is **24.62%** of the geographical area of the country.
- The **Total** Forest cover is 7,13,789 sq km which is **21.71%** of the geographical area of the country.
- The **Tree cover** is **2.91%** of the geographical area of the country.

**As compared to ISFR 2019 the current assessment shows an increase of:**

- 0.28% of forest and tree cover put together, at the national level.
- **Forest Cove**r: 0.22%
- **Tree Cover:** 0.76%

**The top five states in terms of increase in forest cover:**

- Andhra Pradesh>Telangana>Odisha>Karnataka>Jharkhand.
- Forest cover in the hill districts is 40.17% of the total geographical area of these districts. A decrease of 902 sq km (0.32%) in 140 hill districts of the country.
- The total forest cover in the tribal districts is 37.53% of the geographical area of these districts.
- The current assessment shows a decrease of 655 sq km of forest cover inside the RFA/GW in the tribal districts and an increase of 600 sq km outside.
- Total forest cover in the North-Eastern region is 64.66% of its geographical area. The current assessment shows a decrease of forest cover to the extent of 1,020 sq km (0.60%) in the region.

**Mangrove cover:** The Mangrove cover in the country has increased by 0.34% as compared to the previous assessment.

**Total Carbon Stock:** The total carbon stock in forests is estimated as 7,204.0 million tonnes an increase of 79.4 million tonnes since 2019.

Forest Prone to Fire: The analysis reveals that 22.27% of the forest cover is prone to forest fire.

**Bamboo Forests:** The total bamboo bearing area of the country is estimated as 1,49,443 sq km. There is a decrease of 10,594 sq km in the bamboo bearing area as compared to the estimate of ISFR 2019.

# IPCC Sixth Assessment Report- Part 3

## Context:

Recently **Third part** of IPCC's Sixth Assessment Report which talks about the possibilities of reducing emissions has been released.

The **first part**, centered around climate change' scientific basis, was released last August. The **second** instalment, which talked about climate change **impacts, risks and vulnerabilities, and adaptation** options has been released in March 2022.

Background

The Assessment Reports, the first of which was in 1990, are the most comprehensive **evaluations of the Earth's climate.**

Hundreds of experts go through every piece of relevant and published scientific information available to prepare a common understanding of climate change.

The four subsequent reports came out in **1995**, **2001**, **2007**, and **2015**. These are the **basis of the global response on climate change.**

The Paris Agreement, negotiated on the basis of the Fifth Assessment Report.

## Analysis

### ■ *Key findings of the report:*

#### Issue at hand:

- Governments agreed in the 2015 Paris accord to keep global warming well below 2 degrees Celsius this century, ideally no more than **5 degrees** Celsius.
- Yet temperatures have **already increased by over 1.1C** since pre-industrial times, resulting in measurable increases in disasters such **flash floods**, **prolonged droughts**, more **intense hurricanes** and **longer-burning wildfires**, putting human lives in danger and costing governments hundreds of billions of dollars to confront.

#### *Greenhouse Gas Emissions:*

- In 2019, global net anthropogenic Greenhouse gas (GHG) emissions were at **59 Gigatonnes** of carbon dioxide equivalent (GtCO2e), **54% higher** than in 1990.
- But the average annual rate of growth slowed to **3% per year** in the period 2010-19, compared to **2.1% per year** in the period 2000-09.
- At least **18 countries** have reduced GHG emissions for longer than 10 years on a continuous basis due to decarbonisation of their energy system, energy efficiency measures and reduced energy demand.
- Emission by the Least Developed Countries:
- Carbon inequality remains pervasive as ever with Least Developed Countries (LDCs) emitting only 3% of global emissions in 2019.
- Their average per capita emissions in the period 1990-2019 were only 7 tonnes CO2e, compared to the global average of 6.9 tCO2e.
- LDCs contributed less than 0.4% of total historical CO2 emissions from fossil fuels and industry in the period 1850-2019.

- Globally, 41% of the world's population lived in countries emitting less than 3 tCO2e per capita in 2019.

# LAND DEGRADATION AND DESERTIFICATION:

## Context:

Recently, a document published by ISRO (Indian Space Research Organisation) named Desertification and Land Degradation Atlas shows that Land Degradation and Desertification has increased significantly in recent years.

The Atlas provides a state wise area of degraded lands for the time frame 2018-19. It also provides the change analysis for the duration of 15 years, from 2003-05 to 2018-19.

## BACKGROUND:

## Land Degradation:

- Land degradation is caused by multiple forces, including extreme weather conditions, particularly drought. It is also caused by human activities that pollute or degrade the quality of soils and land utility.

## Desertification:

- Land degradation within dry land regions (arid, semi-arid and dry sub-humid regions) is termed as 'desertification'.
- Desertification is the process by which the biological productivity of dry lands is reduced due to natural or manmade factors. It does not mean the expansion of existing deserts.

## ANALYSIS:

As per data given, land degradation year-wise

- In 2003-05, 94.53 mha (28.76 per cent of the total geographical area (TGA) underwent land degradation.
- In 2011-13, the number increased to 96.40 mha (29.32 percent of the TGA).
- **Desertification and Land Degradation Atlas of India**: During 2018-19, 97.85 million hectares (mha) of India's total geographical area (TGA) of 328.72 mha underwent land degradation.
- **Space Applications Centre (SAC)'s Atlas (June 2021):** 7 percent of the country's land in this year became degraded.
- SAC comes under ISRO.

## Desertification increased:

Besides land degradation, desertification had also increased. Some 83.69 MHA underwent desertification in 2018-19. This was greater than the 81.48 MHA in 2003-2005 and 82.64 mha in 2011-13 that underwent desertification.

## Why does desertification occur?

- **Rainfall and surface runoff:**

  Loss of soil cover, mainly due to rainfall and surface runoff, was one of the biggest reasons for desertification. It was responsible for 11.01 per cent of the desertification in the country, the ISRO atlas said.

- **Water erosion:**

  In 2011-13, water erosion was responsible for 10.98 per cent of desertification in the country. In 2003-05, it was responsible for 10.83 per cent of desertification.

- **Vegetation degradation:**

  Vegetation degradation was found to be responsible for 9.15 per cent of desertification in the country. In 2003-05, it was responsible for 8.60 per cent of desertification.

- **Wind erosion:**

  Wind erosion was found to be responsible for 5.46 per cent of the desertification in India. In 2003-05, it was responsible for 5.58 per cent of desertification.

