SAMADHAN PT TRICKS

ASPIRE IAS
The Name Associated with Excellence

PT TRICKS 2023

Environment Current-Jan.

Covering: Basic concepts- current- terms and application

NOTE: **FOR ALL EXAMINATIONS**

SAMADHAN PT TRICKS

Bioenergy Crops Create Cooling Effect on Cultivated Areas

A new study has found that converting annual crops to perennial bioenergy crops can induce a cooling effect on the areas where they are cultivated.

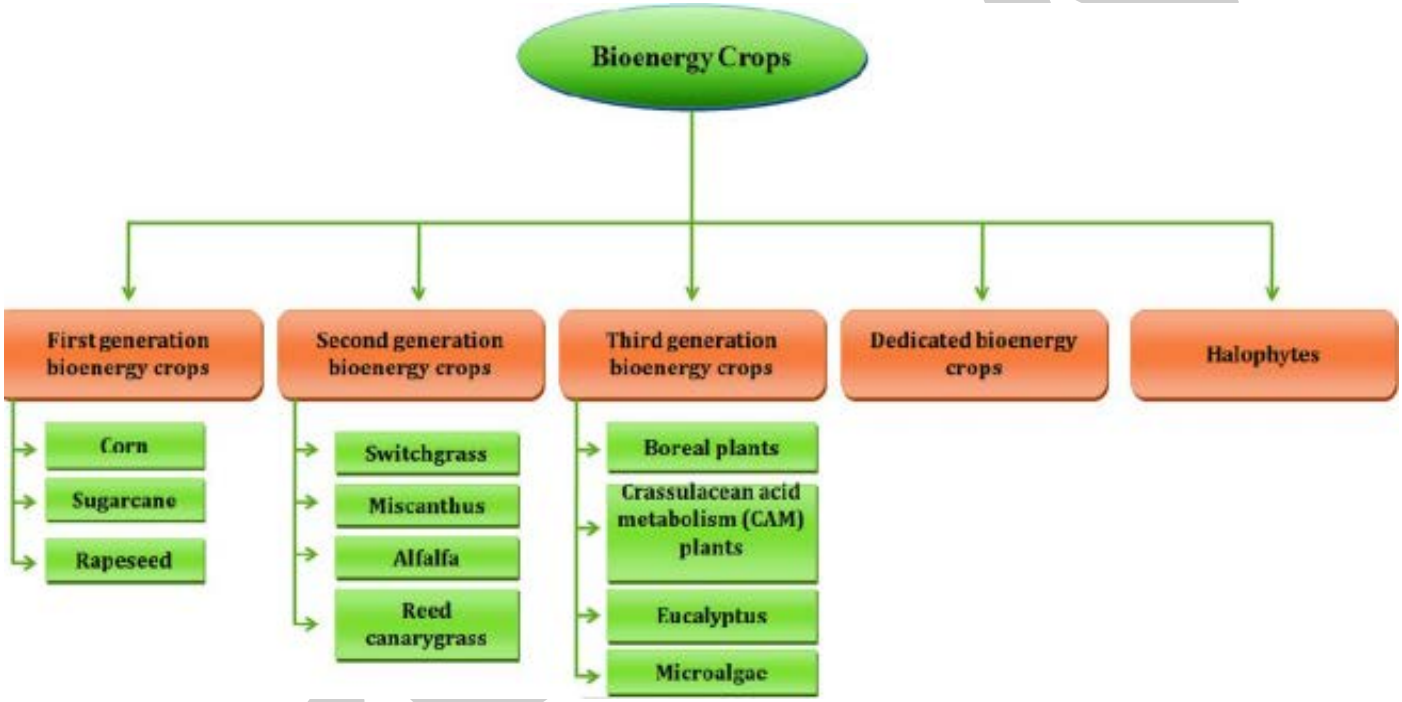
Bioenergy Crops

Crops from which Biofuels are produced or manufactured are called Biofuel crops or Bioenergy Crops.

"Energy crops" is a term used to describe biofuel crops. ☐ Wheat, corn, main edible oilseeds/edible oils, sugarcane, and other crops are among them.

Biofuels have a number of advantages over fossil fuels, including the ability to burn cleaner and emit fewer pollutants and greenhouse gases, such as carbon dioxide, into the sky

- Cultivation area under bioenergy crops occupies 3.8% ± 0.5% of the global total land area, but they exert strong regional biophysical effects, leading to a global net change in air



temperature of −0.08 ~ +0.05 degrees Celsius.

- Large-scale bioenergy crop cultivation with carbon capture and storage (BECCS) has been identified as a major negative emission technology (NET) for removing CO2 from the atmosphere.
- Strong cooling effects in Eurasia, between 60°N and 80°N, may protect permafrost from thawing or reduce methane emissions from wetlands.
- Cultivating eucalypt shows generally cooling effects that are more robust than if switchgrass is used as the main bioenergy crop, implying that eucalypt is superior to switchgrass in cooling the lands biophysically.

India State of Forest Report-2021

- Ministry of Environment, Forests and Climate Change (MoEFCC) released the India State of Forest Report-2021
- It is an assessment of India's forest and tree cover, published every two years by the Forest Survey of India

SAMADHAN PT TRICKS

Three categories of forests are surveyed – very dense forests (canopy density over 70%), moderately dense forests (40-70%) and open forests (10-40%). ☐
Scrubs (canopy density less than 10%) are also surveyed but not categorised as forests.

New Features of ISFR 2021:

- It has for the first time assessed forest cover in tiger reserves, tiger corridors and the Gir forest which houses the Asiatic lion. ☐
- The forest cover in tiger corridors has increased by 37.15 sq km (0.32%) between 2011-2021, but decreased by 22.6 sq km (0.04%) in tiger reserves.
- Buxa (West Bengal), Anamalai (Tamil Nadu) and Indravati reserves (Chhattisgarh) have shown an increase in forest cover while the highest losses have been found in Kawal (Telangana), Bhadra (Karnataka) and the Sunderbans reserves (West Bengal).
- Pakke Tiger Reserve in Arunachal Pradesh has the highest forest cover, at nearly 97%

Highlights

- The forest and tree cover in the country continues to increase with an additional cover of 1,540 square kilometres over the past two years.
- India's forest cover is now 7,13,789 square kilometres, 21.71% of the country's geographical area, an increase from 21.67% in 2019.
- India's forest cover is now 7,13,789 square kilometres, 21.71% of the country's geographical area, an increase from 21.67% in 2019.
- The states that have shown the highest increase in forest cover are Telangana (3.07%), Andhra Pradesh (2.22%) and Odisha (1.04%). z Five states in the Northeast – Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland have all shown loss in forest cover.
- Madhya Pradesh has the largest forest cover in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
- In terms of forest cover as percentage of total geographical area, the top five States are Mizoram, Arunachal Pradesh, Meghalaya, Manipur and Nagaland.
- The term 'forest area' denotes the legal status of the land as per the government records, whereas the term 'forest cover' indicates presence of trees over any land.
- Mangroves have shown an increase of 17 sq km. India's total mangrove cover is now 4,992 sq km.
- Forests in all states (except Assam, Meghalaya, Tripura and Nagaland) will be highly vulnerable climate hot spots. Ladakh (forest cover 0.1- 0.2%) is likely to be the most affected.
- The total carbon stock in the country's forests is estimated at 7,204 million tonnes, an increase of 79.4 million tonnes since 2019. ☐ Forest carbon stock is the amount of carbon that has been sequestered from the atmosphere and is now stored within the forest

ecosystem, mainly within living biomass and soil, and to a lesser extent also in dead wood and litter.

