Environment FOR You 2020

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Environment FOR You 2020

TOPIC GENERAL STUDIES 3: CONSERVATION, ENVIRONMENTAL POLLUTION AND DEGRADATION, ENVIRONMENTAL IMPACT ASSESSMENT

November -2020

1) HYDROGEN BASED ENERGY

Indian firms such as NTPC Ltd, Indian Oil Corporation, Acme Solar and Greenko are looking at hydrogen as a new business opportunity for extracting energy.

About Hydrogen as fuel

• Hydrogen (H2) is an alternative fuel that can be produced from diverse domestic resources. o It is abundant in our environment and it's stored in water (H2O), hydrocarbons (such as methane, CH4), and other organic matter. o Hydrogen is an energy carrier that can be used to store, move, and deliver energy produced from other sources. o Hydrogen with its abundance, high energy density, better combustion characteristics, non- polluting nature etc. has vast advantages over the conventional fuels.

• Hydrogen economy will be a cornerstone of the future energy system which can substitute the conventional fuels.

• Types of hydrogen depending upon process of extraction

o Green hydrogen: It is derived by electrolysis of water, separating the hydrogen atom within it from oxygen using renewable energy (such as wind, solar or hydro) that eliminates emissions during process.

o Grey hydrogen: Hydrogen derived using fossil fuels is called as grey hydrogen.

o Blue hydrogen: It is derived from natural gas through the process of steam methane reforming (SMR). SMR mixes natural gas with very hot steam, in the presence of a catalyst, where a chemical reaction creates hydrogen and carbon monoxide.

• The current global demand of hydrogen is 70 million tons per year, most of which is being produced from fossil fuels — 76% from natural gas and around 23% from coal, with the remaining from electrolysis of water. o In India, hydrogen is being commercially produced in the fertilizer industry, petroleum refining and chemical industries and also as a by-product in chlor-alkali industries. o Cleaner methods of

hydrogen production chiefly constitute electrolysis, via chemical or photoelectrochemical routes.

Application of hydrogen:

• Fuel cell: Hydrogen fuel cell systems are used for generating electricity, in vehicular applications (Fuel cell cars, buses, etc.) and portable devices (Laptops, phones, etc.)

o A fuel cell is a device that generates electricity by a chemical reaction. An electrolyte (membrane) carries electrically charged particles from one electrode to the other (anode and cathode), as well uses catalysts to speed up the reactions and produce electricity at the electrodes. o Only water vapour and heat are emissions from fuel cell.

• Direct fuel in internal combustion (IC) engine vehicles: Hydrogen is used as an energy carrier directly in IC engines and turbines in place of fossil fuels or as blended mixture with fossil fuels.

o Eg. H-CNG, the is hydrogen enriched compressed natural gas upto 30%, with better power output, 4% more fuel economy and 70% more reduction in carbon monoxide emissions than CNG.

• Chemical industries, Fertilizer industries, refineries: Hydrogen is used as a raw material in the fertilizer, chemical and petroleum refining industries as it is a fundamental building block for the manufacture of ammonia. **Advantages of hydrogen-based energy:**

• Reduced imports: Hydrogen as an efficient fuel helps to reduce crude oil import and its use as feedstock for ammonia production reduces India's fertilizer imports.

o India is the world's third largest consumer of oil, for which country has to depend heavily on oil imports.

• Non-polluting & decarbonising: The use of hydrogen can reduce the CO2 related emissions significantly at the point of use and if green hydrogen is used then there is capability to decarbonize the entire value chain, enabling reduced emissions and climate change threats.

o Hydrogen fuel cell leave only water vapour and heat as emissions and releases no greenhouse gasses.

• Abundance: Hydrogen can be produced locally from numerous sources like methane, gasoline, biomass, coal or water.

• High efficiency: Hydrogen is an efficient energy source, means that an automobile that utilizes hydrogen energy travels more miles than one with an equal amount of gasoline.

• High energy density: Hydrogen has the highest energy per mass of any fuel, it is 120 MJ/kg, almost three times more than diesel or gasoline.

• Address energy requirement: Hydrogen can provide linkages between energy supply and demand, in both a centralized or decentralized manner, thereby enhancing the overall energy system flexibility. Challenges in growth of Hydrogen based economy

• Energy intensive: For e.g. green hydrogen requires a massive expansion of renewable generation to power the electrolysis plants that split water into hydrogen and oxygen.

• Emissions: Natural gas reforming process (methane reforming) to produce grey hydrogen requires a fossil-fuel and emits carbon monoxide and carbon dioxide. Hence, not climate friendly.

• Storage: Hydrogen is also hard to store, for storage it requires compression to 700 times atmospheric pressure, refrigeration to -253 degree Celsius. As well it can embrittle metal and is more explosive.