# NUTRIENT DEFICIENCY IN SOIL

## Context:

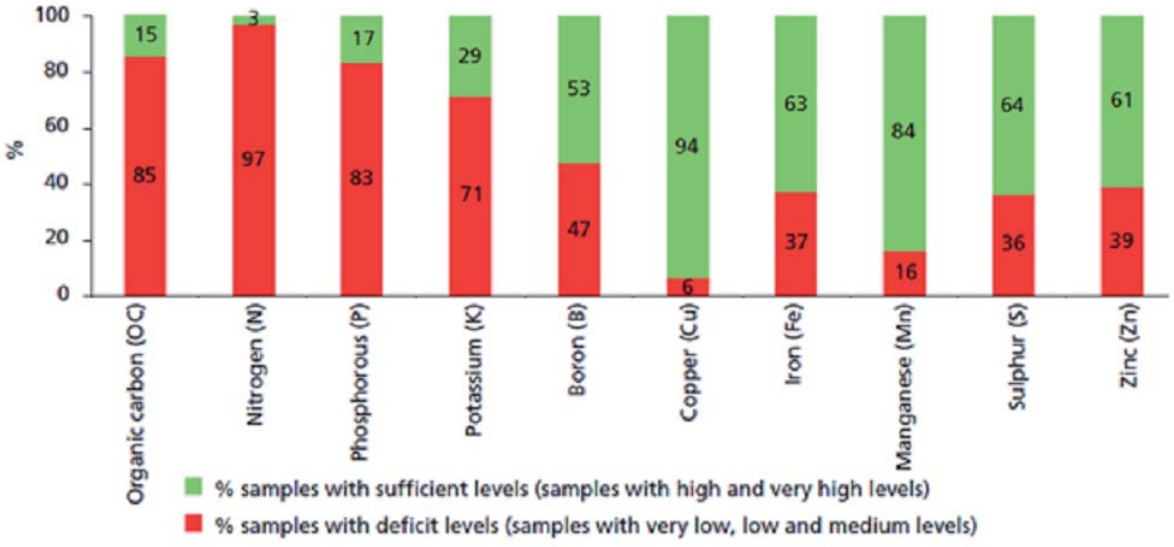
According to a report released by the Centre for Science and Environment (CSE), most Indian soils are deficient in organic carbon and macronutrients.

## About

- **Key highlights of report:**
  - About 85 per cent of the samples were found to be deficient in organic carbon; 97 per cent samples were deficient in available nitrogen; 83 per cent were deficient in phosphorus; and 71 per cent in potassium.
  - Soils were deficient in micronutrients as well: About 47 per cent, 39 per cent, 37 per cent and 36 per cent soil samples were deficient in boron, zinc, iron and sulphur
  - At least **half of the soil samples** in 24 states and Union territories were **deficient in organic carbon.**
  - Of them, seven states have more than 90 per cent deficient samples.
  - Haryana's soils are the most deficient in organic carbon, followed by those of Punjab, Uttar Pradesh, Rajasthan, Tamil Nadu, Mizoram and Andaman and Nicobar Islands, in that order.
  - As many as 27 states and UTs recorded nitrogen deficiency in over 90 per cent samples.
  - **15 states had nitrogen deficiency in almost all (99-100 per cent) of their samples.**
  - In 2019, India was the second highest producer and consumer of chemical fertilizers in the world.
  - **Chemical fertilizer consumption**: In 2020–21, the chemical fertilizer consumption in India, excluding single super phosphate (SSP), was 62.98 million tonne, with a growth of more than 82.5 per cent since 2000–01.

- **Carrier-based solid bio-fertilizers:** In 2020–21, India produced about 1,34,323 tonne of carrier-based solid bio-fertilizers.
- **Liquid bio-fertilizers**: In 2020–21, the total production of liquid bio-fertilizers in India was about 26,442 kilolitre (kl). This marked a growth of about 552 per cent over the 2014–15 figures.

How deficient are Indian soils in organic carbon, macronutrients and imcronutrients?




## ■ Importance of fertilization for nutrient replenishment in soil:

- Crops extract nutrients from soil. Replenishment of nutrients is crucial if crop production is to continue in the long run.
- Soil replenishment can be done through several ways, for example, by recycling organic matter or biomass in soil or through practices that help regain and rejuvenate soil nutrients or by application of external fertilizers.
- Recycling of organic matter or biomass can be done through application of organic fertilizers and practices like growing green manure crops or mulching.
- Some other practices that help regain nutrients include crop rotation, inter-cropping and mixed cropping.
- Biofertilizers can enable nutrient mobilization and solubilization in soil. Chemical-based fertilizers directly provide nutrients to the soil.

# ORGANIC AND NATURAL FARMING

## CONTEXT:

The Centre is planning to enhance the subsidy on "natural farming" by 50 per cent by re-launching the scheme on a mission mode in select blocks without hampering the food security.

Under the plan, now under consideration, one cluster (of 500 hectares), each in 1-2 blocks will be taken up to motivate farmers.

## BACKGROUND:

- Bhartiya Prakritik Krishi Padhati (BPKP) was introduced as a sub-scheme of Paramparagat Krishi Vikas Yojana (PKVY) in 2020-21 under which the Centre releases about ₹12,200/hectare for a period of three years for cluster formation, capacity building and continuous handholding.
- In the 2022-23 Budget both the BPKP and PKVY have been subsumed under Rashtriya Krishi Vikas Yojana (RKVY).

## ABOUT:

| Organic Farming | Natural Farming |
|---|---|
| In organic farming, organic fertilizers and manures like compost, vermicompost, cow dung manure, etc. are used and added to farmlands from external sources. | In natural farming, neither chemical nor organic fertilizers are added to the soil. In fact, no external fertilizers are added to soil or given to plants whatsoever. |
| Organic farming still requires basic agro practices like ploughing, tilling, mixing of manures, weeding, etc. to be performed. | In natural farming, decomposition of organic matter by microbes and earthworms is encouraged right on the soil surface itself, which gradually adds nutrition in the soil, over the period. |
| Organic farming is still expensive due to the requirement of bulk manures, and it has an ecological impact on surrounding environments; whereas, natural agriculture is an extremely low-cost farming method, completely moulding with local biodiversity. | In natural farming there is no ploughing, no tilting of soil and no fertilizers, and no wedding is done just the way it would be in natural ecosystems. |

## ANALYSIS:

Though the plan is to cover 6,672 blocks in the country in phases over a period of time with at least one cluster each, initially the focus will be on those areas which have been practising natural farming and there is potential to achieve the target at the earliest, sources said.

## Significance:

### ■ Minimized Cost Of Production:

- It is considered as a **cost- effective farming practice** with scope for raising employment and rural development.

### ■ Ensures Better Health:

- As Natural Farming **does not use any synthetic chemicals, health risks and hazards are eliminated.** The food has higher nutrition density and therefore offers better health benefits.