- Bamboo forests have grown from 13,882 million culms (stems) in 2019 to 53,336 million culms in 2021.
- There is a 1,582 sq km decline in moderately dense forests, or "natural forests".
- scrub area has increased by 5,320 sq km – indicating the complete degradation of forests in these areas. ☐ Very dense forests have increased by 501 sq km.
- The Northeast states account for 7.98% of total geographical area but 23.75% of total forest cover.
- The decline in the Northeastern states has been attributed to a spate of natural calamities, particularly landslides and heavy rains, in the region as well as to anthropogenic activities such as shifting agriculture, pressure of developmental activities and felling of trees.

Read 2019 Highlights- India State of Forest Report 2019 - AspireIAS
Read Associated Data on Forest Resources - AspireIAS here

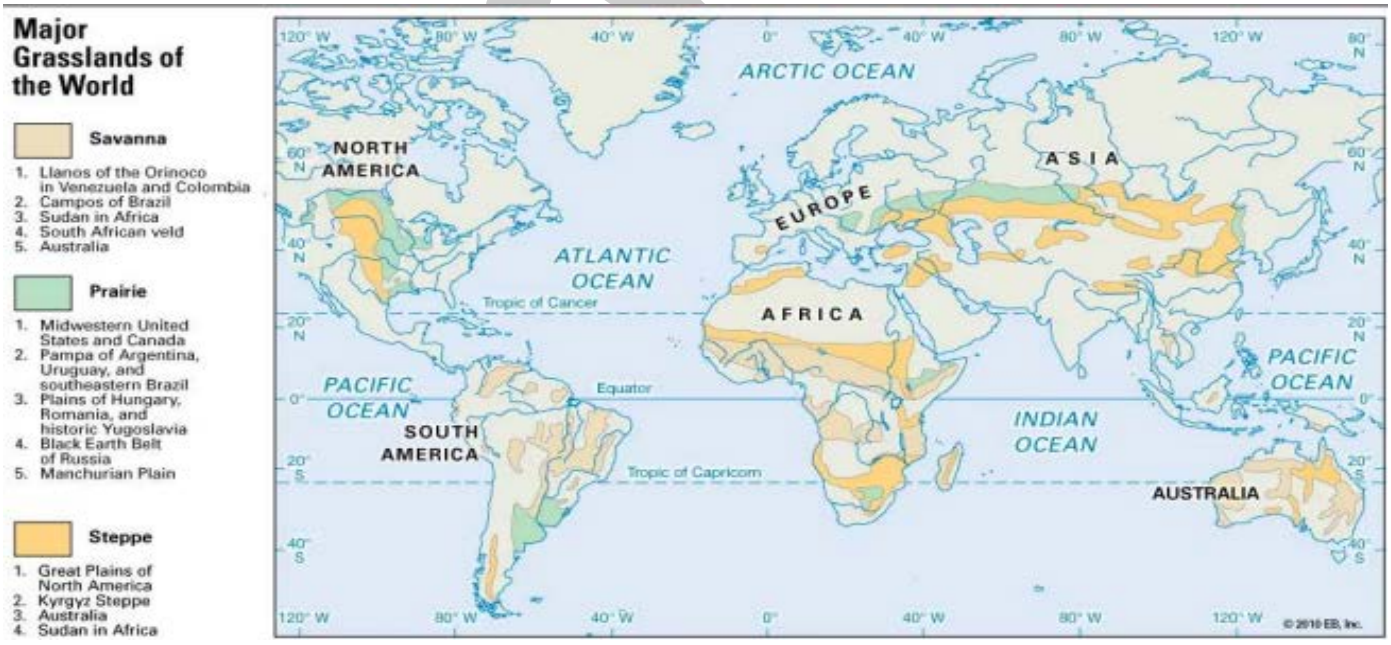
Deforestation in Cerrado: Brazil

Deforestation in 2021 rose to the highest level since 2015 in Brazil's Cerrado, prompting scientists to raise alarm over the state of the world's most species-rich savanna.

The Cerrado is spread across several states of Brazil and is one of the world's largest savannas, is often called an "upside-down forest" because of the deep roots its plants sink into the ground to survive seasonal droughts and fires. ☐

Cerrado is a major carbon sink that helps to stave off climate change.

Destruction of these trees, grasses and other plants in the Cerrado is a major source of Brazil's greenhouse gas emissions, although it is far less densely forested than the more famous Amazon rainforest that it borders.



Aquamation

- It is a process in which the body of the deceased is immersed for a few hours in a mixture of water and a strong alkali in a pressurized metal cylinder and heated to around 150 degree centigrade.

SAMADHAN PT TRICKS

- The process of aquamation uses energy which is five times less than fire. It also reduces by about 35% the amount of greenhouse gases that are emitted during cremation.
- The process leaves behind bone fragments and a neutral liquid called effluent.
- The effluent is sterile, and contains salts, sugars, amino acids and peptides. ☐ There is no tissue and no DNA left after the process completes
- The process is also known as water cremation, green cremation or chemical cremation
- Desmond Tutu, being an environmentalist also was cremated using this method.

Eastern Swamp Deer

- The population of the vulnerable eastern swamp deer has dipped in the Kaziranga National Park and Tiger Reserve (Assam). The eastern swamp deer is extinct elsewhere in South Asia
- The decline can be attributed to two high floods in 2019 and 2020.

There are three subspecies of swamp deer found in the Indian Subcontinent. ☐ The western swamp deer (Rucervus duvaucelii) found in Nepal. ☐
Southern swamp deer/Hard Ground Barasingha (Rucervus duvaucelii branderi) found in central and north India. ☐
Eastern swamp deer (Rucervus duvaucelii ranjitsinhi) found in the Kaziranga (Assam) and Dudhwa National Parks (Uttar Pradesh)
IUCN Red List: Vulnerable ☐ CITES: Appendix I ☐ Wildlife Protection Act, 1972: Schedule I

Environment Management Plan for Najafgarh Jheel

- The National Green Tribunal (NGT) directed Delhi and Haryana to enforce the Environment Management Plan (EMP) for the rejuvenation and protection of the Najafgarh Jheel, a transboundary wetland.
- The implementation of these action plans is to be monitored by the National Wetland Authority through the respective State Wetland Authorities.
- The top priority would be to notify the Najafgarh jheel and its area of influence under The Wetlands (Conservation and Management) Rules, 2017.
- The presence of 281 bird species, including several threatened ones such as Egyptian vulture, Sarus Crane, Steppe Eagle, Greater Spotted Eagle, Imperial Eagle and those migrating along the Central Asian Flyway has been reported at the lake.

According to Indian National Trust for Art and Cultural Heritage (INTACH), the revival of the jheel would yield around 20 million gallons of water a day to support a population of 3.5 lakh.
INTACH is a non-profit charitable organisation registered under the Societies Registration Act, 1860

- The Sahibi river, of which Najafgarh Jheel was the natural floodplain, has been converted virtually into a drain

Fly Ash Management

- The National Green Tribunal (NGT) directed the constitution of a 'Fly Ash Management and Utilisation Mission.
- The Mission is to be jointly headed by the secretaries of the Union Ministry of Environment, Forest & Climate Change (MoEF&CC), Union Ministry of Coal and Power

Fly Ash Notification 2021 was issued under the Environment (Protection) Act 1986.

- Centre has made it mandatory for such plants to ensure 100% utilization of ash in an eco-friendly manner, and introduced for the first time a penalty regime for non-compliance based on 'polluter pays' principle.