• Additional costs: In case of centralized production, the cost of hydrogen generation is lower due economies of scale but Transmission & Distribution (T&D) costs are higher, while in decentralised production say at the refuelling station (using on site electrolyser or reformer), the T& D costs are minimized but cost of production is higher.

• Code of standard: The biggest challenge to the commercialization of the hydrogen-based technologies is the requirement of code and standards to get a sort of consistency and encourage deployment.

Way forward

• Development of code of standards will help in dealing with Hydrogen vehicles in particular and help in progress of Hydrogen economy in a smoother way.

• Advanced research and technology developments are necessary to improve the efficiency of fuel cells, tolerant to impurities, use of non-precious metals as catalyst etc.

• Need to develop safe and cost-effective solid-state storage methods using development of carbon nanostructures to achieve the desired storage goals.

• Major R&D programmes should be introduced linking with applications which may have market acceptance. For this, large number of demonstrative projects should be supported by Department of Science & Technology in production, storage and application areas in addition to usual development projects.

• Generation of hydrogen from renewable sources should be encouraged and Government should explore policies for subsiding hydrogen price generated from renewable.

2) GLACIAL LAKES OUTBURST FLOODS (GLOFS)

Using remote sensing data, researchers from Germany have mapped the evolution of Gya glacial lake outburst flood (GLOF) of 2014 in Ladakh.

• Report by researchers mentions that cause of GLOF was not a spillover due to an avalanche or landslide, rather there was a thawing of the ice cores in the moraine which drained through the subsurface tunnels. o Moraine is any accumulation of unconsolidated debris, sometimes referred to as glacial till, that has been previously carried along by a glacier or ice sheet.

• Researchers noted that such thawing of ice cores may accelerate in the future due to climate change, and there is an urgent need to use multiple methods for better risk assessment and early warning.

• According to report, bathymetric studies are needed to analyse lake volumes and its dynamics. New, technologies can also be put to understand the stability of the moraines, but also need to asses land use planning. **About Glacial Lakes and GLOFs**

• Glacial lakes are ice-dammed, moraine-dammed, and bedrock-dammed lakes.

o These lakes are formed by the trapping of melt water from the glacier within dammed structure. o Due to global warming glaciers are retreating and glacier lakes are expanding in the size and numbers.

• Glacial lake outburst flood (GLOF) is a sudden release of a significant amount of water retained in a glacial lake, irrespective of the cause.

o The formation of moraine-dammed glacial lakes and glacial lake outburst flood (GLOF) is major concern in the Himalayan states of India.

• Factors triggering GLOFs include o Rapid slope movement into the lake: Fast slope movement (slides, falls and avalanches) into the lake produces displacement waves which, in turn overtop the dam or cause direct rupture of the dam.

o Increased water inflow into a lake due to heavy rainfall/snowmelt & cascading processes (flood from a lake situated upstream)

o Earthquake: The direct mechanism of earthquake-triggered lake outburst floods is dam rupture and failure.

o Long-term dam degradation: Successive changes in the internal structure of the dam leading to increased hydrostatic pressure induced by basal ice melting that results in dam failure.

o Black carbon: Due to incomplete combustion of fossil fuels, wood and other fuels amount of black carbon is increasing, which reduces the albedo of earth and melts the glaciers.

o Anthropogenic activities: Mass tourism, developmental interventions such as roads and hydropower projects and the practice of slash and burn type of farming in certain pockets of the Indian Himalayan region.

Impact of GLOFs

• Societal Impact: The sudden and intense flooding that results can cause destruction and disruption of property, infrastructure and deaths.

• Impact on ocean circulation and climate: Sudden release of an extremely large amount of cold freshwater into the ocean reduces the salinity of the surface layer and subsequently alters ocean circulation. This also influence the associated climate.

• Geomorphological impact: GLOFs, have significant potential to influence erosion-accumulation interactions and sediment dynamics, like bank and depth erosion of the stream/river channel, meander shift, replacement of existing channels and formation of new ones or formation of erosional terraces etc.

Steps taken

• Indian Space Research Organisation (ISRO) among many other organisations are engaged in glacial lake monitoring and water bodies in the Himalayan region of Indian River Basins.