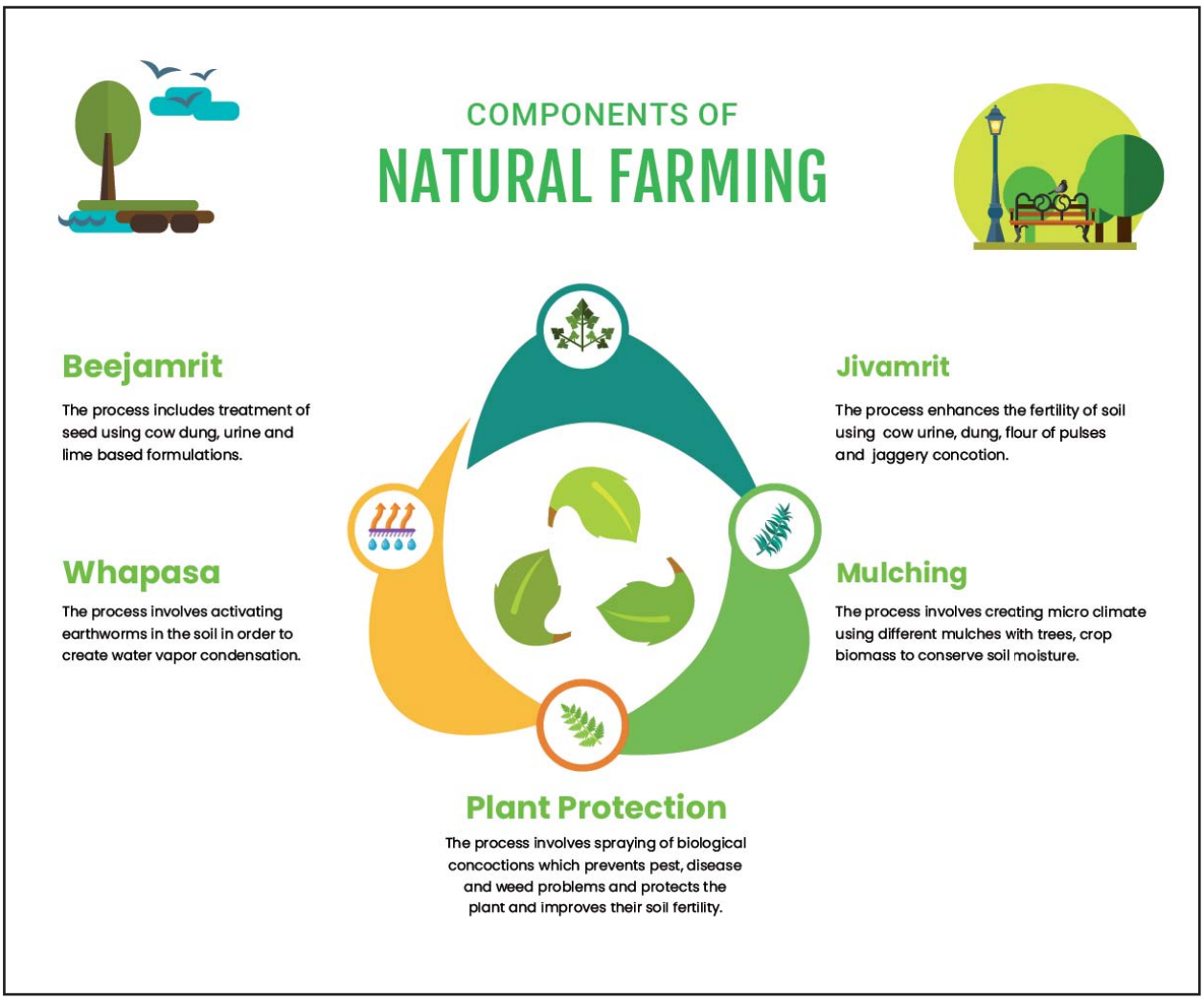
### ■ Employment Generation:

- It generates employment **on account of natural farming input enterprises, value addition, marketing in local areas,** etc. The surplus from natural farming is invested in the village itself.
- As it has the **potential to generate employment**, thereby stemming the migration of rural youth.

### ■ Environment Conservation:

- It ensures **better soil biology, improved agro biodiversity** and a more judicious usage of water with much smaller carbon and nitrogen footprints.

- **Reduced Water Consumption:**
  - By working with diverse crops that help each other and cover the soil to prevent unnecessary water loss through evaporation, **Natural Farming optimizes the amount of 'crop per drop'.**
- **Rejuvenates Soil Health:**
  - The most immediate impact of Natural Farming is on the biology of soil—on microbes and other living organisms such as earthworms. Soil health depends entirely on the living organisms in it.




# PLASTIC MANAGEMENT

## Context:

The Ministry of Environment, Forest and Climate Change recently published the **Plastic Waste Management (Amendment) Rules, 2022** through which it has notified the guidelines on extended procedure responsibility for plastic packaging.

**Dabur India, the largest Science-based Ayurveda** major in the country, has now become a complete **'Plastic Waste Neutral company'** in India, after it collected, processed and recycled nearly 27,000 metric tonnes of post-consumer plastic waste in 2021-22 financial year.

## About

### ■ What is Plastic? And Plastic Pollution?

- Plastic is a synthetic polymer made of gasoline with structures suitable for various uses, including packaging, construction and construction, household and sports equipment, automobiles, electronics and agriculture.
- Plastic is cheap, lightweight, strong and soft.
- More than 300 million tons of plastic are produced annually, half of which are used to design consumer goods, such as shopping bags, cups and straw.
- Only 9% of recycled plastic waste. About 12% burned, while 79% accumulated in landfills.
- According to the International Union for Conservation of Nature (IUCN), at least eight million tons of plastic end up in the oceans every year.
- Pollution due to the use of plastic materials has become an important environmental challenge facing all countries.
- According to the Central Pollution Control Board (CPCB), India produces over 25,000 tonnes of plastic waste every day.

### ■ New Amendments in Plastic Waste Management (Amendment) Rules, 2022:

- The term "extended procedure responsibility" refers to a manufacturer's responsibility for the environmentally sound management of a product until it reaches the end of its useful life.
- The recommendations lay out a framework for putting Extended Producer Responsibility into action.
- Producers, importers, brand owners, the Central Pollution Control Board, State Pollution Control Boards or Pollution Control Committees, recyclers, and waste processors all have roles and responsibilities under the Extended Producer Responsibility Guidelines.
- According to the new rules, plastics have been classified into four categories:
- Category one will include rigid plastic packaging;
- Category two will include flexible plastic packaging of single layer or multilayer (more than one layer with different types of plastic), plastic sheets and covers made of plastic sheet, carry bags, plastic sachet or pouches.
- Category three will include multi-layered plastic packaging (at least one layer of plastic and at least one layer of material other than plastic)
- Category four will include plastic sheet or like used for packaging as well as carry bags made of compostable plastics.
- Specifications for reuse, recycling, use of recycled plastic content, and end-of-life disposal of non-recyclable plastic packaging also featured in the EPR.
- The ministry has also called for setting up a centralised online portal by Central Pollution Control Board (CPCB) for the registration as well as filing of annual returns by producers, importers and brand-owners, plastic waste processors of plastic packaging waste.
- The EPR target will be increased to 70% in 2022-23 and 100% from 2023-24 onwards.
- The recycling obligation for producers will be 50% for rigid plastics in 2024-25, 60% in 2025-26, 70% in 2026-27, and 80% from 2027-28 onwards.

### ■ Plastic Waste Management Amendment Regulations, 2021:

- The Department of Environment has introduced the Plastic Waste Management Amendment Regulations, 2021.
- These laws prohibit certain types of plastic items that are used and have 'low use and high waste disposal capacity' by 2022.

- The permissible size of plastic bags, currently 50 microns, will be increased to 75 microns from September 30, 2021, and to 120 microns from December 31, 2022.
- High-strength plastic bags are easily treated as waste and have high recycling performance.
- At the policy level, the concept of Extended Product Responsibility (EPR), already mentioned under the 2016 Regulations, should be promoted.
- EPR is a policy in which producers are given significant, financial and / or physical responsibility for the treatment or disposal of post-consumer products.
- The Central Pollution Control Board, together with state pollution agencies, will monitor the ban, identify violations, and impose fines already imposed under the Environmental Protection Act, 1986.

### ■ Recent initiative to end plastic pollution

- **India Plastics Pact (IPP):** India has become the first Asian country to develop a plastics pact, launching a ground-breaking new initiative to bring together leading businesses at a national level to make commitments for building a circular system for plastics.
- The India Plastics Pact (IPP) has launched as a collaboration between:
- WWF India
- the Confederation of Indian Industry (CII)
- India has pledged to prohibit Single Use Plastics with the aim of liberating India of once-used plastics by 2022.
- Swachh Bharat Abhiyan laid the foundation for the next iteration of the plastic rules.

# RIGHT TO BURN FOSSIL FUELS:

## Context:

With a lot of debate on India's dependence on coal, the Government of India has for the first time made a commitment to achieve the net zero target by 2070.