SAMADHAN PT TRICKS

- Under new rules, the non-compliant power plants will be imposed with an environmental compensation of Rs 1,000 per tonne on unutilised ash during the end of every financial year.
- The amount, collected by the Central Pollution Control Board (CPCB) from the thermal power plants, will be used towards the safe disposal
- In cases where fly ash is being used in various activities, power plants will have to deliver fly ash at project sites free of cost.
- The power plant may, however, charge for ash cost and transportation as per mutually agreed terms, in case it is able to dispose of the ash through other means. ☐
- The new fly ash notification of December 2021, has made provision for the 'enforcement, monitoring, audit and reporting' of the progress of fly ash utilisation and implementation by coal thermal power plants and user agencies. ☐
- The Notification holds the CPCB and State Pollution Control Boards (SPCB) / Pollution Control Committees (PCC) responsible for monitoring the effective implementation of mandates under it. ☐
- However, along with these statutory regulators, the Mission also extends the responsibility of fly ash management to the chief secretaries of the states.
- The Notification mandates the individual thermal power plant to upload monthly information regarding ash generation and utilisation on its web portal

Fly Ash

Fly ash is an unwanted unburnt residue of coal combustion in a coal thermal power plant.
The fly ash collected with the help of precipitators is converted into a wet slurry to minimise fugitive dust emissions.
Fly ash includes substantial amounts of silicon dioxide (SiO_2), aluminium oxide (Al_2O_3), ferric oxide (Fe_2O_3) and calcium oxide (CaO).
Resemble Portland cement but is chemically different.
It is used in concrete and cement products, road base, metal recovery, and mineral filler among others

Environmental Emergency in Peru

- The Peruvian government declared a 90-day "environmental emergency" after a recent oil spill
- The spill was caused by freak waves, which resulted from the eruption of a volcano in Tonga.

A freak wave or rogue wave is usually defined as a wave that is two times the significant wave height of the area. ☐

- The significant wave height is the average of the highest one-third of waves that occur over a given period.

Oil Spill Impacts:

- poses health hazards for the indigenous population who depend on seafood.
- harmful to many forms of aquatic life because it prevents sufficient amounts of sunlight from penetrating the surface
- ruins the insulating and waterproofing properties of feathers and fur of birds and they die of hypothermia a (decrease in body temperature to below-normal levels).

Remedies:

SAMADHAN PT TRICKS

- Bacteria can be used to clean up oil spills in the ocean through bioremediation. Using bacteria such as Paraperlucidibaca, Cycloclasticus, Oleispira, Thalassolituus Zhongshania and some others can help remove several classes of contaminants.
- Floating barriers, called booms, are used to restrict the spread of oil and to allow for its recovery, removal, or dispersal.
- Skimmers: They are devices used for physically separating spilled oil from the water's surface
- Sorbents: Various sorbents (e.g., straw, volcanic ash, and shavings of polyester-derived plastic) that absorb the oil from the water are used.
- In 2015 India ratified the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Convention).

Development Project in the Great Nicobar Island

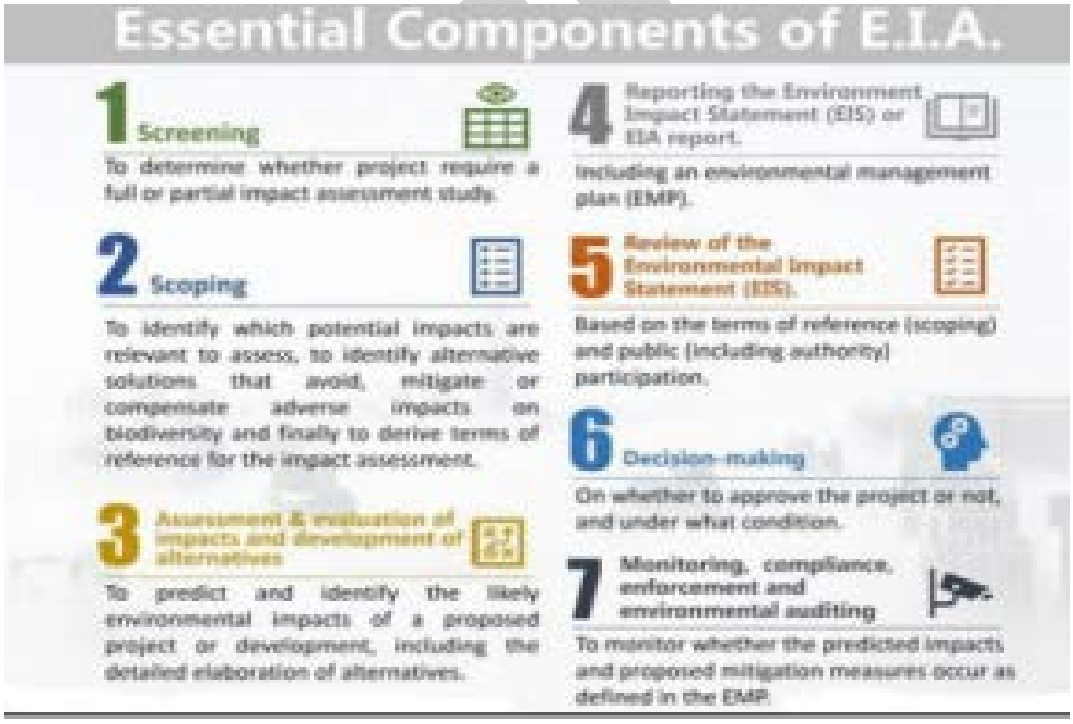
- NITI Aayog-piloted Rs. 72,000-crore integrated project in Great Nicobar includes construction of a mega port, an airport complex, a township and a solar and gas-based power plant.
- The recently released draft Environment Impact Assessment (EIA) report highlights incomplete story.

Environmental Impact Assessment (EIA)

It is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

EIA is statutorily backed by the Environment Protection Act, 1986 which contains various provisions on EIA methodology and process.

- It was reported that the Galathea port area does not record any coral reefs, whereas the Zoological Survey of India (ZSI) study shows that the coral reef spread over 116 hectares in Galathea Bay. ☐



- Galathea Bay is an iconic nesting site in India of the enigmatic Giant Leatherback, the world's largest marine turtle—borne out by surveys done over three decades.

- 330 species of fauna are recorded in the island, while the same ZSI study puts the number at more than double at 695.
- The EIA says in another place no migratory birds have been reported from Great Nicobar, whereas it is well known that these islands are located along two globally significant bird flyways and more than 40 species of migratory birds have been recorded from Great Nicobar.

Issues Raised by Environmentalists: ☐

- This project is likely to impact turtle and megapode nesting sites and coral reefs at the islands. ☐
- Many reserved areas are expected to be de-notified for the project including land under Great Nicobar Biosphere Reserve and a tribal reserve.
- The project will have a direct impact on the biodiversity and cascading effects on the indigenous Onge tribe.

Great Nicobar is the southernmost island of the Nicobar Islands Archipelago. The Great Nicobar Biosphere Reserve harbours a wide spectrum of ecosystems comprising tropical wet evergreen forests, mountain ranges reaching a height of 642 m (Mt. Thullier) above sea level, and coastal plains. ¾

The Mongoloid Shompen Tribe live in the forests of the biosphere reserve particularly along the rivers and streams. ☐

Another Mongoloid Tribe, Nicobarese used to live in settlements along the west coast.

After the tsunami in 2004, which devastated their settlement on the western coast, they were relocated to Afra Bay in the North Coast and Campbell Bay.