• National Disaster Management Authority (NDMA) guidelines for management of Glacial Lake Outburst Floods (GLOFs):

o Hazard and risk mapping: Hazard and risk assessment provide the basis for prioritising, designing, and implementing risk management strategies, and is therefore considered to be a cornerstone of Disaster Risk Management.

o Monitoring, risk reduction and mitigation measures: Early Warning Systems (EWS) are commonly agreed upon as the most effective approach to disaster risk red

o Awareness and preparedness: Building awareness and strengthening preparedness can be effective on short, mid, and longer time. In particular, attention should be given to the most vulnerable members of society, including women, children, disabled, elderly, and marginalised communities.

o Capacity development: A successful and sustainable implementation of the framework for GLOF risk assessment and management requires scientific, management, engineering and institutional capacities. Efforts to develop capacities should focus both on training and strengthening academic education in relevant disciplines from natural and social sciences.

o Disaster response: Well-established disaster response procedures at national, state district, and community levels. Also, response strategies need to consider a multi-hazard perspective, considering access and evacuation routes and relief camps.

o Research and development: Repeated monitoring using advanced space-borne and terrestrial technology is required for regular re-assessment of lakes across the entire Himalayan region.

o Action plan and implementation: Comprehensive disaster management plans will be prepared at the National, State and District levels.

• Sikkim has installed a Lake monitoring and information System (water level Sensor) at South Lhonak lake. The sensor gives the water level of the lake and also monitored the lake level when there is sudden fluctuation in water level.

o Also high density polyethylene (HDPE) pipes have been installed to siphon off water from the glacial lake.

4) LA NIÑA

Recently, the World Meteorological Organization (WMO) has announced the arrival of La Niña in the central and eastern equatorial Pacific Ocean after nearly a decade's absence.

• The La Niña of 2020 is expected to be moderate to strong and could last into 2021.

• The Horn of Africa could see below average rainfall; East and Central Africa will see drier than usual conditions.

• WMO's weather models forecast above-average rainfall for Southeast Asia, some Pacific Islands and the northern region of South America.

• It will result 2-3 degrees Celsius cooler than average Sea Surface Temperature (SST).

o However, this may not prevent 2020 from being one of the warmest years on record. o Also 2016-2020 is expected to be the warmest five-year period on record.

El Niño-Southern Oscillation (ENSO)

• El Niño and La Niña are opposite phases of the ENSO. La Niña is sometimes referred to as the cold phase of ENSO and El Niño as the warm phase of ENSO.

• The ENSO cycle refers to the fluctuations in temperature between the ocean and atmosphere in the eastcentral Equatorial Pacific (approximately between the International Date Line and 120 degrees West).

o Along with impact on Sea Surface Temperature (SST) the ENSO also has an impact on rainfall, temperature and wind patterns across the world.

• La Niña and El Niño usually last between 9 and 12 months. While their frequency is fairly irregular, they take place every two to seven years. Typically, El Niño occurs more frequently than La Niña.

o Normal year: In a normal year, the easterly winds along the equator push warm water westward. Warm water at the surface of the ocean blows from South America to Indonesia.

✓ As the warm water moves west, nutrient rich cold water from the deep rises up to the surface reaches on the coast of South America. This phenomenon is called upwelling.

o La Niña: La Niña is the unusual cooling of sea surface temperatures. In a La Niña year the easterly winds blow much stronger; this makes the water near the equator a few degrees colder than normal. Thus upwelling is enhanced. Also this change in the ocean's temperature impacts the weather across the world.

o El Niño: El Niño is the unusual warming of sea surface temperatures (SST).

In El Niño year the easterly winds are much weaker than usual. They actually blow the other way from west to east (toward South America instead of Indonesia). So, the warm surface water along the equator piles up along the coast of South America and then moves north towards California and south toward Chile.

Impact of La Niña

• Impact food production: La Nina weather system could stir global food production, sending prices higher, as potential droughts and floods bring upheaval to a suite of key agricultural commodities from Southeast Asia to South America.

• Fishing Industry: La Niña usually has a positive impact on the fishing industry of western South America. Upwelling brings cold, nutrient-rich waters to the surface. Nutrients include plankton eaten by fish and crustaceans.

• Water Supply: Rainfall associated with the summer monsoon in Southeast Asia tends to be greater than normal (sometimes floods also occur), especially in northwest India and Bangladesh.

o La Niña results in heavy or better monsoon rains in India, heavy floods in Australia, droughts in Peru and Ecuador.

• Colder winter in India: During La Niña years, usually, temperature over northern parts of country becomes relatively low. In that situation winter may be relatively colder.

o La Niña could also affect the South West Indian Ocean Tropical Cyclone season, reducing the intensity.

5) ENVIRONMENTAL IMPACT OF AGRICULTURAL SUBSIDIES

Recent incidents of burning paddy stubble in Punjab, Haryana and Western Uttar Pradesh have raised concerns about Agriculture's contribution to pollution and role played by regime of agricultural subsidies in it.