## BACKGROUND:

### ■ Carbon budget framework

- India has neither historically emitted nor currently emits carbon anywhere close to what the global North has, or does, in per capita terms.
- If anything, the argument goes, it should ask for a higher and fairer share in the global carbon budget.
- There is no doubt that this carbon budget framework is an excellent tool to understand global injustice but to move from there to our 'right to burn' is a big leap.
- However, the question is do the countries in the global South necessarily need to increase their share in the global carbon budget?
- **Justification for continuing the dependence on coal**
- The crux of the theoretical argument is that India needs to develop, and **development requires energy.**
- However, since India has neither historically emitted nor currently emits carbon anywhere close to what the global North has, it has no reason to commit to reduce dependence on coal at least

in future.

- The argument is that it should ask for a **higher and fairer share in the global carbon budget.**
- Why India doesn't/shouldn't need to depend on coal for its future energy requirements?
- **Alternative forms of energy**: Normally the argument in favor of coal is on account of its **cost**, **reliability,** and **domestic availability**. But a deeper analysis reveals the truth.
  - **Cost**: The recent data shows that the levelised cost of electricity from renewable energy sources like the solar (photovoltaic), hydro and onshore wind **has been declining sharply** over the last decade. It is already less than fossil fuel-based electricity generation.
  - **Reliability:** With technological progress, the reliability issues are being addressed by the frontier renewable tech.
  - **Domestic availability**: As for the easy domestic availability of coal, it is a myth. According to the Ministry of Coal, India's net coal import went up from ₹782.6 billion in 2011-12 to ₹1,155.0 billion in 2020-21. India is among the largest importers of coal in the world.
- **The abundance of renewable natural resources** in the tropical climate can give India a head start in this competitive world of technology.
- **South-South collaboration:** This type of collaboration can help India avoid the usual patterns of trade between the North and the South, where the former controls technology and the latter merely provides inputs.
- **Benefits of a greener development path**: The high-employment trajectory that the green path entails vis-à-vis the fossil fuel sector may help address the issue of surplus labor, even if partially. Such a path could provide decentralised access to clean energy to the poor and the marginalised, including in remote regions of India. So, it simultaneously addresses the issues of employment, technology, energy poverty, and self-reliance.
- **Arguing for burning more coal will make the situation worse** for developing countries like India. Due to its tropical climate and high population density along the coastal lines, India remains vulnerable to climate change. Hence, burning more coal is not the solution.
- **Moral high ground**: If the global south including India takes an independent and greener approach to development, then it affords it a moral high ground. This will allow developing countries to push for a more inclusive carbon budget framework, like **South Africa at Glasgow**. It'll force the global north to come to the table for negotiations on climate finance.

# SINGLE USE PLASTICS

## CONTEXT:

Recently, the Ministry Of Environment Forest And Climate Change has notified the Plastic Waste Management Amendment Rules, 2021.

These rules prohibit specific single-use plastic items which have "low utility and high littering potential" by 2022.

## BACKGROUND:

### ■ Single Use Plastics and Reasons for the Ban:

- Single-use plastics, or disposable plastics, are used only once before they are thrown away or recycled.
- Plastic is so cheap and convenient that it has replaced all other materials from the packaging industry but it takes hundreds of years to disintegrate.

## ■ EXAMPLES OF SINGLE-USE PLASTIC INCLUDE:

- plastic forks and knives
- plastic shopping bags
- plastic coffee cup lids
- plastic water bottles
- Styrofoam and plastic take out containers
- and, of course, plastic straws
  - If we look at the data, out of 9.46 million tonnes of plastic waste generated every year in our country, 43% is single use plastic.
  - Further, Petroleum-based plastic is non-biodegradable and usually goes into a landfill where it is buried or it gets into the water and finds its way into the ocean.
  - In the process of breaking down, it releases toxic chemicals (additives that were used to shape and harden the plastic) which make their way into our food and water supply.
  - Pollution due to single use plastic items has become an important environmental challenge confronting all countries and India is committed to take action for mitigation of pollution caused by littered Single Use Plastics.
  - At the 4th United Nations Environment Assembly in 2019, India piloted a resolution on addressing single-use plastic products pollution.
  - The Prime Minister of India was also conferred the "**champions of the earth"** award by the **United Nations Environment Programme (UNEP)** in 2018 for pledging to eliminate all single-use plastic by 2022.

## ■ WHY ARE SINGLE-USE PLASTICS BAD?

- Single-use plastics may represent the epitome of today's throwaway culture.
- The U.N. Environment reports just nine per cent of the world's nine billion tonnes of plastic has been recycled.
- Most of our plastic ends up in landfills, our oceans and waterways, and the environment.
- Plastics do not biodegrade. Instead they slowly break down into smaller pieces of plastic called micro plastics.
- It contaminates our soil and water. The toxic chemicals used to manufacture plastic gets transferred to animal tissue, eventually entering the human food chain.
- Styrofoam products are toxic if ingested and can damage nervous systems, lungs and reproductive organs.
- Plastic items like bags and straws choke wildlife and block animals' stomachs. Turtles and dolphins, for example, often mistake plastic bags for food.

## ■ New Rules:

- The **manufacture, import, stocking, distribution, sale and use of the identified single-use plastic will be prohibited** with effect from the 1st July, 2022.
- The ban **will not apply to commodities made of compostable plastic.**
- For banning other plastic commodities in the future, other than those that have been listed in this notification, the government has **given industry ten years** from the date of notification for compliance.
- The **permitted thickness of the plastic bags,** currently 50 microns, **will be increased** to 75 microns from 30th September, 2021, and to 120 microns from the 31st December, 2022. **Plastic bags with higher thickness** are more easily handled as waste and have **higher recyclability.**

- **Legal Framework for Banning Plastic:** Currently, the **Plastic Waste Management Rules, 2016, prohibits** manufacture, import, stocking, distribution, sale and use of **carry bags and plastic sheets less than 50 microns in thickness in the country.**
- Plastic Waste Management Amendment Rules, 2021 amend the 2016 rules.
- **Implementing Agency:** The **Central Pollution Control Board**, along with state pollution bodies, will monitor the ban, identify violations, and impose penalties already prescribed under the **Environmental Protection Act, 1986.**

# STUBBLE BURNING

## Context:

Recently, some experts advised that the government should speed up implementation of **alternatives to** stubble burning**.**

## BACKGROUND:

- Stubble (parali) burning is the act of setting fire to crop residue to remove them from the field to sow the next crop.
- In order to plant the next winter crop (Rabi crop), farmers in Haryana and Punjab have to move in a very short interval and if they are late, due to short winters these days, they might face considerable losses. Therefore, burning is the cheapest and fastest way to get rid of the stubble.
- If parali is left in the field, pests like termites may attack the upcoming crop.
- The precarious economic condition of farmers doesn't allow them to use expensive mechanised methods to remove stubble.
- It begins around October and peaks in November, coinciding with the withdrawal of southwest monsoon.

## Effects of Stubble Burning:

### ■ Pollution:

- Open stubble burning emits large amounts of toxic pollutants in the atmosphere which contain harmful gases like methane ($CH_4$), Carbon Monoxide (CO), Volatile organic compound (VOC) and carcinogenic polycyclic aromatic hydrocarbons.
- After the release in the atmosphere, these pollutants disperse in the surroundings, may undergo a physical and chemical transformation and eventually adversely affect human health by causing a thick blanket of smog.