Ranking of States on Faster Green Clearances

- Ministry of Environment, Forests and Climate Change has decided to rank states on the speed with which they accord Environmental Clearances (EC) to development projects to facilitate ease of doing business.
- It has been decided to incentivise the states through a star-rating system, based on efficiency and timeliness in grant of EC.

The State Environment Impact Assessment Authorities (SEIAAs), which clears projects in the shortest period of time, has a high rate of clearance, and seeks fewer “essential details”, will be ranked the highest

The parameters are:

- average number of days taken by an SEIAA to accept proposals
- number of complaints addressed by the Authority
- percentage of cases in which the Authority seeks additional information from project proponents more than once
- disposal percentage of proposals seeking fresh or amended ToRs that are older than 30 days
- percentage of cases for which site visits are carried out by either SEIAAs or State Expert Appraisal Committees (SEACs).

Environmental Clearance In India

- In India Environmental clearance of a project has to be obtained either from the State Government and /or from the Central Government
- The basic objective behind the environmental clearance is to ensure the least damage to the natural resources and incorporate suitable remedial measures right at the stage of project formulation.

- The EIA notification, issue by Min.of Environment, Forest & Climate Change is valid for both Government as well as the Public sector/Private sector for mega projects undertaken by them.

Indian Environment Service (IES)

- The creation of IES was recommended by a committee headed by TSR Subramanian in 2014
- It will act as an expert group in the public and quasi-governmental sectors over the next decades, regarding environmental matters

Observations of TSR Subramanian Committee:

- Looking at the current administrative set-up, it can be inferred that the government servants might not be able to spare special time for environmental causes.
- There is a lack of trained personnel involved in the administration, policy formulation, and supervising the implementation of policies of the state and central governments.
- India had a strong environmental policy and legislative framework but weak implementation has resulted in environmental governance being criticised by conservation experts and the judiciary.
- It pointed out that there was no effective coordination amongst various Ministries/ institutions regarding the integration of environmental concerns.

.
.

SAMADHAN PT TRICKS

SAMADHAN PT TRICKS

SAMADHAN PT TRICKS

Domestic Hazardous Waste

- Indore is the only city in the country that safely handles its domestic hazardous waste

Domestic Hazardous Waste is any chemical or product that can cause serious illness or pose an environmental or health threat if improperly stored, transported or disposed of.
Examples: Auto batteries, Fertilizers, Batteries (non-alkaline), Paint.

- Household waste is governed by the rules outlined in the Solid Waste Management Rules 2016. ☐
- These rules divide household waste into dry and wet waste.
- Wet waste is categorised as any waste that decomposes or degrades by itself.
- All other waste falls into dry waste according to the rules.

2021 Sixth Warmest Year

- Earth in 2021 was about 1.1 degrees Celsius warmer than the late 19th century average, the start of the industrial revolution.
- And the last 10 years were the warmest since recordkeeping began in 1880
- The Northern Hemisphere land surface temperature was the third highest on record — 2016 (second) and 2020 (first) were warmer. ☐ The 2021 Southern Hemisphere surface temperature was the ninth highest on record.
- Record-high sea surface temperatures were observed across parts of the Atlantic and Pacific oceans. ☐ The upper ocean heat content was record high in 2021, surpassing the previous record set in 2020. ☐ The seven highest ocean heat content have all occurred in the last seven years (2015-2021).
- Antarctic sea ice extent during December 2021 is 11.6% below average and was the third-smallest December extent on record

The Indian Ocean, which includes the Arabian Sea and Bay of Bengal, has warmed faster than the global average.
The South West Monsoon has declined over the past few decades because of the increase of aerosols, but once this reduces, the country will experience heavy monsoon rainfall.
India now ranks fourth in terms of installed renewable energy capacity and non-fossil energy has increased by more than 25% in the past seven years and reached 40% of the total energy mix.

- This warming trend around the globe is due to human activities that have increased emissions of carbon dioxide and other greenhouse gases into the atmosphere.

CHEETAH REINTRODUCTION PLAN

- 'Action Plan for Introduction of Cheetah in India' was launched at the 19th meeting of the National Tiger Conservation Authority (NTCA).
- Cheetah is the only large carnivore that got completely wiped out from India in 1952, mainly due to over-hunting and habitat loss
- The locally extinct cheetah-subspecies of India is found in Iran and is categorized as critically endangered.
- Action Plan aims to establish viable cheetah metapopulation in India that allows the cheetah to perform its functional role as a top predator and provides space for the expansion of the cheetah within its historical range

Amongst the 10 surveyed sites of the central Indian states, Kuno Palpur National Park (KNP) in Madhya Pradesh has been rated the highest.

SAMADHAN PT TRICKS

The other sites recommended

- Nauradehi Wildlife Sanctuary
- Gandhi Sagar Wildlife Sanctuary
- Shahgarh bulge in Jaisalmer
- Mukundara Tiger Reserve

	African Cheetah	Asiatic Cheetah
Pictorial Representation		
IUCN Status	Vulnerable	Critically Endangered
CITES Status	Appendix I	Appendix I
Distribution	Africa (Northwest Africa, East Africa, and Southern Africa)	Only few left in Iran
Physical Characteristics	Bigger in size as compared to Asiatic Cheetah, slightly bigger build and sturdy legs and neck.	Slightly smaller and slender than the African Cheetah. Their neck is much smaller and slender. Also, their legs are slender.
Food Intake	Diverse diet due to bigger habitat	Limited source especially medium sized prey like Chinkara, Gazelle etc.

Significance:

- Carnivore reintroduction/conservation translocation is an appropriate conservation strategy to restore the integrity of ecosystems.
- A top-down effect of a large predator that enhances and maintains the diversity in lower trophic levels of the ecosystems
- Reintroducing cheetahs in India will help relieve pressure on the species by creating additional habitat, which the cheetah desperately needs to survive.
- It will help to enhance India's capacity to sequester carbon through ecosystem restoration activities in cheetah conservation areas and thereby contribute towards the global climate change mitigation goals

RED SANDERS

- Red Sanders (Red Sandalwood) has fallen back into the 'Endangered' category in the International Union for Conservation of Nature's (IUCN) Red List.

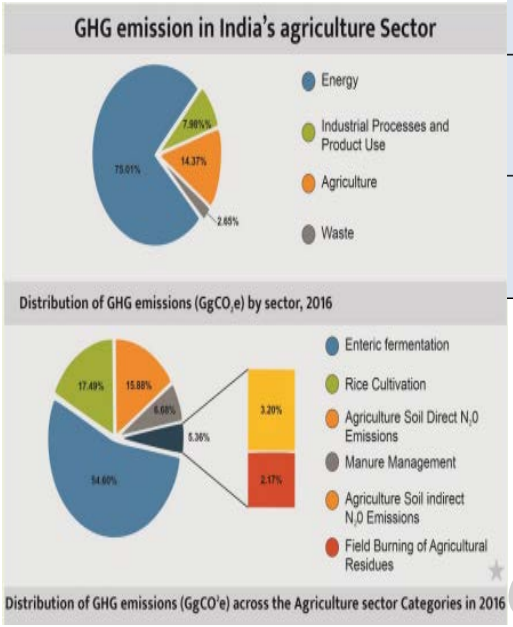
Morphological characteristics	Floral characteristics	Varieties	Distribution	Climate and Soil
• It is a deciduous tree with clear trunk and dense rounded crown. • It is a small tree that grows to 5-8 meters in height and has a dark grayish bark. • The inner bark, when injured or cut, oozes red coloured 'santolin' dye. • The wood is extremely hard and dark red in colour.	• The flowers of the species are yellow, densely arranged. Flowering occurs from February to April. • Pods are formed rapidly but get ripened in next February–March. • There is only one seed per pod, and red- dish brown in colour.	• In nature, two types of trees are observed— ~ Wavy grained ~ Straight • The wavy grained wood is more in demand in trade and is preferred for commercial plantation.	• It is distributed in peninsular India and Sri Lanka. • It occurs in patches in tropical dry deciduous forests, towards South-Eastern Ghats.	• Well-drained red soils with gravelled loam are suitable for the cultivation of Lal Chandan species. • It regenerates well in dry hot climate and requires rainfall ranging from 800 mm to 1000 mm annually for good growth.