Types of Agricultural Subsidies in India Different kinds of agricultural subsidies provided to farmers in India are as follows:

• Input Subsidies: These are subsidies granted through distribution of inputs at prices that are less than the standard market price for these inputs. Several varieties of subsidies in this category are

o Fertilizer Subsidy: Urea and Phosphatic and Potassic (P&K) fertilizers are made available to farmers at subsidized prices through fertilizer manufacturers/importers.

o Irrigation Subsidy: Subsidies to the farmers which the government bears on account of providing proper irrigation facilities through provision of subsidized private irrigation equipment such as pump sets or public goods (such as canals, dams etc.).

o Power Subsidy: The government charges low rates for the electricity supplied to the farmers, which is primarily used by the farmers for irrigation purposes.

o Seed Subsidies: High yielding seeds can be provided by the government at low prices.

o Credit Subsidy: It includes interest subvention schemes for farmer loans and other costs such as write-offs bad loans.

• Price Subsidy: It includes mechanisms such as Minimum support prices (MSPs) at which the government procures food-grains from farmers at a higher price than its market price.

• Infrastructural Subsidy: Government allowing use of public goods such as roads, storage facilities, power, information about the market, transportation to the ports, etc. at lower prices to farmers.

• Export Subsidies: Subsides provided to encourage exports of specific agricultural products.

What are the environmental impacts of Agricultural subsidies in India?

• Impacts of fertilizer use and production: Subsidization of chemical fertilizers, specifically urea based and P&K fertilizers, have led to the following

o Boom in fertilizer industry: India's Fertilizer industry is classified under the "red category" of polluting sectors by Central Pollution Control Board of India. Wastewater generated at urea plants contains nitrogen, and cyanides in varying concentrations, which can lead to groundwater and surface water pollution, if not treated properly.

✓ Also, naphtha-based fertilizer plants or those with fuel oil or coal-based captive power plants are associated with high carbon emissions and air pollution.

o Overuse of fertilizer: This leads not only to problems such asstagnating or even declining soil productivity, widespread deficiency of secondary and micronutrients, and soil alkalinity and salinity, but also to the following:

✓ Atmospheric nitrogen: Nitrogen use efficiency in India is very low, at below 35 per cent in lowland rice and under 50 per cent in upland crops. The rest of the nitrogen is lost to the environment which can become nitrous oxide, a potent greenhouse gas (GHGs) contributing to climate change, or nitrogen oxide, which contributes to Photochemical smog and ground-level ozone.

✓ Nutrient Runoff: Excess nitrogen and phosphorus can be washed from farm fields and into waterways and can also leach through the soil into groundwater over time. High levels of nitrogen and phosphorus can cause eutrophication of water bodies, which can lead to hypoxia ("dead zones"), causing fish kills and a decrease in aquatic life. Excess nutrients can also cause harmful algal blooms (HABs) in freshwater

systems, which not only disrupt wildlife but can also produce toxins harmful to humans.

• Depletion of groundwater: India subsidizes the cost of energy and equipments required to pump water for agriculture, through various schemes. This encourages producers to produce water intensive crops and overexploit groundwater resources.

o The groundwater level in India has declined by 61 per cent between 2007 and 2017 and of the extracted water 89 per cent is used for irrigation,

• Intensification and Extensification of Agricultural Production: Agricultural subsidies by increasing farmers' revenues provide incentives to increase output through intensive practices such as monocropping, rigorous use of inputs, such as fertilizers and pesticides and through expansion of agricultural activity. Environmental impacts associated with extensification of agricultural production include encroachment on fragile ecosystems and deforestation, while intensification can cause water pollution, land degradation, and biodiversity loss.

• Wastage of resources: Excess stocks of foodgrains procured by Food Corporation of India (FCI) when disposed off can lead to high methane emissions and wastage of precious resources like water that went into their production. • Extensive paddy cultivation: Open-ended procurement of paddy, high MSPs and subsidized power water, have led to substantial growth in paddy cultivation across the country. Continuous or intense forms of intermittent flooding in rice farms can lead to high methane and nitrous oxide emissions, both GHGs. o Also, disposal of paddy stubble through burning is responsible for release of air pollutants such as suspended particulate matter (PM), Carbon monoxide, Carbon dioxide etc.

Way Forward

• Sustainable policies: Policy frameworks for subsidies related to agricultural activity need take into account local environmental conditions and socioeconomic contexts and focus on sustainable use of resources.

• Rationalization of fertilizer subsidies: Instead of massive subsidisation of urea to the tune of almost 75 per cent of its cost, it would be better to give farmers input subsidy in cash on per hectare basis, or something on the lines of the nutrient based subsidy programme.

• Fertilizer sector in India needs appropriate investments in technologies for pollution control, such as NOx control in stack, ammonia emissions curtailment, and advanced water treatment.

• Promoting crop diversification: and other practices such as multi cropping can help reduce impacts of intensive agricultural practices and encourage cultivation of climate suitable and less water intensive crops.