### ■ Soil Fertility:

- Burning husk on the ground destroys the nutrients in the soil, making it less fertile.
- *Heat Penetration:*
- Heat generated by stubble burning penetrates into the soil, leading to the loss of moisture and useful microbes.

### ■ Alternatives to Stubble Burning:

- In-Situ Treatment of Stubble- For example crop residue management by zero-tiller machine and Use of bio-decomposers.

- Ex-Situ (off site) Treatment- For example use of rice straw as cattle fodder.
- *Use of Technology*- For example Turbo Happy Seeder (THS) machine, which can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.
- *Changing Cropping Pattern*- It is the deeper and more fundamental solution.

## Solutions to the burning problem

- In 2014, the Union government released the National Policy for Management of Crop Residue.
- Farmers can also manage crop residues effectively by employing agricultural machines like:
- Happy Seeder(used for sowing of crop in standing stubble)
- Rotavator (used for land preparation and incorporation of crop stubble in the soil)
- Zero till seed drill (used for land preparations directly sowing of seeds in the previous crop stubble)
- Baler (used for collection of straw and making bales of the paddy stubble)
- Paddy Straw Chopper (cutting of paddy stubble for easily mixing with the soil)
- Reaper Binder (used for harvesting paddy stubble and making into bundles)
- Waste Decomposer: Scientists at the National Centre for Organic Farming have developed a 'Waste Decomposer' concocted with effective microorganisms that propel in-situ composting of the crop residue.

# SUSTAINABLE FARMING

## Context:

A sustainable natural farming system adopted in **southern Rajasthan's Banswara district,** which has created new livelihood sources and brought food security to indigenous tribal communities, has impressed the **Chief Minister's Economic Transformation Advisory Council.**

## What is Sustainable farming?

- **Sustainable farming** is farming in sustainable ways meeting society's **present food needs, without compromising the ability for current or future generations** to meet their needs.
- The basic goals of sustainable agriculture are **environmental health, economic profitability, and social and economic equity.**

## Benefits of Sustainable Farming:

- **Contributes to Environmental Conservation:** Sustainable agriculture helps to **replenish the land as well as other natural resources such as water and air.**
- **Public Health Safety:** Sustainable agriculture **avoids hazardous pesticides and fertilizers**. As a result, farmers are able to produce fruits, vegetables and other crops that are safer for consumers, workers, and surrounding communities.
- **Prevents Pollution:** Sustainable agriculture means that any waste a farm produces remains inside the farm's ecosystem. In this way, the waste cannot cause pollution.
- **Prevents Soil Erosion:** Our continued ability to produce adequate food has been a serious threat to soil erosion. Therefore, numerous practices have been developed to keep soil in place, which includes **reducing or eliminating tillage, managing irrigation to reduce runoff, and keeping the soil covered with plants or mulch.**

- **Reduction in Cost:** Sustainable agriculture lessens the overall costs involved in farming. **Smarter farming and moving food from farm-to-fork in a more efficient manner have helped everyone involved with the agriculture industry.**
- **Biodiversity:** Sustainable farms produce a wide variety of plants and animals, resulting in biodiversity. During **crop rotation, plants are seasonally rotated, and this results in soil enrichment, prevention of diseases, and pest outbreaks**.

## Sustainable Farming Methods or Practices:

- Make use of Renewable Energy Sources: The use of solar, hydro-power or wind-farms is ecology friendly. Farmers can use solar panels to store solar energy and use it for electrical fencing and running of pumps and heaters.
- Integrated pest management: Integrated pest management is a combination of pest control techniques for identifying and observing pests in the initial stages. One also needs to realize that not all pests are harmful, and therefore it makes more sense to let them co-exist with the crop than spend money eliminating them.
- Hydroponics and Aquaponics: In these innovative farming techniques, plants grow without soil and get nourished through specialized nutrients that are added to water. In hydroponic systems, crops are grown with the roots directly in a mineral solution or with the roots in an inert medium like gravel or perlite. Aquaponics combines the raising of aquatic animals (such as fish) with the growing of hydroponic crops.
- Crop Rotation: Crop rotation is a tried and tested method used since ancient farming practices proven to keep the soil healthy and nutritious. Crop rotation has a logical explanation to it – the crops are picked in a pattern so that the crops planted this season replenish the nutrients and salts from the soil that were absorbed by the previous crop cycle. For example, row crops are planted after grains to balance the used nutrients.
- Polyculture Farming: It involves growing multiple crop species in one area. These species often complement each other, and greater diversity of products can be produced at one plot while fully utilizing available resources. High biodiversity makes the system more resilient to weather fluctuations, promotes a balanced diet and applies natural mechanisms for preservation of soil fertility.
- Permaculture: Permaculture is a food production system with intention, design, and smart farming to reduce waste of resources and create increased production efficiency. The focus is on the use of perennial crops such as fruit trees, nut trees, and shrubs that all function together in a designed system that mimics how plants in a natural ecosystem would function.
- Avoid Soil Erosion: Healthy soil is key to a good crop. Age-old techniques like tilling the land, plowing etc. still work wonders. Manure, fertilizers, cover crops etc. also help improve soil quality. Crop rotations prevent the occurrence of diseases in crops, as per studies conducted.
- Agroforestry: Agroforestry has become one of the powerful tools of farmers in dry regions with soils susceptible to desertification. It involves the growth of trees and shrubs amongst crops or grazing land, combining both agriculture and forestry practices for long-lasting, productive, and diverse land use when approached sustainably.
- Natural Pest Eliminators: Bats, birds, insects etc. work as natural pest eliminators. Farmers build a shelter to keep these eliminators close. Ladybugs, beetles, green lacewing larvae, and fly parasites all feed on pests, including aphids, mites and pest flies.

# THREATS TO CORAL REEFS:

## Context:

Recently, coral reefs are facing new threats due to rising marine heat waves.

## BACKGROUND:

- Corals are invertebrate animals belonging to a large group of colourful and fascinating animals called Cnidaria.
- Each coral animal is called a polyp, and most live in groups of hundreds to thousands of genetically identical polyps that form a 'colony'. The colony is formed by a process called budding, which is where the original polyp grows copies of itself.
- These polyps have microscopic algae called zooxanthellae living within their tissues. The corals and algae have a mutualistic relationship. The coral provides the zooxanthellae with the compounds necessary for photosynthesis.
- In return, the zooxanthellae supply the coral with organic products of photosynthesis, like carbohydrates, which are utilized by the coral polyps for the synthesis of their calcium carbonate skeletons.
- In addition to providing corals with essential nutrients, zooxanthellae are responsible for the unique and beautiful colours of corals.
- Coral is generally classified as either hard coral or soft coral. There are around 800 known species of hard coral, also known as the 'reef building' corals.
- Soft corals, which include seas fans, sea feathers, and sea whips, don't have the rock-like calcareous skeleton like the others, instead, they grow wood-like cores for support and fleshy rinds for protection
- Soft corals also live in colonies that often resemble brightly coloured plants or trees, and are easy to tell apart from hard corals as their polyps have tentacles that occur in numerals of 8, and have a distinctive feathery appearance. Soft corals are found in oceans from the equator to the north and south poles, generally in caves or ledges.