- In 2019, the Directorate General of Foreign Trade, an agency of the Ministry of Commerce and Industry, revised its export policy to permit the export of red sander timber, if it is obtained from cultivated land.

Red Sanders is an Indian endemic tree species, with a restricted geographical range in the Eastern Ghats of India.

SAMADHAN PT TRICKS

It has been assessed as 'Endangered' as per the IUCN criteria and scheduled in appendix II of CITES and Wildlife Protection Act.
It is also known as: Almug, Saunderwood, Red Sanders, Red Sanderswood, Red Saunders, Rakta chandana (Indian), Lal Chandan, Ragat Chandan, Rukhto Chandan, Undum.



Diversification to more nutritious and environment-friendly crops like millet, pulses, vegetables and fruits etc.	• Promote **Agroforestry**. • **Encourage production of diversified crops** like sorghum and millet through price incentives, marketing etc. • Raise **awareness about diversified diets** among Indian consumers.
Agro-ecological approaches promoting Nature-positive and regenerative agriculture practices	• Encouraging practices like- ○ **Organic farming, No-till farming, crop rotation, mulching**, zero-till planters etc. ○ **In situ residue crop harvest management,** viz., briquetting and conversion of wastes into fuel forms, various industrial usages and recent intervention of microbial decomposing solution etc.
Water-use efficiency by moving away from a supply-based to demand-based system	• **Reduce water intake in cultivation of paddy** through techniques like system of rice intensification (SRI), alternate wetting and drying (AWD), direct seeded rice (DSR) and furrow irrigation. • **Incentive mechanism** to enhance usage of micro-irrigation practices (sprinkler and drip).
Expansion of Renewable energy usage to address water-energy-food nexus	• **Setting up of solar power plants** on farmlands, wherever possible. • **Reduce agriculture's power subsidy bills** and divert the money towards sustainable farm sector investments like solar power.
Digital technology and extension services	• **Promoting new agri-tech start-ups and farm enterprises** for developing ICT based tools in fields like- ○ delivery of farm-based information and services ○ market integration and intelligence ○ weather advisories etc.
Research and innovation investments	• **Increased resource allocation** to agricultural research and innovation, especially in the field of developing climate resilient varieties. • **Life cycle assessment (LCA) studies** need to be done for products or services in the livestock sector for robust measurement systems as tools for national GHG inventory and monitoring emission reduction targets.

CARBON INEQUALITY

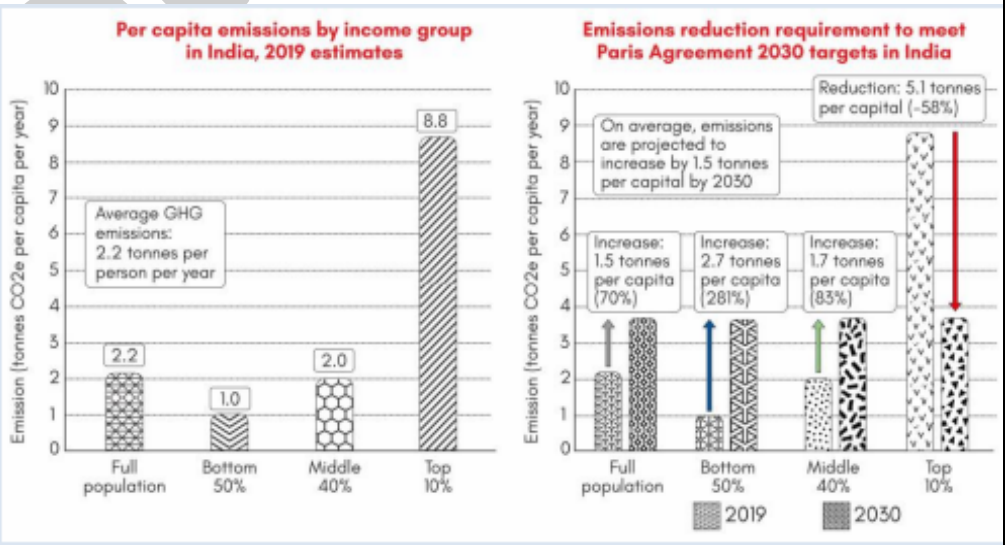
A study has found that Wealthy people have disproportionately large carbon footprints and the percentage of the world's emissions they are responsible for is growing.

What is Carbon inequality?

- It refers to the phenomena of the highly unequal distribution of carbon emissions throughout the world.
- Carbon equality today exists between countries as well as within countries, reflected in the findings of the World Inequality Report (WIR), 2022

Status of Carbon inequality in India

- **Inequality within India**: The bottom 50%, middle 40% and top 10% respectively consume 1, 2, and 9 tCO2e/capita.
- **Comparison with other nations**:
  - **India is a low carbon emitter** with the average per capita consumption of greenhouse gas is equal to just over 2 tCO2e lower than the Global average of 6.6 tCO2e.
  - Moreover, a **person in the bottom 50% of the population in India is responsible for, on average, 5 times fewer emissions** than the average person in the bottom 50% in the European Union and 10 times fewer than the average person in the bottom 50% in the US.



INDIAN AGRICULTURE : GREEN REVOLUTION 2.0

SAMADHAN PT TRICKS

- Agriculture sector amounts to around 14% of Greenhouse gas (GHG) emissions of India.

Strategies/pathways to make Indian agriculture resilient and sustainable post COP26

BIODIVERCITIES BY 2030

- The World Economic Forum (WEF) recently published a report titled 'BiodiverCities by 2030: Transforming cities' relationship with nature'

BiodiverCities by 2030 initiative

• It is a joint initiative of the World Economic Forum and the Government of Colombia.

• It aims to support city governments, businesses and citizens, to enable cities to live in harmony with nature by 2030.

Key observations

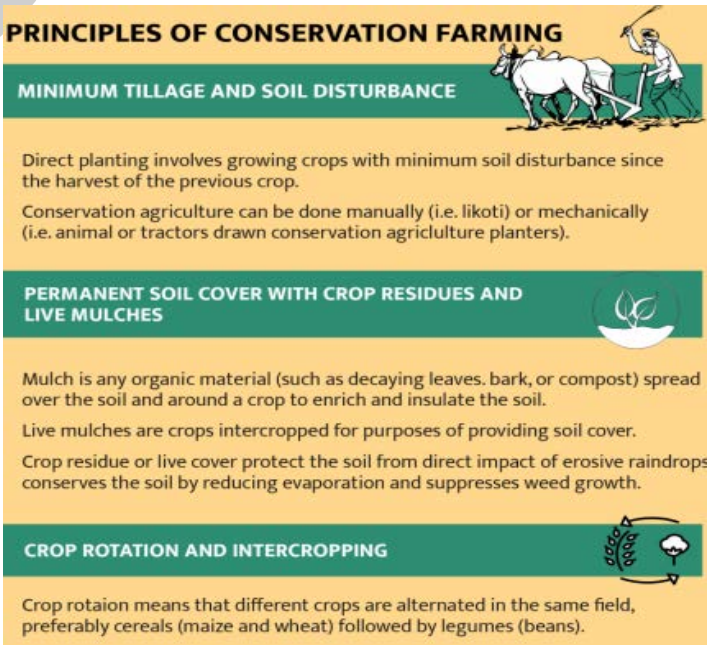
- urban areas are responsible for over 75% of global carbon emissions and climate change is one of accounts for 11-16% of global biodiversity loss.
- 44% of global GDP in cities is estimated to be at risk of disruption from nature loss, through impacts like
    - Compromised water supplies causing water scarcity, droughts
    - Heat island effect, often related to a lack of green areas or smart surface, impacting citizens' health and leads to high energy expenditure on cooling.
    - Loss of coastal habitats, such as carbon-rich and biodiverse mangrove forests, significantly increases the risk from floods and hurricanes for cities within coastal zones
    - Poor air quality and lack of urban green space impacting human health and cities' productivity

Suggestions:

- nature-based solutions (NbS) for infrastructure.
- adopting a systems approach to urban governance.