• Shifting from input subsidies to investment subsidies: For instance, investments can be made for the conversion of paddy areas to orchards with drip irrigation, vegetable, pulses and oilseeds, that consume much less water, much less power and fertilisers and don't create stubble to burn.

• Rationalizing power subsidies: Public investments in electricity subsidies can be diverted to innovation and infrastructural development in micro irrigation techniques and helping farmers become capable in using such techniques.

• Adopting Nutrient Management Techniques: Farmers need to be trained to improve nutrient management practices by applying nutrients (fertilizer and manure) in the right amount, at the right time of year and with the right methods.

• Regulation of groundwater extraction: There is an urgent need to limit groundwater extraction, which can be done by placing upper limits on extraction, promoting water harvesting techniques and ensuring last mile connection of farmlands to water sources such as canals and rivers.

6) Project Lion: Proposal identifies 6 relocation sites:

Six new sites apart from the Kuno-Palpur Wildlife Sanctuary were identified under Project Lion that was announced by Prime Minister Narendra Modi on August 15, 2020.

The six new sites include:

1. Madhav National Park, Madhya Pradesh.
2. Sitamata Wildlife Sanctuary, Rajasthan.
3. Mukundra Hills Tiger Reserve, Rajasthan.
4. Gandhi Sagar Wildlife Sanctuary, Madhya Pradesh.
5. Kumbhalgarh Wildlife Sanctuary, Rajasthan.
6. Jessore-Balaram Ambaji WLS and adjoining landscape, Gujarat.

Lion relocation has been talked about since 1995, when the Kuno Wildife Sanctuary was identified as an alternate site.

What is the need for relocation?

● The population in Gir has low genetic diversity, making it vulnerable to threats of extension from epidemics.

● Lions are found in Gujarat across an area of 30,000 sq km called the Asiatic Lion Landscape (ALL).
● Besides, the 2013 Supreme Court order directed Gujarat to relocate lions to the Kuno-Palpur Wildlife Sanctuary. About Asiatic Lions: Listed as 'Endangered' under the IUCN Red List.
● Its population is restricted to the state of Gujarat in India (Gir National Park).

7) WWF identifies 100 cities, including 30 in India, facing 'severe water risk' by 2050:

A hundred cities worldwide, including 30 in India, face the risk of 'severe water scarcity' by 2050, according to a recent report by the World Wide Fund for Nature (WWF).
The cities include:
● Global hubs such as: Beijing, Jakarta, Johannesburg, Istanbul, Hong Kong, Mecca and Rio de Janeiro.
● Indian Cities such as: Jaipur, Indore, Thane, Srinagar, Rajkot, Bengaluru etc. More than half of the identified cities are from China and India.

What's the concern and challenge?

The cities would face a 'grave water risk' by 2050 due to a dramatic increase in their population percentage to 51 per cent by 2050, from 17 per cent in 2020.

What needs to be done?

1. Cities need to invest more in nature-based solutions and enhance the health of river basins, watersheds and wetlands to build resilience to water risks.
2. To manage these initiatives, a public funding pool needed to be created in collaboration with the private sector to invest, reduce risk and generate returns and fuel sustainable economic growth.
3. Cities also needed to support greater global efforts to mitigate greenhouse gas emissions to avoid reaching these scenarios.

8) Bio-decomposer technique:

Chief Minister Arvind Kejriwal has said that the bio-decomposer technique of converting stubble into manure has shown success.

● This claim was based on the initial results from a farm where the bio-decomposing solution, developed under the guidance of the PUSA Institute, was being tried out by the Delhi government.

What next?

● The government would now present this alternative in the Supreme Court owing to its effectiveness and cost.

● This solution can also be tried by farmers in Punjab and Haryana.

How were these bio-decomposers formed?

Pusa Decomposer is a mix of seven fungi that produce enzymes to digest cellulose, lignin and pectin in paddy straw.

● The fungi thrive at 30-32 degree Celsius, which is the temperature prevailing when paddy is harvested and wheat is sown.

How these decomposers are used on fields?

● A liquid formulation is formed using decomposer capsules and fermenting it over 8-10 days and then spraying the mixture on fields with crop stubble to ensure speedy bio-decomposition of the stubble.

● The farmers can prepare 25 litre of liquid mixture with 4 capsules, jaggery and chickpea flour. The mixture is sufficient to cover 1 hectare of land.

● It takes around 20 days for the degradation process to be completed.

Benefits of PUSA decomposers:

1. Improves the fertility and productivity of the soil as the stubble works as manure and compost for the crops and lesser fertiliser consumption is required in the future.
2. It is an efficient and effective, cheaper, doable and practical technique to stop stubble burning.
3. It is an eco-friendly and environmentally useful technology.