## Coral bleaching

- When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae living in their tissues, causing them to turn completely white.
- Warmer water temperatures can result in coral bleaching. When water is too warm, corals will expel the algae (zooxanthellae) living in their tissues causing the coral to turn completely white. This is called coral bleaching. When a coral bleaches, it is not dead. Corals can survive a bleaching event, but they get under more stress and are subject to mortality.
- There have been instances when cold water conditions have caused coral bleaching-like in 2010, cold water temperatures in the Florida Keys caused a coral bleaching event that resulted in some coral death. Water temperatures dropped -6.7 degrees Celsius lower than the typical temperatures observed at this time of year.

## Causes of coral bleaching

- ***Warm Sea Temperature:*** Coral species prefer to live in waters close to the warm temperatures which they can tolerate but a slight increase in ocean temperature can harm corals. Events like El Nino and marine heatwaves increase the sea temperature and destroy coral reefs.
- ***Extreme low tides:*** Extreme events of low tides exposes the corals to solar and ultraviolet radiations which can induce coral bleaching.
- ***Ocean Acidification:*** Oceans are the carbon sinks, but more carbon dioxide increases the acidity of the ocean. This increase in the acidity of ocean water inhibits the coral's ability to create calcareous skeletons, which is essential for their survival.
- ***Diseases:*** Species of bacteria like *vibrio shiloi* inhibits the photosynthesis of zooxanthellae. These bacteria become more potent at higher sea temperatures.
- *Ocean Pollution:* The increasing nutrient concentrations leads to excessive phytoplankton growth, and attracts more and more marine life, which may cause strain on the reefs.

- *Sedimentation*: High rates of land erosion causes silt and other sediments to leach into ocean waters which causes sedimentation and water turbidity. The siltation tends to smother corals and turbidity reduces light availability potentially reducing coral photosynthesis and growth.
- *Anthropogenic threat:* Over-fishing, pollution from agricultural and industrial runoff, coral mining, development of industrial areas near coral ecosystems have adverse impacts on coral reefs.
- *Predators:* Acanthaster planci, also known as Crown-of-Thorns Starfish, eats corals during the night. They may destroy the entire coral reefs if found in huge numbers.
- *Plastic pollution:* 8 million tones of plastic rubbish enters the world's oceans every single year. Such plastic is now found in all corners of the ocean, from the deepest – the Marianas Trench – to sea ice and coral reefs. Many discarded plastic is broken down into what is known as micro plastics, tiny pieces that are mistaken by coral polyps as food and ingested.

# UNEA'S PLEDGE TO CURB PLASTIC POLLUTION

## Context:

At the UN Environment Assembly on March 2, more than 170 countries pledged to develop an international legally binding treaty to tackle plastic pollution by 2024.

The resolution will pertain to marine ecosystems as well, and will include both binding and voluntary approaches from member states.

## BACKGROUND:

- In a historic move, more than 170 countries including India have pledged to develop an international legally binding treaty to tackle the problem of plastic pollution.
- On March 2, leaders and representatives of member states at the fifth session of the United Nations Environment Assembly (UNEA) in Nairobi, Kenya, agreed to establish an Intergovernmental Negotiating Committee that will develop an international, legally binding agreement to end plastic pollution by 2024.

## ANALYSIS:

The UNEA resolution to tackle plastic pollution will pertain to marine ecosystems as well and include both binding and voluntary approaches from member states to curb plastic pollution.

It aims to address the entire lifecycle of plastic, from sustainable production and consumption to "environmentally sound" waste management.

Countries will be responsible for developing national action plans to prevent, reduce and eliminate plastic pollution.

The resolution also mentions that countries should take into account "national circumstances" and capabilities while implementing national-level actions to address plastic pollution.

This was included in the text of the resolution to allow developing countries to follow their development trajectories on India's insistence

## WHY IT WAS NEED OF THE HOUR:

- Plastic pollution has emerged as one of the biggest environmental concerns world over.
- According to Our World in Data, the world produced only 2 million tonnes of plastic per year in 1950. Since then, annual production has increased nearly 200-fold, reaching 381 million tonnes in 2015.

- A lot of plastic finds its way into natural systems and is also known to impact public health.
- At least 14 million tonnes of plastic end up in the ocean every year, according to the IUCN. Plastic makes up 80% of all marine debris found from surface waters to deep-sea sediments.

# Waste to Wealth Mission:

## OVERVIEW:

The Waste to Wealth Mission is one of the nine national missions of the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC).

India is projected to surpass China as the world's most populous country by 2027 and by 2050, India's urban population will nearly double to reach 814 million.

Waste generation in urban areas of India will be 0.7 kg per person per day in 2025, approximately four to six times higher than in 1999. According to the Ministry of Environment, Forest and Climate Change, India currently generates 62 million tons of waste (both recyclable and non–recyclable) every year, with an average annual growth rate of 4%. Solid waste, plastic waste and E-waste are the principal waste materials.

**Aim:** To identify, develop, and deploy technologies to treat waste and generate energy, recycle materials and extract value from waste.

To identify and support the development of modern technologies that promise to create a clean and green environment.

The mission will assist and augment the Swachh Bharat and Smart Cities projects by leveraging science, technology, and innovation to create circular economic models that are financially viable for waste management to streamline waste handling in the country.

The mission is the "scientific arm" of the Swachh Bharat Mission.

## Objectives of the Waste to Wealth Mission:

- To support the development of new technologies that can help create a cleaner and greener environment.
- To boost and augment the Swachh Bharat Mission and Smart Cities Project by leveraging science, technology and innovation.
- To create circular economic models that are financially viable for waste management.
- To streamline waste handling in India.

## Significance:

The benefits of effective waste management is huge.

As it is predicted that India has the potential to generate 3GW of electricity from waste by 2050.

**Waste to Wealth: Some Examples from the Field**

*Conversion of Waste Plastic into Liquid Hydrocarbons/Energy*

### ■ Advantages:

- • 100% waste is converted into value added products.
- • Solution to the waste plastic problem, can change global economic scenario by saving millions of dollars in import of crude oil

### Polythene Recycling

- Plastic recycling is an alternative method to prevent plastic from entering our environment and thus, reducing the menace

# WATER CRISIS AND WOMEN

## Context:

India is water-stressed due to changing weather patterns and repeated droughts. And the worst sufferers of this crisis are mostly women.

- Water scarcity in India is expected to worsen as the **overall population is expected to increase to 1.6 billion by the year 2050.**

## BACKGROUND:

### ■ Water Crisis:

- Although **India has 16% of the world's population,** the country possesses only **4% of the world's freshwater resources.**
- In recent times, the water crisis in India has become very critical, **affecting millions of people across India.**
- As many as **256 of 700 districts in India** have reported **'critical'** or 'overexploited' groundwater levels according to the most recent **Central Ground Water Board data** (from 2017).
- Three-fourths of India's rural families **lack access to piped, drinkable water and must rely on unsafe sources.**
- India has become the **world's largest extractor of groundwater,** accounting for 25% of the total. Some **70% of our water sources** are contaminated and our major rivers are dying because of pollution.

## Causes of Water Crisis:

### ■ Population Growth:

- There is **insufficient water per person** as a result of population growth.
- The total amount of **usable water in India has been estimated to be between 700 to 1,200 billion cubic meters (bcm)**

### ■ Poor Water Quality:

- Water in most rivers in India is largely **not fit for drinking,** and in many stretches not even fit for bathing.