A systems approach cultivates a conditional view of development, in which complex interactions between systems (e.g. healthcare, education and environment,) are mapped, and the outcomes of each action are measured and reported in totality (as opposed to ad-hoc).

- positive links between urban and rural settings
- bio-circular economy and bio-inspired innovations
- novel investment models like Debt-for-nature swaps.



ZERO-BUDGET NATURAL FARMING

- ICAR had set up a committee, under V Praveen Rao in 2019 to empirically validate the results of ZBNF.

SAMADHAN PT TRICKS

- In its report committee highlighted that ZBNF would result in tremendous reduction in production of agricultural crops thus compromising India's food security.

About ZBNF

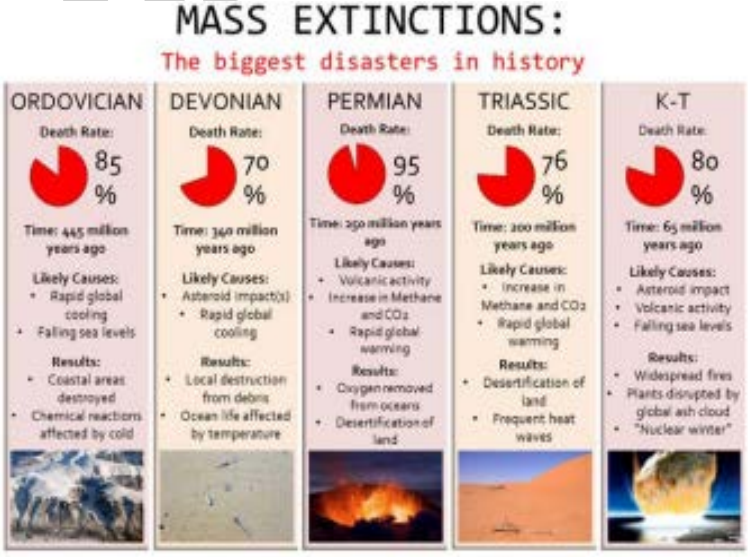
- It is a method of chemical-free agriculture drawing from traditional Indian practices
- It is a natural farming technique in which farming is done without use of chemicals and without using any credits or spending any money on purchased inputs.
- promoted by Maharashtrian agriculturist Subhash Palekar as an alternative to the Green Revolution.

Significance of ZBNF

- ZBNF processes require 50%–60% less water and less electricity (than non-ZBNF) for all the selected crops.
- ZBNF reduces methane emissions significantly through multiple aeration. It also has the potential to avoid residue burning by practising mulching
- The ZBNF method also promotes soil aeration, minimal watering, intercropping, bunds and topsoil mulching and discourages intensive irrigation and deep ploughing.
- one aspect being considered is natural farming methods such as the ZBNF which reduce farmers' dependence on loans to purchase inputs they cannot afford.
- Meanwhile, inter-cropping allows for increased returns.

SIXTH MASS EXTINCTION

- Mass extinction event is usually defined as about 75% of the world's species being lost in a 'short' amount of geological time - less than 2.8 million years.
- There have been five mass extinctions so far. However, all of those were caused by natural phenomena.
- This time, it is being caused entirely by humans and hence referred to as Anthropocene extinction.
- A recent study states that earth is going through its sixth mass extinction.



Causes of mass extinction:

- Rising climate change activities i.e., extreme temperature changes, rising or falling sea levels, depletion of oceanic oxygen etc.
- Geologic catastrophes (volcanic eruptions, asteroid hitting Earth).
- Invasive species.
- Overconsumption of resources.
- Agriculture, leading to diminishing wild spaces and driving out species from their natural habitats.

CLIMATE HAZARDS AND VULNERABILITY ATLAS OF INDIA

- Launched by IMD, Atlas is based on several extreme weather events (extreme rainfall, drought, coldwave, heatwave, thunderstorm, cyclones, lightning etc) and the risks they pose to the local population, livelihoods and economy of each district.

Significance:

- Help disaster management sectors to identify the vulnerable districts for taking preventive and adaptive measures
- Aid in disaster preparedness as extreme weather events rise in the wake of the climate crisis.
- Planning climate-resilient infrastructure.
- Supporting monitoring and forecasting, Improving public health facilities i.e. emergency response capabilities, better early warning systems etc.

GLOBAL RISKS REPORT 2022

- The Report is published annually by the World Economic Forum (WEF).

Key findings

- Vaccine inequality and resultant uneven economic recovery risk has compounded social fractures and geopolitical tensions.
- By 2024, developing economies (excluding China) will have fallen by 5.5% below their pre-pandemic expected GDP growth
- Growing dependence on digital systems with increasing cybersecurity threats. E.g. 435% increase in ransomware in 2020.
- Worsening of Climate change impact with 200 million projected climate refugees by 2050.
- Space as a new frontier of divergence with 5 new government-developed space stations by 2030.
- Increasing pressure to transition to net-zero economies could have severe short-term impacts, such as putting millions of carbon-intense industry workers out of jobs or triggering societal and geopolitical tensions

Top 5 Global Risks

- Climate Action Failure,
- Extreme Weather,
- Biodiversity loss,
- Social Cohesion Erosion, and
- Livelihood crisis

Top 5 India Risks

- Fracture of interstate relations,
- Debt crises in large economies,
- Widespread youth disillusionment,
- Failure of technology governance, and
- Digital inequality

Ocean Heat Content (OHC)

According to recent annual Ocean Heat Content (OHC) study:

- Oceans have been experiencing an unambiguous increase in heat since the late 1980s with an eightfold increase in warming rates in 1986-2021 in comparison to 1958–85
- Upper 2,000 metres of the ocean absorbed 235 zettajoules (ZJ) of heat in 2021 relative to the 1981-2010 average.
- Ocean absorbs most of the excess heat from GHG emissions, leading to rising ocean temperatures.

Ocean heat is a better indicator of climate crisis in comparison to air temperature because natural cycles like El Niño and La Niña play a relatively smaller role in ocean warming as-

✓ During El Niño oceans release heat, contributing to a mini global warming, and

✓ During La Niña oceans take up heat and bury it at depths away from the surface

Impact of Ocean Warming

- Sea-level rise due to accelerated ice melting and thermal expansion of water.
- More powerful storms and hurricanes; increased precipitation and flood risk.

- Increase ocean stratification or separation, o Effects on marine life because less oxygen penetrates to depths, and all organisms are affected.