9) What is smog and how dangerous can it be?

Smog in Delhi due to high levels of pollution.

● This year, Delhi's air pollution in October was higher in comparison to last year.

What is Smog?

Smog is a harmful mixture of fog, dust and air pollutants such as nitrogen oxides, volatile organic compounds, etc. which combine with sunlight to form a dense layer of ground-level ozone.

● Ozone present high in the atmosphere is good, but when nearer to the ground, it can cause irritating health effects. (Note: The term 'smog' was first coined by Dr Henry Antoine des Voeux in his paper, Fog and Smoke, in July 1905, after a blanket of smoke and fog was noticed over London in the early 1900s.)

How is Smog formed?

It consists of ozone, along with harmful substances like sulphur dioxide, nitrogen dioxide, carbon monoxide and PM10s, which can find their way deep into our lungs.

Smog can be caused by:

1. Large amounts of coal-burning in an area
2. Slash-and-burning of crops (a major source in Delhi)
3. Smog-forming pollutants generate from automobile exhausts, power plants, fireworks, even paint, hairspray, charcoal starter fluid, and plastic popcorn packaging.

Role of local weather phenomenon: The formation of smog is also closely linked with temperature, sunshine, and calm winds. On a warmer day, smog can form more quickly than otherwise.

Types: Sulfurous smog and photochemical smog are two distinct types of smog recognised so far. Sulfurous smog, also known as London smog, develops due to high concentration of sulfur oxides in the air. Photochemical smog is produced when sunlight reacts with oxides of nitrogen and at least one volatile organic compound (VOC) in the atmosphere.

Health impacts:

1. Inhaling smog over a long span of time can inflame your breathing passage, much like cigarette smoking.
2. Smog causes inflamed lungs, and inflamed lungs, in turn, secrete interleukin-6 which can cause blood clots in people, cardiac and respiratory disorders, leading to heart attacks or strokes.
3. Smog can dry out the protective membranes of your nose and throat.
4. It can jeopardize your body's ability to resist infection, hence, increasing your susceptibility to illness.
5. It can greatly decrease the UV radiation, leading to low production of important elements like Vitamin D

10) Coastal Regulation Zone (CRZ) norms:

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The Supreme Court has extended the mandate of one-member committee of retired Kerala High Court judge Justice K Balakrishnan Iyer constituted to determine the compensation paid to flat owners of Maradu municipality of Kochi district, whose houses were demolished for being in violation of Coastal Regulation Zone (CRZ) norms in the state.

What's the issue? (Just try to know background of the issue):

On September 23, last year the top court had observed that illegal construction in coastal areas of Kerala is a "colossal loss" to the environment and expressed shock over a spate of unauthorised structures coming up at Kochi's Maradu.

● Coming down heavily on the Kerala government for not complying with its orders to demolish four apartment complexes built in violation of Coastal Regulation Zone (CRZ), the top court had asked the chief secretary to conduct a survey to gauge the extent of devastation caused to nature.

● On May 8, 2019 the apex court had directed that such buildings be removed within a month's times, which were constructed in a notified CRZ, which was part of the tidally-influenced water body in Kerala.

What are CRZ norms?

Under the section 3 of Environment Protection Act, 1986 of India, Coastal Regulation Zone notification was issued in February 1991 for the first time.

● In 2018-19, fresh Rules were issued, which aimed to remove certain restrictions on building, streamlined the clearance process, and aimed to encourage tourism in coastal areas.

Objectives:

● They restrict certain kinds of activities — like large constructions, setting up of new industries, storage or disposal of hazardous material, mining, reclamation and bunding — within a certain distance from the coastline.

What are the restrictions?

● The restrictions depend on criteria such as the population of the area, the ecological sensitivity, the distance from the shore, and whether the area had been designated as a natural park or wildlife zone.

● The latest Rules have a no-development zone of 20 m for all islands close to the mainland coast, and for all backwater islands in the mainland. For the so-called CRZ-III (Rural) areas, two separate categories have been stipulated.

1. In the densely populated rural areas (CRZ-IIIA) with a population density of 2,161 per sq km as per the 2011 Census, the no-development zone is 50 m from the high-tide level, as against the 200 m stipulated earlier.
2. CRZ-IIIB category (rural areas with population density below 2,161 per sq km) areas continue to have a no-development zone extending up to 200 m from the high-tide line.

Implementation: While the CRZ Rules are made by the Union environment ministry, implementation is to be ensured by state governments through their Coastal Zone Management Authorities.

11) NGT links firecracker sales to air quality:

The National Green Tribunal (NGT) has imposed a total ban on the sale and use of firecrackers in NCR and also ordered a similar ban in all cities/towns where air quality fell below 'poor' and above categories last year.