### ■ Dwindling Groundwater Supplies:

- There is dwindling groundwater supplies due to **over-extraction by farmers.**

### ■ Unsustainable consumption:

- Wells, ponds and tanks are drying up as groundwater resources come under **increasing pressure due to over-reliance and unsustainable consumption.**

## Impact on Women:

### ■ Vulnerability of Women:

- The crisis of water only puts them at a higher risk of vulnerability. Fetching water in India has been perceived as a **woman's job for centuries.**
- Women, especially in the rural areas, **walk miles to collect water from the nearest source.**

### ■ Reduced Access to Sanitation:

- Their marginalisation is compounded by the **indignity and insecurity** of not having a private spot to fulfil their toilet needs.
- It also **reduces access to clean sanitation, better physical and mental health of women.**

### ■ Water-Wives:

- The entire water management by women has led to **polygamy in one drought-prone village of Maharashtra.** This involves having more than one spouse to collect water. The arrangement is termed as **'water wives'.**

# World Wetlands Day

## Context:

World Wetlands Day is observed every year on February 2 all over the world. It is celebrated to raise global awareness about the vital role of wetlands for people and our planet.

- **The year 2022 commemorates the 51th anniversary** of the signing of the **Ramsar Convention on Wetlands** on **2 February 1971 in Ramsar, Iran, celebrated annually as World Wetlands Day.**

## About

## About Wetlands

- **Wetlands** are **land areas that are saturated or flooded with water either permanently or seasonally.**
- **Inland wetlands include marshes, ponds, lakes, fens, rivers, floodplains, and swamps.**
- **Coastal wetlands** include **saltwater marshes, estuaries, mangroves, lagoons, and even coral reefs. Fishponds, rice paddies, and saltpans are human-made wetlands.**
- On this day, environmentalists and community protectors come together to celebrate their love for nature.
  - This is done through **seminars, exhibitions, and special on-ground campaigns.**

## History of World Wetlands Day

- **February 2, World Wetlands Day is the United Nations International Day** of Importance when the Convention on Wetlands of International Importance was signed on **2 February 1971 to raise public awareness of wetland values and benefits.**
- It was also aimed to make the world's population aware of the **conservation and wise use of wetlands.**
- The day was founded as initially **five nations signed the Convention, but today over 170 nations are signatories to the Ramsar Convention** and there are over **2,400 listed Ramsar wetlands, including in India.**

## Ramsar Convention

- **The Ramsar Convention is an international agreement promoting the conservation of wetlands.**
- The Convention was adopted at Ramsar in Iran in **1971 and came into force in 1975.** Almost 90% of the UN member states are part of the Convention.

## Theme

- In 2021, the world wetlands day is celebrated under the following theme 'Wetlands and Water,' highlights the importance of wetlands as a source of freshwater and encourages action to restore them and stop their loss.
- In 2022, the World Wetlands Day is celebrated under the following theme "Wetlands action for people and nature".

## Significance of wetlands

- Wetlands are a critical part of our natural environment. They mitigate floods, protect coastlines and build community resilience to disasters, absorb pollutants and improve water quality.
- The wetlands have a major role in **water security.**
  - They provide a **barrier against natural disasters such as flooding.**
- They are a vital source for food, raw materials, genetic resources for medicines, and hydropower.
- **They nurture complex ecosystems.** They prevent **soil erosion and help fight against climate change.**
- The wetlands act as carbon stores. They act as one of the **best sinks for greenhouse gases, especially carbon monoxide.**
  - 30% of land-based carbon is stored in peatland (a type of wetlands).

# FOREST FIRES:

## CONTEXT:

**Forest fires** continue to scorch several hectares of green cover in the **Uttarakhand and Himachal Pradesh.**

Himachal reported close to **750 forest fires**, while Uttarakhand recorded over **1,500** such incidents.

## Background

- The forest fire season in India lasts between **November and June.**
- The **large forest fires** are the most challenging to control due to their intensity, geographical cover and duration that can go up **to 5 days.**
- Some of the leading natural causes of **wildfires include, dry climate, lightning, climate variability and volcanic eruption.**
- **Uttarakhand** had witnessed 51 large fire incidents, the maximum by any Indian state.
- **Vulnerability of India's Forests to Fires:**
- As of 2019, about 21.67% (7,12,249 sq km) of the country's geographical area is identified as forest, according to the India State of Forest Report 2019 (ISFR) released by the Forest Survey of India (FSI), Dehradun.

- Forests in Assam, Mizoram and Tripura have been identified as **'extremely prone'** to forest fire.
- States with large forest areas under the 'very highly prone' category include Andhra Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Maharashtra, Bihar and Uttar Pradesh.
- As per the 2020-2021 annual report of the MoEFCC, Western Maharashtra, Southern Chhattisgarh and areas of Telangana and Andhra Pradesh, along with central Odisha, are turning into '**extremely prone'** forest fire hotspots.
- Areas under **the 'highly prone'** and '**moderately prone'** categories make up about 26.2% of the total forest cover.

## Analysis

### ■ What does a forest fire mean?

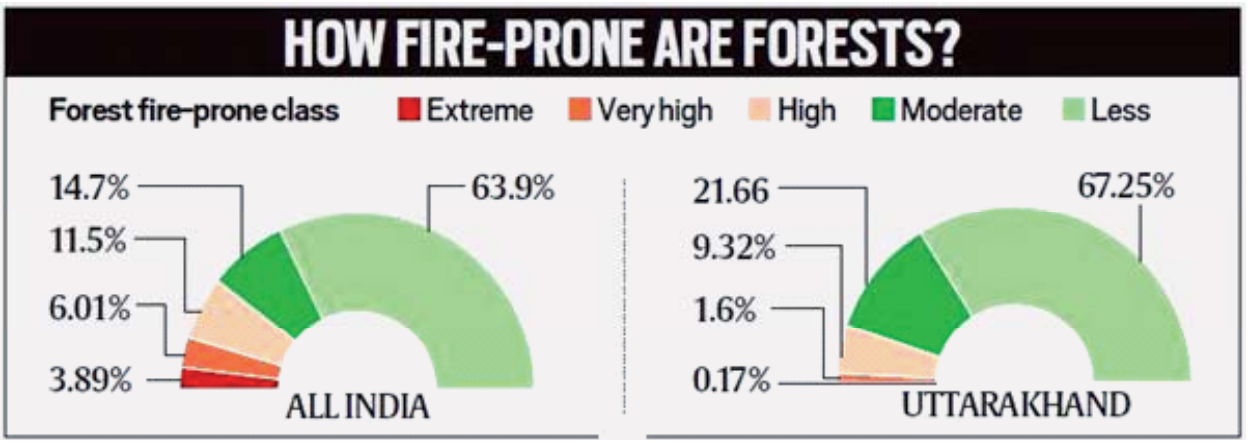
- A wildfire, forest fire, bushfire, wildland fire or rural fireis an unplanned, uncontrolled fire in an area of combustible vegetation starting in rural and urban areas.
- Some forest ecosystems in their natural state depend on wildfire.
- Depending on the type of vegetation present, a wildfire can also be classified more specifically as a forest fire, brush fire, bushfire (in Australia), desert fire, grass fire, hill fire, peat fire, prairie fire, vegetation fire, or veld fire.

### ■ What are the causes of forest fires?

- Several factors like temperatures, precipitation, vegetation, and moisture contribute to the scale and frequency of these fires.
- According to the Forest Survey of India, nearly 36 per cent of India's forests are prone to frequent fires.
- Higher fire incidents are reported in March, April and May due to ample availability of dry biomass (fuel load) following the end of winter and the on-going summer season.
- Most forest fires, according to experts, are man-made due to changes in agriculture and unchecked land-use patterns.