ASIA MINISTERIAL CONFERENCE (AMC) ON TIGER CONSERVATION

- AMC is a meeting of thirteen tiger range countries (TRC) to discuss the plight and plans for conservation of the wild Tiger population

TRCs consist of Malaysia, Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Russia, Thailand, and Vietnam.

- Ministry of Environment, Forest and Climate Change released its statement on 4th AMC hosted by Malaysia in collaboration with Global Tiger Forum
- According to the St. Petersburg Declaration on Tiger Conservation (2010), TRC agreed to Global Tiger Recovery Programme (GTRP) which envisages doubling the wild tiger population by 2022.
- India has 70% of the world's tiger population. 14 Tiger Reserves in India have already been awarded with international CA|TS accreditation.

Conservation Assured Tiger Standards CA|TS: It is a set of criteria which allows tiger sites to check if their management will lead to successful tiger conservation.

RENEWABLE ENERGY CERTIFICATE (REC)

- REC is a market based instrument introduced in 2010 to facilitate compliance of renewable purchase obligations (RPO) andpromote Renewable Energy (RE).
- It is aimed at addressing the mismatch between availability of RE resources in state and the requirement of the obligated entities to meet RPO.

As per Indian Electricity Act2003, RPO mandates that all electricity distribution licensees should purchase or produce a minimum specified quantity of their requirements from RE Sources.

- 1 REC is equivalent to 1 MWh (megawatt hour) generated from a renewable energy resource
- Only 4% of the installed RE capacity stands registered as on December, 2021.
- Wind and solar power account for 58% and 21% share, respectively, of the total registered capacity.

NATIONAL WATER AWARDS (NWA) 2020

- In the 3rd NWA-2020, Uttar Pradesh has been awarded the first prize, followed by Rajasthan and Tamil Nadu.
- It is given with the objective of encouraging the stakeholders to adopt a holistic approach towards water resources management
- It has been instituted by the Ministry of Jal Shakti since 2018

Down to Earth Special

PT Points:

Reclassification in Green Fuels: European Union has planned to reclassify nuclear energy and natural gas based power plants as green fuels.

- Proponents: Countries like France are at the forefront of the proposal. They say the reclassification would lead to increase in investments in Nuclear Power Plants and Natural Gas, thus reducing Green House Gas (GHG) emissions. This would be a boon to the global fight against climate change.
- Opponents: However, opponents of the move, including EU members like Germany, Denmark and Austria, have said that increased investment in the Nuclear Power Plants

would increase the generation of radioactive waste. This would be detrimental to the ecology of the region.
- Transition Fuel: South Korea has classified Liquefied Natural Gas (LNG) as a transition fuel towards cleaner energy sources. The move comes after opposition of environmental groups to the reclassification of LNG as a green fuel.

PROTRACTED STRUGGLE

In a tribal rights case, the tribals allege that the government is trying to **forcefully award the mining rights to private companies, despite a judicial order** against the same. They also contend that the government is trying to subdue their ownership rights as well as mining rights on land which they have owned for generations.

Samata Judgement 1997

- **The Case:** The case pertains to mining rights in the Nimmalapadu village in Andhra Pradesh. The NGO, which filed the case on the behalf of tribals, alleged that the government is trying to **award mining rights to private companies** without obtaining consent from the tribals. This is expressly prohibited under the provisions of Schedule 5 of the Constitution of India and the Panchayats (Extension to Scheduled Areas), Act, 1996 (see inset).
- The NGO also alleged that the **government was also a legal person** and it does not have the power to award the mining rights without the consent of the tribals, let alone transferring the ownership of land from the tribals to private persons.
- It is only the **tribals who have the right to mine the land** for extracting the minerals, either themselves or by forming a cooperative, with financial assistance from the state.
- **Sustainable Mining:** The **Samata judgement** is considered a stellar judgement and is remembered as pinnacle of Judicial intervention in the area of tribal rights. In the judgement, the Supreme Court directed that at **least 20% of the profits** obtained from such mining needs to be set aside for the development needs of the tribals, as well as the need for rehabilitation of such lands.
- **Nimmalapadu Village:** The case was fought over the mining rights for the mineral **Calcite**. Supreme Court directed that only people belonging to the **Konda Dora tribe** and the cooperatives formed by them have mining rights in the area. It also said that private mining is illegal in the area, even if the mining licences or lease is awarded by the Government, effectively impeding the power of Government to award mining licences in the area.

Apathy of the Authorities

- **Issue of Licenses:** Andhra Pradesh Mineral Development Corporation (APMDC) has issued licenses 5 times since the Samata judgement. However, the people of the village alleged that they have been kept out of the process every time. This has proved to be a bone of contention as **people have not allowed mining** in 4 cases out of 5.
- **Exception:** Only instance when the residents came on board with mining was in 2012, due to the **fair compensation policy** of Durga Sandstone MAC Society. The Society has paid Rs. 2 Lakh per year to land owners as well as Rs 1 Lakh to landless residents. It also paid salaries to some residents, who were made members of the society.
- **Latest Attempt:** Andhra Pradesh Mineral Development Corporation **(**APMDC) floated a mining tender in 2021 to mine calcite in a 32.7 ha area. However, the tender **allowed bidding by experienced miners only**, which the tribals did not have. Considering the Government's insistence on mining calcite in the region, the residents have thought it fit to

start mining themselves. Therefore, the residents approached the High Court and obtained a stay on the process.

- **Mining through a Proxy:** Villagers allege that APMDC has awarded licenses to outsiders, but from the Konda Dora community. This does follow the letter of Samata judgement, but not its spirit. As per the villagers, the two outsiders are contractors who also do not have any experience like them. They are in fact **proxy of private players** who were earlier unable to bag licenses directly.
- **PESA norms not followed:** Villagers also accuse the authorities of flouting the PESA Act, 1996 norms, by **not taking the Gram Sabha** of the concerned villages **into confidence**
- **Landless Families:** While 18 families have been directly affected by the APMDC lease, more than 130 families are **indirectly affected due to their dependence** on the land under question. These families do not own the land directly, but they are **landless laborers** who are indirectly dependent upon the same land.

Demands of the Residents

- **Compensation**: Villagers have **demanded royalty** for the project for the extraction for minerals from the lands, owned by them for generations. Also, the villagers **aspire for annuity** till the time the project is operational.
- **Ecological Restoration**: The villagers also fear that the mining operations might be unsustainable in nature and will lead to **degradation of land** in which mining would take place. Even after the company is gone, the land would be rendered unusable for agriculture or other uses. Therefore, they have demanded a Rehabilitation fund for restoration of the land after the company leaves.
- **Step-Motherly Treatment**: Residents of the village also allege step-motherly treatment from the government **because of their non-conformity to the directions of the State**. They say that the villages have been denied basic infrastructure like schools and hospitals due to their continued defiance against the exploitative order of the Administration.
- **Seasonal Diseases**: Tribals also say that due to **lack of proper sanitation** in the villages, the people of the community suffer from seasonal infections like malaria and typhoid. This is compounded by the unavailability of proper medical care in the vicinity of the villages.
- **Developmental Infrastructure:** Apart from the monetary compensation, villagers believe the projects to be a god-sent opportunity to ask for developmental infrastructure in lieu of consent for mining-related activities. Therefore, they have asked for **employment for the affected community, equivalent land at a nearby place, a tower for a better cellular network, medical facilities and transport facilities** to the nearby town.
- **Government Land**: Currently, the Government and APMDC have proposed to allocate licenses to only Government land and not tribals' land. However, the villagers have demanded **compensation to the families who are dependent upon these lands** so that they are not condemned to a state of penury.