- The ban on firecrackers in NCR will start from midnight of November 9 to midnight of November 30.

Other directions issued by NGT:

1. All states/UTs should initiate drives to contain air pollution from all sources in view of potential of aggravation of Covid-19.
2. The cities/towns where air quality is 'moderate' or below, only green crackers should be sold.
3. The timings for use and bursting of crackers should be restricted to two hours during festivals like Diwali, Chhath, New Year/Christmas Eve etc., as may be specified by the state concerned.

What's the issue?

Recently, the tribunal expanded its ambit of hearing cases on pollution by use of firecrackers beyond the DelhiNCR region and issued notices to 19 states and Union Territories where air quality is beyond norms.

Why do we need such measures?

The tribunal has given primacy to the precautionary principle in sustainable development over employment and revenue losses.

- This is understandable as the impact of COVID-19 became clear in March, and there were fears of a case surge during the winter, it was incumbent on the Centre to

work with States and resolutely prevent the burning of farm stubble ahead of Deepavali.

● This annual phenomenon unfailingly fouls the air across northern and eastern India, and imposes heavy health and productivity costs.

What else needs to be done now?

Only damage control is possible now, including steps to address the concerns of the fireworks industry. However, states like Tamil Nadu, where 90% of firecrackers are produced, have legitimate concerns on the fate of the industry this year, which, producers claim, represents about ₹2,300 crore worth of output.

● Therefore, a transparent compensation scheme for workers, and suitable relief for producers may be necessary. ● The longer-term solution might lie in broad basing economic activity in the Sivakasi region, reducing reliance on firecrackers. Conclusion: There were 148 days of poor to severe air quality during 2019 in the NCR, down from 206 days the previous year. Many other cities have a similar profile, but get less attention. With 40% of all pollution-linked deaths attributed to bad air quality in leading emerging economies and some evidence from the U.S. on higher COVID-19 mortality in highly polluted areas, it is time governments showed a sense of accountability on the right to breathe clean air.

12) Panna Tiger Reserve gets UNESCO's 'Biosphere Reserve' Status:

Madhya Pradesh's Panna National Park has been declared a UNESCO Biosphere Reserve.

● The UNESCO's recognition cited PTR as a critical tiger habitat. Background: Every year UNESCO appoints new biosphere reserves and removes others to promote the conservation of biodiversity, resolve the man-animal conflict at that site and allow sustainable use of natural resources. UNESCO's Man and the Biosphere Programme (MAB): The idea of the biosphere reserve was initiated by UNESCO in 1974 under the MAB with the objective of obtaining international cooperation for the conservation of the biospheres.

● Launched in 1971, UNESCO's Man and the Biosphere Programme (MAB) is an Intergovernmental Scientific Programme that aims to establish a scientific basis for the improvement of relationships between people and their environments.

● MAB combines the natural and social sciences, economics and education to improve human livelihoods and the equitable sharing of benefits, and to safeguard

natural and managed ecosystems, thus promoting innovative approaches to economic development that are socially and culturally appropriate, and environmentally sustainable. Under this, Protection is granted not only to the flora and fauna of the protected region, but also to the human communities who inhabit these regions, and their ways of life.

● The first of India's reserves to make it to UNESCO's list was Tamil Nadu's Niligiri Biosphere Reserve in 2000. **About Panna Tiger Reserve:**

● The Panna tiger reserve is situated in the Vindhya mountain range in the northern part of Madhya Pradesh.

● Ken river (a tributary of the Yamuna River) flows through the reserve.

● The region is also famous for Panna diamond mining.

● Ken-Betwa river interlinking project will be located within the tiger reserve.

13) What are deemed forests, and why Karnataka wants to declassify some?

Karnataka government is planning to declassify 6.64 lakh hectares of the 9.94 lakh hectares of deemed forests in the state (nearly 67%) and hand it over to Revenue authorities.

The issue of deemed forests is a contentious one in Karnataka, with legislators across party lines often alleging that large amounts of agriculture and non-forest land are "unscientifically" classified as such. What are deemed forests? An expert committee constituted by the Karnataka government after the Supreme Court order (in T N Godavarman Thirumalpad (1996) Case) identified 'deemed forests' as "land having the characteristic of forests irrespective of the ownership'". This includes:

1. Thickly wooded areas of the Revenue Department not handed over to the Forest Department.
2. Thickly wooded areas recommended to be handed over to the Forest Department.
3. Thickly wooded land distributed to grantees but not cultivated.
4. Thickly wooded plantations of the Forest Department. But,

What are Forests?

The Supreme Court in the case of T N Godavarman Thirumalpad (1996) accepted a wide definition of forests under the Act. It said, the word 'forest' must be understood according to its dictionary meaning.