### ■ Has there been an increase in forest fire incidents this year?

- The **Forest Survey of India** data on forest fire points between March 1 and April 30 this year shows a clear spike in incidents coinciding with rising heat wave conditions.
- The number of forest fire points rose from 8,735 to 42,486 during the four weeks in March.
- However, the week-wise progress in the number of forest fire points in April peaked in the first week fell to 13,719 in the second week and picked up to touch 20,285 in the last week.
- In the last three months, Uttarakhand has recorded at least 1,791 forest fires that have scorched over 2,891 hectares of forest land, including 2,079 hectares of reserve forest areas. These fires have caused estimated damage to property worth over Rs 74 lakh and death of at least one person.
- While the numbers are lesser in last year's comparison, the issue of forest fires intensifying mainly in mid-February and continuing usually till mid-June is a major problem for the hill state which has forests in almost **71 per cent of its geographical area.**
- The chief conservator of forests admitted that the number of forest fires this year increased significantly in the month of April mainly due to unexpected rise in **temperature and less rain**.
- The **strong wind velocity also contributed majorly** to spreading the fires fast across the jungles.




# Wildlife Protection (Amendment) Act

## CONTEXT :

Parliament has proposed an amendment to the Wildlife (Protection) Act, 1972.

## Background

- The geographic location and latitudinal position of India has gifted India with a diverse wildlife species.
- India with 6 biodiversity hotspot possesses several numbers of species of plants and animals. In order to conserve and protect these species of biodiversity India needs a speculative and strong legislative backing.
- Wildlife (Protect) Act, 1972 provides a legal backing for protection of the wildlife species and to the commitments made by India to the Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (CITES).
- Rationalization of scheduled species of plants and animals were long overdue.
- The new bill proposes for 50 Amendments to the existing act of 1972.
- Despite several sequential amendments wildlife species are still facing survival threat in India.

## Analysis

### ■ Origin of the act:

- To protect the biodiversity of India, Government of India has passed an act Wildlife (Protection) Act in the year 1972.
- Wildlife (Protection) Act, 1972 has several Provisions:
- Schedule 1: Endangered species immune from all kind of trading and poaching with extreme protection
- Schedule 2: Species with lesser protection and prohibition of trade.
- Schedule 3 and 4: Non – Endangered species
- Schedule 5: Plants species
- Schedule 6: Vermin Species

## ■ What changes does the amendment propose?

The Bill seeks to increase the species protected under the law, and implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

## ■ Key features of the Bill include:

### Rationalizing the schedules:

- Reduced the number of schedules for specially protected animals to two
- Removed the scheduled for vermin species.
- New schedule for specimens listed in the appendices of CITES
- Obligations under cites: Bill provides for creation of two independent authorities
- Management Authority: To grant license for trading purpose
- Scientific Authority: To give advice on aspects related to impact on the survival of the specimen being traded.
- Regulation on invasive species: Bill empowers the central government to regulate the import and trade of invasive alien species.
- Control of Sanctuaries: Empower the government to regulate the business of Chief Wildlife Warden in line with the regulatory guidelines made by central government.
- Voluntary Surrender of Specimen: Any one surrendering any captive animal to the Chief Wildlife Warden, the person will not be compensated and the specimen of the captive animal will be considered as states property.

**Penalties:** Penalties on violation of the rules has been revised and increased under this bill.

### What are major benefits of the proposed amendment?

- Decentralization: The Bill aims to decentralise wildlife protection, with the establishment of Standing Committees of State Boards of Wildlife, which can regulate permissions to various projects based on their impact on the wildlife, without having to refer to the National Board for Wildlife.
- The bill also aims to streamline the schedules mentioned in the original Act, shrinking them from six to four.
- Additionally, Wildlife Management Plans crafted for wildlife sanctuaries and parks in the country will be brought under the jurisdiction of the Act, thereby increasing the scope for stricter protection for various species. These were earlier governed by the government in charge.

### Increased penalty for wildlife crimes:

The Bill increases penalties for wildlife crimes.

For example, offences that attracted a fine of Rs 25,000 now attract Rs 1 lakh.

- CITES: There's a new and separate chapter on regulating species involved in international trade according to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Specifically, the Bill prohibits possessing, trading and breeding species without prior permissions from CITES authorities.
- India became party to CITES in 1976.
- Invasive alien species: The Bill also recognises threats that invasive alien species pose.
- These species aren't native to the country; when they're introduced to an ecosystem that hasn't evolved to deal with this life-form, they can quickly degrade it to their advantage.
- An infamous example is the weed called mesquite.

# Wildlife Conservation in India

## CONTEXT:

According to the recent data by the Wildlife Crime Control Bureau (WCCB) and State Forest and Police Authorities, in the past three years (2018-2020), about 2054 cases were registered for killing or illegal trafficking of wild animals in India.

In order to control this, the WCCB has conducted a number of species-specific enforcement operations with coordination of State Enforcement Agencies.

WCCB is a statutory multi-disciplinary body established by the Government of India under the Ministry of Environment and Forests, to combat organized wildlife crime in the country. It has its headquarter in New Delhi.

## Key Points

### ■ Impact of Illegal Wildlife Trade:

- Species face extinction because of demands arising out of illegal wildlife trade.
- Overexploitation of the wildlife resources due to its illegal trade creates imbalances in the ecosystem.
- Illegal wildlife trade as part of the illegal trade syndicates undermines the economy of the country and thereby creates social insecurity.
- Wild plants that provide genetic variation for crops (natural source for many medicines) are threatened by the illegal trade.

### ■ Various Species-Specific Enforcement Operations:

**Operation Save Kurma**: To focus on the poaching, transportation and illegal trade of live turtles and tortoises.

**Operation Turtshield**: It was taken up to tackle the illegal trade of live turtles.

**Operation Lesknow**: To gain attention of enforcement agencies towards the illegal wildlife trade in lesser-known species of wildlife.

**Operation Clean Art**: To drag attention of enforcement agencies towards illegal wildlife trade in Mongoose hair brushes.

**Operation Softgold**: To tackle Shahtoosh Shawl (made from Chiru wool) illegal trade and to spread awareness among the weavers and traders engaged in this trade.

**Operation Birbil**: To curb illegal trade in wild cat and wild bird species.

**Operation Wildnet:** It was aimed to draw the attention of the enforcement agencies within the country to focus their attention on the ever increasing illegal wildlife trade over the internet using social media platforms.

**Operation Freefly**: To check illegal trade of live birds.

**Operation Wetmark:** To ensure prohibition of sale of meat of wild animals in wet markets across the country.

## India's Domestic Legal Framework for Wildlife Conservation:

### ■ Constitutional Provisions for Wildlife:

- The 42nd Amendment Act, 1976, Forests and Protection of Wild Animals and Birds was transferred from State to Concurrent List.

- Article 51 A (g) of the Constitution states that it shall be the fundamental duty of every citizen to protect and improve the natural environment including forests and Wildlife.
- Article 48 A in the Directive Principles of State policy, mandates that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.

## Legal Framework:

- Wildlife (Protection) Act, 1972
- Environment Protection Act, 1986
- The Biological Diversity Act, 2002

## India's Collaboration With Global Wildlife Conservation Efforts:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- Convention on Biological Diversity (CBD)
- World Heritage Convention
- Ramsar Convention
- The Wildlife Trade Monitoring Network (TRAFFIC)
- United Nations Forum on Forests (UNFF)
- International Whaling Commission (IWC)
- International Union for Conservation of Nature (IUCN)
- Global Tiger Forum (GTF)

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