Conclusion

- Despite Supreme Court's directions to the contrary, it is alleged that **State has not kept the interests of the tribals in mind** while commercially exploiting the natural resources owned by them for generations.
- It is imperative to keep in mind that the tribals are one of the most vulnerable communities and are **susceptible to exploitation** at the hands of the opportunists. Therefore, it is

expected that a welfare state like India, would keep in mind the primacy of tribal rights so that any efforts to trample upon such rights are defeated at the earliest.

SUN, SALT AND SAND

A salt-farming community called Agariyas in Gujarat has **switched from diesel-powered pumps to solar-powered pumps**, leading to huge savings and other related benefits.

Introduction to Agariyas

- **Rann of Kutch:** Rann of Kutch region is situated on the India-Pakistan boundary. It is a coastal region to the Arabian Sea. It is a marshy area, being fed by multiple rivers from Gujarat, Saurashtra region and the state of Rajasthan. The areas in which Agariyas work, remain desert for eight months. For the rest four months, i.e. during the monsoon season, they resemble a **brackish water lake**, because of monsoon rains, inland drainage and tidal waters.
- **Salt Production:** The underground water in Rann of Kutch is **highly-concentrated with salt and is called Brine.** It is used by the Agariyas for making salt for retail consumption. Agariyas are responsible for almost 30% of the total inland salt production of India, which amounts to 3,50,000 tonnes. India is the third largest producer of salt after the US and China.
- **Agariyas:** Agariyas are salt farmers, who work in the Rann of Kutch. They pump the brine out and evaporate the solution, leaving crystallized salt. The process involves making **salt pans called agars (lending the name Agariyas** to the community). Some of the pans are used for concentrating brine, while others are used for crystallizing the salt. The process of salt production by Agariyas is **completely manual**, except for the pumping out of water. This is in contrast to the mechanical nature of salt production industry.

Problems of Agariyas

- **Seasonal Migration:** During the salt manufacturing seasons, the Agariyas pack up the essential goods and move towards the salt production areas. This means **leaving behind their villages** and families. Sometimes, it becomes even more difficult to leave, if any dependent member of the family has health issues.
- **High Input Costs:** The Agariyas require power for not only pumping out brine, but also lighting purposes and daily needs. This is accomplished by the **use of diesel-powered generators,** which do not have a very high fuel efficiency. In fact, many NGOs have estimated that diesel costs comprise 70% of the input costs of the production process. Also, they have high maintenance costs, apart from the fear of bursting motor due to heat, if not constantly monitored.
- **No Land Rights:** Since the **Rann of Kutch is a Wild Life Sanctuary**, the Agariyas do not have land rights in the area they have been farming for generations. The problem with this is they have **no basis to access institutional loans** from banks and other financial institutions. This makes them vulnerable to loans with usurious interest rates from the traders and middlemen. Therefore, it is difficult for them to invest in the production process.
- **Exploitation by Traders:** Since the Agariyas take advance loans from the traders, they are vulnerable to their machinations and are **treated almost like bonded labour** by the traders. The traders fix the wholesale rate of salt, which is exploitative. For e.g., earlier the wholesale rate was just 7 paise per kg as opposed to Rs 10-15 per kg in the retail market.
- **Health issues:** The diesel-powered generators **emit a lot of soot** leading to a thin film of black soot on the surrounding areas. The **inhalation of fumes causes respiratory diseases**. Also, if the motor is not constantly monitored for heat, motor burst can lead to

bodily injury, sometimes leading to death. Apart from that, the diesel engine also leads to noise pollution, decreasing the ambience of the environment.

- **Environmental Damage:** At the same time, the diesel engine is responsible for **emission of carbon dioxide and other Greenhouse gases (GHGs).** This contributes to global warming and is also not in consonance with the national commitments, made in the Paris Climate Agreement (link to India's renewable energy plan – the big picture, 28 Nov 2020). Also, the PM has promised additional reductions under Panchamrit in COP 26, held at Glasgow (link to DTE 1-15 Dec 2020).

Usage of Solar Pumps

- **Attempts to alleviate suffering of the Agariyas:** Before diesel powered generators, Agariyas **used bullocks to extract brine**. This was replaced by diesel generators because of the easier mobility and unavailability of feed for the animals. However, diesel generators came with their own set of problems, as stated above.
- **Usage of Wind-powered Pumps**: After watching the sufferings of Agariya community, many NGOs have tried to come up with solutions to their problems. For e.g., one NGO attempted the **use of wind-powered pumps** for brine extraction. However, it did not work as the winds were not strong enough for the extraction. Sufficient winds are available only at the end of salt-production season, which renders them infeasible for the process.
- **Usage of Solar Powered Pumps:** After trying multiple options, some members of the community tried their hand at installing solar-powered pumps. It was this initiative which proved to be fruitful for the community. The solar-powered pumps have obvious benefits, which have caused **alleviation of the sufferings** of the community to a great extent.
- **Subsidy on Pumps:** Though the initiative to use solar pumps was taken by the NGOs, the **government has pitched in with a subsidy** programme on Solar pumps, leading to further decrease in the overall costs of the community. Though the problem of initial payment persists as the subsidy is availed as a cashback, rather than upfront decrease in costs, but the NGOs have been able to circumvent it by **tying up with banks** for upfront loans for the solar pumps.
- **Women Empowerment:** The installation of solar pumps has also proved to be empowering for women as many NGOs arrange initial capital, only when the pumps are **owned by women**. This shifts the ownership towards women, which is much required in a patriarchal society.
- **Role of NGOs:** As stated above, many NGOs have helped in popularizing the usage of solar-powered pumps among the Agariyas. Initially, **NGOs helped by experimenting with** the usage of solar pumps on a trial basis in the production process. They also tweaked the guidelines of the Ministry of New and Renewable Energy to the requirements of desert areas, to make the pumps more suitable for use in the region. Later when the pilot project turned out to be a success, the **NGOs helped in accessing credit** for the initial capital costs of purchase and installation of the pumps.
- **Lower Input Costs:** Solar pumps have caused huge savings for the Agariyas. They have decreased the need for power consumption for brine extraction. The diesel generators are required only at the night for continuing the extraction process. At the same time, the upfront costs are taken care of by government subsidy and institutional financing through the NGOs. Similarly, **solar pumps have lesser maintenance costs** due to lesser number of moving parts.
- **Lesser Emissions:** Solar pumps are also helpful in decreasing the amount of carbon dioxide emissions, thereby **keeping the environment clean**. This is also in keeping with

India's commitments under the Paris Climate Agreement, under which India has promised to decrease its emissions intensity by 33-35% of GDP by 2030 from 2005 levels.

- **Better Health:** Solar pumps have a better impact on the health of the members of the community as they do not emit soot like diesel generators. This is helpful in **decreasing respiratory ailments**. Also, unlike diesel pumps, solar pumps do not get heated up and there are no chances of motor burst.
- **More time for Social Interactions:** Solar pumps have an added advantage in their ability to continue the process **without the need for constant monitoring.** This is helpful in diverting time for socially meaningful interactions, as well as, for devoting time towards the family.

Conclusion

- Usage of solar pumps has proved to be a boon for the members of Agariya community due to their lower input costs and lower maintenance requirements. There is a **need for replication of this model** across the country by identifying the various vulnerable communities and creating awareness for this model.
- Also, it is required that the **government learns from the NGOs**, who have experimented with different models of power generation and have zeroed on a profitable one, without actually disrupting the production process or putting undue load on the salt farmers.

.

All the Best to all my students...
Hope this material will help you.
God bless...
Jai Hind