● It covers all statutorily recognised forests, whether designated as reserved, protected or otherwise for the purpose of Section 2 (1) of the Forest Conservation Act.

● It also includes any areas recorded as forest in the government record irrespective of the ownership. After this announcement, what now for Karnataka? Preservation of forest areas in India under the Forest Conservation Act, 1980 has been continuously monitored by the Supreme Court since the Godavarman case judgment in 1996.

● Karnataka state government must now obtain clearances from the Supreme Court for affecting changes to land classified as deemed forests since the verdict.

14) Global Renewable Energy Investment Meeting and Expo:

3rd Global Renewable Energy Investment Meeting and Expo (RE-Invest 2020) was inaugurated recently.

● The summit is organised by the Ministry of New and Renewable Energy.

● The theme for 2020 is 'Innovations for Sustainable Energy Transition'.

How is India performing on this front?

● India's renewable power capacity is the 4th largest in the world and is growing at the fastest speed among all major countries.

● The renewable energy capacity in India is currently 136 Giga Watts, which is about 36% of our total capacity.

● India's annual renewable energy capacity addition has been exceeding that of coal based thermal power since 2017.

● In the last 6 years, India has increased installed renewable energy capacity by two and half times. Overall, India has shown to the world that investing in renewable energy early on even when it was not affordable has helped in achieving the scale, which is bringing costs down. Sound environmental policies can also be sound economics.

15) What Is The Beautiful 'Blue Tide' Spotted Along Mumbai Coastline?

The tide producing a fluorescent blue hue, popularly known as bioluminescence, recently made an appearance at Mumbai's Juhu Beach and Devgad Beach in Sindhudurg, along Maharashtra's coastline. Background: Bioluminescence has been

an annual occurrence along the west coast since 2016, especially during the months of November and December.

Why is it caused?

The spectacle occurs when phytoplankton (microscopic marine plants), commonly known as dinoflagellates, produce light through chemical reactions in proteins. Waves disturb these unicellular microorganisms and makes them release blue light.

● Main factors for its occurrence could be eutrophication – the reduction of oxygen in the water – which makes the phytoplanktons very dominant. Why it is dangerous? The spectacle may be beautiful, but it may also be a signal of danger. Many of the species in this group are toxic. If dinoflagellates reproduce rapidly, they may cause so-called 'red tides'.

● During this period all the animals (molluscs, fish, etc.) that feed on dinoflagellates also become toxic due to the accumulation of high amounts of toxins from dinoflagellates.

● It is dangerous to eat such sea animals because the toxins that are contained in them may have various unpleasant effects: some merely irritate the bowel and cause food poisoning, whereas others, being neurotoxins, may even have an effect on memory.

● Some species, such as the sea sparkle (Noctiluca scintillans) are not as toxic, but may have other unpleasant effects.

16) Pilibhit tiger reserve gets the first TX2 award:

Pilibhit Tiger Reserve (PTR) in Uttar Pradesh has bagged the first international award, TX2, among the 13 tiger ranging countries for having doubled the number of tigers in less than the stipulated time.

● In 2014, All India Tiger Estimation had estimated 25 tigers in Pilibhit and 2018 estimation showed an increase by projecting 65 tigers. Conservation Excellence Award for 2020: Transboundary Manas Conservation Area straddling the India-Bhutan border has received the TX2 Conservation Excellence Award for 2020.

● Transboundary Manas Conservation Area or TraMCA comprising the 500 sq. km. Manas National Park in Assam and the 1,057-sq. km. Royal Manas National Park in Bhutan. What is TX2? It is the global award which was set up in 2010 in St.

Petersburg, Russia by international organizations working for tiger conservation like WWF, UNDP, IUCN, Global Tiger Fund (GTF), CATS and The Lion's Share.

Conservation efforts in India:

1. The National Tiger Conservation Authority (NTCA) has launched the M-STrIPES (Monitoring System for Tigers – Intensive Protection and Ecological Status), a mobile monitoring system for forest guards.
2. At the Petersburg Tiger Summit in 2010, leaders of 13 tiger range countries resolved to do more for the tiger and embarked on efforts to double its number in the wild, with a popular slogan 'T X 2'.
3. The Global Tiger Initiative (GTI) program of the World Bank, using its presence and convening ability, brought global partners together to strengthen the tiger agenda.
4. Over the years, the initiative has institutionalised itself as a separate entity in the form of the Global Tiger Initiative Council (GTIC), with its two arms –the Global Tiger Forum and the Global Snow Leopard Ecosystem Protection Program.
5. The Project Tiger, launched way back in 1973, has grown to more than 50 reserves amounting to almost 2.2% of the country's geographical area.

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